



ANALYSIS OF POMELO VALUE CHAIN IN BEN TRE PROVINCE

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ABBREVIATION

HCMC	: Ho Chi Minh city
MRD	: Mekong river delta
GTZ	: The German Agency for Technical Cooperation (Deutsche Gesellschaft für Technische Zusammenarbeit)
SOFRI	: Southern Fruit Research Institute
MoT	: Ministry of Trade
EC	: European Commission
SME	: Small and medium enterprises

CHAPTER 1: INTRODUCTION

I. Background

GTZ in cooperation with Metro Cash & Carry in Viet Nam and the Ministry of Trade of Vietnam initiated the capacity building project on fruit and vegetable marketing value chain analysis in 2005. Mutually, under the cooperation between the two governments of Vietnam and Germany, the capacity building program assisting small and medium enterprises (SME) which is coordinated by the Ministry of Planning and Investment and GTZ was also implementing to enhance the competitiveness of certain agricultural commodities in Viet Nam using value chain analysis approach.

In order to develop an efficient plan that is suitable to assist the fruit and vegetable commodity development as well as to measure its impact, both of the above mentioned projects decided to collaborate each other to implement two project components: data collection on fruit and vegetable both nationally and locally focused in four provinces including Hung Yen, Quang Nam, Dak Lak and An Giang; and 18 investigations on marketing value chains on 12 fruit and vegetable commodities in 18 provinces.

SOFRI was selected to implement the value chain investigations on mango in Tien Giang and Dong Thap; water melon in Long An; and pomelo in Ben Tre. This paper presents the result on pomelo value chain analysis in Ben Tre province.

II. Objectives

- To collect relevant information from growers to consumers on current farming and marketing practices of water melon in Long An province, .
- To define essential players in water melon value chain, then to map flowchart for different marketing channels and to evaluate roles of particular players in the chain. Through these appraisals, certain problems and constraints of different members of the chain could be identified and then suitable solutions in term of technical, financial and political supports could be recommended in order to implement value chain for water melon in Long An province.

III. Methodology

By approval of Metro – GTZ - MoT and by concerning of studies on value chain of other crops, Southern Fruit Research Institute (SOFRI) had carried out the study of value chain of water melon by following approaches:

3.1. Desk research: Relevant information from different sources such as annual reports of different organizations, scientific reports from projects, conferences, workshops, newspapers, internet, etc.. had been collected and presented in accordance with the objectives of the study.

3.2. In-depth interview: Oral interviews had been carried out for individuals or representatives of particular organizations in order to obtain reliable information or experiences regarding to water melon cultivation and marketing. Players in water melon value chain like staffs of Services of Agriculture and Rural Development, collectors and packing house operators in cultivated area, wholesalers in cities, retailers and

consumers had been identified. Reliably collected information had been subsequently analyzed in such a manner required by objectives of investigation.

3.3. Group discussion: Information regarding to cultivating and marketing practices of water melon had been obtained from growers through field visit, farmers' group discussions in order to learn problems and needs of growers. These information had also been analyzed and presented in this report.

CHAPTER 2: VALUE CHAIN ANALYSIS FOR POMELO IN BEN TRE PROVINCE

I. Summary

Ben Tre is an eastern province in the Mekong River Delta (MRD). It is recognized as highly potential in agricultural and aquacultural production with main products include: coconut, sugar cane, fruits and ornamental plants. It is also known as the main fruit and ornamental plants nursery that provide million of seedlings per year through out the country.

Ben Tre has about 41,000 ha under fruit cultivation producing most of tropically typical fruits of which Da Xanh pomelo is recognized as high quality and highly competitive in both local and international markets. Da Xanh pomelo origins from Thanh Tan village, Mo Cay district of this province. This high quality variety was found in a fruit contest organized by SOFRI. Its high quality raise higher consumer demand on market which, in consequence, encourages farmers to develop larger pomelo area. A well managed pomelo orchard can provide up to VND 200 million per year to the grower. With those advantages, Da Xanh pomelo is selected as a main fruit commodity for horticultural economic development plan at all level from province to villages.

However, the investigation showed that the development of Da Xanh pomelo production faces different constraints. Most of farms are small scale and farmers work individually which produce fruit in small quantity and inconsistent quality that make it hard to market. In addition, the production and supply are not well organized, fruit are poorly packed and marketed in several small quantity locations, and the trade mark is not well established.

This pomelo marketing value chain investigation in Ben Tre province provides chain's players' information about challenges and constraints as well as suggestions. This may help them to navigate the development program that is sustainable and beneficial.

II. General information

2.1. Introduction to Ben Tre province

2.1.1. Natural conditions

Ben Tre locates at 9°48' to 10°20' North altitudes and 106°48' West to 105°57' East longitudes. It is on the downstream of Mekong river and faces to the East sea with 65 km of seashore. It is bounded by Tien Giang in the North, Tra Vinh in West and Vinh long in the South. The provincial township is also named as Ben Tre which is 87km south of HCM city. Ben Tre is isolated by Tien river in the north and by Co Chien river in

the south. It is also divided longitudinally by Ba Lai and Ham Luong rivers into three main islands: An Hoa, Bao and Minh.

Its area is 2.356,8 km² with population of 1.351.472 in 2005 (573 person/km² on the average) . The province is administratively divided into one town and 7 districts including Cho Lach, Mo Cay, Chau Thanh, Binh Dai, Giong Trom, Ba Tri and Thanh Phu



The climatic condition is typical tropical with monsoon influence: the weather is divided into two clear seasons: the rainy last from May to November and the dry season last from December to April. Average temperature is 26 - 27°C. Annual precipitation is 1.250 - 1.500 mm.

Ben Tre's total land area is 235,684 ha in which 136,795 ha is for agriculture (58.04%). The agricultural land is divided to annual-crop area (51,405 ha), perennial crop area (85.390 ha), forest (6.421 ha), aquaculture (36.294 ha), and salt farm ...

Soil in Ben Tre is classified to four groups: Alluvial, acid sulphat, sandy and saline infected.

Alluvial group: occupies 26.9% of the total area (66.471 ha), locates on the Westside includes Cho Lach, Chau Thanh, Giong Trom and north of Mo Cay. The soil texture is mainly loamy clay (50-60%), sour character on the top layer (but neutral when move further to the sea), not very fertile, nitrogen level is medium but poor phosphate content.

Acid sulphat group: occupies 6.74% of the total area (15.127 ha), distributed through out the province including all regions from fresh to saline water effected. In some area the combination of both acidic character and saline water effects make it almost impossible for agriculture. There are two main types: low and high content of humic and organic matter.

Sandy group: occupies 6,4% of the total area (14.248 ha). This type of soil is high ferrous content, low water holding capacity, low organic, severe nitrogen deficiency and infertile.

The river and canal system in Ben Tre forms a thick net that is about 6000 km long in total. This water system is very useful in terms of irrigation and water way transport, fishery and aquaculture. However, that thick net of water system is also a demerit. It limit the land transport and makes the saline infection become severe in the dry season when the sea water enter further into main land.

With such diversified eco-system Ben Tre is said highly potential in terms of agriculture (fruits, coconut, sugar cane cultivation), fishery, aquaculture, and tourism.

2.1.2. Economy

Ben Tre's economic system grows fast during 2001-2005. The 2005's GDP is about VND 9,974.95 billion as compared to VND 5,860.5 billion of 2001. The average annual growth rate is 9.23%. Agriculture, aquaculture and fishery make highest contribution (60%) to total GDP followed by services (20-25%). Industry and others contribution are not remarkable.

Table 1: Ben Tre GDP (VND billion) and GDP structure (%)
(Ben Tre statistical year book 2005)

Year	2001	2002	2003	2004	2005
GDP	5,860	6,449	7,191	8,672	9,975
Agriculture, aquaculture and fishery (%)	66,7	64,6	62,1	60,8	57,6
Industry and construction (%)	12,8	13,7	14,6	15,7	16,8
Services (%)	20,5	21,7	23,3	23,5	25,7

Ben Tre's agriculture has relatively fast growth in the past few year with the annual growth rate of 5.02%. The agriculture GDP has also increased respectively during 2001-2005 in which animal husbandry makes higher contribution (7.1%) as compared to crop cultivation (4.1%). During 2001 to 2005 the share of animal husbandry in agriculture GDP increased from 20.46% to 29.45% while that of crop cultivation decreased from 75.98% to 62.54%. It was explained that there was a significant technology improvement in animal husbandry with the participation of various sectors such as food processing, veterinary...

Table 2: Ben Tre's agriculture GDP during 2001-2005
(Ben Tre statistical year book 2005)

Year	2001	2002	2003	2004	2005
GDP (billion VND)	3,990.3	4,212.6	4,493.4	5,002.5	5,521.4
Crop (%)	75,98	69,25	68,46	66,64	62,54
Animal husbandry (%)	20,46	25,68	25,05	25,71	29,45
Other services (%)	3,56	5,07	6,49	7,65	8,01

Within crop cultivation fruit growing made the highest share of 51.3% followed by food crops (24.2%) and industrial crops (16.4%).

The fruit area gained a fast increase and reach to 39,739 ha in 2005 that occupies 29.1% of total agricultural land and produces 379,901 MT. The fruit area is mostly concentrated in Cho Lach and West of Chau Thanh district. The fruit development is oriented to variety diversification in which the citrus group is emphasized a well as those fruit for processing like mango, banana, papaya and locally typical fruit such as durian, rambutan, mangosteen, langsat. The province plan to achieve fruit productivity up to 588,000 MT in 2010.

Ben Tre has 5,000 private nursery those are concentrated in Cho Lach district. They produce about 16-18 million seedlings per year and provide through out the Mekong river delta and other area like the South Easter, the central and the North as well. The nurseries in Cho Lach through variety collection, selection and multiplication have provided a number of good fruit varieties to the area including Chin Hoa, Mong-Thong, RI-6 durian; Cai Mon mangosteen; Rong Rieng rambutan; Ha Chau Chinese berry; Hoa Loc, Tu Qui mango; Nam Roi and Da Xanh pomelo; sweet mandarin, Xoan orange, seedless guava. Especially, it is recognized that the two private nurseries of Hai Hoa and Ba Ro provide about 50,000-60,000 seedlings of Da Xanh pomelo to farmers.

In addition, Ben Tre developed 29 eco-tourist resorts. Tourism is emphasized as the third income resource for the province after horticulture and aquaculture. Tourism is also considered as the for hungry elimination and poverty reduction. In 2005 it is recorded of 151,00 foreign tourists visited Ben Tre that increases 82,4 % as compared to 2002.

Regarding to man resource, in 2005 it is calculated that 66.59% of Ben Tre population is of the working-age (899,908 persons) in which 54.76% are working in agricultural field.

2.2. Pomelo in Ben Tre

Pomelo - *Citrus maxima* (Burm. Merr.) or *Citrus grandis* (Osb.) – belongs to Rutaceae family that origins in South east Asia and southern part of China. It is recognized as a healthy fruit due to its high nutrition and mineral content (Ca 30 mg, Fe 0,7 mg). It is also believed that this fruit has medical effects as it help to improve digestion system and others. In Viet Nam pomelo was grown popularly from North to South. In 2004 Viet Nam has 25,690 ha pomelo of which 14,234 ha is in the Mekong river delta and divided as 5,947 ha in Vinh Long, 3,732 ha in Tien Giang, 2,406 ha in Ben Tre, 1,750 ha in Hau Giang, 1575 ha in Soc Trang, and 1,038 ha in Tra Vinh. The pomelo varieties include Nam Roi, Da Xanh, Long Co Co, Duong...in which Da Xanh is recorded as the best.

Currently Pomelo occupies 7.56% of total fruit area in Ben Tre (3,004 ha) of which 500 ha is for Nam Roi, 1290 ha is for Da Xanh. Nam Roi pomelo are grown though out the province while Da Xanh is concentrated in Cho Lach, Mo cay, Ben Tre town and Chau thanh districts. It is recorded that a well managed Da Xanh pomelo orchard can provide up to VND 200 millions/ha/year.

Table 3: Pomelo area and production in Ben Tre (2005)

	2001	2002	2003	2004	2005
Total fruit area(ha)	35,106	36,390	39,268	40,378	39,739

Pomelo area (ha)	624	843	1,544	2,366	3,004
Pomelo production (MT)	3,255	5,987	9,058	11,448	15,827

Variety characteristic of some pomelo in Ben Tre.

Long Hong pomelo: Also called as Long Co Co, origins in Cai Be, Tien Giang. It is said that this variety has lower quality as compared to Nam Roi and Da Xanh but higher yield. It is also a hard variety, highly tolerant to pests and diseases. Its name comes from a character that the young shoots, fruits are lightly hairy. Tree is woody vigorous, tree canopy is rounded. Leaves are elliptic in shape and dark green. Tree start bearing 2.5 – 3 years after planting. Fruits are harvested all year round but the main season is from Aug. to Dec. It takes 7-7.5 months from flowering to harvest. 7-year-old tree can produce up to 100 fruits/year. Fruits have average fruit weight from 0.9-1.5kg, pear shape, yellowish green and lightly hairy peel, easy peeled and seeded. The juice sacs are pinkish and juicy. The juice taste is a bit bitter with good blend of sugar and acid content.

Da Xanh: grown from 1960 in Thanh Tan, Mo Cay, Ben Tre. This variety is popularly growing in Ben Tre, Vinh Long, Dong Nai and Tien Giang due to its high quality. Tree is semi-vigorous, rounded canopy. Leaves are dark green. The typical character of this variety is that the leaf blade is partly covered by the leaf wing. Tree come to bearing stage 2.5-3years after planting by grafted or marcoting materials. It takes 7-8 months from flowering to harvest. Tree yields up to 100 fruits per year and regular bearing. The average fruit weight is 1.5 kg though some reach to 2-2.2 kg. Fruit is rounded green contents pinkish and impact juice sacs, seeded. Fruit juice has good sugar-acid blend and aromatic.

Nam Roi: Origins in Long Tuyen, Chau Thanh A, Can Tho. However, others say its origins in My Hoa, Binh Minh before 1925. It is also a famous variety in the MRD. Currently it is grown popularly in this area. Tree is semi-vigorous. The dark green leaf blade is in egg shape with heart shaped wing. Tree start bearing 2- 2.5 years after planting. Fruits are harvested all year round but the main season is from Aug. to Jan. that coincides with New year festival. It takes 7-7.5 months from flowering to harvest. 7-year-old tree can produce up to 100 fruits/year. The average fruit weight is 0.9-1.5kg, pear shape, yellowish green and lightly hairy peel, easy peeled and seedless. The juice sacs are pinkish and juicy. The juice taste is a bit bitter with good blend of sugar and acid content. Fruits have average fruit weight from 0.8-1.8kg, pear shape, yellowish peel, easy peeled and seedless. The juice sacs are pinkish and juicy. The juice taste is not bitter with good blend of sugar and acid content.

Table 4: Variety description:

Characters	Long Hong	Da Xanh	Nam Roi
Shape	Pear shape	Global	Pear shape, lower fruit talk
Peel color	Yellowish-spot green	Yellowish green	Pale green to pale yellow.
Average fruit weight (kg)	0,9 – 1,5	1,2 – 1,8	1,0 – 1,5
Juice sac color	pinkish	Pink to light red	White to yellowish
Brix (%)	9-10	9-11	10-12

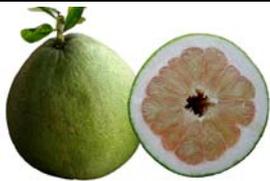
Seed number /fruit	seedless	0-30	0-30
pictures			

Table 5: Pomelo area in Ben Tre (currently)

Local	Total area (ha)	Bearing area (ha)	Yield (MT/ha)	Production (MT)
Cho Lach	150	30	9.0	270
Mo Cay	573	245	14.4	3,532
Ben Tre town	300	45	10	400
Chau Thanh	267	15	7.6	114
Total	1290	335		4316

Source: Ben Tre Department of Science and Technology

Table 5 shows that Mo Cay and Ben Tre town occupy highest Da Xanh pomelo area (573 ha and 300 ha respectively), Their combined production is about 4,000 MT/year (91.1% Ben Tre total production). The average yield is 14.4 MT /ha/year as compared to 8-10 MT/ha/year that of other places.

Da Xanh pomelo shows suitable in light acidic soil of the Ben Tre town and western area. The province plan to develop this crop upto 4000 ha in 2010 in which 1000 ha in each of Cho Lach, Mo Cay and Chau Thanh; Ben Tre town and Giong Trom share 500ha each. This program is implemented by Ben Tre Department of Science and Technology from 2006 to 2010 with the fund of VND 125.5 billion from several sources.

Pomelo can be induced to flower all year round. Farmer take this technical advantage to get fruits around the traditional festival to gain higher price on the market. This technique was developed by Mr Hai Hoa – a experienced farmer in Cho Lach. It is applied by defoliating the small mature switches with diameter around 1cm. According to the innovator, this technique can help to gain up to 1.5 MT/1000 square meter/year.

III. Market information and product competitiveness

3.1. Pomelo market trend.

Pomelo is the largest citrus fruit that is consumed in fresh, juicy forms or other products with pomelo aroma.

The world production is about 14 – 14.8 million MT/year. The US, India, Israel, Mexico, Cuba, China, Malaysia, The Philippines, Thailand are recorded of highest producers. Malaysia and Thailand share export pomelo export. Malaysian pomelo are yellowish and harvested around Jan – Feb. while those of Thailand are green and from Jun. – Oct. China also export a small quantity, mainly to Hong Kong (4207MT in 1999 and 3828 MT

in 2000) which take 2,4% in the world pomelo market share. It is said that a seedless variety was developed in China which is highly competitive in the world market.

South Africa produces 264,000MT pomelo in 2004, 250,000mt in 2005 and estimated 260,000MT in 2006. In 2004 this producer exported 217,000 MT pomelo to Japan which is about 34% in total export followed by 21% to Holland, 9.3 % to Mozambique, 5% to England and Russia. In 2005 South Africa exported 200,000MT and expected to 210,000MT in 2006.

In 2004 the total world market of pomelo was 464,000MT. Japan is recorded the largest importer (288,000MT) followed by Canada (51,000MT) and Russia (46,000MT)

Recently, Russia import higher fruit quantity including pomelo/ It is said due to the living standard is improving in this country. Russia's pomelo import increases yaer by year: 22,000MT in 2001, 33,000MT in 2002, 32,000MT 2003, 46,000MT in 2004, and 30,000MT in 9 months of 2005. The mport growth rate is about 76% per year especially 109.9% in 2004. Pomelo suppliers to Russia are Turkish, Israel, South Africa and Argentina.

The Russian pomelo market creates a potential chance for new exporters. So far, exporters could only supply 50% of Russian market demand. Beside that there is no well known pomelo brand in this market. This offer opportunity for new exporters advertise their products to Russian market. The import price in Russian market is increasing. In 2002 it was USD0.73/kg then USD 0.93 in 2003 and USD 1.2 in 2005. The import tax in Russia is lower than 5% of the import price though not lower then 0.02 EU/kg. The VAT is 18 (source: VN Agri magazine's Market infor: VN 20-26/01/2006).

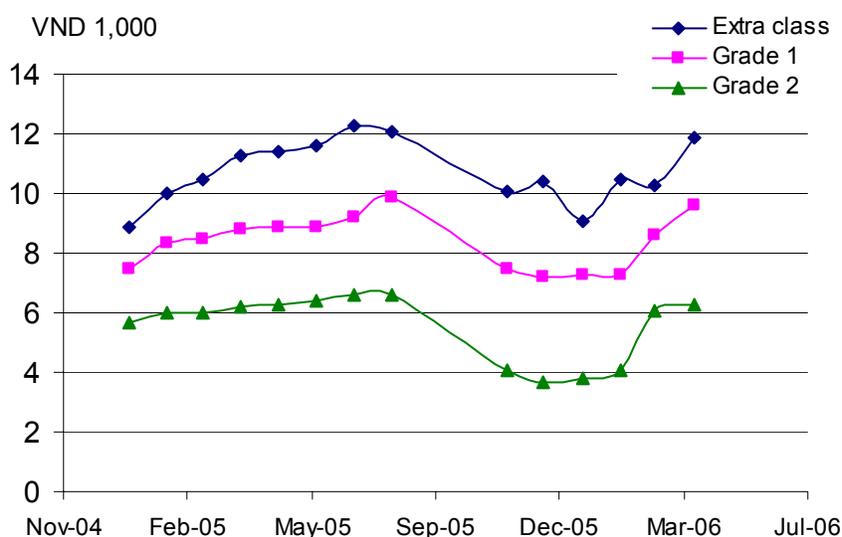
In 2004 there is 28,600 ha pomelo in viet Nam. More than half of that is in the MRD (14234ha). Currently this figure is estimated around 30,000ha with the production of 250,000MT. Most of pomelo production is sold domestically. It is recorded that in 2004 a private company names as Hoang Gia Ltd. Co had tried 50 MT export to Germany with the FOB price of USD 590 at HCM port. The calculation showed that with the buying price VND 4000/kg plus all other costs (packaging, transport...) the company gained VND 1,000,000 /MT. This means the export revenue will be zero if the fruit cost up to VND 5000/kg at local market.

Beside Da Xanh pomelo, Nam Roi and Long Co Co, Duong Da lang in the South there are others in the North such as Phuc Trach, Dien, Doan Hung. In 2005 the pomelo in Huong Khe increases to 1,600 ha in which 950 ha is in bearing stage and targeted the increase up to 5000 ha in 2010. With estimated yield of 12-15MT/ha this area produces 11,400-14,250MT/year. Similarly in 2005 Doan Hung has 749 ha (300ha in bearing) and produces about 3850MT in 2005. This district develops a project to plant a new pomelo area of 1300 ha to make total area up to 2000ha. The total pomelo area in this region will be around 7,000 in 2010. The market price of pomelo in the North is not lower than that of in the South. It is recorded that Phuc Trach pomelo gains VND 15,000-20,000/fruit, even up to VND 35,000/fruit during the peak demand period. Dien Pomelo gets VND19,000-20,000/fruit.

Da Xanh pomelo is considered as high quality and high value fruit. Fruits are sold in high value super markets, airport, fruit shops in big cities as HCM, Ha Noi, Da Nang... In Ben Tre Da Xanh pomelo is supplied through intermediate agents and fruit traders. The orders are also big at the Da Xanh Cooperative, however, this is over the cooperative supply capacity. Recently there are about 300 ha of Da Xanh pomelo grown in Tien

Giang which produces 1,500MT/year. This is even not enough to satisfy the local market demand.

On the international scale, Da Xanh were introduced into some countries in Europe, but as the samples for advertisement and promotion. Thus, Da Xanh is mostly consumed locally especially in Ben Tre and Tien Giang, the two provinces where it is grown. There is high demand of this fruit in other provinces, This make the market price of Da Xanh 2 times higher than that of Nam Roi (VND 10,000-15,000/kg as compared to VND 4,000-6,000/kg, respectively). The demand for Da Xanh is higher during local festivals and celebrations. During these occasions Da Xanh can cost VND 18,000-20,000/kg). However the supply is even not enough to satisfy the demand. This variety has been registered with the trade name as BR 99 by Mr. Ba Ro in 2004. The owner has also signed a contract with SASCO for 300 kg supply/week with the price of VND 18,000/kg.



Da Xanh price at farm gate in Ben Tre

The same variety of Da Xanh but fruits produced out of the trade-name-owner farm get only VND 10,000-12,000/kg for grade 1 and VND 8,000-10,000/kg for grade 2. This fruit gain highest market price during Jan. to Jul. as the off-season fruit harvest falls into nation festival celebrations. Similarly, trade named Phuc Trach pomelo gains much higher price as compared to others (VND 15,000-20,000/kg as compared to VND 4,000-5,000/kg respectively)

3.2. Potential of Ben Tre pomelo growth

The fruit area is fast increasing in Ben Tre with the formation of fruit-specie specified region as well as multi-variety orchards reformation campaign. The irrigation system is also well invested to make the water supply and water management program become more efficient. This created better condition for new techniques to be applied such as off-season induction to improve the farmer's income.

Currently, Ben Tre has about 144,234 ha of agri land of which 40,000ha is under fruit tree, 37,000 ha coconut and 69,000ha annual crop. Of annual crop area, 14,000 ha is one-crop paddy rice field and 17,000 two-crop paddy rice field. Apart of this low profit field can be converted to fruit orchards.

According to Vietnam Nutrition Institute, the average fruit consumption of Vietnamese is 64.97 kg/person/year. This consumption level is lower than that of in developed countries such as 73 kg in French, 120 kg in Germany. It is recommended that the number should be 150. Moreover, the improvement in income allows the change in diet, more fruit and vegetable added while carbohydrates and animal proteins are decreased.

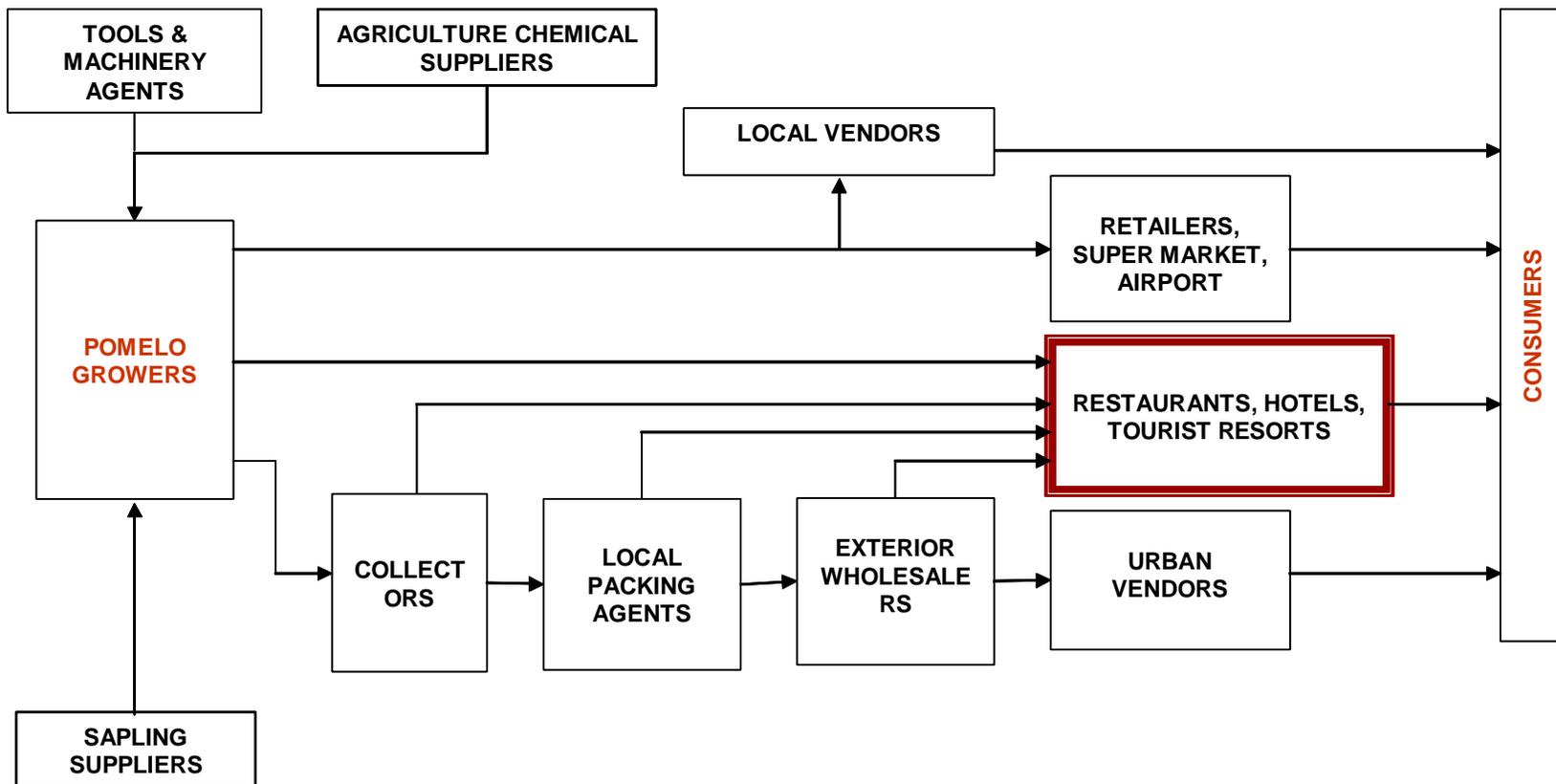
Pomelo is said to be healthy fruit. It contains high content of vitamin C that help to enhance the illness resistance. Having 100-150g pomelo/day can cure headache. Pomelo contents high amount of pectin that control cholesterol level, cease the cancer cells growth. In addition pomelo content many other health support substances such as glucoric acid, glutathione, naringin, beta-carotene and lycopene...

Currently for different trade names of Da Xanh pomelo were registered as Ba Ro (Mo Cay), Hai hoa (Cho Lach), Nong Phu dien and Da Xanh Cooperative. However the trade name promotion and advertisement are still limited.

The province planned to develop this crop up to 4,000 ha applying GAP (good agricultural practices) in 2010. This program is implemented by Ben Tre Department Science and Technology from 2006 to 2010 with the fund of VND 125.5 billion from various sources. In this project 2 pomelo grower coop will also be established.

IV. Pomelo value chain map in Ben Tre

Pomelo value chain in Ben Tre



Pomelo are consumed in fresh form. There is no processing product so far.

There are 5 marketing channels in Ben Tre:

Channel 1: farmer → retailer → consumer.

Different from other fruits, pomelo is sold directly from farmers to retailers. This channel brings higher price and higher profit to farmers as the intermediate agents were cut off.

Some farmers sign supply contracts directly to super markets in HCM city, especially Da Xanh pomelo BR99 of farmer Ba Ro are sold directly to SASCO by the long term contract. This channel provide Da Xanh fruits to Tan Son Nhat airport in HCM city. According to this farmer the demand is always higher than supply capacity. Thus the farmer has to collect fruit from others but under care that those fruits are produced from true to type variety propagated from his own mother stock tree. Similarly, other farmers prefer to bear to transport cost to bring fruit directly to retailers. It is calculated that the value added from higher price of those markets can compensate all cost and produces more profit to farmers. However this channel is known and practiced only by some farmers.

Channel 2: farmer → restaurant and tourist resort → consumer

This is an important marketing channel. Similar to the channel 1, pomelo growers bring their fruits to marketing around the tourist resorts, restaurants, hotels which mainly locate in the province and surrounding area where eco-tourist is developing. In this channel pomelo are sold not only as deserve but also as souvenir gift. Fruits are sold without contract because farmers can not assure the consistent supply. This is a potential channel since the eco-tourist is in fast developing.

Channel 3: growers → collectors → restaurant and tourist resort → consumer

Similar to the channel 2, growers have contacts with a number of the tourist resorts, restaurants, hotels but do not have enough supply they collect fruits from near by farms and become collectors after some time. By this channel small farmers get advantage of higher price because they sell fruits directly to high value markets without the interfere of intermediate agents. However collectors participate in this channel as well. They collect fruits then sell to both whole sellers and inside channel 2.

Channel 4: growers → collectors → local packers → restaurant and tourist resort → consumer

This channel serves for those customers who are large hotel, tourist resorts in HCM city where the supply from the previous ones can not satisfy. In this channel the local packers collect fruits through collectors, some small quantities from growers. Fruits are then sorted out into different grades, packed and sent to customers. Local packers also sell fruits to restaurant and tourist resort – consumer in other provinces through whole sellers in that provinces because the demand from those customers are consistent but small which are not very efficient with direct supply. The second whole sellers will supply them DaXanh along with other pomelo.

Channel 5: growers → collectors → local packager → local whole sellers → retailers/super markets → consumer

This is the main marketing channel for DaXanh pomelo in Ben Tre and also other fruits in the MRD. Fruits go through growers – collectors –Local packager - local whole sellers –retailers/super markets- consumer. The local packers collect and sort fruits then send to whole sellers and inter-province fruit traders. From this point fruits are then sold to local retailers and others to consumers. This channel can assure large quantity supply but can not fully control the fruit quality. In addition, the other citrus fruits are also sold through this channel.

SWOT analysis:

Strength: The natural condition in Ben Tre is favourable for fruit cultivation. Da Xanh pomelo was developed in 2000, today farmers are experienced in growing and marketing this fruit commodity. Da Xanh is a hard fruit with long self life. In the ambient conditions, Da Xanh fruits can be stored for 7-10 days. Under optimum storage conditions, this fruit can be store for 2 months which is long enough for distant transport with low cost. The Da Xanh marketing channel are developed which is not involving lot of intermediate agent, farmers gain better income with better market price. The Da Xanh Ba Ro 99 brand was registered, this help to build up more demand and more supply contracts though the supply is limited. A higher portion of fruit grower in bent re prefer to grow Da Xanh, the area enlargement of this fruit is highly potential. There is a strong support from the local authority, a number of local projects are implemented to intensify this commodity growing in order to assure consistent supply. Several studies on this fruit are performing in various research institutions.

Weakness: Most of Da Xanh farms in Ben Tre are in small scale and in mixing with other fruits. This makes the fruit yield is low and low market competitiveness. The planting material are not well certified which makes the commercial fruits are not uniform and seeded due to cross pollination. This affected the fruit quality, the trade name and the supplier reputation which are harmful to further development of this commodity. There is an increase in technology transfer activities but the fruit cultivation technique is not well improved because farmers said not well literated. There is a lack of pioneers or advanced farmers to coordinate the local programs that focus on Da Xanh development. Facilities that support fruit cultivation, harvesting and post-harvesting are not enough to produce fruit that meet the international market standard. Off season flower inducing make trees flower year round and bear fruits of various growth stages, these make it difficult to strictly follow the spray program that avoid chemical residues. The is no official market standard or fruit safe standard to control fruit quality on the market. The production cost and marketing cost are high. The export will not bring good revenue to sellers since the input price reaches the export price.

Opportunity: The fast economic growth raises higher quality fruits demand in local market. The trade name development promotes higher demand on international market(EU, Japan, Canada, Russia). The BR99 pomelo get more and more demand with large quantities. A number of Da Xanh cooperatives (Da Xanh My Thanh An Coop., Da Xanh Phu Thanh Club) were formed to promote higher production and marketing this fruit commodity.

Threats: There are strong competition from other pomelo suppliers in the region such as Thailand, Malaysia, The Philippines, China...with large volume and high quality. Da Xanh market is in risk since the fruit quality is not consistent and the fruit safe is not fully assured. The high fruit production and marketing costs are also significant constraints.

V. Description of value chain's members/inter-firm relationships

5.1. Pomelo growers

Through direct observation and farmer group discussion the results show that:

- The farm scale is from 0.1 to 8.0 ha. The popular scale is 0.2 – 0.5 ha.
- Da Xanh occupies 82.5% area, Nam Roi takes 25% and 7,5 % for other varieties
- Regarding to the reason of variety selection, data from a population of 50 farmer show that 100% farmer grows Da Xanh due to its hard characters, high quality high return; 20% said that it is suitable to the local eco-condition; 15% said due to it highly potential for Ben Tre and nearby provinces.
- Most of Da Xanh orchards are resulted from reforming of other low income fruits cultivation like longan, oranges or rice. In the first 2 years cash crop and vegetables are inter-cropped with juvenile pomelo trees to produce living for farmers. The return increases from third year when pomelo start bearing but the orchard dose not provide income due to production cost is high. Good revenue may come from the fifth year or forth year in well managed orchards.
- 40% of growers buy planting material from Ba Ro and Hai Hoa nurseries. Other 60% buy from near by then multiply by themselves because they have less capital.

The cultivation procedure is as following:

* Orchard design:

- Damming to avoid inundation.
- Bed raising.
- Wind break planting.
- Identify planting density and planting distance
- Installing irrigation system
- Soil preparation

* Planting and care

- Variety selection
- Planting
- Ground mulching
- Water supplying
- Sodding (grow grass to maintain soil moisture and avoid soil erosion)
- Mudding (clear the mud layer under canal basin to raise the bed every year)
- Fertilizer application
- Training and pruning
- Flower inducing
- Fruit thinning and fruit bagging

*Plant protection: Cancer (*Xathomonas campestris pv.citri*) root rot (*Fusarium; Phytophthora*), Nematodes, peel borers (*Spray citri*), Mealybugs (*Pseudococcidae*), Psylla (*Diaphorina citrii*) ...

*Harvest and storage:

- identifying Maturity index.
- Harvesting method.
- Packaging and marketing.

72.5% manage the orchard by themselves while 27.5% hire labor for some works like spaying, fertilizer application, weeding. 85% of growers have some sorts of machine like water pump, sprayer.

72,5% of farmers buy the inputs from local chemical shops, though they may have to pay higher price but the supply is consistent and sometimes they can pay the later. However 27.5 % buy inputs from larger shops not due to lower price but just because those shops are by the road way or near to other markets. Most of farmers buy inputs by cash. They sometimes delay the input application because they think that those delay won't affect much fruit yield and quality. This perception against the scientific recommendations.

10% of farmers recognize the technical consult from chemical sellers. However, it is also recognized that the fruit yield and quality sometimes decreases due to the wrong recommendations and limit of supply of right products from local chemical shops. 50% of farmers said the input price is increasing which increases the cost of production.

Though recommendations on pomelo cultivation are provided by different research institutions and extension departments, however, farmer's knowledge is still limited. This is argued by growers that the training and workshops are not organized properly in terms of timing, location and not regular. The technical providers explained the problem is due to the constraints as the limit of extension fund, only district extensionist and key farmers are trained to be farmer trainers.

A 5-year old pomelo can bear 20-25 fruits/year. On the average, with the planting density of 35-40 trees/1000m² farmer can get 8-10MT/year. Fruits are harvested year round, farmers select and harvest fruits by themselves. When fruits are harvested in small quantity, farmer sell fruits directly to local collectors as it is most convenient. If fruits are harvested in larger quantity, a small increase or decrease in price will make a significant change of the income, farmer sort fruits out and sell directly to different targets when they believe best. Fruits are harvested at 8-11 am or 15-17am. On the farm fruits are sorted to 3 grades: super, grade 1 and grade 2. The super grade is around 10-15%. The portion of grade 1 and 2 usually are 40-50% and 30-40% respectively. The off season harvest don't provide super grade.

Table 6: Da Xanh pomelo standards in Ben Tre.

Grades	Shape	Appearance	Weigth
Super	Well shaped	Pale green, enlarged oil cells	1.5 – 2.0 kg
1	Typical shaped	Pale green, enlarged oil cells	1.3 – below 1.5 kg
2	Mishaped	Pale green, enlarged oil cells	below 1.3 kg

Source: Survey 2006

Most of farmers have no treatment for their fruits after harvest, only 41.3% of them sort the fruits before marketing. The treatment includes shortening the fruit talk, clean the peel and packing. Fruits are packed in nylon containers. Each container contains 10-20 fruits of grade 1 or 25 -35 fruits of grade 2. The post-harvest loss from harvesting to marketing is 1-2%. This loss is due to mechanical damages. 30% of farmers accept their fruits are not meet the human health hazard standard, 15% of them believe their fruit is safe and 55% of interviewees did not answer the question.

Farmers are smart in market price querying. The information may come from other farmers and local packers, collectors (whom they normally sell their fruits to), local radio, TV (VTV, Vinh Long TV). Generally, farmers gain income equal to 83-149% of input for bearing fruit orchards. Owners of 2-3 year-old orchards spend VND 3,911,000/year for investment.

Table 7: Cost-return on 1,000 m² Da Xanh pomelo in Ben Tre

Juvenile phase (2-3 years)		Producing phase (4 year onward)	
Orchard preparation	748.214	Orchard preparation	563.913
Planting material	613.333	Planting material	540.455
Organic matter	591.333	Organic matter	135.652
Inorganic fertilizer	438.889	Inorganic fertilizer	128.421
Pesticides	108.897	Pesticides	255.391
Fungicides	95.263	Fungicides	102.308
Power	337.500	Power	1.361.429
Others	191.818	Others	444.000
Tools and machines	643.077	Tools and machines	152.250
Family labor	1.236.875	Family labor	537.500
Hired labor	1.124.545	Hired labor	4.221.318
Total	4.478.267	Total	1.050
Yield (kg)	161	Yield (kg)	4.020
Average sell price	11.091	Average sell price	10.000
From Fruits	566.667	From Fruits	10.500.000
Net income	-3.911.600	Net income	+6.278.682

Source: Survey 2006

Fruits are traded in cash. This is the most preferable way. However, the buyers sometimes low the price down by regarding the fruits to lower grade or by any reason when they find the oversupply and due to the trading way without contract. The price may change depending on daily market price. Usually the price is high during the off season. The coop members of My Thanh An Coop. sell fruits directly to market instead of collaborative marketing.

Table 8: Selling prices (VND) at farm gate

Grade	Main season	Off season
Extra	13,000 – 15,000	16,000 – 18,000
1	8,000 – 12,000	12,000 – 15,000
2	6,000 – 8,000	8,000 -10,000

5.2. Collectors

The collectors may be pomelo growers. After a long term contact with routine wholesalers they sometimes collect fruits from other farmers to add to their own product before transport to the wholesaler. They may also be wholesaler relatives. They collect and sell fruits as described in supply chain analysis section above. Farmers sometimes harvest small quantity of product which is too small to make an efficient transport to the market, they accept to sell for fruit collectors with lower price and get cash. In contract sometime the collectors collect fruit under contract or order from whole sellers when they need a certain amount that fill up the implementing contract. Collectors play a role as the connection between growers and packers or wholesalers. They also feed back market information to farmers timely. Usually the collectors obtain revenue of 5-7% of total exchange value. They work with their own family labor source. Their capital is as little as around VND 10-15 millions. They buy and sell fruits within a day, this way of trading does not require large capital.

The price sometimes goes mad due to low and inconsistent supply. When it occurs collectors prepay farmer 20-50% of the total estimated value of product. As an oral agreement they collect any fruit that farmers have later then pay the remain at current market price. This creates a high competition between collectors.

5.3. Local packing agents

These agencies plays an important role and potentially powerful with large capital. They are mostly local people, well experienced (2-20 years running business but mostly from 5-15 years). They trade 2-3 different citrus fruits, however, each runs a main commodity combining with others depend on the sources of supply.

The business scale is different between local packers which are from VND 40 million to VND 500 million, in some cases the capital may be VND billions. The intake of those local packers ranges from 1-5 MT/day to 10-20MT/day depend on the season. The revenue of those local packers is about 5-15% of total exchange value.

Most of workers in those local packers are within family member or relatives. 2-5 labor may be hired during the peak season (From Oct. to Feb.) for sorting, packing and other labor works. The owners exclusively perform works that directly relate to business management. Most of exchanges are paid in cash.

The local packers have to bear all cost of collecting, sorting, transport, tax...until fruits arrive the whole sellers. They pay the lower price to farmer as compared to that of for collectors. It is explained as because fruits collected from farmers need to be resorted while that is not necessary when fruits were collected by collector. The portion of Da Xanh is about 10-20% of total pomelo volume intake.

Some of constraints that limit the operation of these agencies are:

- The business position (land plot) which is close to fruit markets is rent from others and small. It is hard to enlarge the operation ground. Moving to the new place will severely affect the business because it will influence the transport and the operational habit of routine customers.
- The other constraint is the capital. Large capital is needed to enlarge the business, however, loaning or crediting source is limited. Usually, the local packers get credit

or loan from family members and relatives. The paper works scare them to banking. Thought the current credit sources take higher rate of interest as compared to banking but it is said to be easier.

- The cost of transport is increasing. It is said due to the increase of gas/petrol and other road fees, ferry fair...One metric tonne of pomelo transported from Ben Tre may cost up to VND 600,000 -700,000 to HCM city; VND 1,4 -1,8 million to the central area and 2.0 – 2.5million to the north.

5.4. Wholesalers in other provinces

Those actors are mainly at fruit whole sale markets in HCM city. They have 10-30 year experience in running this kind of business. Their business is specified to a particular fruit or a few fruit commodities. The business activities is similar to those are local packers. Their customers are supermarkets, retailers, restaurants, hotels.

The business expenditures includes costs of hiring a fruit shop in the fruit wholesale market, costs of handling and transports, labor cost for sorting, packaging...Most of them operate as a commission agent. The commission fee is around 10% of total value after all cost are reduced. Usually the super pomelo of Da Xanh, Nam Roi are sold to supermarkets by orders.

60% of wholesalers pay the same price for fruits collected from either farmers or collectors while others said they pay VND 500 higher for the later. It is explained that their pay higher price for collectors because those are routine customers with high reputation. In contract, the supply from farmers are usually in small volumes and not consistent. Moreover, the farmer's grading standard is also not consistent. During the off season when fruit supply is rare farmer require to upgrade the grade 2 to grade 1 and grade 1 to super and require a higher pay.

The key principle that most of the wholesalers follow is consistency in quality and maintained reputation.

The wholesalers require cash from street retailers who come to buy fruits directly. In other cases fruits are home delivered to super markets, restaurant, fruit shops and the payment can be done on next delivery after the fruit quality is satisfied by consumers.

Most of business activity in wholesaler shops is performed by their family members accept 2-4 employed workers who do some physical works. Today most of wholesalers have mini-truck that can deliver fruits within the city area in stead of paying for transport service. This help to save some running cost.

5.5. Retailers and supermarkets

Those agents supply both domestic and imported fruits directly to customers. Retailers sell fruits all most everywhere such as food markets, fruits market, super markets, street markets, street shops...

There are two groups of retailers: Local retailers and retailers in other provinces

Local retailers: This group collect grade 2 and grade 3 fruits from local packers then supply to consumers within Ben Tre. They gain a profit around VND1,000-2,000/fruit. They collect grade 1 fruits only when they get order directly from customers. It is

explained that the grade 1 fruit is expensive, it requires higher capital input but difficult to sell to local consumers and don't make higher profit.

Retailers in other provinces collect fruits from farmers, local packers and wholesalers then sell to consumers in their provinces. The selling price is usually double because they have to pay higher price from middlemen and bear different other costs. In this group the super market is special. They do get fruits delivered directly to the main point then deliver to different branches. They sometimes buy fruit from farmers who carry fruits directly to their place, but due to inconsistent supply they do not pay much interest to this supply source. In return farmers with small quantities are not interested to sell fruits to super markets since it does not bring them more profit as the cost of transport and others are high and the payment is complicated.

The retailer force is huge, their capital (VND 1million to 5 million) and the exchange volume are low. However their sell-buy cycle is fast. Each time they buy 30 – 150 kg of fruits and repeat the cycle within 1-3 days. Within the short cycle fruit quality and fruit appearance are almost maintained accept 3-5 % weight loss. To balance the price with fruit quality, retailers sell higher price to early customers when fruit quality is super and lower price to later customers when fruit quality is decreased.

5.6. Customers and consumers.

Consumers spend up to 28% total income for food. Market is the main source of food supply. 87.6 % of consumer get food from market. They believe that food is fresher in the market as compared to that of at super market. However, consumers preferred to buy poultry product in super market due to food safe concern issue. It is clear that consumers do not pay high concern of food safety issue in case of fruits, vegetables and some others. Consumers also believe that the food safety is assured by directly selecting rather than rely on the trade name and food safe certificates.

Usually consumers evaluate fruits by eyes and by hand touching. The criteria order applied when selecting fruits are: size, maturity or ripeness or color, shape, taste or flavour or aroma. They make decision base on the size appearance and price. 76% of consumer buys fruits from retailers that close to their home or on street shops due to its convenience while the remain portion of consumers by fruits from super market because they believe fruits in super market are assured in terms of right quality and right price. 90% of consumer said they can not identify fruits from different varieties but rely on retailers. There are some cheating retailers who sell high price for poor quality fruits that bear the name of good variety.

There are 22% of consumers often buy fruits like apple, grapes, dragon fruits, mango, king mandarin, mandarin, pomelo, water melon, banana, papaya of which pomelo takes 30% of volume share. 79% of consumer buy fruits 1-2 times per week; 1-3kg each time. Most of consumer buy grade 1 and grade 2 pomelo. They don't pay interest on super grade sine it is more expensive and not much better quality. Consumer concern the safety issue on vegetables rather than fruits as they say fruits are peeled before use, especially pomelo with thick peel and has a long development time on the tree. 65% consumer store fruits in the fridge for 2-8 day except pomelo in the ambient condition. Pomelo sometimes is chilled before eating to get cooler taste.

Most of consumers prefer fresh fruits. In case of pomelo, consumers prefer Nam Roi sine it is not very costly and it quality is good. 80% of consumer does not know Da Xanh pomelo. The other 20% know Da Xanh but can not differentiate Da Xanh with other

pomelo. Consumers buy Da Xanh for diplomatic purpose, for their own consumption they prefer Nam Roi. Consumer in HCM city accept to pay (will buy more) VND 10,000-15,000 /kg rather than currently VND 20,000-25,000/ kg.

5.7. Restaurants, Hotels, tourist resorts.

This is a special group, they supply fruits directly to consumers. Recently when eco-tourist industry is fast developed, the demand for tropical fruits is high included Da Xanh pomelo. They get fruits supply at home from collectors and farmers. This group market a considerably high volume of Da Xanh for fresh consume and for customers to bring home as tourist gifts. Restaurant in HCM city use to order Da Xanh from wholesalers. This group pay the same price for all suppliers and require grade 1 quality only.

Like the exchange between collectors and farmers this group pay cash to suppliers when get fruits without contracting.

5.8. Role of different organizations on pomelo development.

The VINAFRUIT (Vietnam fruit growers and traders association) was formed in 2000. Its principle objective is to assist the production and marketing for its members and to maintain fruit price on the domestic market. Some of its activities and projects are fruit trade name development, reforming fruit nursery organization, fruit sale promotion workshops, building information exchange network, developing fruit whole sale markets.

VI. Pricing

Table 9: Pricing of pomelo fruits through market chain from Ben tre to HCM city.

Season	Market chain components	Selling price (VND)		
		Grade 1	Grade 2	Grade 3
Da Xanh				
Off season	Grower	15.000	12.000	10.000
	Collector	16.000	13.000	11.000
	Local packer	20.000	16.000	13.000
	Wholesaler	22.000	18.000	15.000
	Retailer	25.000	20.000	16.000
Main season	Grower	12.000	10.000	7.000
	Collector	13.000	11.000	8.000
	Local packer	16.500	14.000	11.000
	Wholesaler	18.000	15.000	14.000
	Retailer	20.000	17.000	15.000
Nam Roi				
Off season	Grower	7.700	6.400	5.000
	Collector	8.500	7.000	5.400
	Local packer	12.000	10.000	7.000
	Wholesaler	13.000	11.000	8.000
	Retailer	14.000	12.000	9.000
Main season	Grower	5.500	4.000	3.000
	Collector	6.000	4.500	3.300
	Local packer	9.000	7.000	5.300
	Whole saler	10.000	8.000	6.000
	Retailer	11.000	9.000	7.000

Long				
	Grower	Max	Min	
	Collector	4.000	2.500	
	Local packer	4.300	2.800	
	Whole saler	7.000	5.000	
	Retailer	8.000	5.500	
	Vựa ban lẻ	9.000	6.500	

The average farm gate price of pomelo is high (VND 11,200-15,000/kg), during traditional festival it may go up to VND18,000/kg. It brings high profit to farmers. The retail price of Da Xanh pomelo is about VND 15,000-10,000 during the main season and up to VND 20,000-25,000/kg in the off season. The demand for Da Xanh is high and its supply is not enough while Nam Roi and Long pomelo are available with cheaper prices. Nam Roi is VND 7,000-10,000 per kg lower than that of Da Xanh. Similarly the difference is 10,000-15,000 in case of Long pomelo. The pricing as in the market does not follow any rule but depends on the demand at a particular time. When demand is high every component of the chain tries to push the price up to get as much profit as possible while consumers have to pay much higher than the normal cost of production. It can be said that there is not an effective sales promotion or marketing strategy. Consumers may turn to buy other supplementary fruits.

This pricing makes Ben Tre pomelo difficult to be marketed on an international scale. According to Dr. Vo Mai, secretary of VINA FRUIT, foreign consumers do not concern variety name but quality, appearance, uniformity, safety. The current product volume and current high price make Da Xanh product impossible for export.

VII. Constraints/opportunities

The first concerned difficulty is the high cost of input in pomelo production. In addition, the other costs such as transport, marketing are also high, making the retail price high.

Next difficulty is inconsistent quality which may be due to:

- The planting material is not uniform and not certified. Farmers buy seedling from so many different suppliers that many of them are not certified.
- Due to various constraints, farmers' knowledge on cultivation technique is limited and farmers' experience is variable, which makes the fruit quality become inconsistent. The technical guidance doesn't reach the growers.
- Pomelo cultivation is also not well intensified. This fruit is intercropped with other fruit crops, making orchard management very difficult.
- Fruit thinning technique is not well applied, making trees produce small fruits, mostly grade 2 and 3.
- High pressure of pests and diseases, especially greening disease, also affects the fruit quality and orchard life.
- Low capital input is also one of the main challenges for most small-scale farmers. Loaning from government requires complicated paper work, pushing farmers and other components in the market chain to take credit from the private sector with a high rate of interest. This contributes to the high production cost issue.

Contracting is not familiar to most of members in marketing chain. Most of trading is based on oral agreement and reputation that put their business into high risk and difficult for legislation application.

There is no common quality standard. This makes it difficult to apply and consistent understanding on fruit quality between market chain's members. The farmer coop is not well operated due to limit operational capacitive of management board. The coop. efficiency is low and inconsistent. There is a lack in providing market and technical information, especially on post harvest technology. The trade name was developed, but how to promote and enhance the production and expand the high value market is still a question.

Those constraints and challenges make pomelo cultivation and marketing very difficult.

VIII. Conclusions and recommendations

8.1. Conclusions

- Da Xanh pomelo in Ben Tre has a super quality as compared to others. It brings high profit to farmer and considered as highly economic potential in future.
- The demand for this fruit both in local and international market is high but the trading is limited due to inconsistent supply and expensive price.
- The trade name was developed, but how to promote and enhance the production and expand the high value market is still a question due to low efficient operational skill of the trade name owner.
- The channel 1, 2 and 3 show highly efficient since farmers get chances to obtain necessary information during involving which make them to run their business better.
- The fruit quality is not consistent. The volume of first grade fruits is low makes its competitiveness power low.
- The fruit quality and safety standard are not developed that make fruit trading complicated.
- The limit knowledge and low input capital make farmers difficult to obtain good agricultural practices standard that is now required.
- There is lack of research on pomelo markets both in domestic and on international. Sale promotion and advertisement is not well practiced.

8.2. Recommendations

The pomelo growers in Ben Tre province need more supporting programs from government and NGOs in and out of the country to develop this fruit commodity better and sustainable

- The local authority should launch a program that improve the nursery system toward fruit nursery certification scheme and to control the uncertified seedling traders.
- Improve the extension service that meet the farmer requirement.
- Improve the technical transfer activities by timely provide training workshops to farmers and encourage farmers to applied improved techniques.

- Plan a concentrated pomelo area that can produce pomelo in large volume and uniform and consistent quality.
- Develop the common quality standard and rules to apply the standard during trading.
- Assist the farmer coop to operate more efficient that in return help farmer to produce better and gain higher income.
- Make the loaning and banking easier to all' especially to farmer coop.
- Assist to develop high quality trade name.
- Regularly provide market information to the chain's components.

For Metro's project: training for the pomelo market chain's components is necessary on:

- Safety fruit production techniques and safety fruit quality.
- Introduction the government rules, regulations, standards on food safety including some common international standards (Codex, EUREPGAP).
- Train the management board of farmer cooperatives and others traders on organization management, business skills, financial management, marketing, brand building...
- Develop or assist farmer cooperatives and packers to develop better facilities for fruit handling and storage.

For interventions from donors:

Assist growers to expand cultivation area for BR 99 pomelo brand, to increase volume of this brand in order to supply fruits to the market. Multiply several cultivation same as BR 99 brand owner and building reputation for this brand.

Support pomelo traders to be able to access to international market by documents, multimedia means about the production technologies in developed countries and assist them to take part in international fruit fairs.

Support some good production model farm in the province, focus on cooperatives or farmer groups to obtain GAP certification (EUREP GAP, for instance), drive the farmer to sustainable agriculture.

Suggestions for other support agencies:

Authorities at various levels should consult farmer about planning, organizing and managing their activities effectively, help them to control the volume of pomelo in a year equal to demand in order to reduce the risk of price fluctuation which has often happen for other fruit crops. Local authority also need to assist all players in pomelo value chain joint together to enhance their power and competitiveness.

Provincial Department of Agriculture & Rural Development should promulgate pomelo fruit standards and encourage all players apply these standards.

IX. Appendices

Appendix 1 : List of interviewees

Farmer group discussion					
No	Name	Address	No	Name	Address
1	Bui Van Hoang	My Thanh An, TX Ben Tre	24	Nguyen Van Hong	Phu Nhuan, TX Ben Tre
2	Nguyen Van Tu	My Thanh An, TX Ben Tre	25	Nguyen Van Linh	Phu Nhuan, TX Ben Tre
3	Pham Van Mau	My Thanh An, TX Ben Tre	26	Nguyen Van Ma	Phu Nhuan, TX Ben Tre
4	Nguyen Ngoc Thai	My Thanh An, TX Ben Tre	27	Le Thị Tuyet	Phu Nhuan, TX Ben Tre
5	Truong Van Lanh	My Thanh An, TX Ben Tre	28	Doan Van Hung	Phu Nhuan, TX Ben Tre
6	Nguyen Van Ngai	My Thanh An, TX Ben Tre	29	Le Hoang Tuan	Phu Nhuan, TX Ben Tre
7	Tran Van The	My Thanh An, TX Ben Tre	30	Ngo Hong Chon	Nhon Thanh, Chau Thanh
8	Truong Van Loc	My Thanh An, TX Ben Tre	31	Bui Thien My	My Thanh An, TX Ben Tre
9	Tran Trung Son	My Thanh An, TX Ben Tre	32	Le Thị Kim Yen	My Thanh An, TX Ben Tre
10	Bui Thien Tin	My Thanh An, TX Ben Tre	33	Nguyen Hong Phuc	My Thanh An, TX Ben Tre
11	Truong Minh Tuan	My Thanh An, TX Ben Tre	34	Le Kien Truc	My Thanh An, TX Ben Tre
12	Le Huu Khai	My Thanh An, TX Ben Tre	35	Nguyen Van Muoi	My Thanh An, TX Ben Tre
13	Nguyen Thị Hien	My Thanh An, TX Ben Tre	36	Tran Van Hai	Phu Nhuan, TX Ben Tre
14	Bui Van Trung	My Thanh An, TX Ben Tre	37	Huynh Ngoc Cam	Phu Nhuan, TX Ben Tre
15	Nguyen Van Toi	My Thanh An, TX Ben Tre	38	Bui Hoang An	My Thanh An, TX Ben Tre
16	Nguyen Thanh Duoc	My Thanh An, TX Ben Tre	39	Nguyen Van Thanh	Phu Nhuan, TX Ben Tre
17	Tat Van Phung	My Thanh An, TX Ben Tre	40	Nguyen Quốc Dung	Phu Nhuan, TX Ben Tre
18	Tran Van Duong	My Thanh An, TX Ben Tre	41	Tran Phu Thuan	Phu Nhuan, TX Ben Tre
19	Le Trong Nghia	Phu Nhuan, TX Ben Tre	42	Do Kim Ngan	Nhon Thanh, Chau Thanh
20	Nguyen Ba Hung	Phu Nhuan, TX Ben Tre	43	Tran Thị Tuyet	Phu Nhuan, TX Ben Tre
21	Nguyen An Ninh	Phu Nhuan, TX Ben Tre	44	Le Thị Cam Van	My Thanh An, TX Ben Tre
22	Le Van My	Phu Nhuan, TX Ben Tre	45	Nguyen Thị Ngọc Trinh	My Thanh An, TX Ben Tre
23	Tran Duy Linh	My Thanh An, TX Ben Tre	46		
In-depth interview					
Players	Name	Address			
Staff and experts					
	Nguyen Van Khong	Director, Ben Tre Agriculture Extension Center			
	Chị Thủy	Divison of Scientific Management, Ben Tre DST			
	Nguyen Van Duoc	Economy Division, Ben Tre Town			
Collectors	Dặng Van Ro	Thanh Tan village, Mo Cay district			
Local Packer	Nguyen Tan Tai	My Thanh An village, Ben Tre Town			
Cooperative	Nguyen Thị Kim Huong	Vice head My Thanh An pomelo Coop., Ben Tre Town			
Wholesalers	Tran Thị Kim Phuong	Thu Duc Agricultural fresh produce wholesale market			
	Le Thu Thủy	Thu Duc Agricultural fresh produce wholesale market			
Retailers	Pham Thị Lan	An Dong market, District 5, HCMC			
	Mai Thi Diem Thủy	An Dong market, District 5, HCMC			
Tourist resort	Tran Van Thanh	Ba Lan Resort, My Thanh An, Ben Tre Town			
Consumers	Le Ngoc Khanh	135 Pham Van Hai, Ward 11, Tan Binh, HCMC			
	Truong Thị Yen	48, 3-2 street, ward 12, District 10, HCMC			
	Le Thị Thu Ha	158 Pasteur, District 3, HCMC			

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