



Sustainable vegetable chain development in Brazil

Grape tomatoes from Holambra to the higher market segment

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Referaat

Holambra (Brazilië) is een groot tuinbouwcluster nabij Sao Paulo. Het cluster is traditioneel op sierteelt gericht. Een aantal telers zijn gaan experimenteren met bedekte groenteteelt om zo het gebruik van gewasbeschermingsmiddelen te kunnen reduceren en voor een hoger marktsegment te kunnen telen. Wageningen UR kon deze ondernemers helpen bij het verbeteren van hun teeltsystemen door een systematische check op het wortelmilieu, de voedingshuishouding en het teeltklimaat. Daarbij zijn de knelpunten in de supply-chain in kaart gebracht. Op basis van deze analyse konden ondernemers keuzes maken voor investeringen in gerichte verbetering van deze supply chain. Het project is vervolgens aanjager geweest in het gebied voor verdere samenwerking tussen tuinders op R&D en kwaliteitsmanagement.

Abstract

Holambra (Brazil) has a large horticultural cluster for flowers and ornamentals. However, only few growers use protected cultivation for vegetable productions. This study analysed the market and market chain relationships for vegetables in the Sao Paulo region as well as the technology used for cultivation. With the rising middle class the demand for quality vegetables with high food safety standards is rising strongly. The growers supplying this market niche are aware of these quality demands and are able to deliver according to them. The growers had been developing their production systems individually, but were aware of the advantage in closer cooperation on R&D as well as improving supply chain quality (cooled chains). The technological developments were needed in areas of climate control and water and nutrition steering. During the project growers were given tools to improve their systems as well as identify the crucial factors for quality control in the supply chain.

The study was conducted by LEI and Wageningen UR Greenhouse Horticulture

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Inhoudsopgave

	Introduction	5
1	Vegetable sector	7
	1.1 Production	7
	1.2 Domestic market demand	8
2	Chain actors and processes	9
	2.1 Input suppliers	10
	2.1.1 Seed suppliers	10
	2.1.2 Greenhouse suppliers	11
	2.2 Producers	11
	2.3 Post harvest	13
	2.3.1 Packaging	13
	2.3.2 Cooling & Transport	13
	2.3.3 Waste	14
	2.4 Wholesale markets	15
	2.5 Retailers	17
	2.6 Knowledge infrastructure	17
3	Trends in the vegetable sector	19
	3.1 Quality and standards	19
	3.2 Vegetables in greenhouses	19
	3.3 Sustainability	20
	3.4 Direct sourcing by retailers	21
	3.5 Branding	21
4	SWOT	23
5	Strategic action plan	25
6	References	29
Appendix A	Program visit to Holambra	31
Appendix B	Veiling Holambra	33

Introduction

Producers in Holambra have started to show interest in vegetable production. Currently the area is well known for its flowers and plants, not yet vegetables. Consumers in Brazilian urban areas are increasingly demanding high quality and safely produced vegetables. The Netherlands has a lot of experience in sustainable and protected vegetable production for high value market segments and can therefore provide support in the sustainable development of the vegetable sector in Holambra.

Need of knowledge

The global trend of the increasing quality demand of horticultural products is also an issue in Brazil and especially becoming more important for the urban consumers and retailers. Urban consumers of the middle and upper class demand safe and convenient food. This is a challenge but also an opportunity for the Brazilian horticulture sector. Fruits and vegetables need to be cultivated according to good agricultural practices to reach high consumer standards. After harvesting, the products need to be treated in such a way that it maintains its freshness when arriving at the different urban outlets, passing through different distribution points which may affect the quality and freshness of the product if not treated, packed and stored in the appropriate way.

Project goal

This project aims to contribute to the development of sustainable initiatives that improve the linkages between vegetable production in Holambra and local higher value markets, situated in Brazilian urban areas.

Approach and time frame

We started with a quick desk research to get to know the basics of the intervention area. Secondly we established contacts with local interested parties that represent the vegetable sector in the indicated region, including researchers from Embrapa. After this “preparing the ground” phase we gathered data on the current vegetable value chain by interviewing stakeholders in the chain¹. We focused our analysis at the most important vegetable chains that connect the producing area Holambra with retailers in the state São Paulo, covering aspects of sustainability of production systems and identification of product quality decline and post harvest losses. We have analysed the gathered information and have identified the main strengths, weaknesses, opportunities and threats. This analysis has brought forward a first identification of main priorities to reach sustainable vegetable supply chains. We are currently sharing our analysis and drafted priorities with the stakeholders to provide feedback, further discuss the priorities and possible further activities to be formulated in a strategic development plan to reach sustainable vegetable chain development.

Proposed results and products

Output of this project will be a written report that includes a description of the current main vegetables chains in Holambra for the high value market segments in the state São Paulo, opportunities and constraints for sustainable development of vegetables supply chains, and a priority listing of sustainability trajectories discussed with the stakeholders. These findings will be used in the second part of 2010 to develop together with the project team a strategic action plan with suggestions for chain innovation trajectories that aim to increase the efficiency and sustainability of the selected vegetable supply chains. The report will also mention the potential role of Dutch agribusiness to reach this goal.

1 For a detailed program on the interviewed stakeholders, please view Appendix 1.

1 Vegetable sector

In 2009 Brazil had a GDP of 2.025 trillion USD. The primary agricultural sector contributes for 6.1% to the GDP, compared to 25.4% by the industry and 68.5% by the services sector. The agricultural sector does employ 20% of the population (CIA, 2010). When the agribusiness is included, the agricultural share in the total GDP will increase substantially.

1.1 Production

Brazil is the largest producer of oranges, sugar, ethanol and coffee in the world (Central Bank of Brazil, 2008). Tomatoes is in terms of volume and value the most important vegetable, ranked at respectively number 12 and 17. Sugar cane is the most important crop in terms of volume while cattle meat is most important in terms of value. Brazil is also the largest exporter of both crops. Export of agricultural products increased strongly and its value tripled between 2002 and 2008 (FAOSTAT, 2010).

Holambra is a municipality in the state of São Paulo. In 1948, the Brazilian Minister for Colonisation Affairs signed an agreement to offer 5000 ha for the Dutch immigrants to settle. The name HOLAMBRA was given to the area, based on HOLLand, American continent and BRAzil. Between 1958 and 1962 flower production expanded rapidly. Now Holambra is well known for its large production of flowers and plants and has grown to be the largest production centre of flower and plants in Latin America. Holambra is home to the largest flower auction of Brazil, Veiling Holambra, and the Horticultural Technology Fair (Hortitec). Local producers are more and more interested to develop vegetable production activities again. They once started vegetable production, before the flower production but because the market was a real problem they stopped vegetable production decades ago.

We refer to Holambra 1 as Holambra which focuses on flower and greenhouse production, while Holambra 2 focuses on open field production (although they have some tomato greenhouses) such as cotton. The cities are more or less 290 km from each other.

Holambra has just more than ten thousand inhabitants (IBGE, 2009), but with one of the highest GDP in the country (R\$ 50,978 per person versus the national's average of R\$ 14,464 (IBGE, 2008)).

Use of greenhouses for vegetables is yet very limited (AVAG, 2005). A retailer estimates that only 2-3% of production is currently grown in greenhouses, but it is likely to be even less. Vegetables are mostly grown in open field or are protected with plastic or other shadow offering materials.

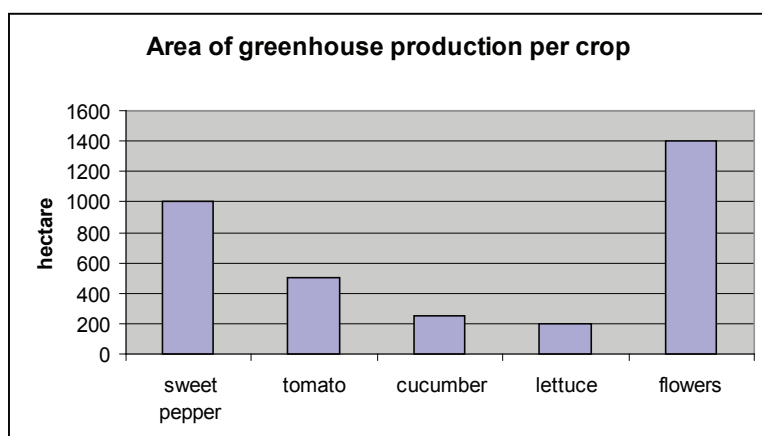


Figure 1. Area of greenhouse production per major crop in Brazil. Source: AVAG, 2005

1.2 Domestic market demand

The consumers in Brazil are very much differentiated. Brazil has a large population of almost 200 million people (CIA, 2010) of which 26% lives below the poverty line. São Paulo city has just more than 11 million inhabitants and the São Paulo region is home to about 10% of the total population (17 million) (IBGE, 2009). Close to Holambra and within São Paulo state is the city Campinas with approximately one million inhabitants (IBGE, 2009).

São Paulo city has a high income concentration with a GDP of R\$ 22,667 compared to the national's average of R\$ 14,464 (IBGE, 2008). Campinas has a relatively high GDP per person of R\$ 26,133. Campinas is about 30 km from Holambra; São Paulo city about 110 km from Holambra.

Supply of vegetables in Brazil is increasing. In the early 90s the supply was about 5 million tons of vegetable per year. In 2000 this increased to 6.5 million ton and in 2007 it was 8.8 million ton (FAOSTAT, 2010). Consumption of vegetables can be expressed in grams per capita/day and is shown below.

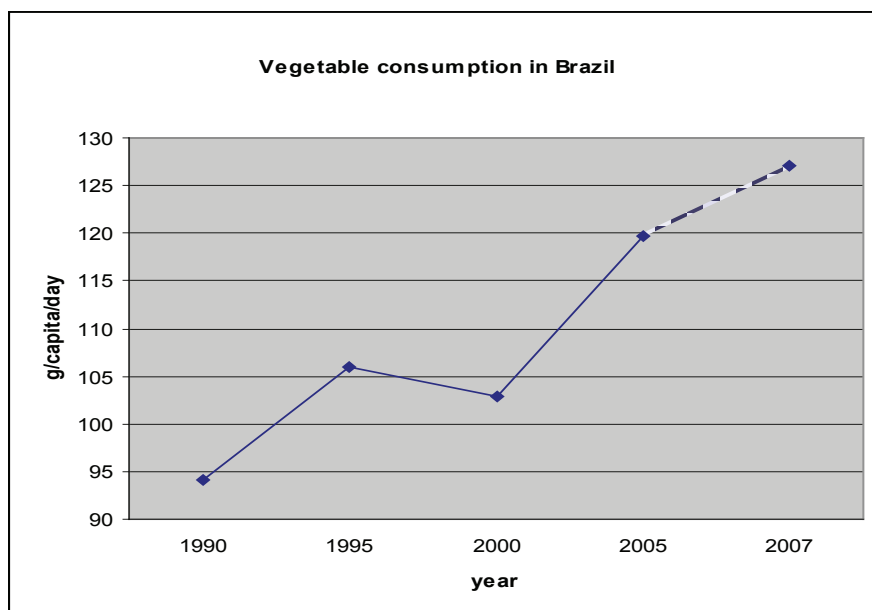


Figure 2. Vegetable consumption trend in Brazil. Source: FAOSTAT, 2010

This consumption trend shows an increase in demand for vegetables. The retailers underline that demand of vegetables is higher than is currently being supplied. Therefore there is room for more vegetable production in Brazil.

About 70% of total fruits and vegetables demand is concentrated in Brazilian metropolitan regions, such as São Paulo, Rio de Janeiro, and Belo Horizonte. Fruit and vegetables sales in supermarkets, as compared to other outlets, is increasing and comes from policies that seek to increase the quantities and expand the composition of products offered to consumers at the same shopping site (Lima-Filho *et al.* 2009).

According to the retail sector consumption of diverse fruit and vegetables is still seen as a luxury. The CEASE sees a clear increase of fruits and vegetables sales at the beginning of the month when salaries have been paid. The retail sector estimates the higher segment to consist of a maximum of 30 million people with a large concentration in and around São Paulo city. This market segment requires standards focussed at quality, convenience, freshness and food safety. According to the retail sector foreign brands are popular with the Brazilians as imported products are regarded as high quality products. São Paulo region is one of the biggest markets for organic and environmentally friendly products in the country.

According to Pão de Açúcar, lettuce shows the highest growth in consumers demand. Lettuce is half of the legumes sold to the lower segment and 20% of the legumes sold to the higher segment. Demand for vegetables is growing and is still larger than is being supplied.

2 Chain actors and processes

A common vegetable supply chain in Brazil consists of a producer buying inputs and growing vegetables, after which the produce is transported to a state distribution company such as the CEAGESP or CEASA. There, the retailer can buy the product (if it is an open market negotiation) or just pick it up (if it is a contract negotiation). The retailer will sell the product to the consumer. Direct supply from producers to retailers becomes more common nowadays. Figure 1. shows the regular vegetable supply chains in Brazil, although the red flows are less common in terms of volume. The green flow shows the most common flow involved in the vegetable supply chain.

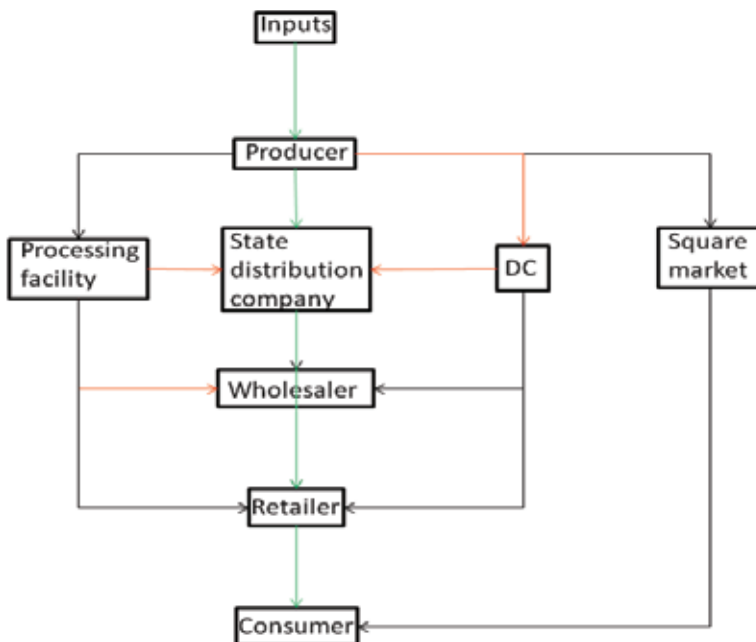


Figure 3. Common vegetable supply chains

Fruit and flower producers are often organised into cooperatives that buy inputs in bulk and collectively market their produce. Individual producers can also choose to directly deliver their products to the retailer, processing industry, state distribution company or the square market. Retailers select producers with high quality standards and high constant volumes. Processing includes industries that make sauces, minimally process vegetables and also facilities to clean and store the product for a short period of time. It is estimated that 60% of the fruits and vegetables consumed in São Paulo region pass through the state distribution company (CEAGESP-ETSP warehouses). In most cases, the warehouses are used in cross docking operations between the producer and the retailer. The square markets do not trade many vegetables.

In this chapter we briefly discuss the chain actors and processes involved in our selected chains. We started with the producers in Holambra starting vegetable production for the high segment market and followed their suppliers and markets. Currently tomatoes are the sole vegetable being produced in Holambra. Since greenhouses are readily available due to the flower production, it makes sense to grow high value tomato varieties in the greenhouses. The visited production companies have selected grape tomatoes after experiments with several fruit-vegetables like pepper, cucumber, aubergine and zucchini. Each producer takes care of its own packaging, storage and transportation. One of the production companies also sources tomatoes from other suppliers. Figure 2. shows the supply chains based on the three tomato production companies. Each step in the supply chain will be further discussed in this chapter.

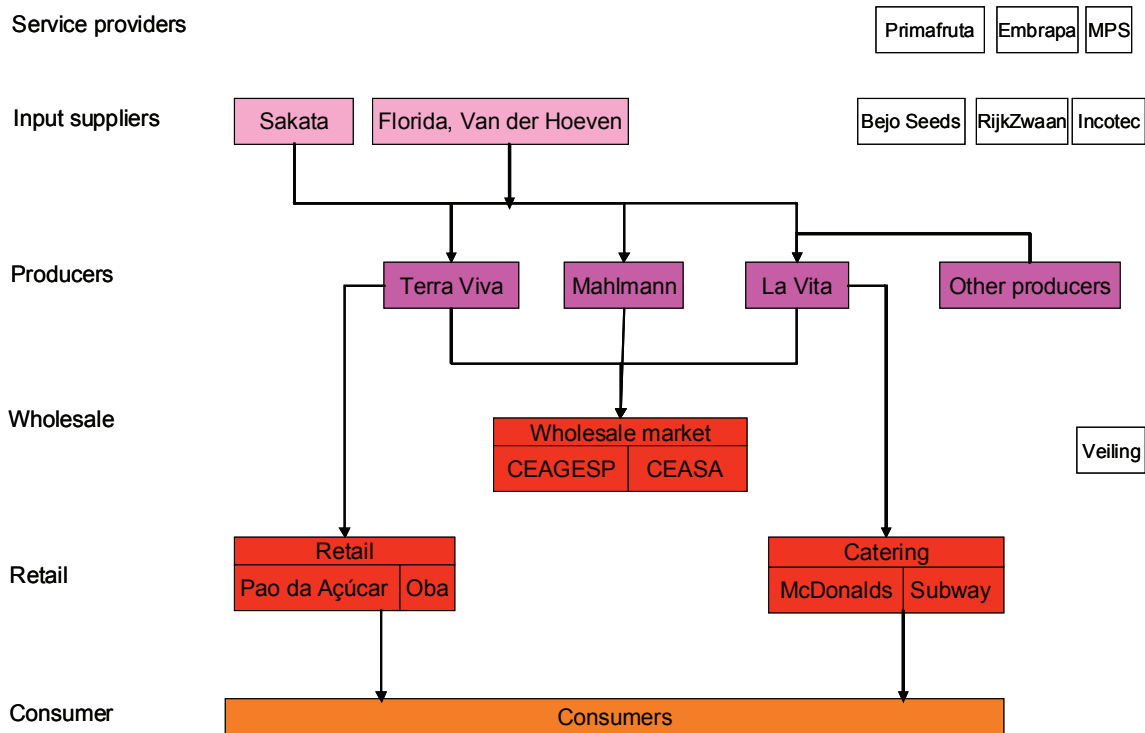


Figure 4. Grape tomato supply chains from Holambra

2.1 Input suppliers

The three tomato growers currently use a variety from Sakata. Sakata however wants a more centralized control on the production. The producers are not attracted to the contract, and will be looking for other grape tomato varieties for the following season. Sakata is a Japanese seed company with world-wide offices. It started its activities in Brazil in 1994. It currently offers 140 horticultural cultivars and 500 flower cultivars.

2.1.1 Seed suppliers

Rijkzwaan

Rijkzwaan is setting up a company in Brazil-Holambra in the coming year. It has offered its vegetable seeds to the growers we met in this project. Rijkzwaan uses licence schemes for its seeds to prevent the product becoming a bulk product (too soon). It does so by facilitating growers into non-competing markets. Since the growers are searching for new tomato seed suppliers, there is an opening for them to cooperate with Rijkzwaan.

Bejo seeds

Bejo seeds does not see itself as a direct partner in this study since they focus on different crops and systems. Most vegetable production (98%) occurs in open field production. Some producers have very simple greenhouses or nets over their production fields. To use the glasshouses for vegetable production is not common. The seed company supplies big vegetable farms of 5 to 20 hectares sown every week with carrot or another vegetable. These farms are also around São Paulo city and Curitiba. One of the bigger producers has 6 million tomato plants with 1600 plants/ha. Holambra produces 50.000 tomato plants per year.

Enza

Enza has opened an office in Holambra this year. They have selected Holambra due to its close vicinity to the largest market for vegetables being São Paulo Region. Enza supplies a large range of vegetable varieties for both open field and greenhouse production. The most important crop is tomatoes, followed by onions, sweet pepper and lettuce. It claims to be the currently marketleader of hybrid onions in Brazil.

Incotec

Incotec is a seed coating company supplying coating materials in South America and treating seed in Brazil. Next to Bejo, Incotec regards Taki and Agristan as the current most active seed companies. Both Rijkswaas and Enza are showing more interest. Seed treatments are mainly focused on crop protection and germinative power. Largest product in Holambra for Incotec is tobacco followed by lettuce. It also treats soya, maize, cotton, wheat and vegetable seeds such as lettuce, endive, carrot, onion and tomato. Lettuce is becoming a popular crop to be grown in greenhouses as it allows better control of pesticides.

Incotec contributes to sustainability by offering technology that improves the land productivity; therefore expansion of land is not per se necessary. One example is to make seeds more heavy which results in a more steady distribution of seeds as it doesn't blow away (especially in large open fields where seeds are aerial sprayed). Seed coating can also result in less water use.

2.1.2 Greenhouse suppliers

Van der Hoeven^{2*}

Van der Hoeven is officially the largest greenhouse company with 60% market share. In reality it probably has a 35% market share in Brazil. Van der Hoeven employs 130 people (down from 150 before the economic crisis). The Japanese and the Dutch were the first ones to buy their greenhouses. Van der Hoeven provides different types of greenhouses. For vegetables it offers a greenhouse higher than normal creating a cooler atmosphere. Another one is more simple without aluminium. Prices of a greenhouse range between 45 and 70 real per square metre. Borrowing money for agricultural production is expensive with 10-12% rent for larger companies and 6.5% for families.

Van der Hoeven has no R&D-strategy other than meeting customers' demands when asked for new systems - this is a common strategy in greenhouse suppliers. It believes in its unique selling point to deliver quality as agreed at the agreed delivery time.

Florida

Another greenhouse company is Florida. It assists growers in the high financial investments of greenhouses by providing loans with lower rents than the bank. Florida sees a clear trend in greenhouses being used for vegetables. Especially the last few years, more and more greenhouses are built particularly for vegetables. Reasons for greenhouses are basically the possible quality control due to the rain shield and possibility to use better planting material. Price of greenhouses starts at 30-35 real per square metre. Florida set up a greenhouse builder association (ABEAGRI). The focus of the association is standard setting for more homogenous price formation as greenhouse builders used to call the same structures differently, resulting in different VAT-regimes.

Dutch technology is seen as too advanced or not relevant for the Brazilian situation. A conversation with growers and suppliers during a Chambre of Merchandise-lead visit to Wageningen UR Glastuinbouw in Bleiswijk confirmed this view. However application of climate control, glasshouse systems and advanced watering systems in warmer climates elsewhere in for example Spain and Saudi Arabia suggests there is room for innovation. Further analyses of possible applications for technology in the Holambra area was not performed.

2.2 Producers

We visited three vegetable producers in Holambra: Terra Viva, La Vita and Mallmann. These three companies each produce grape tomatoes and compete with other local companies (mostly from Japanese origin) also producing grape tomatoes. The companies mention that the region lacks facilities to improve their systems, such as labs for analysis of leaf samples and nutrient solution and high tech nutrient systems.

2 * A Brazilian company, not affiliated with the Dutch based Van der Hoeven greenhouse company.



Grape tomato production in greenhouse

Terra Viva

Terra Viva is the largest grower in the area, producing flowers, pot plants, potatoes, soy and it has 2 ha with grape tomato. The company policy of Terra Viva is to operate in a corporate social responsible manner based on economical, social, economic and human aspects. Brazil has introduced new laws that will push companies to be more social responsible as well.

Terra Viva experimented in vegetable production with a number of crops including pepper, lettuce, eggplant, other leafy vegetables, sweet peppers and (snack) cucumber. Tomato turned out to give the most reliable production results. The company started tomato production four years ago in an originally flower greenhouse. Currently it has 3 greenhouses with tomatoes and it uses three varieties of grape tomato. Terra Viva realises it has potential to increase its tomato production. It wants to improve its cropping system. An analysis of the cropping system suggests further development along the lines of substrate system, nutrient supply and water management.

Terra Viva sells tomato to many different outlets, including Oba, Pão de Açúcar, CEAGESP and small boutique shops. It sells tomato for the same price to everyone. It does not want to differentiate prices between customers; it also does not want to negotiate its price. The aim is to have a steady product in the shop for a fixed price year-round.

La Vita

La Vita is run by a young businessman that started from scratch 7 years ago with packaging and providing cooled chains. The company is expanding quickly. The company's main concern is attracting capable personnel. La Vita now also produces its own lettuce and tomato but mainly buys produce from other growers (lettuce, cabbage, grape tomato, other tomatoes, herbs, etc.). The production system is still under development. La Vita sees possibilities for high tech components in plastic greenhouse such as CO₂-dosage and greenhouse cooling while keeping CO₂ in. It also thinks about better climate control through selection of another production place and an improved greenhouse system.

La Vita has a clear vision for its packaging, trading and production units. Customers for the packed branch are Pão da Açúcar, McDonalds, Subway, CEASA and CEAGESP.

Mallmann

With 550 hectares open field production (average production of 6-8 kg/m²), some hectares with greenhouse cultivation and 1200 employees Mallmann is among the 10 biggest tomato growers in Brazil. The company started seven years ago by a trader who was dissatisfied with his supplied tomatoes.

Tomato production is rotated with maize. Every year the land needs to be prepared for tomato production again. Labourers have a half-year contract. Some come back, others leave for another company. The company has a simple processing factory with a sorting and washing machine. Tomatoes are packed in plastic crates, carton boxes or in plastic bags. The company focuses on "Mass Customisation". The plastic bags have printed information about the tomato production process mentioning their choice of precision agriculture resulting in limited use of water and energy.

Sustainable production systems

Non-soil bound production systems have multiple environmental benefits, but also some set backs. On the whole such production systems are seen as more sustainable by their:

- Higher efficiency of water through recirculation (water use per kg produce is 25% of that of soil-bound production)
- With that a lower use of fertilisers
- Lower use of crop protection agents (no need for soil fumigants, targeted use of biological crop protection with predator insects, possibilities of climate control to prevent mould).
- Reduction of emission to surface water
- More efficient land use - in The Netherlands production in greenhouses is 10 times that of open field production.
- Higher product quality and therefore higher efficiency of resources.

Production in greenhouses, however, requires more energy than open field production. For climate control energy is needed in the form of a fan (and in colder climates also heating systems). Besides the direct use, also the production and disposal of the greenhouse structures requires energy and resources. Finally waste in non-soil bound systems is higher due to the use of substrate. These wastes can however be recycled. On the whole non-soil production in greenhouses can be seen as a more sustainable production system than soil bound.

2.3 Post harvest

2.3.1 Packaging



Grading and packing grape tomatoes

The three visited producers each have their own storage rooms and packaging lines. Packaging is one of the core activities of La Vita. Mallmann uses different types of packaging depending on the market outlet. Next to plastic crates it uses small packaging with plastic bags mentioning background information about the tomato production. Topics included are precision agriculture, environmental friendly production and good water use. Terra Viva packs its grape tomato in small plastic transparent boxes, some with Warner Bros icons. Terra Viva has organised the labeling with Warner Bros itself to encourage the consumption of grape tomatoes by children. It is quite remarkable that a production company who just started growing vegetables includes marketing in such a way and has been able to finalise the negotiations with a multinational company to carry their world-known cartoon pictures.

2.3.2 Cooling & Transport

The three producers have organised their own transport. They bring the produce to each market outlet themselves. It seems transportation logistics still provides room for improvement, especially related to the currently low transported volumes per client.

Some stakeholders mention the old Veiling building in Holambra as a potential logistical place for trade of vegetables, others do not regard this as a good option. The president of the flower cooperative at the Veiling³ does not want to use the Veiling for vegetables. He wants to keep the two product groups to remain separate.

Logistics of Pão de Açúcar are through its own distribution centre. Practically all its logistics is dry cargo. The used trucks have 3, 4 or 5 axes. The 3 axis trucks can carry up to 12 tons. The 4 axis trucks can carry about 18 tons, and, the 5 axis, about 25 tons. Most of the farmers use 3 axis trucks, while retailers use 4 and 5 axis trucks.

A transport company in Holambra (Primafruta) has 12 trucks of 30 ton (14.5 meter long, 2.5 m high and 2.4 m wide). Price of transporting produce to São Paulo city is 1500 R using the 30 ton truck, taking about 2 hours. Transport to Campinas costs 700 R, taking less than one hour. Prices include toll, but not yet 12% road tax. Availability of trucks is not a problem. The company also uses smaller trucks of 7 meter (7 ton) or 9 meter (12 ton). Cost for going to São Paulo city with the small truck is estimated at 900 R. The larger trucks of 30 t can guarantee a constant cooling. The smaller trucks have cooling facilities (included in the price), but can not regulate other conditions. These trucks can cool produce during transport but probably only when driving.

The transport company has an insurance against loss of transported products caused by problems occurring during transportation. The company does not see any problems with the CEASA as everything is always going smoothly. However, to be able to park your truck it is necessary to be at the CEASA by 4-5 am, otherwise there is no room left. Therefore, packing the truck needs to be done the evening before (and is not being cooled during the night).

It is compulsory to mix diesel with 2% biodiesel. The transport company is interested in using more biodiesel, as this seems to be an increasing trend. Clients don't ask about the type of diesel used in transportation. The company is part of a program which plants trees for driven kilometres. The company pays to be part of this system, but later you can earn money back (CO₂ credits).

2.3.3 Waste

Currently there are not many performance indicators in the supply chain, such as minimum volume supply, continuity of supply, product quality, etc. Quality is checked when it arrives in the market, just by checking its appearance. According to the CEASA in Campinas 30% of vegetables is lost after harvest. The market itself has 350 ton non-traded produce each month which is supplied to the poor. It has 700 tons of waste of which 80% can be used as compost.

At the distribution centre of Pão de Açúcar only 1-3% of the produce is rejected. During transportation 10% is lost. After the retailer has accepted the produce the responsibility of the product is with the retailer itself in 98% of the cases. Only in a few cases the quality of the produce declines so rapidly that the retailer is not willing to take responsibility. Pão de Açúcar wants each supplier to be member of their newly implemented tracing and tracking system. It is currently in the process of communicating this idea with its suppliers.

3 For more information on Veiling Holambra, see Appendix 2.

2.4 Wholesale markets

CEAGESP

The São Paulo General Warehousing and Centres Company (CEAGESP) is a major public system of warehouses. CEAGESP manages 13 wholesale centres of horticulture produce and flowers, with one in São Paulo City and 12 in the interior of São Paulo state. These units operate as regional production distribution channels of horticulture produce. CEAGESP's main place of business in São Paulo City is in the Terminal Warehouse of São Paulo (ETSP).

The main products commercialized are fruits and vegetables, next to fish and flowers. The CEAGESP started to trade also higher value added products, like minimally processed and organic products. Table below shows first the top five fruits and vegetables traded at the ETSP in 2009 in terms of volume, followed by the trade share of all vegetables. Orange is having a major share of the total trade, followed by tomato and potato. The other vegetables are fulfilling a small part of the total volume traded.

Table 1. Volume of trade at ETSP in 2009

Trade at ETSP by product in 2009							
Ranking	Product	Volume (*1000 ton)	% of total	Ranking	Product	Volume (*1000 ton)	% of total
1	ORANGE	366	11,6	27	PUMPKIN	33	1,0
2	TOMATO	293	9,3	28	CASSAVA	32	1,0
3	POTATO	211	6,7	32	EGGPLANT	26	0,8
4	PAPAYA	142	4,5	36	GARLIC	22	0,7
5	APPLE	132	4,2	37	STRING BEAN	18	0,6
				39	BROCCOLI	14	0,5
9	CARROT	93	2,9	41	OKRA	13	0,4
10	ONION	90	2,8	44	CAULIFLOWER	11	0,3
18	CABBAGE	53	1,7	46	EGGPLANT	10	0,3
19	CHUCHU	51	1,6	47	CHARD	10	0,3
20	PAPRIKA	48	1,5	51	CABBAGE	8	0,2
21	CUCUMBER	48	1,5	56	ENDIVE	6	0,2
22	LETTUCE	43	1,4	60	PEPPER	4	0,1
24	AVOCADO	39	1,2				
25	ZUCCHINI	37	1,2				

Source: CEAGESP, 2010

The CEAGESP supplies over 60% of the Great São Paulo region. It commercializes products originating from 1,500 cities of 23 Brazilian states, as well as 18 countries. In its 700 square meters, the market receives about 10 thousand vehicles, and 30 to 50 thousand people per day. Together, the wholesale centres of CEAGESP sell about 350 thousand tons of products per month. The CEAGESP publishes prices of all vegetables at a daily level, total volume and value sold (CEAGESP, 2010).



Vegetable department at the CEAGESP

In addition to wholesale, CEAGESP is also present in the retail market of horticulture produce, flowers, poultry, and other products through services known as “Varejões” (Big Retail Markets). CEAGESP’s Retail markets move almost 2 thousand tons of products per month.

The vegetable trading hall in São Paulo City is huge with many vegetable traders present. A wide range of vegetable is being traded, including the grape tomatoes, hydroponics vegetables and snack cucumbers. None of the vegetables is being cooled. Most are packed in wooden or plastic crates and only few vegetables are individual packed like the hydroponics. The vegetable hall is different from the fruits where each trader has a kind of shop with cooling and docking facilities.

CEASA Campinas

CEASA Campinas is part of the Government Supply Centrals, and works basically as a wholesaler and a place for farmers to sell their products. The supply centrals’ network has 53 units in the whole country, and, in 2008, was responsible for the commercialization of almost 14 million tons of fruits, vegetables and other horticultural crops. Its system is different from the CEAGESP system, because the CEASAs also buy products, acting as a wholesaler. The main goal of the CEASAs is to help setting the balance between supply and demand. It is a place for selling products, cross docking activities and warehousing. Major function of this state wholesale market and DC is to facilitate trade. The organization is financially self-sufficient. The market has storage, cooling and processing facilities, but the availability is not enough

The CEASA is also an important place for pricing and quality evaluation of products. The product prices are historically ‘set’ to develop on Monday, Wednesday and Friday between 5:00 and 7:00. The price formation is based on immediate bilateral bargaining, and the collective of bargains determines the standard for that day.

CEASA Campinas was responsible for the commercialization of 56 thousand tons of fruits, vegetables and other horticultural crops in 2008. This market is ranked in terms of volume turnover as the fourth biggest market after São Paulo city, Rio and Belo Horizonte. Clients come from 200 to 250 km away, but some also further from within São Paulo state, or from Minas state, with a total of approx. 3 million consumers. Supply comes from 500 different cities and through import, like garlic from China and pears from the US. Leafy vegetables and cabbages are mostly from areas closer to Campinas. Buyers are large supermarkets (40%), middle size vegetable stores and supermarkets (30%) and markets, restaurants, etc. (30%).

The market consists of a lower segment vegetable market where small producers have a few square metres to sell their produce to clients. Another part of the market is reserved for fruits, occupied by mostly larger companies where trucks are next to the shops with cold storage rooms. Supermarket chains like Oba also have their own space at the market where suppliers can bring their produce to. Currently meat and fruit are handled with climate control, vegetables not. Oba-Campinas is not satisfied with the space it has and is therefore constructing its own storage rooms and distribution centre just outside the marketplace.



Vegetable department versus the fruit department at the CEASA Campinas

2.5 Retailers



Grape tomatoes from different suppliers in Oba

Oba

Oba is a retail chain with the concept of fruit and vegetable shops expanded with a bakery, winery, meat department, coffee corner and some processed food. It sells fresh fruits and vegetables but also processes fruits and vegetables like, cut vegetables and mixed salads. It peels fruit when ripe fruit is not sold yet (for example with pineapple). More than half of the shop's turnover is based on fruits and vegetables sales. The visited shop in Campinas employs 125 employees. This shop sells many different types of vegetables, including grape tomatoes from Terra Viva, salads, herbs, eggplant, sweet pepper, cucumber, broccoli (although no year-round supply yet). Oba sources 20 tons of fruits and vegetables per day at the CEASA. Tomato and potato are the most important crops in terms of volume. Tomato is also most important in terms of value.

Oba sees opportunities to improve packaging. Customers want to touch the produce, but damage the products and decrease their quality. Through packaging the quality of the produce can be maintained.

Grupo Pão de Açúcar

Grupo Pão de Açúcar is the biggest retailer in Brazil with multiple retail brands and a total of 1000 stores in Brazil. It is a Brazilian company. The retailer Pão de Açúcar serves the higher market segments, but the group also has retail brands focussed on lower market segments.

For Pão de Açúcar, fruits and vegetables provide 1.6 billion real in sales. If you would start selling all fruits and vegetables now sold in Pão de Açúcar in a new retail shop you would be the number six retailer. The retailer would like to improve its fruit and vegetables segment. It regards the fruits and vegetables market as much less developed than in Europe and would score it with a 2 or 3 on a scale of 10. Currently the main vegetables sold are 1) potato 2) tomato 3) onion and 4) garlic. The retailer started a program to track and trace products from its preferred suppliers (see next chapter). It has also started a program on selling handcrafts (Caros do Brazil) to provide a market for the small producers and it has its own LEEDS green stores which only sell organic products, compost organic waste etc.

Carrefour and Wall Markt

The fruit and vegetable departments in both Carrefour and Wall Markt are relatively small and aimed at the lower market segments. Prices of the produce indeed seem to be lower than in Pão de Açúcar. Carrefour and probably also Wall Markt has a strong negotiation position. Growers are forced to supply these retailers at prices lower than the wholesale market price and are often responsible for non-sold produce (to pay for it and remove it). The shop employee is often credited by the absence of waste, resulting in (too) little stock.

2.6 Knowledge infrastructure

Embrapa Medio Ambiente

Embrapa is a large research institute with many different locations where a broad variety of research fields are being covered. *Embrapa Hortaliças* researches the major *vegetables* crops in Brazil. It is technically oriented and based in

Brasilia, far from Holambra. We visited Embrapa Medio Ambiente which is a research institute focussed on sustainable farming and improving the environmental quality. The institute is not far from Holambra. Research topics are agricultural production systems, environmental friendly production, climate issues, food safety and sustainability indicators at farm level. It has many laboratories for analysis of for example pest residues and food contaminants. The research institute is mainly focused on production but also includes researchers focused on supply chain issues and sociology. Marketing is not yet much part of its research neither of one of the other departments within Embrapa. As a research institute Embrapa works together with students but does not have its own students.

This research institute is currently involved in a flower project in Holambra which is focused on a production system which is eco- and sustainability sense. The institute is also involved in a GAP project with Denmark which is more focussed on the role of smallholder producers and their working environment. It regards the price for differentiated products as the most important bottleneck for further vegetable development. You need to show the difference of your produce. Commercialisation is a real problem .

Abcsem

Abcsem (Associação Brasileira do Comércio de Sementes e Mudas / Brazilian Seed and Young Plants Trading Association) is a foundation of seed companies focused on supporting the horticulture sector. ABCSEM has 56 associates. The association is managed by representatives from seed and production companies, among which Peter Schoenmaker of Terra Viva is the Executive Director for Ornamental Young Plants and Gerard Vrolijk of Incotec is the second Financial Director. The foundation focuses on communication to the general public, with messages based on fruit and vegetables as part of health and a healthy living (a high value in Brazil). As such the association is a source of knowledge and particularly interesting in the marketing of vegetables. It is one of the rare sources for information on consumers preferences since not much research in Brazil is done on consumers preferences.

3 Trends in the vegetable sector

3.1 Quality and standards

In Brazil there is a market for every type of quality. Oba shows this within its own premises. The fruit and vegetables displayed in the shop are of decent quality. The lower quality produce arriving at the shop has been processed. The fruits and vegetables not sold in time are still being processed or are moved to another section, right next to the main shop where the lowest quality fruit and vegetables are being sold.

CEASA does not control quality in any way. The larger supermarkets do have quality standards, mostly their own developed ones. Display of fruit and vegetables in the shops of Pão de Açúcar distinguishes itself in quality of produce and presentation. The retailer outsourced the display and sourcing of fruit and vegetables is outsourced to the company Benassi. They have chosen a display which looks natural, in a farm atmosphere, with related products next to each other, showing health information of the products and a harvest calendar. The retailer started a program on *Qualidade esta origem*. Suppliers are asked to become a member of this system for which they have to pay and to code their produce. In the end all suppliers need to be a member of this system. The grower provides online information about his/her farm which can be seen on the internet by the consumer through using the barcode at the packaging. The program is a set of control points and compliance criteria and focuses on traceability. Aspects of Global Gap are included. The scheme does not require 100% compliance after first registration, but development towards full compliance is necessary. The scheme does not have independent auditing; growers are regularly visited by representatives of Pão de Açúcar.

Pão de Açúcar is not willing to pay a higher price for the higher quality they demand, nor for the necessary adjustments to fulfil to their required quality standard. It believes suppliers are interested to supply to Pão de Açúcar because of their large market share.

Embrapa has a certification program PIFE which covers the GAP contents. It differs from the *Qualidade esta origem* program in that PIFE requires full compliance immediately. Several federal agencies are present in fruit and vegetables quality control like MAPA, Visa for food safety and IBAMA for the environment. GLOBALGAP is only important for export and seen as difficult to reach for most growers at this moment and therefore not a necessary certificate for the local market, even for a leading supermarket in the higher market segment like Pão da Açúcar.

MPS is a known and used certificate in Brazil, but is mainly applied in the North for export production. In Holambra six flower-growers are certified by MPS-abc standards (among whom Terra Viva and La Vita). MPS seems the most likely generic certificate for sustainable vegetable production for its global application and experience in introducing itself to new users. MPS has immediate value for growers for the management tools it offers for steering in usage of pesticides, fertilizers, energy and water. The market demand for MPS is mostly felt in the export markets. A premium for sustainable production in the local market seems yet unlikely to all stakeholders. The vegetable market allows for too much low-end production where sustainability is not seen as an issue, while quality control in the higher end market is determined by the retailer. As mentioned, many retailers put effort in developing own quality brands - at lower standards than the Global Gap.

3.2 Vegetables in greenhouses

In Brazil vegetables are mostly grown in the open field. However there is an upward trend since a few years to use greenhouses for high value vegetables like grape tomatoes, snack cucumbers and hydroponics.

In general Brazil has 5000 ha professionally built greenhouses and another 5000 built by metal construction companies and others (AVAG, 2005 & Kuipers, 2006). Protected vegetable production takes place in Southeast Brazil mostly around São Paulo city and Rio de Janeiro and in Central West around Brasilia with large areas of protected tomato and sweet pepper cultivation (AVAG, 2005). Holambra has 87 greenhouses totalizing 322 hectares (IBGE, 2009).

Van der Hoeven has seen a steady growth in its sales of greenhouses, but not booming yet. Florida clearly sees a trend in growing vegetables in greenhouses. Over the past five years most greenhouses were built for tree plantation. In 2009

by far most greenhouses were built for vegetables - mostly to grow lettuce. Growers (particularly the Japanese) use NFT-cropping systems. Greenhouses are usually 0,5-1 ha.

3.3 Sustainability

Sustainability in Brazil is generally focussed on water use, water quality, CO₂, energy use and use of chemicals. In Brazil fruits and vegetables are perceived to be produced with high chemical levels. Especially sweet pepper is known for its high chemical use. Still Embrapa regards organic production as grower driven and not per se market driven. Currently organic produce is available at Carrefour and Pão de Açúcar. The organic market is growing according to the retailers and seed suppliers. In Pão de Açúcar organic sales are growing with 35% per year. Focus on organic production is to be environmentally friendly and provide safe food. President Lula decided that more rural people have to switch to organic horticulture production. To stimulate this, the government assists in credit provision and technical assistance, particularly for the smallholder farmers. The government has developed regulations for organic production and integrated production. The applied good agricultural practices can be certified.



Wooden crates are still commonly used

According to the CEASA in Campinas, vegetable packaging can be improved a lot. Currently there are wooden and plastic crates. The use of wooden crates is responsible for lowering the product's quality. The plastic crates are more and more demanded by the retailers. Also the government has forbidden to use wooden crates already 5 years ago. However, wood comes from replanted areas and is cheap to produce and therefore still popular to be used. A Crate Bank has started to organise a new crate system. This company lends crates and cleans them after use. The Crate Bank entered the CEASA in Campinas in December and aims to have all wooden crates replaced by plastic ones by October. Currently the CEASA has 1.8 million crates of which 1.2 million are wooden and 0.6 million plastic. Of the plastic ones, 0.2 million belong to the Crate Bank based within the grounds of the marketplace. The concept is that producers buy a "crate ticket" that can provide them with a plastic box in the Crate Bank. The crate goes from the producer to the wholesaler or retailer and, after its use, it is returned to Crate Bank. Every time the crate changes from one agent to another, a crate ticket must be given in exchange of the crate. If one of the agents loses the crate, he will have to buy another ticket. The CEAGESP warehouses gradually adopt the Crate Bank concept as well.

3.4 Direct sourcing by retailers

Rapid consolidation and multinationalisation of the supermarket sector in Brazil in the 1990s has reduced the role of traditional wholesale markets, increased the number of specialised wholesalers and distribution centres and was the beginning of contracts with growers (Farina, 2002). In Brazil the supermarkets have the highest share of food retail sales in Latin America. Supermarkets have 75% of the overall food retail, while the supermarkets' share of fresh fruits and vegetables in São Paulo is 50% (Reardon, 2008).

Supermarket chains have been shifting away from the old procurement model based on sourcing products from the traditional wholesalers and the wholesale markets towards sourcing from dedicated wholesalers, distribution centres and preferred suppliers (Reardon, 2008). Both Pão de Açúcar and Oba prefer to work with direct suppliers. Pão de Açúcar has decided to do this through its program Qualidade esta origem. Oba is mainly working with direct suppliers with whom they have tight relationships. OBA does not specify a minimum volume to its suppliers.

Pão de Açúcar has 650 fruits and vegetables suppliers in Brazil. Each supplier sources produce from 20 to 25 growers. Of these suppliers 150 are producers, 200 are producer & distributor and 300 are distributor. Pão de Açúcar used to have 1100 suppliers and expects the number of suppliers will further decline to 500 next year. 120 Suppliers are now part of the Qualidade program.

3.5 Branding

All retailers are developing their own brands. Branding is part of "linking high quality and safety standards to the product and the company in the consumers mind, produces reputation and competitive advantage" (Reardon, 2010). Oba is about to develop its own brand, starting with fresh meat products. Pão de Açúcar has its own brand for conventional production (Qualita) and for organic production (Taek). Terra Viva uses its own brand and introduced a child-oriented brand together with Warner Bros. Its local competitor developed a similar brand but with Walt Disney. Supermarkets are gaining strength in the vegetable market. Supermarkets try to uphold their quality by introducing own brands and supply technical assistance for growers to meet their brand. Brands of individual growers can be seen as competing with retailers' brands.

4 SWOT

Taking the viewpoint of developing sustainable grape tomato supply chains for the higher segment with production in Holambra we can draw the following strengths, weaknesses, opportunities and threats:

Strengths

- Greenhouses and its supplying infrastructure are readily available to the production companies for growing high value vegetables. Greenhouses have a major advantage compared to open field production to protect the vegetables against rain damage resulting in higher quality products. Greenhouse production uses less chemical inputs than open field production due to less infestation of pests and diseases. See 2.1.2
See 2.2 last paragraph
See 3.2
- Packaging of the grape tomatoes by the Holambra producers is in order to protect the quality of the produce and to enable information display and branding. See 2.3.1
See 2.5 1st paragraph
- The producers of grape tomatoes in and around Holambra follow a consistent, apparently successful, but different market strategy. Demand is larger than supply and demand is growing. The market is big enough in terms of volume and differentiated enough in terms of marketing channels for the current growers yet not to compete. See 2.2
See 1.2
- The grape tomato producers in Holambra are able to manage complex innovation trajectories. See 2.2

Weaknesses

- Consumers' preferences are not available which causes a slash in supply and demand and results in inefficient supply chains. See 2.6 2nd paragraph
- The cropping systems in the expensive greenhouses are all still under development and have room for improvement to increase production and product quality, balancing with the high expenses of a greenhouse. Technical supplies in greenhouses such as measure units for nutrition in a substrate system are locally not available. See 2.3.2
See 2.3.3
See 2.2 1st paragraph
- High volume of rejected produce due to low quality control and lack of coordination in the supply chain. See 3.3 2nd paragraph
See 3.1
See 2.3.2
See 2.3.3

Opportunities

- Production of grape tomatoes is small (about 2 ha per company), there is room for more production to supply to the market through better production technology and implementing a control system in the supply chain. See 3.1
See 2.2 1st paragraph
See 1.1 last paragraph
- Room for improvement in better use of water, nutrients and pesticides and better climate control to reduce costs and improve sustainability. See 3.3
- Implementation of a control system combined with good chain management will improve the quality of produce in the chain and will decrease rejects. See 2.3.2;
See 2.3.3
See 2.2 1st paragraph
See 2.4 5th paragraph

- Producing vegetables in a healthy way and marketing it like that is seen as a good marketing strategy and reaching a broad group of consumers since Brazilians are strongly focussed on their appearance and health. See 2.6 2nd paragraph
See 2.3.1

Threats

- A well developed vegetable production area closer to São Paulo City than Holambra is able to rapidly close the current gap in supply and demand of high quality vegetables See 2.2
- Power of the retail is growing which endangers the autonomous development by growers. See 3.4
See 3.5
- Fruits and vegetables do not have a very good image for the use of pesticides. Especially tomatoes (and strawberries) are connected to high chemical use. See 3.3

5 Strategic action plan

Based on the SWOT for sustainable grape tomato chain development in Holambra for the local higher segment market in Brazil we suggest a number of priorities to continue with. The first three priorities are needed in the short term, the last two factors are recommended to consider for the longer term strategy and apply to the vegetable sector in general. Where possible we also suggest priorities for the overall vegetable sector targeted at the high market segment with a production base in Holambra.

A. Improve the production system by implementing technical improvements (like substrate selection and use of sensors) and start a growers study group to

- a. increase productivity**
- b. have a more sustainable production system**

Technical improvements

Since the production systems of the three producers are very similar, it seems possible to jointly optimise the production systems.

Current systems include hanging plant pots of 5-10 litres with a drip-irrigation system mostly in a pad-fan greenhouse. Different substrates are used by the different growers. In the discussions with the growers a number of challenges with these systems were identified: substrate choice, nutrient supply and climate conditions.

First thoughts for further assays to improve the systems would be:

- Substrate selection:
 - o Rough grains (small stones): preferably not used because of the non-uniformity in the substrate and the low level of water retention.
 - o sand fraction > 500 µm (pots of 20 cm high) - high flexibility in steering the EC. It will take some time to develop the optimal watering strategy, but the system has high potential.
 - o coco or coco-peat (pot height probably around 30 cm) - lower steering flexibility, but easier to work with than sand. Requires lots of (expensive?) substrate.
 - o different pot types, allowing for re-growth of roots (in stead of 'looping' roots)
 - o alternative system with a layer of water under in the pot to prevent drying out? (useful if watering system is unreliable)
- Optimizing nutrient supply: making it based on irradiation and moisture deficient regulated, recirculation, nutrient solution.
- Higher density of plants in the greenhouse (double from current density, to create more uniform climate conditions), combined with mist-system for cooling and air hoses to let in dry air (at greenhouse temperature). This makes the pad-fan system obsolete.
- Sensor-based cropping strategies: substrate humidity, irradiation, temperature, RV and moisture deficient.

Study group with three growers (Mallman, Terra Viva, La Vita) for knowledge exchange on cropping strategies and small scale tests with the systems.

Meetings (monthly meetings to start with):

- First meeting to set goals and boundaries
- After the first meeting: inventory of production challenges the growers face.
- Second meeting: 1) Growers discuss the suggestions of Wageningen UR and other advisors. 2) Growers decide on strategies or systems they wish to experiment with and 3) Growers divide the 'load' of doing field trials on their production sites and in doing background research.
- Follow-up meetings - following the different trials

- Meetings facilitated by an external facilitator?
- External advisor to coach the growers in the alternative strategies? (12 hours of coaching/grower/month = weekly visit). Are current advisors capable of coaching field trials for new cropping systems and - strategies?

A study group would involve the hiring of an external facilitator (5 days/year) and advisor (45 days per year for 3 companies).

Mallman has indicated not to be part of the study group as it has negative experiences on collaboration from the past. Late October Terra Viva decided not to continue with grape tomato production since more investments were necessary for a profitable production and it was preferred to invest in other products than grape tomato.

Use of sensors and online monitoring of cropping conditions to improve production strategies.

This requires use of systems like Let's Grow, hardware to support this program and cooperation with production advisors.

B. Control the quality in the supply chain to reduce waste and rejection. Investments in post harvest handling and transport can be economically efficient to meet consumers' quality demand. These investments do require cooperation of all chain actors. Quality control starts by collecting data about the current quantity of rejected products and measurements of possible factors responsible for rejection such as temperature during transportation.

- Use devices (such as thermostats) to monitor the temperature of the produce in the chain processes
- Estimation of the waste based on the quantity that is shipped by the grower and the quantity that is accepted and sold by the retailer
- The indicators proposed will be explained through clear and easy-to-read protocols, with, if possible, one page each and use of pictures and figures
- The monitoring of these indicators should be started as soon as possible, so that we will have enough data at the final report to draw solid conclusions and recommendations
- Another proposal is to ask for each agent its definition of good and bad quality. We expect that growers have a different vision from retailers, and if we can have this data, our recommendations will be improved

The use of indicators to monitor quality in the supply chain is proven to be a highly effective tool to reduce costs in the supply chain. For that reason, a series of indicators are proposed to help monitoring quality in the supply chain and, at the end, to reduce waste of products. The summary of the indicators can be found on Figure 5.

<u>Distribution</u>				
Bottleneck	Indicators	Way to measure	Expected results	Who will measure
-Problems in the cold chain -Use of inappropriate crates - Unknown amount of waste in the chain	-Temperature along lead time -Percentage of wooden crates -Quantity of product wasted	-Use of thermostat and analyze number of failures -Number of wooden crates used divided by number of plastic crates used - Products wasted in transportation in kg/truck	-Better quality of the products, less waste -Better quality of the products, less waste - Notions on the economic losses caused by waste	-Growers will install the device and retailers will check it -CEAGESP and CEASA (if possible) - Growers (waste from production and selection) and retailers (waste from transport and selection)

Figure 5. Indicators proposed for the project

The *first indicator* proposed is related to the existence of disruptions in the cold chain during the distribution processes. Through the use of a thermostat, it will be possible to monitor the temperature during the transportation of the vegetables, registering the occurrence of failures in maintaining the temperature of the products leading towards more awareness of the importance of cold chain management in relation to product quality and losses. From awareness this will (have to) lead towards management control. The main results of this indicator will be better quality of products and less waste on the chain, leading to higher revenues. The main actors that will be responsible for measuring this indicator are the growers, that will install the device, program it and the retailers, that will read the information contained, will throw the device away or prepare it for reuse, and send more devices for the suppliers. The exchange of information can be done via an independent organisation (consultant group) or an open internet platform.

The *second indicator* proposed is an indicator to measure the quantity of waste throughout the supply chain. This indicator will be explained in more detail in a specific protocol.

The *third indicator* proposed is related to the measurement of the use of plastic crates, in comparison with the use of wooden crates and preferably also connect quality information to the type of crates used. This is important because plastic crates lead to better maintenance of the quality of the products, when compared with wooden crates. The measurement will be done at CEAGESP, and if possible CEASA, through the monthly calculation of a percentage of plastic crates compared to wooden crates.

Based on the study conducted in the logistics and supply chain of vegetables, it is possible to observe that there is a need for monitoring of temperature control and the production of waste throughout the supply chain. This because in the selected chains a lack of monitoring is the problem that causes a lack of information on how quality can be improved and how rejection of produce can be minimised. Based on this observation, indicators were proposed to characterize and monitor the supply chain. Using the data collected, a series of recommendations will be made on the logistics area in the final report of the research project.

It is important that the different links in the chain start to invest in cooperation and transparency, to permit better match between supply and demand of vegetables.

The first recommendation would be the use of indicators, explained through operational protocols, to diagnose the supply chain and measure its evolution on the months of September, October and November.

The second recommendation is to apply a questionnaire to identify what the different agents of the supply chain define as good and bad quality, with comparable attributes. The main agents interviewed will be the suppliers and retailers. The questionnaire will be sent in the end of July.

The third recommendation is related to the use of plastic crates. The assumption is that plastic crates are able to maintain the quality of the products in a better way than the wooden crates, and the existence of trends towards the use of plastic crates, it is proposed an indicator that will measure the change from wooden to plastic crates.

The further steps of the research will involve the elaboration of visual protocols on how to apply on practice the indicators proposed, which will be sent to the parties involved on July 15th. These shall be put in practice as soon as possible, with all the data gathered transmitted to the group of researchers via e-mail, along with difficulties in the approach proposed.

C. Organise cooperation among producers to

a. improve production and have a year round supply of substantial volume

b. strengthen their market position

To be successful in vegetables, you need to be a good trader. Trade competencies are less important when growing flowers due to the existence of the Veiling. The vegetable sector is yet divided. A uniting factor is needed for further development of growers to prevent the market to fully dominate the industry. Development should be on organisational level (associations, veiling, cooperation) and technical level (quality, production, logistics).

D. Think of a special line, or different product, focused on health or organic and market it as a healthy choice which is eco/sustainability sense, in order to

- a. respond to consumers demand**
- b. differentiate from the competitors, especially from the producers from Japanese origin**

E. Research consumers demand to know what will be future demand and offer new products and concepts in time

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Appendix A Program visit to Holambra

Rolien Wiersinga and Tycho Vermeulen

Sunday 21-03	Welcome to Holambra by Kees and Ria Schoenmakers	
Monday 22-03	CEASA Campinas	Interview and tour with Laurismaradno M. da Fonseca - Gerente de Departamento de Mercado de Hortigranjeiros
	Oba	Interview and tour with Milton Machado
	Carrefour Dom Pedro Walmart Pão de Açúcar Delicatessen shop	Shop visits
	Terra Viva	Interview and tour with Pieter Johannes Fransoo
Tuesday 23-03	Incotec	Interview and tour with Gerard Vrolijk - Gerente Geral
	Van der Hoeven	Interview and tour with Adriano Doevendans
	Besa	Visit to production company
	Flortec/MPS	Interview with Ana Paula
	Prima Fruta	Interview with Marcelo Schut
	Bejo Seeds	Dinner with Paulo Christians - Diretor
Wednesday 24-03	Terra Viva	Interview with Leandro
	Embrapa Medio Ambiente	Interview and tour with Marcelo A.B. Morandi and Claudio C.A. Buschinelli
	La Vita	Interview and tour with Stefan
	Flórida	Interview and tour with Alberto J. Wagemaker - Socio Gerente
	Vegetable producer from Japanese origin	Interview and visit to one of Stefan's vegetable suppliers
Thursday 25-03	Pão de Açúcar, head office	Interview with auditor of sourcing Fruits and Vegetables
	CEAGESP / SP	Visit to the Fruit and Vegetable departments
Friday 26-03	Veiling Holambra	Interview and tour with Robert van Arnhem - Diretor
	Mallmann	Interview and tour with Freddy
	Departure to airport	

We would like to thank Pieter Fransoo in joining many of our visits to introduce us and translate when necessary. We would further like to thank Lucia Bergamo and Ria Schoenmakers for their great help in assisting us in our program.

Appendix B Veiling Holambra

After the second World War, Dutch immigrants settled in Holambra and introduced the flower cultivation. In the 90s a cooperative structure was developed in Holambra. The Dutch auction clock model was introduced between 1999 and 2002 after which online bidding was introduced. The Veiling has just moved to a new bigger site. Around 15% of the investment costs have been paid through a bank loan. The rest of the investment was made with money borrowed from the members without interest. In 1989 the basic goal was to create a marketplace where the output of small producers would be gathered in a single market center, thus increasing their bargaining power with buyers. Benefits of growers are access to new buyers, fiscal benefits, incentives for competitiveness and innovation, greater financing ability to leverage operations and institutionalised capability to communicate within the business environment. Members of the cooperative are obliged to supply 100% of their production through the Veiling. This is based on trust, not much controlled. Some members still have their 'second' production area which they use to supply to others than the Veiling as well. However most seem to be happy with the Veiling as they always receive their money, not ensured in other marketplaces.

The Veiling Holambra is yet a major flower trading centre in Brazil. Its products and services reach the whole of Brazil. By 2003 the Veiling was exporting to Europe and the US and importing mainly from the Netherlands to meet Brazilian market demand for products not cultivated in Holambra. Veiling Holambra's objective is not only to strengthen its leading position in the South American flower industry but also to increase its presence in the international markets. Without the key elements of flower producing knowledge, cooperative concept, auction model, the entire economic process of creating a dynamic flower industry in the region would have been very difficult and slow. There are two Dutch-style clocks, one for cut flowers and one for ornamentals. On a yearly average, a plant lot is sold in 1.5 second during the clock sessions. Around 40% of traded products are sold through direct sales, where clients and suppliers close deals daily, as well as short, medium and long term future sales on production contracts and pre-set values. Pot plants correspond to 56% of all sales, cut flowers 30% and ornamental/gardening plants 14%. Most of the volume comes from the town of Holambra itself, but with an increasing share coming from a 100 to 200 km radius around the Veiling. As a trade center, the Veiling maintains relationships with wholesalers and supermarkets. Of all sales, 30% goes to retailers (Pão de Açúcar and Carrefour); 30% to carriers and 20% to CEASA. It currently has 560 clients and 280 supplying growers.

The Veiling Holambra offers loading and unloading ramps, cold storage with different temperatures, acclimated product show room, trained staff to handle product from grower through dispatching to buyer, and a quality control team to assure quality standards are followed. Carrefour and Pão de Açúcar rent space for their own bought produce. It is possible to rent cold storage rooms as well. Cash 'n Carry is a successful concept. The Clock Bid is an additional purchasing tool for clients that can not attend the auction. The system allows clients to pre-set their bids, while establishing all other routine decisions such as quality, amount and so on (www.veiling.com.br).



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