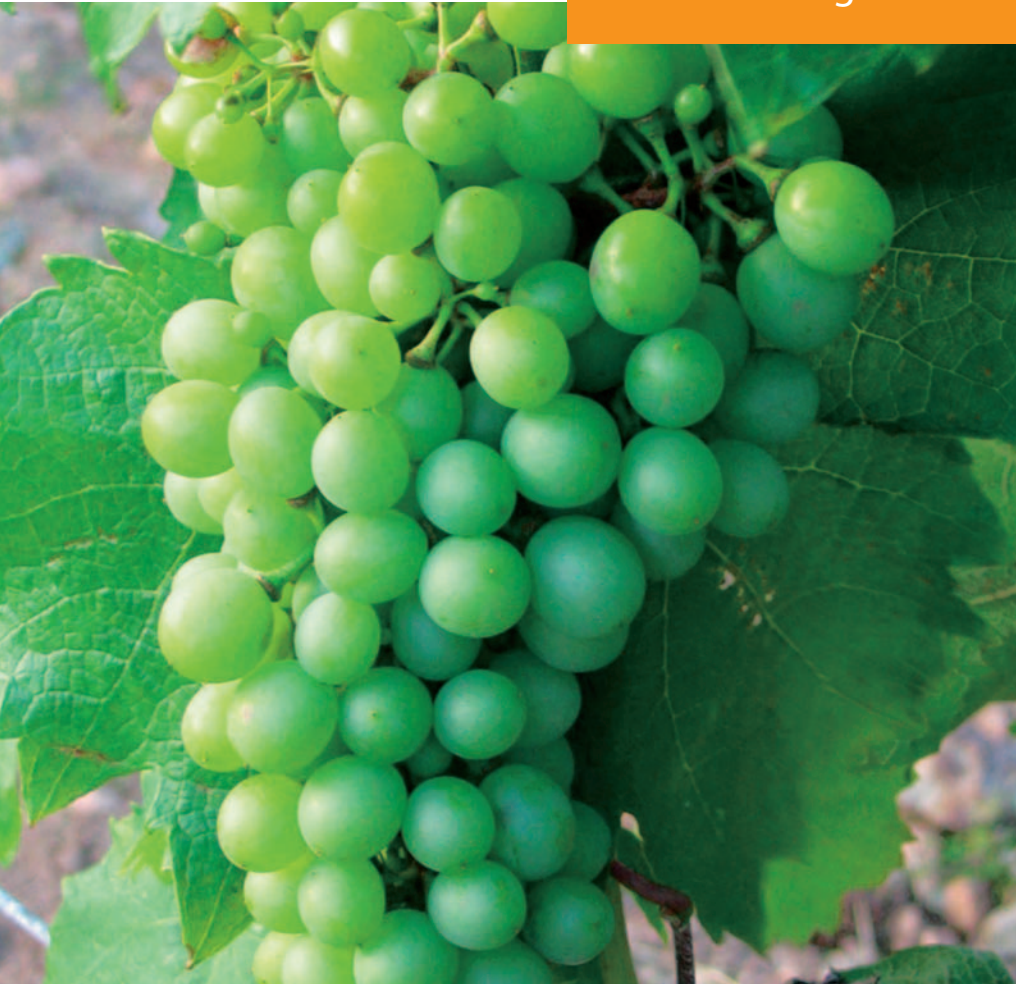


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## São Francisco Valley irrigated fruit production

An interesting alternative for new investments



<b>Title</b>	São Francisco Valley irrigated fruit production
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# Introduction

The SFV produces various irrigated fruits and vegetables

The São Francisco Valley (SFV) is a region that is currently successfully producing mainly grapes and mangoes for export, though there are also areas of sugarcane, coconuts, bananas, melon, guava and other less expressive fruits. There is still plenty of potential in this region to produce other fruits given its soil and weather conditions. Add the plentiful supply of water and infrastructure for irrigation, labour availability and access to top production technology and trade mechanisms and you have one of the top regions in the world for the production of a variety of fruits.

Its weather and production technology allows exploring good market windows

With the best profit per area in the region, grape production has seen heavy investment in the region in recent years. Since the weather in the SFV allows the harvesting of grapes and other tropical fruits at any time of the year, the driver of the harvest season becomes purely economic, and farmers manage to mature crops at market windows that generate the highest price. Furthermore, weather and technology allow the harvesting of grapes twice a year, allowing two different market windows to be explored, although some farmers have only one, more profitable harvest per year, while mango harvest is spread along the second half of the year (mostly).

The region is still under development, which means that there are infrastructure limitations and land available for expansion with more irrigation infrastructure under construction. Roads to transport fruits to ports are in a poor state, increasing logistics costs. Another indication of development in the region is the research in varieties of different fruit crops to find varieties that are well adapted to the region and well accepted in the international market, thus contributing to the diversification and sustainability of the business.

At the moment, there are about 120,000 irrigated hectares under production, and it is estimated that there are about 68,000 hectares of land with irrigation infrastructure under construction<sup>1</sup>, and total area with potential to reach about 360,000<sup>2</sup> hectares. This expansion potential represents an opportunity for firms to invest in the medium and long terms but, at the same time, represents a threat of overproduction if crop diversification and marketing of fruits is not well managed.

<sup>1</sup> Note that there are farms being settled along the São Francisco that do not depend on governmental irrigation infrastructure. These farmers are able to build their own pumping station and pipelines.

<sup>2</sup> Source: Valexport

The SFV could be an opportunity to companies to diversify its origination or production base, but requires understanding of its limitations

Since the region has land to expand and potential to produce fruits that are internationally competitive, either due to costs or market windows, the SFV could be an attractive prospect for fruit and vegetable companies willing to diversify their origination or production base to better understand the strengths, weaknesses, opportunities and threats (SWOT), the risks and mitigants as well as the key drivers and trends of the region. This study benefits not only large fruit and vegetable traders, processors or producers but also region's community, since it describes the supply chain and points out threats and opportunities for the current players in the supply chain.



# 1 Description of the region

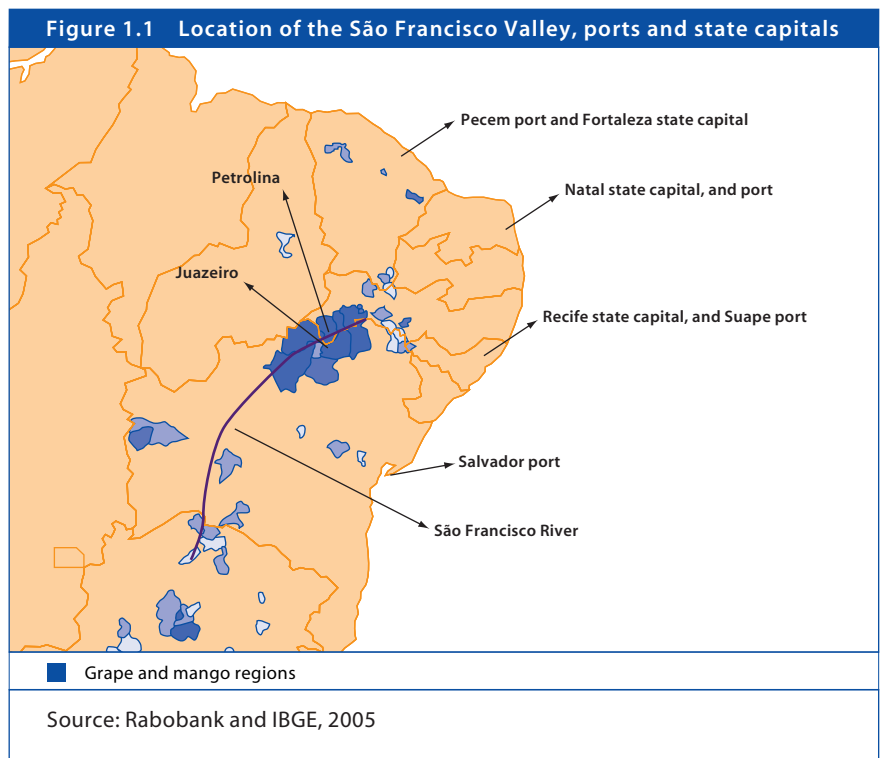
The SFV has historically been a poor region within Brazil, mostly due to its very dry conditions. Before irrigation, not much economic activity had been developed in the region. Such drought and lack of economic alternatives have historically promoted the migration of the population of the region towards the large urban centres such as São Paulo.

The region found economic feasibility in agricultural production once the government promoted investments in irrigation infrastructure in the 1970s. However, the large boom of the region came in the 1990s, mainly after the devaluation of the currency that enabled farmers to be competitive in the profitable foreign markets. Such recent economic growth has attracted people back to the labour intensive fields of grapes and mangoes, besides input companies and services. The municipalities of Juazeiro and Petrolina and surroundings totalled about 650,000 people in 2004.

## 1.1 Location

The SFV is located in a dry region of the Brazilian Northeast

The region being highlighted is called Sub-medium SFV, with the municipalities of Juazeiro (in Bahia state) and Petrolina (in Pernambuco state) its centres (Figure 1.1). The São Francisco River crosses the region and is the main source of irrigation water for the mostly dry regions it transverses.



The SFV is 513 km from the closest port (Salvador), but also has access to and utilises four other ports to export fruits, since it is very central in relation to the north-eastern state capitals and ports (Figure 1.2).

**Figure 1.2 Distances from Petrolina to major ports in the Brazilian northeast region**

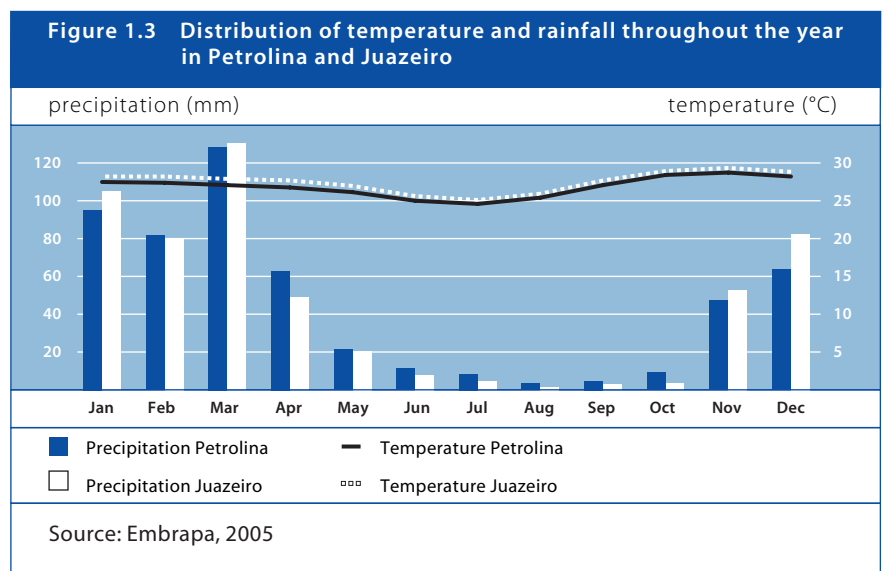
Port	km
Salvador	513
Suape	770
Fortaleza	868
Natal	923
Pecem	924

Source: National Transport Department (DNIT), 2005

## 1.2 Climate

Its dry and sunny climate conditions favor the production of irrigated crops

The climate in the SFV is predominantly dry and hot year-round (540mm rainfall and 26°C), with the rains slightly more concentrated in the first half of the year (Figure 1.3). The region also has good sunshine intensity (3,000 hours per year and 300 sunny days per year) which is also quite constant year around. Such dry and hot conditions, in association with a good irrigation infrastructure with plentiful water supply, and use of state-of-the-art technology of irrigation, production and packing, makes it very interesting to grow various types of fruits and vegetables.



The greatest advantage of this climate is to allocate harvest according to market windows

Probably the greatest advantage of such a climate is that it makes possible to stimulate plants to bear fruits at market windows that have the highest prices and least competition in Europe and North America. Furthermore, it allows grapes to have two harvests per year, though this does not necessarily imply more fruits per hectare than other production regions. Indeed, not all areas are managed to have two harvests and some farmers prefer to concentrate on one harvest per year.

Basically, having two harvests of grapes per year is more advantageous from the risk management point of view than from the total production point of view. Two harvests per year mitigates risks because of the sensitivity of grapes to rain upon maturity, something that could jeopardise most of the production. With time, research in varieties and production technology is likely to improve yields, making two harvests per year also advantageous in terms of production.

Nevertheless this region receives less sunshine hours than the summer season higher latitude regions

However, the constant and regular sunshine is disadvantageous when compared to higher latitudes, where yields are much higher because of more intense sunshine during the summer. This results in significant cost differences. Such characteristics cannot change, but research and development efforts may reduce the yield differentials between high and low latitude production.

### 1.3 Irrigated area and irrigation infrastructure

There is plenty of water supply, and infrastructure is expected to grow

The irrigated area under production in the SFV is estimated to be 120,000 hectares, which are under governmental and private ownership. Irrigation water is collected from the São Francisco river, and from an artificial lake (called Sobradinho), which stores about 38 billion m<sup>3</sup> of water. Such water supply assumes that there will not be problems related to this issue, which is good for the sustainability of the business.

To supplement the existing irrigation infrastructure, the governmental development company for the SFV region (CODEVASF) is arranging the construction of more irrigation channels that will reach additional 68,000 hectares (Salitre, Pontal, and Baixio de Irece projects). CODEVASF is the owner of the land and irrigation infrastructure of the oncoming new irrigation projects. This new area under CODEVASF ownership will be leased to farmers for about 30 years with possibility for contract renewals. This prevents real estate speculation, and favours farmers and processors who will not be compelled to buy the land, and also benefits the development of the region. There is also expansion potential in privately owned land (non CODEVASF areas), mainly on plots along the São Francisco River.

### 1.4 Production

In terms of land occupation, the SFV region currently produces various crops including mangoes, grapes, sugarcane and guava on a relatively large scale, and melon, coconuts, watermelon, bananas, tomatoes, passion fruit, lemon and papaya on a smaller scale (Figure 1.4).

Besides fruit, high-yield sugarcane is grown in the region and sugar mills enjoy the benefits of both irrigation and long hours of sunshine. The success of the sugarcane in the region shows the potential not only for sugar production but ethanol production as well.

**Figure 1.4 Production and planted area of main crops in the SFV<sup>1</sup>**

	<b>Production (tonnes - 2003)</b>	<b>Planted area (hectares - 2003)</b>
Sugarcane	1,370,658	15,483
Mango	310,483	14,805
Banana	211,714	10,462
Onion	154,937	7,926
Grape	182,563	6,368
Coconut	152,198	5,357
Guava	108,680	4,475
Watermelon	83,034	4,303
Melon	35,521	1,983
Tomato	68,885	1,895
Papaya	11,544	572
Passion Fruit	6,599	514
Lemon	6,829	251
Orange	163	25

Source: IBGE, 2005  
 1 Includes data from the micro-regions of Juazeiro and Paulo Afonso in Bahia state, and Petrolina and Itaparica in Pernambuco state.

Grapes and mangoes are the most important fruits produced in the region regarding exports

After sugarcane, which needs large scale to make a mill feasible, the planted areas of grapes and mangoes are the most important in terms of export in the SFV. For grapes, the SFV represents 32% of the table grape production in Brazil and 17% of all grape production (including wine grape production in the south of the country). In the case of mangoes, the SFV is responsible for 32% of the Brazilian mango production (Figure 1.5).

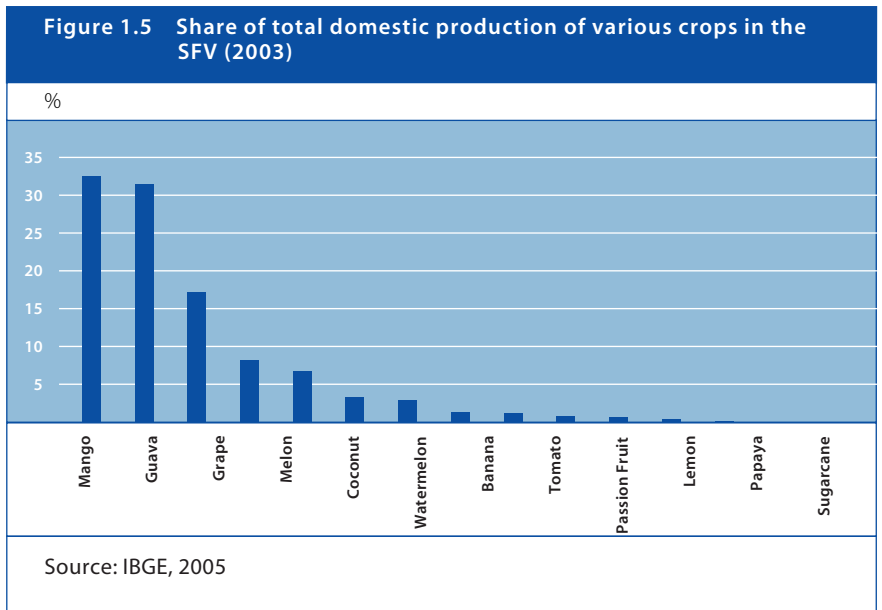
### 1.5 Logistics

Transportation infrastructure is still poor

Logistics is an important factor for fruit production in the SFV since its production is mostly exported. Transportation from production regions to ports is expensive in total terms, since the SFV region transports its production to ports via poorly maintained roads. For instance, transporting a refrigerated container from Petrolina to Recife, a distance of some 770 km, takes about 15 hours.

Average domestic freight USD 1,300 to 1,500 per container

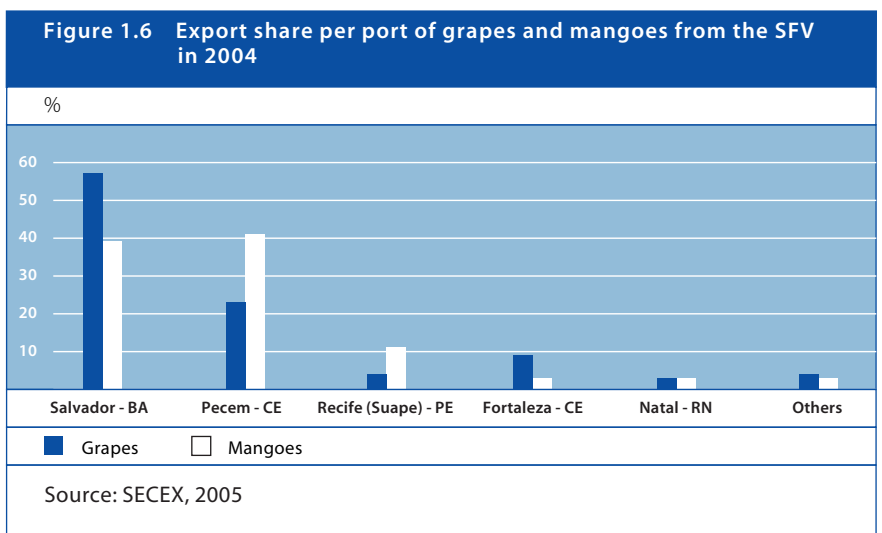
The average freight rate of a grape container (of about 15 tonnes – 40 feet) from Petrolina or Juazeiro to Salvador port is about USD 1,000 per container. Since Salvador is the nearest port, this is the lowest domestic freight cost. Transportation



costs to other ports are about USD 1,300 per container to Recife/Suape, and USD 1,500 to Fortaleza. This freight is, in many cases, operated by the same sea transportation companies who provide the container and all transportation services from the farm gate or packing house to the international destination.

Salvador the leading port, but alternatives are emerging

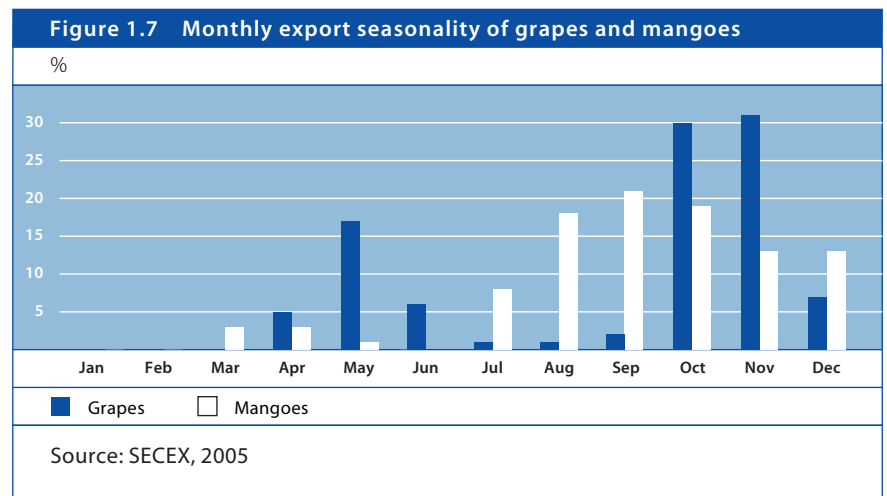
The port most used for grapes and mangoes is Salvador. This port is actually very busy, and to avoid delay in transport (important for fruit quality/shelf life) and extra costs, farmers and exporters are using port alternatives such as Pecem, Fortaleza, and Suape (Figure 1.6).



Exports through Suape have been growing since the inauguration of the “super-loader” terminal (Figure 1.6), despite industry claims about the higher cost of this port relative to the others. Port tariffs are estimated to be around USD 300 per container, though this varies from port to port.

Significant seasonality which matches market windows

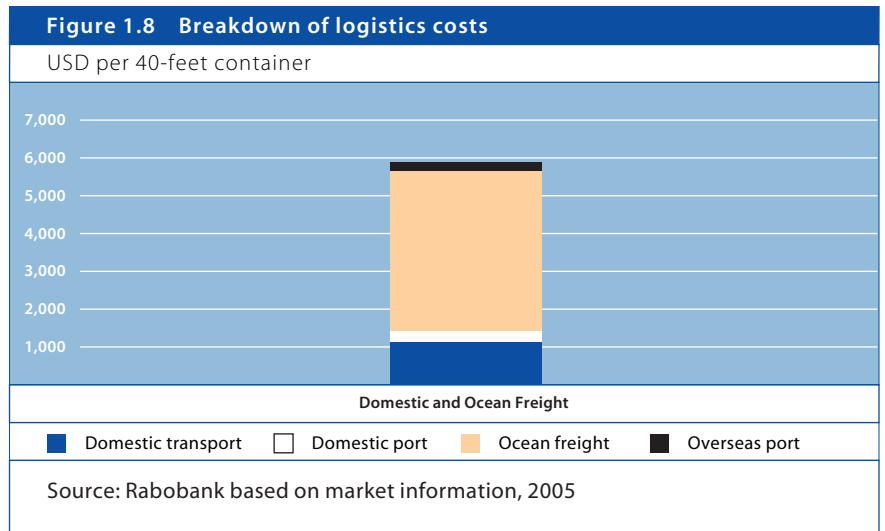
There is significant seasonality in the exports of grapes and mangoes (Figure 1.7), which matches market windows in Europe and North America, and harvest times. Basically, exports of mangoes are concentrated from July to December, and exports of grapes are concentrated in two windows, from April to June and from October to December.



Overall export costs from the farm or packing gate to the storage facility in the destination port of Rotterdam in the Netherlands or Tilbury in the UK, for instance, ready for distribution ranges from USD 5,300 to 5,900 per container. This includes all transportation costs such as domestic truck freight, domestic port costs, ocean transportation and import port costs. However, it does not include insurance (Figure 1.8).

As an alternative to truck and ocean transportation, the region has just inaugurated an airport terminal to export fruit, vegetables and flowers, though there has been little export activity so far because of the current high cost of this modal, but may develop towards high value markets such as Japan.

Another alternative to road transportation is a railway that links the region with the Salvador port. This could be of good use for both domestic and export markets. This rail line is currently not being operated for fruit, only for fuel. The operator of this rail line is the Companhia Vale do Rio Doce (CVRD), which is a mining company that is also in the logistics business. Rail tracks are already in place, but investment is needed in maintenance, terminals, and locomotives and railcars for the specific transport of refrigerated containers. Therefore this could be an opportunity to reduce current logistics costs.



Domestic logistics costs although high, are small in relative terms.

Domestic transport alternatives and improvement of road maintenance to the ports is a cost reduction factor for the industry. However, given the high value of grapes for instance, the domestic transportation cost is relatively unimportant since it represents only about 4% of the total cost of seedless grapes in a European port. Therefore large investments to improve this transportation infrastructure may reduce the domestic transportation cost by 50% (which is significant) but only reduce the total cost in Europe by 2%, which is not very significant. For the domestic market, truck transport, and long distances and elevated costs reduce the margins to farmers in the SFV regarding the domestic market.



## 2 Relevant markets for the SFV

While various crops are produced in the region, this section focuses on grapes and mangoes, which are the most economically important crops for the region at the moment.

### 2.1 Exports

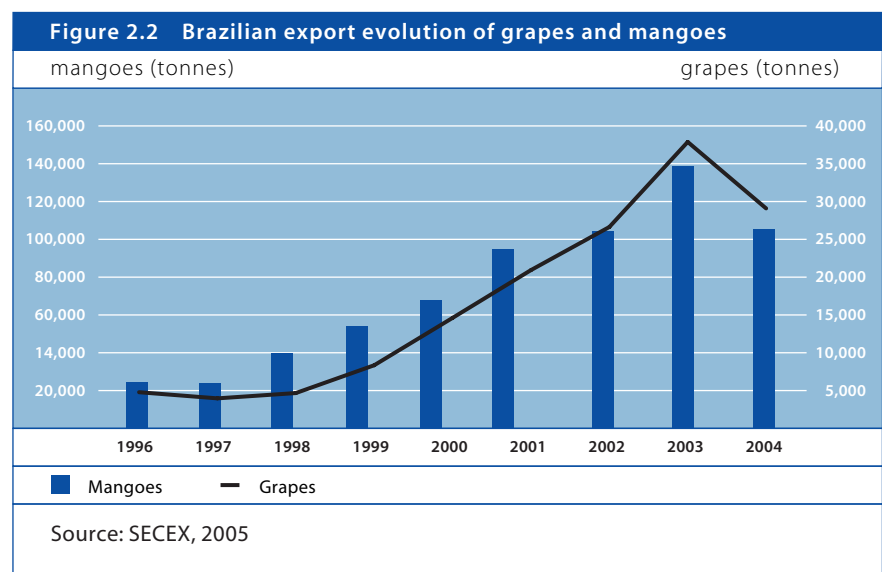
The SFV is the larger exporter region of grapes and mangoes of Brazil

Although the production of grapes in the SFV region is small in national terms (17% of national production), the region was responsible for 99% of exported grapes and 92% of exported mangoes in 2004 (Figure 2.1). In part this happens because the grape production regions of the south of the country are focused on wine production and the domestic market. Likewise, the other mango production regions of Brazil are focused on the domestic market. This also shows the know-how present in the whole supply chain of this region that is able to deliver fruit at their best market windows to the international market and at international quality standards.

**Figure 2.1 Importance of SFV in the Brazilian exports of grapes and mangoes**

SFV share	Exports 2004	Production 2003
Grapes	99%	17%
Mangoes	86%	32%

Source: IBGE and SECEX, 2005

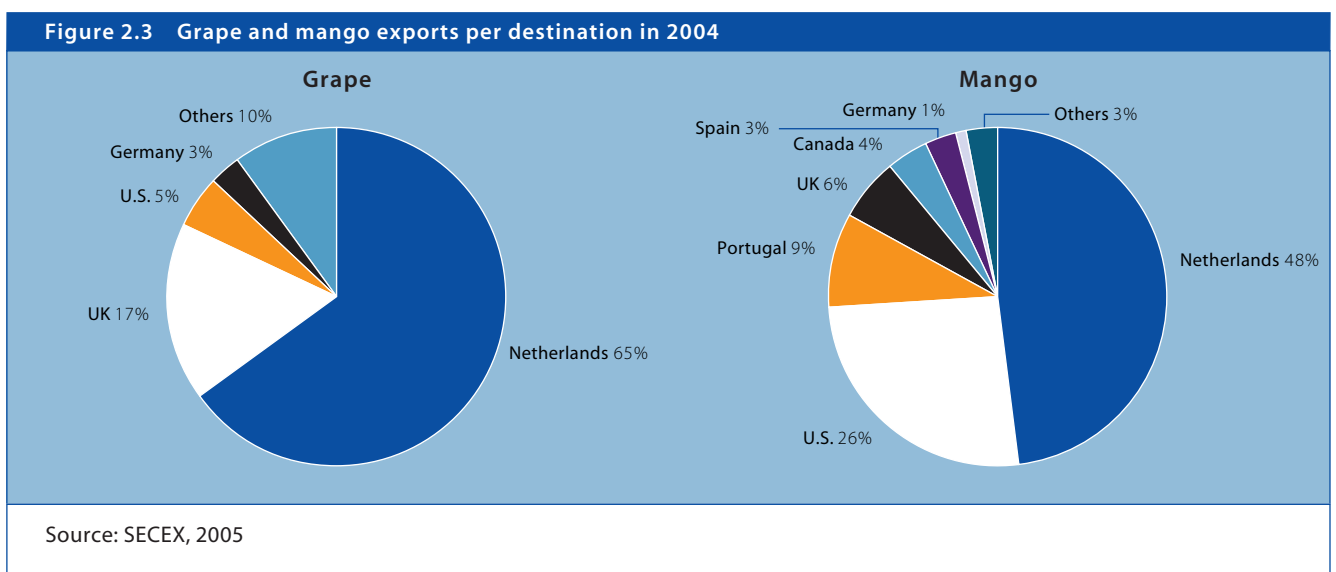


As it can be seen, the region exports most of its production of grapes and mangoes, characterising a strongly expanding export platform for fruits (Figure 2.2). Such expansion, with similar growth rates for mangoes and grapes, has been driven by the good profitability of both crops due to production factors. At the moment, most of the farms and packinghouses already have in place the structure needed to fulfil the USDA and Eurepgap requirements.

Figure 2.2 shows a decrease in exports in 2004 in comparison to 2003. This was mostly due to strong and abnormal rainfall in 2004, which reoccurred in the first harvest of 2005, though in lesser intensity. The financial stress incurred in 2005 by grape and mango producers in this region as a result of these two events was mitigated by the very good previous years.

The EU is the main export destination for grapes, and mangoes

The main destination of the grapes produced in the SFV is the EU (90%). Most grape exports are destined for the Netherlands and from there distributed throughout Europe, and to the UK, which is also a strong consumer. Mango exports from the SFV are destined for both the EU (68%) and the U.S. (26%) (Figure 2.3).



The UK is the market which requires higher quality and also pays the most within EU and U.S.

Within the grape export markets, the UK imposes the strictest requirements in terms of quality, but it also is the market that pays the most. Therefore, the best quality grapes are exported to the UK, while the second best quality grapes are exported to the rest of the EU. Lower quality grapes are traded in the domestic market. For mangoes, the situation is similar. Lower quality fruits are kept in the domestic market, and better quality fruits are exported to the U.S. and Europe. The very top quality mangoes are starting to be exported to Japan, which is parallel to the UK in the grape market in terms of high quality requirements and higher prices. Initial exports of mangoes to Japan are being air-freighted.

## 2.2 Domestic market

The domestic market is not the main focus of the SFV

The SFV production structure is focused on exports. The fruit for the domestic market is basically the export excess caused by seasonality, sizing of contracts, quality or pricing issues. The export market is the source of profitability for the region, and if farmers had to rely in the domestic market, the fruit production in the SFV would not be feasible given the costs of domestic freight to major consumer markets (e.g., São Paulo) and competition with other domestic regions that supply these major markets.

Albeit with narrower margins and smaller volumes, the SFV still reaches the domestic market of many different regions of the country via the long truck distances that separate the SFV region and large markets such as São Paulo. The fruit normally goes to distribution centres called CEASAs that exist in many large cities of the country.

Distribution centers called CEASAs are the main wholesale domestic market

These distribution centres are where wholesalers of fruits, vegetables and flowers buy products from farmers and sell to retailers. Wholesalers rent the space from the CEASAs that are part of the governmental infrastructure. Normally the farmer or the association at the SFV sells the fruit to the wholesaler FOB farm. Once the fruit gets to the CEASAs, it is sold to the small, medium and large retail.

Another trade option for SFV fruit to the domestic market is through the SIC-VALE (Integrated Trade System of the São Francisco Valley), an auction based on the Dutch Veiling system and established by the large farming operations in the region. The system provides buyers with access to the produce with the description of quality of the fruit, variety, size, time to delivery and payment conditions. Buyers participating are wholesalers and retail chains. This system brings advantages to the farmers because it reduces the participation of "middlemen" in the trade, reduces the risk of default and brings sellers and buyers together in an organised way.

The Agricultural Cooperative of Juazeiro (CAJ) as other cooperatives in the region also play a role in selling fruits to the domestic market. In this case, the cooperatives provide large volumes to the market to the benefit of small and medium size farmers, and also arrange the trade.

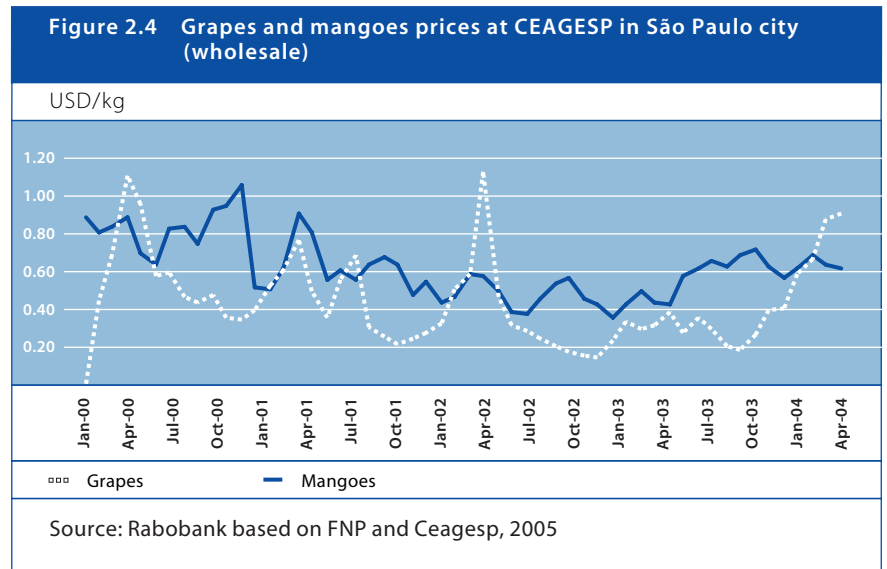
Brazilian retail sector is improving their procurement of fruits

The large retail chains are improving their fruit and vegetable origination system, trying to have a better distribution around the country, and even being a facilitator for exports in the case of international chains. These two strategies, nationalisation and internationalisation, are becoming increasingly important as fruit and vegetables becomes a 'showroom' to keep the consumer attracted and loyal to the store.

Thus, the quality of the fruit sold in large retail chains should be reasonably good, otherwise it will not act as a differential or an attraction. Some chains have also created their own traceability mechanisms and some have high quality standards that the fruit has to meet to be within the retailer portfolio. Therefore, despite the fact that fruit from the SFV that is directed to the domestic market is not the top

quality, it still has to be of good quality to be able to reach the large retail chains, or be competitively priced. And yet, there are other production regions closer to São Paulo (large concentration of retail chains and consumers) that are focused on the domestic market.

Domestic prices are quite volatile as they typically are around the world for many different fruits, depending on seasonality of production in the various production regions able to reach a certain market (Figure 2.4).



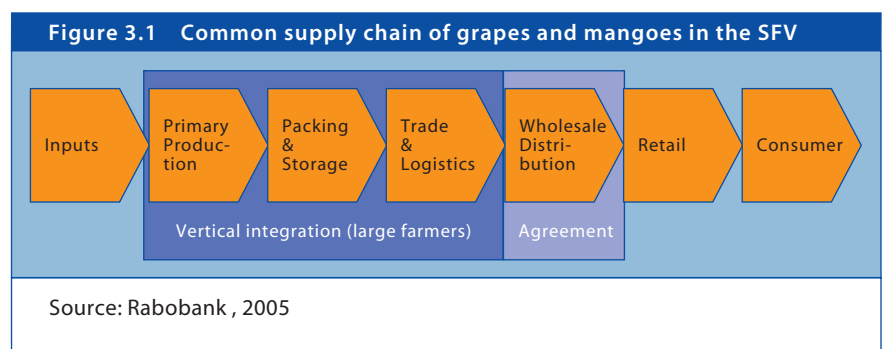
The production costs of seeded grapes added to the domestic freight to São Paulo total USD 0.77/kg, which compared to the prices evident in Figure 2.4 makes the SFV production only competitive in the domestic market over a few windows during the year.



# 3 Supply chain characteristics

The supply chain is well organized for grapes and mangoes, being quite vertical integrated

The fruit industry in the SFV has good supply chain coordination. The supply chain is organised around large farmers that are also exporters since they integrate production with packing, storage and trade, reaching international wholesalers abroad (Figure 3.1). The chain is therefore quite vertical integrated for most part with large farmers largely responsible for the production. Non-vertically integrated small farmers are, however, more numerous.



The grape supply chain is particularly well organised around the Brazilian Grape Marketing Association (BGMA), which is basically an export tool with rigid quality control. The success of the SFV in meeting international grape standards is founded on the organisation of its supply chain. In the case of mango, there is less organisation in the chain but the quality requirements are relatively easier to accomplish than for grapes.

## 3.1 Inputs

Most inputs are sold through local distributors

Inputs are mostly sold through local input distributors that may have the representation of a firm that produces inputs, or through local cooperatives such as CAJ. Almost all chemicals and fertilisers are sold through these local distributors and cooperatives, but some large farmers are able to purchase some of the inputs directly from manufacturers.

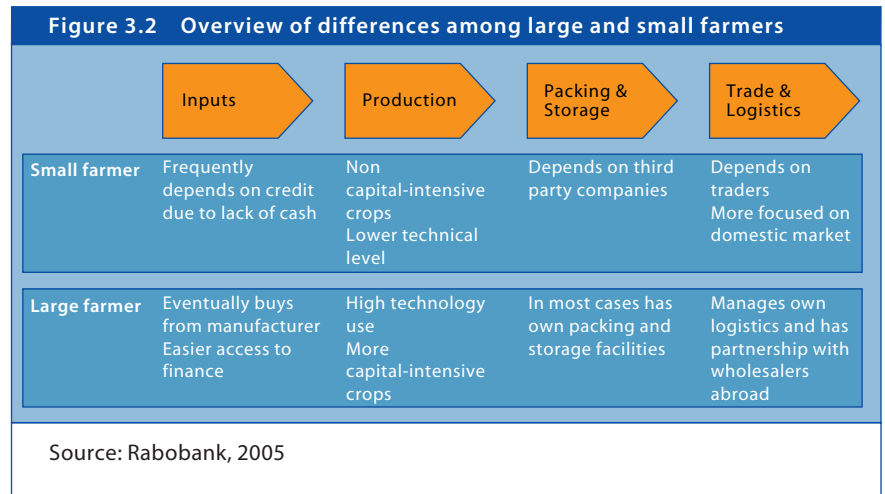
Technical assistance and credit is key for these distributors

In most cases the local input distributor also provides technical assistance to its clients. The average sales term of the local input distributors is about 90 days, though this varies with the specific credit terms for each client. Here access to finance is a key competition driver for these distributors, since small and medium farmers do not have easy access to capital.

### 3.2 Primary production

Farming is quite different depending on scale, technology, vertical integration and capital access

The region has two main types of farmer: large and small (Figure 3.2). On the one hand, there are large farmers that are basically top fruit companies producing mostly high-quality grapes and mangoes with state-of-the-art technology and infrastructure. On the other hand, there is a group of small producers farming about two to five hectares under the CODEVASF irrigation projects. These smaller farmers represent about 70% of the farmers of the region but have only 17% of the planted area of the region.



Some large farmers are more intensive in technology and capital, and are also packers and exporters of their own production

Large farmers are normally fruit exporters as well, and their production system makes use of the top technology that is available for irrigation and crop management. These large producers also have the more capital-intensive crops, which have been very profitable in the recent past, grapes and mangoes. Grapes are labour intensive and a farmer with about 100 hectares of grapes would employ over 400 people, which is not easy to manage, particularly with respect to providing transportation and food for these workers. Furthermore, these large farmers have easier access to capital due to the fact that they are exporters, giving them less costly credit lines.

In general, large farmers also manage their trade and logistics up to the international destination port. From there on, the large farmer has a partner wholesaler that will trade his fruit (in Europe for instance).

Small farmers, on the other hand, are more numerous but less representative in total production terms. They are more focused on less capital-intensive crops such as guava, coconut and bananas. These farmers apply less technology regarding irrigation systems and crop management. These farmers are dependent on traders to market their crops and have much more difficult access to either working or investment capital.

### 3.3 Packing houses and storage

Packing is done either by large farmers, or by independent traders

Packing and storage are done either by large farmers who are vertically integrated with packing and trading or by traders that are present in the region. The farmer may pack and trade the fruit he produces or buy from third party producers, pack and sell. The pure trader basically buys the fruit from the farmer, does the packing, logistics and trade of the fruit. Besides large farmers and pure traders (packing houses that do not own fruit production), there are cooperatives that also provide the services of packing and trading fruits to small and medium farmers.

In the process of buying fruit from farmers and selling it, there is the need to classify fruit with regard to its quality, which will dictate its market destination. Therefore, before quoting a price to the farmer, the packing house has to analyse the quality of the fruit in order to define the price and market where it will be sold. The packing house may wait until the wholesaler states the price he gets for the fruit abroad before negotiating the price with the farmer or may fix a price with the farmer and bear the price and quality risks until the final price is negotiated abroad.

Another issue that is important to packing houses that trade third party fruit is the lack of working capital. This type of business is mostly done with small farmers that do not own a packing house, are normally short of working capital and have difficult access to credit lines. At the same time, this is a significant business cycle that comprehends the period of time that the fruit is packed, refrigerated, exported and finally paid by the international wholesaler, which takes about 60 days in all. The lack of working capital may be worse when small farmers ask the packing house for an advance payment for their fruit to buy inputs or pay labour expenses, which may extend the business cycle even longer.

All export oriented packing houses in the SFV region are certified by the EUREPGAP, and by the USDA. In the case of USDA certification, there is an USDA inspector (paid by the farmer) present in the packing house during harvest (packing operation) to assure the good practices and fruit quality being packed there.

### 3.4 Trade and logistics

The BGMA and CAJ are two large export pools, but not the only ones, other large farmers have direct access to the international market independently

Some large farmers in the region are organised in an export pool called Brazilian Grape Marketing Association (BGMA). This pool negotiates prices as a group but makes individual sales. It has an agent in Rotterdam (main export destination) who performs quality inspections and if there is a problem, the farmer risks being excluded from the pool. This group also buys packing boxes as a group, which is another advantage.

CAJ also markets a large volume of fruits to the international market, representing mostly medium sized farmers. Independent large farmers that do not belong to any export pool work independently but, in all cases, they have agreements with one wholesaler abroad who transports their containers, store them in port and sells to retail.

Domestic export logistics have got simpler recently. Nowadays the same ocean transport companies provide the domestic transportation service of the container from the farm to the port. They also handle all the transportation of the containers in the domestic and foreign port besides the actual ocean transportation service.

### 3.5 Distribution

#### Wholesale

Internationally, exporters have a stable relationship with very few wholesalers that are their export partner abroad. Basically, the international agent will take care of selling the Brazilian fruit it has stored in the port, normally in consignment.

Domestically, the wholesale of fruit tends to be done through the CEASAS, as previously explained.

#### Retail

In an expected response from a sector that is concentrating worldwide, large supermarket chains are optimising their fruit procurement. The challenge of retailers to differentiate themselves and acquire customer loyalty is closely related to the fruit sector since the retail is trying to add value to the fruits and offer good quality fruit independent of the season.

#### Research

EMBRAPA is the Governmental Research Enterprise that works with crop research. EMBRAPA has a branch in the region, which is very strategic because of the need to improve yields, combat crop diseases and develop new crops that are adapted to the region. Therefore, this region has substantial knowledge in grapes, mangoes, coconut, bananas, guava and many other fruits and vegetables that are being tested in experimental fields.

The presence of EMBRAPA in the SFV is fundamental to the sustainable development of the region because of the need to diversify the production with the growth potential of planted area and irrigation infrastructure.

### 3.6 Financing sources

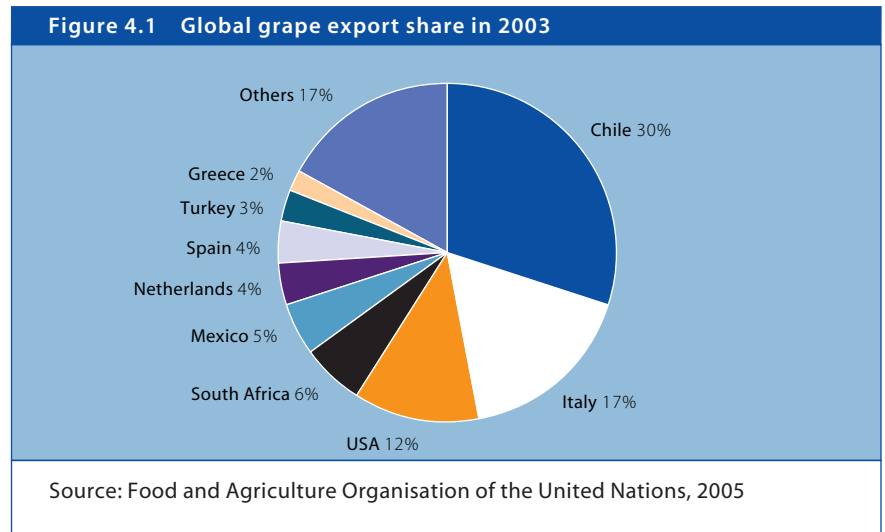
The region and activity lacks financing means

At the moment, besides private capital, the major financing source for the fruit business in the SFV is the Banco do Nordeste (BNB), a governmental bank focused on the northeast region. The BNB can provide funds for investments and working capital at more competitive rates than commercial banks. However, some farmers in the region are not satisfied about the ability of this bank to process credit in a timely manner. Thus, in practice, there is a strong lack of financing for the activity in the region, mainly for those small and medium sized farmers.



# 4 Grape market and competitiveness

Today Brazil represents 1.2% of global grape exports. The international grape market is led by Chile (29%) and followed by Italy (17%) (Figure 4.1).



Weather conditions provides the SFV to access the EU at favorable export windows

Favourable weather conditions enable Brazil to supply the EU during interesting marketing windows, which none of the other major exporters is able to do (Figure 4.2). This is one of the greatest advantages of the SFV, despite its lower yield than its main competitors, which increases its average cost per sold unit. This demands strategic access to the European market in the off-season of the major competitors and gaining for better prices.

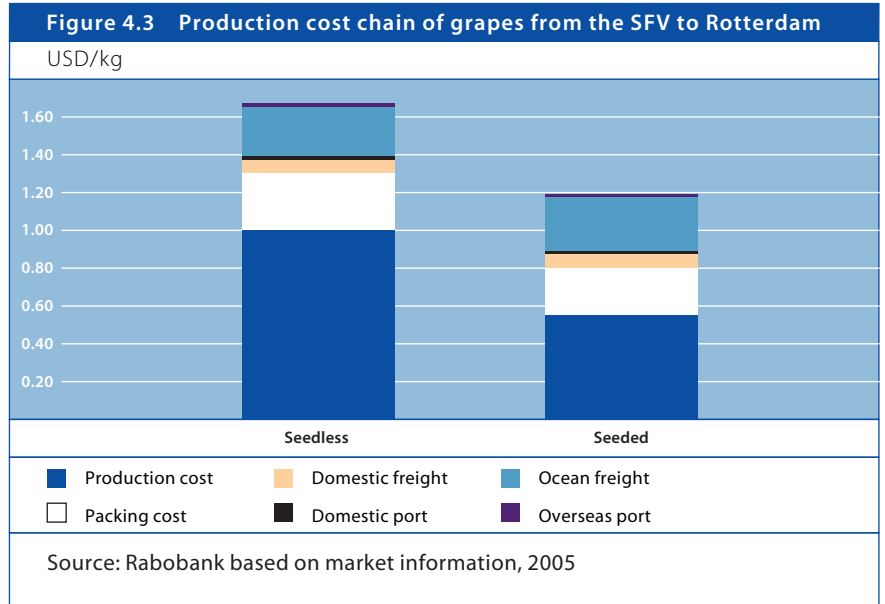
**Figure 4.2 EU market windows**

Market	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
EU	Chi S.Afr	Chi S.Afr	Chi S.Afr	Bra Ind	Bra Ind	Bra Ita	Ita	Ita Gre	Ita Gre	Ita Gre Bra	Ita Bra	S.Afr

Chi = Chile, S.Afr = South Africa, Ind = India, Ita = Italy, Gre = Greece, Bra = Brazil,  
Source: Rabobank based on CEPEA, 2003

#### 4.1 Production costs of grapes

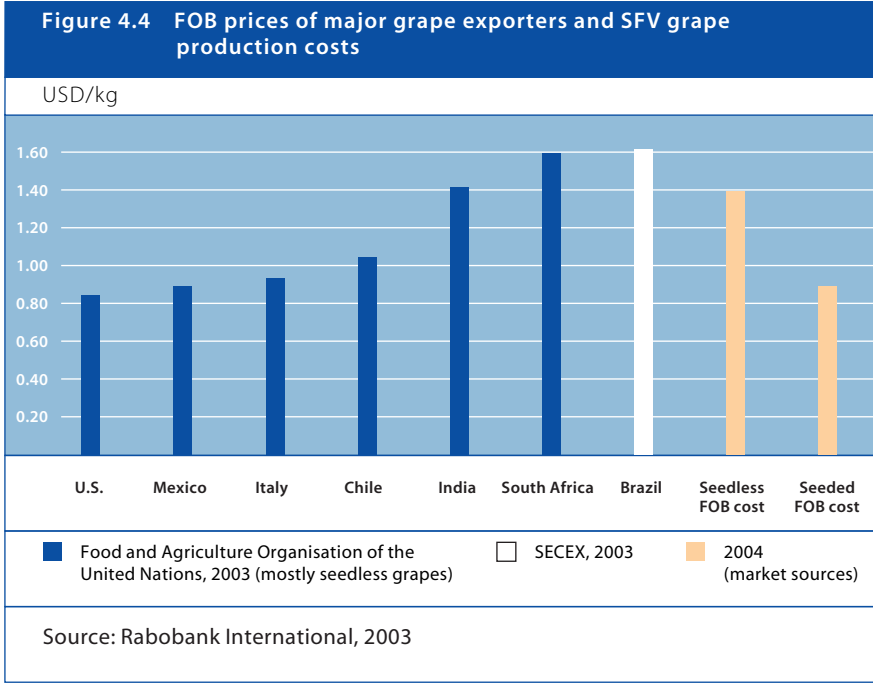
The total cost of production for seedless grapes in this region is estimated to be around USD 1.70/kg delivered to European ports, and the production cost of seeded grapes is estimated to be USD 1.20/kg (Figure 4.3).



Production and packing represent 80% of the seeded grape cost in Rotterdam, while ocean freight represents 15%, domestic freight 4%, domestic port 1% and Rotterdam port 0.5% of the total costs.

Improvements in the poor domestic transportation will not significantly reduce costs

Given the low share of domestic transport in the total export cost to Rotterdam, any improvements in domestic transport from packing house to ports is not likely to increase farmer's margin significantly. Probably, there are greater opportunities to reduce costs along the production and packing process through the adoption of new technologies that would result in either lower costs or greater yields.



The SFV is not cost competitive due to its relative low yields. Exploring market windows makes it feasible

When comparing the FOB export prices of Brazil’s main competitors, we find that on average, SFV are able to sell at lower prices than the SFV FOB cost (Figure 4.4) which is USD 1.40 to 1.50 per kg for seedless grapes and USD 0.90 to 1.00 per kg for seeded grapes. Thus, the competitiveness of the SFV in the grape market comes from the possibility to explore exclusive windows (mainly in November) and not from low production costs. Mostly, lower yields than its competitor are responsible for the relatively higher production costs of this region.

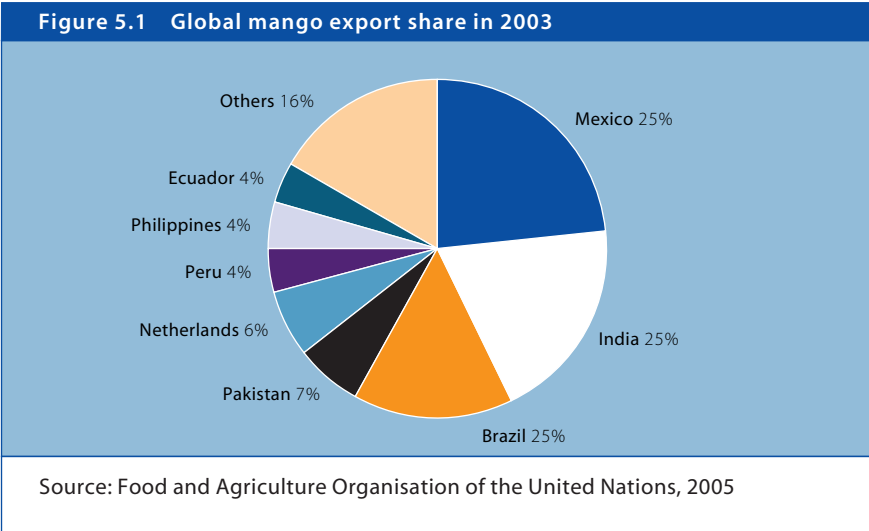
Therefore, if SFV had to sell at prices that most competitors sell, the production of seedless grapes would not be feasible in the SFV. However, the possibility to explore the November market window has, in itself, made grape production in the SFV both feasible and profitable.



# 5 Mango market and competitiveness

Brazil (SFV) has larger expression in the international market than grapes

Brazil is the third largest exporter of mango in the world after Mexico and India, and it represented 15% of the global mango exports in 2003 (Figure 5.1).



Favourable weather conditions enable the SFV to supply the EU and the U.S. during interesting market windows (Figure 5.2). Mexico is the largest export competitor to the U.S., whereas South Africa and Central America are the two largest competitors in Europe.

**Figure 5.2 Mango market windows**

Market	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
EU	Bra C.Am S. Afr	Bra C.Am S. Afr	C.Am	C.Am	C.Am	C.Am						S. Afr
U.S.	Per	Per	Mex Per	Mex	Mex	Mex	Mex	Bra Mex	Bra	Bra	Bra Ecu	Bra Ecu

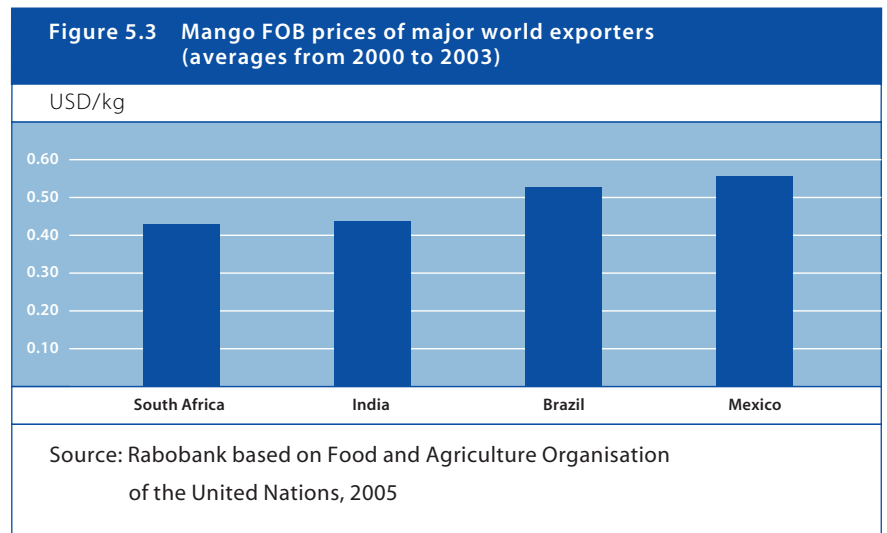
S.Afr = South Africa, Bra = Brazil, Mex = Mexico, C.Am = Central America, Per = Peru  
Source: Rabobank based on CEPEA

### 5.1 Production costs of mangoes

Mango production is more cost competitive than grapes are comparing to the main competitors

There are indications that SFV is more competitive in exporting mangoes than grapes in relation to its major international competitors, although grape production is more profitable in the SFV. Annual production costs of mango are estimated at BRL 10,500/ha (USD 4,375), with yields of 25 to 30 tonnes per hectare, resulting in about USD¢ 16/kg, adding, internal freight and port costs, the FOB cost of mango reaches about USD¢ 30/kg.

Comparing average FOB prices from 2000 to 2003, Brazil is among the countries with better revenues, probably due to its exploration of market windows (Figure 5.3).





## 6 Alternative crops

Mango production is more cost competitive than grapes are comparing to the main competitors

The SFV has to look for production alternatives in order to improve sustainability for its business. In this sense, EMBRAPA's research is crucial in improving the varieties of other fruits, such as bananas, that are currently less important in the region. At the same time, there are studying the economic feasibility of these new business alternatives for the region like bananas, oranges, sugarcane, pineapple, fruit pulp, wineries and so forth, to better structure its growth. However, these other businesses or crops are still subject to particular constraints at the moment (Figure 6.1), which cause investors to continue investing in either grapes or mangoes.

**Figure 6.1 Potential crops and current main constraints**

<b>Fruit</b>	<b>Major constraint at the moment</b>
Banana	Need to adapt the variety accepted in the international markets; Poor domestic logistics
Sugarcane	Requires expansion of the local sugar mill, or investment in a new mill
Young wines <sup>1</sup>	Limited market access (domestic and international)
Oranges	Sanitary and tariff barriers in the U.S. and the EU for table orange Production technology and efficient varieties for juice production
Melon	Export market windows are already being explored by other similar region, northern to the SFV

Source: Rabobank based on market information, 2005

<sup>1</sup> Young wines refers to wines that are drunk young



# 7 Strategic Analysis of the SFV

Long term sustainability will come from yield improvement, and new crop alternatives

Considering that the largest strength of the SFV region is the ability to harvest fruits in market windows that no or few other competitors can have supply for the international market, the most important risk of producing fruits in the SFV is its own growth, which would increase the supply in its almost exclusive market window resulting in price decrease. Of course, weather and exchange rate can not be forgotten, since these also offer risks for the sector, but in a more immediate manner. The longer term sustainability will be linked to the improvement of some of the SFV weaknesses such as the low yielding varieties of grapes that would turn the region competitive in other market windows, and to develop alternative crops.

## 7.1 Risks and mitigants

Risks	Mitigants
Crop failure – Rainfall	- Plastic cover on vineyards (grape) - Window focus based on market but also on rain pattern
Low prices	- Diversification of markets in domestic and various export markets
Exchange rate	- Diversification of sales in domestic and exports
Water shortage	- Sobradinho lake and the São Francisco River offer plenty of water supply
Sanitary requirements	- Easy adoption of EUREPGAP and USDA standards because of top technology and in some cases large scale of farms helping to dilute this cost
Concentration in grapes and mangoes, putting pressure on prices	- Possibility to successfully grow other irrigated crops - Strong marketing arrangement / coordination
Increasing production of mangoes and grapes diminishing profitability of exports	- Explore new markets such as Asia - Make marketing efforts promoting Brazilian fruit overseas - Better chain coordination among farmer and trader - Reduce production costs by improving production technology, increasing yield, quality, and margins
Source: Rabobank, 2005	

## 7.2 Drivers and trends

Drivers	Trends
Sanitary barriers	- Adoption of EUREPGAP, USDA and other certificates - Presence of Brazilian exporters at major international destinations to check quality and help in negotiations with buyers (some private companies or associations) - Diversification of crops
Quality control	- Packing houses at farms to avoid: <ul style="list-style-type: none"> <li>• transportation problems reducing losses in quality and costs</li> <li>• better quality at final destination</li> </ul> - Increasing use of ports with better infrastructure for refrigeration containers and with easier inspection process

Export bargain power	- Export through associations or cooperatives - Increasing farmer scale
Salvador port being fairly busy	- More use of other ports such as Suape, Pecem and Fortaleza
Expansion of grape area and need for labour	- Increasing fixed employees per grape farm to ensure a minimum of good workers during peak times
Increasing rainfall in the first half of the year	- Decreasing first crop of grapes, increasing second crop
Relatively low yields	- Research and adoption of new technology aiming to improve yields - Concentrate sales to market niches or market windows
Increasing retail concentration in Europe with increasing packing requirements (increasing product specificity)	- Increasing threat of difficult sale for second markets in case products are rejected due to the specific packing required by some retail chains. - Decreasing market access to new entrants, since these large retail chains tend to work with fewer, specialised suppliers.
Increasing farmer size	- Decreasing dependency of the large farmer on the export association
Increasing production and exports of grapes	- Decreasing grape prices in Brazilian export windows - Will eventually need to expand the harvest season to compete in other countries' market windows, which will require cost reduction
Source: Rabobank, 2005	

### 7.3 SWOT analysis of the region

Strengths	Weaknesses
<ul style="list-style-type: none"> <li>- Favourable natural conditions of rain, soil and water for irrigation;</li> <li>- Possibility of harvesting at any time during the year so producers can have flexible market windows to maximise sale price, while the climate of other regions makes this impossible;</li> <li>- Access to six export ports;</li> <li>- Close to major capitals of the north-east region (large consumer market);</li> <li>- Fast return on invested capital, depending on the fruit;</li> <li>- Supply of labour;</li> <li>- Adoption of top technology in production systems, crop management, packing and trading;</li> <li>- Supply chain coordination (by farmers);</li> <li>- Relatively large and well organised farmers, with own packing houses, and own trading and logistics organisation;</li> <li>- Export pool organisation with high quality guidelines for its participants, and high volume to offer to the international buyer;</li> <li>- Entrepreneurial spirit of the top farmers.</li> </ul>	<ul style="list-style-type: none"> <li>- High logistics costs to ports due to poor road maintenance, and distance to ports;</li> <li>- Lack of financing resources for farmers;</li> <li>- Safety of the farm – need to invest in security to prevent theft of inputs or machinery and equipment;</li> <li>- Constant year-around sunshine results in smaller yields, unlike production regions in higher or lower latitudes whose sunshine hours are concentrated in production season.</li> </ul>

Opportunities	Threats
<ul style="list-style-type: none"> <li>- Decrease transportation costs by reactivating a railway in the region, or improving the maintenance of the roads;</li> <li>- Available land to expand;</li> <li>- Available irrigation infrastructure and water to expand;</li> <li>- Expand the use of air transportation for exports;</li> <li>- Possibility of diversification to other crops since the valley has soil, weather and irrigation conditions to produce crops other than grapes and mangoes;</li> <li>- Explore the Asian market.</li> </ul>	<ul style="list-style-type: none"> <li>- Price decline of fruits with expanding production in the Brazil export windows;</li> <li>- Appreciation of the exchange rate since most of the costs are in BRL;</li> <li>- Strong concentration in grapes and mangoes, or insufficient diversity of crops;</li> <li>- Trade restriction by quotas or duties, while sanitary restrictions will be more difficult to be imposed given the high quality degree of the exported fruits.</li> </ul>
<p>Source: Rabobank, 2005</p>	



## 8 Final remarks and outlook

The SFV is a profitable export platform of grapes and mangoes

In conclusion, the SFV is a region that has proven to be a profitable export platform for mango and grapes. It enjoys the possibility to harvest grapes and mangoes practically any time of the year, therefore farmers may choose the best time in the year to supply target markets. This is the most important competitive advantage of the region since in the case of seedless grapes low yields would not make it competitive in cost terms. Other than grapes and mangoes, the region has favourable characteristics to produce other fruits such as bananas, melons and coconuts.

Production expansion tends to depress prices in the market windows it explores. Then other crops will gain importance

These other crops will gain importance in the region once the grape begins to achieve lower prices in the windows during which Brazil supplies the EU, which tends to happen as the SFV increases its production. Such a situation will force the industry to invest directly in new production areas and other fruits. It will also force the industry to reduce costs, either by improving yield or by adopting new technologies to reduce production costs in other ways.

Therefore, it is important that the region coordinates its expansion. There is nothing to be gained by expanding the grape area much further if prices and margins shrink, and the region does not have the competitiveness yet to compete at low prices for the reasons already noted above. At the moment, firms should capitalise on the November window and, as a group or an association, invest in more productive varieties that will improve competitiveness by reducing costs and allow expansion through other market windows.

Not only crop alternatives, but also explore new markets will help the sustainable development of the region

The Asian market still has to be developed by SFV producers to allow sustainable expansion of the region that has too high a concentration on grapes and mangoes. The possibility to grow other irrigated fruits will mitigate this, and ideally the development of new production regions should be coordinated by industry and government to best allocate land, farmers and crops.

