

REPORT ON NINH THUAN GRAPES' VALUE CHAIN

1. General introduction:

Ninh Thuan is a southernmost central province with land and climatic conditions typified by dryness, heat and humidity, suitable for the growth of the grape tree with high yield. The grape was introduced into Ninh Thuan from the 1960s and turned into a kind of commodity in the 1980s. Here formed the biggest typical and concentrated grape area.

However, the growing of grapes in Ninh Thuan is now facing problems such as improper growing techniques, imbalanced use of fertilizer, untimely harvest so the quality of the grapes is going down. Also, high investment expense, growth of epidemic diseases, unstable yield, complicated and difficult chain of production and distribution..., Therefore Ninh Thuan people generally and the grape growing farmers here particularly are still in difficulty.

An important factor is manpower, which is always the most difficult problem in conducting big-scale farming encouragement programs due to high illiteracy and high ratio of minority peoples in Ninh Thuan. Therefore, figuring out a direction for this potential product from production to consumption, especially from fruit cutting, packaging, preservation, transportation to marketing is not simple and extremely necessary.

Since the project aimed at building up a value chain from farmers to collectors, wholesalers, retailers, supermarkets, processors, exporters, etc... This report is therefore to focus on analyzing the value chain of Ninh Thuan grape. However, the quality of the grape is much affected by seed choosing and planting, so we would like give a more detailed introduction to these steps at the beginning of the report before analyzing the value chain as other reports.

In Ninh Thuan, there are 28 ethnic groups, of which the majority are the Kinh, the Cham and Gia Rai. According to the census report in April 1st, 1999, there are 57,100 Cham people in Ninh thuan, which accounts for over 11.3% of the provincial population or 43% of the whole Cham population in the country; 47,600 Gia Rai people, respectively 9.4% and 49.1%.

II. General Information

1. Ninh Thuan Province

Ninh Thuan is a coastal province in the South Eastern Part of Vietnam, surrounded by mountains on three sides. Geographically, land is divided into 3 forms: mountain, plain and coastal areas. It is bordered with Khanh Hoa northward, Lam Dong westward, Binh Thuan southward and East Sea eastward (Source 11, appx. 6).

According to the 2004 Statistic Directory of Ninh Thuan, the province's natural land area is 3,360.06km², of which 58,213.6 ha is cultivation land.

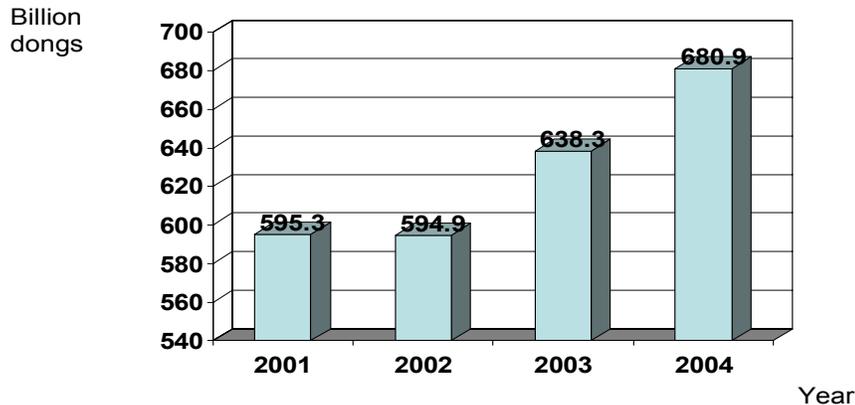


There are two apparent seasons in Ninh Thuan: dry and rainy season. Dry season starts from November to April, with high humidity (this season is suitable for growing main grape crop) and rainy season from May to October. Ninh Thuan is located in the country's driest region, with monsoon tropical climate characterized by heat and dryness, windiness, strong evaporation and winterless ness. Annual average temperature is 27 degrees Celsius, average rainfall 705mm (28in) and increase by height to 1,100mm (43in) in mountainous areas. The local climate and land are suitable for the growth of grapes with high yield.

According to the General Department of Statistics, Ninh Thuan's population in 2004 is 554,700, of which urban areas makes up 32.3%, and rural areas 67.7%, with the population density of 165 people/ km². The number of laborers (agriculture and forestry) is 153,625 people, of which about 15,000 grape growers makes 10% of the population of agricultural and forestal laborers (source 7, appx 6). Literacy is low, ethnic minority proportion is high, number of poor families is plenty so it's hard to conduct grape tree developing programs (Source: Department of Agriculture and Rural Development).

With harsh natural conditions, particularly manpower, Ninh Thuan is still a poor and destitute province with low income per capita: only 4,186,000 dong in the year 2004 (Source: Ninh Thuan's Statistic Directory of 2004). In 2004, The province's GDP grows by 9.5%, the highest growth rate in recent years (source 12, appx. 6).

Chart 6: Ninh Thuan's 2001-2004 agricultural production value as per comparable price of 1994:



(Source: Ninh Thuan's Statistic Directory of 2004)

The chart shows that Ninh Thuan's agricultural production value grows regularly, especially from 2002 (average growth rate of 6.98%).

2. Information of Ninh Thuan grapes:

2.1. Breed and features of Ninh Thuan grapes:

Different from other kinds of Vietnamese fruits, grape was introduced into Vietnam from other countries in the world in the 1960s. The first grape breed grown is fresh-eating Red Cardinal. Until now, this is still a major grape breed having high output (20 tons per hectare), farmers' experiences in growing and disease resisting as well as consumption habits among the Vietnamese people have existed so long (Source: in-depth interview with the Department of Science and Technology).

Till the year of 2000, Ninh Thuan expanded to some of the new grape breeds like fresh-eating green grape breed NH01-48, Black grape Black Queen, Red Star, Palchong seedless, Muscat Alexandria. Among them, the green grape NH01-48 is being grown on a large area as it has higher output than Red Cardinal (around 30 tons per hectare). The root grafted grape breeds like Couderc 1613, Ramsey are being grown for testing at Nha Ho Plant and

Seed Center of Ninh Thuan province (Source: (Source: Dept of Agriculture and Rural Development).

Until now, 100% of the farming households still grow fresh-eating grape breeds. The plant and seed center has around 162 grape breeds, of which only 40 are wine grape breeds. Dr. Nong, Vice Director of Ninh Thuan Plant and Seed Center, says they will popularize some of the wine grape breeds like NH02-04, NH02-10 (Chambourcin), NH 02-09 (Rubi Red), Chardonay, Syrah...so that farmers can grow them for testing in respect of meeting requirements of qualified wine grape breeds for winemaking in the future (Source: in-depth interview with the Department of Science and Technology).

Hereunder are the two major fresh-eating grape breeds in Ninh Thuan.

+ Red cardinal (image 3, appendix. 7): having vitality of medium to high level. The bunch is of medium size, shaped in short or long cone with slightly close fruits. The fruit has dark red color, sphere or ellipse shape and small to medium size with 14-15° brix*. It gets ripe early, the time from branch cutting to getting ripe lasts 87-95 days. This breed is mainly grown for fresh eating and sensitive to a plenty of funguses.

This breed survives for 30 years. Before the year of 2000, it occupies 100% of the cultivating area but now around 80%, the remaining area of 20% grows newly imported breeds.

This breed is still grown the most today due to consumers' preference for the red grapes to be used as offerings on ceremonies on the holidays or the fifteen of the lunar month. (Source: In-depth interviews to farmers)

+ NH 01 – 48, White Malaga (image 1, appendix. 7): It has been imported from Thailand since 1997 and has medium vitality. The time from branch cutting to getting ripe lasts for 115-125 days. Its leaves is light green, smooth, little hairy. The flower bunch is long and not branchy. The fruit bunch is of medium to big size, long cone-shaped with tightly close fruits and its upper part is not much bigger than lower part. A fruit bunch weighs 300-350g. The fruit is oval-shaped and has few numbers of seeds/ fruits, only 1-2 seeds, 1.6 seeds on average. When getting ripe, the fruit turns out yellow green. A fruit weighs 4.8 – 5.2g. The fruit peel is thick, easy to be taken from the flesh. The fruit flesh is solid. The fruit stem is closely connected to the embryo. The fruit quality is good with 17-18° brix.. High yield: 12-15 tons per hectare per crop.

*Brix means sweetness level, used for fruits

At present, this breed takes almost 20% of the cultivating area and is considered as a high quality fresh-eating breed in Ninh Thuan.

However, our study shows that this green grape breed incurs diseases, such as anthracnose, white powder (see image 4,5,6, appdx.7). Thus it has higher risk of harvest failure than the Red Cardinal. The Seed Center is studying preventions to those diseases. During this time, farmers have been worried and narrow down the cultivating area of green grape in order to re-plant Red Cardinal (Source: farmers' group discussion).

2.2. Quality of Ninh Thuan Grapes

The discrimination of unsafe and safe grape is an issue recently noted, though the Seed Center together with Ninh Thuan's Department of Science and Technology have conducted a safe grape production project using bio-organic manures, by which some of new grapes will be put into used in order to diversify grape breeds.

The clean grape being grown in Ninh Thuan is NH01 – 48 and regarded as a safe grape breed. After 4 years of growing, the safe grape cultivating area of farmers increase to 40ha (around 2.5% of the total area). (Source 10, appdx.6).

In particular, the criteria for differentiation between safe and unsafe grapes can be found as follows:

- Insecticide residue
- Heavy metal residue
- Quantity of microorganisms surpasses allowed limits set by FAO and WHO*
- Sweetness level, size, specific fruit color of breed.**

* FAO/WHO Codex Alimentarius, 1993 and Decision No. 667- 1998/QĐ- BYT (VN)

**Criteria for Seed Techniques issued by The Ministry of Agriculture and Rural Development, 2002.

Hereunder is the result of analysis by the Sub-Institute of Agricultural Electro-Mechanics and Post Harvest Technology about the two Vietnamese grape breeds in comparison with imported breeds.

Table 4: Analysis of the Quality of Vietnamese breeds and imported (Source 3, appx. 6)

Type	L (cs. Color)	TSS %, brix degree	Sourness (%)	Solidity (kg)	TSS/TA Ratio	Perception Index
Vietnamese red grape	35,60	13	0,25	1,45	52	3
NH01-48	41,10	16,5	0,186	1,53	88,7	4
Australian green grape	46,93	22,0	0,195	2,63	112	5,6
Australian red grape	34,77	15,0	0,196	4,33	76,5	4,6
Chinese green grape	-	17,0	0,25	4,70	68	5,4

The above result shows that the quality of Green grape NH-01-48 is rather high (much higher than that of Red grape Cardinal) and as good as Australian red grape.

However, both of the local breeds have lower brix degree and solidity than imported ones, the yield ratio of Vietnamese green grape is much lower than Australian green grape. Besides, both of the locals are lower in terms of sense index and some other indexes.

In reality, the grape quality of farmers is much lower than that tested in the above table due to untimely harvesting which makes the grape sour (low brix and TSS/TA, solidity), not to mention sense index or other indications. Particularly, the insecticide residue which surpasses the allowed criteria (>1 ppm) shows that the real quality of the Ninh Thuan grape is much lower than the imported one. That's the reason why Vietnamese grapes has not yet qualified be exported to world markets (only a very small quantity is exported to Cambodia and China individually).

The Southern Institute of Agricultural Sciences recently has conducted trial use of Agrostim bio-organic manure for red grapes, providing higher quality: nicer color, higher sweetness and thicker peel. However, very few farmers grow grapes that meet necessary requirements (for safe grapes), so the quality of Ninh Thuan grapes is still a difficult problem that requires all the sectors of the province and the Ministry of Agriculture and Rural Development pay more effort to solve.

2.3. Crop time

The average life cycle of a grape tree is between 5 and 7 years. There are apparently 2 harvests per year: dry crop when humidity is low, the grape grow wells and has high yield, on the contrary, in rainy crop high humidity makes the grape underdeveloped with many pestiferous diseases, low yield (only about 20-30%). Depending on each breed, one crop lasts for 3-4 months (green breed has longer crop). Favorable crop is from November till the end of April (Source: farmers' group discussion).

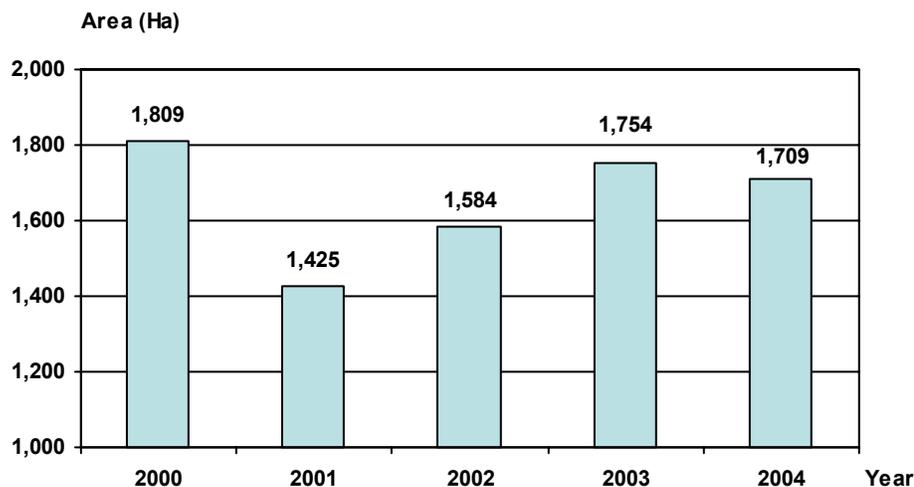
2.4. Area, yield and output

2.4.1. Area:

According to Ninh Thuan's Department of Agriculture and Rural Development, grapes are grown in 29 out of 59 communes of such districts and towns as Phan rang – Tháp Chàm, Bác Ái, Ninh Sơn, Ninh Hải, Ninh Phước. Among them, Ninh Phuoc is the district having the largest growing area of almost 1,113 ha in the year of 2004 (source 1, appdx.6).

At present, in the province, the red grape area is around 1,500 ha, of which 1,200 ha is at the right time for trading (having fruit). Green grape area is 380 ha, of which 150 ha is in at the right time for trading. The following chart will show the area of Ninh Thuan grapes from 2000-2004.

Chart 7: Area of Ninh Thuan grapes from 2000-2004 (Source 1, appx. 6).



The chart shows that the area of Ninh Thuan grapes does not grow stably, it particularly decreases by 50% from 2000 to 2001 and by 3% in the period of 2003-2004.

Reported by the Department of Agriculture and Rural Development at the first Grape production and consumption seminar held by the Sub-institute of Agricultural Electro-Mechanics and Post-Harvest Technology (Source 3, appdx. 6), the grape area is decreasing: in 1997 the grape area in the whole province was 2,200 ha, in 2000 it was just 1,809 ha and at the last survey of April 2004, it was just 1,576 ha. The green grape area in 2003-2004 was lessened considerably, from 20% to 5%*

Our analysis shows that there are some vital reasons leading to the problems and hindrances in expanding the overall grape area in Ninh Thuan as follows:

- ❖ Fast urbanization and a lack of farming area protection policy for local farmers.
- ❖ In recent years, weather has changed abnormally, vineyards in low areas have been flooded heavily during a year, there's no more water during long-lasting drought making farmers be obliged to chop down grape trees for other kinds of crops.
- ❖ Pestiferous diseases make the yield of grapes unstable and decrease grape quality.
- ❖ Farmers have difficulties in cultivation techniques and growing grapes. Most importantly, people's awareness is low and they have not yet caught up with the requirements of cultivation techniques and still run after profits.
- ❖ With difficulty in reservation, too simple processing conditions, after-harvest loss rates are high and no organization in charge of buying products exists, Ninh Thuan grapes has unstable price.

**One of the important reasons is that there are uncurable diseases found in green grapes that can cause harvest loss, green grapes have longer time from branch cutting to harvest than red ones so green grapes need more fertilizer (higher expense). Besides, it's also caused by traditional perception and habits of the local people when red grapes are preferred for worshipping (red color), easier for winemaking, sweeter than green ones while the price of these two types are not much different (source: Ninh Thuan farmers; group discussion conducted by Axis).*

Among the above reasons, the most important is pests*. Therefore, some grape growers switch over growing other kinds of trees or raising cattle.

The following is a comparison between the actual grape area and the growth of Ninh Thuan's grape area till the year of 2010:

Table 5: comparison between the actual grape area and the growth of Ninh Thuan's grape area till the year of 2010.

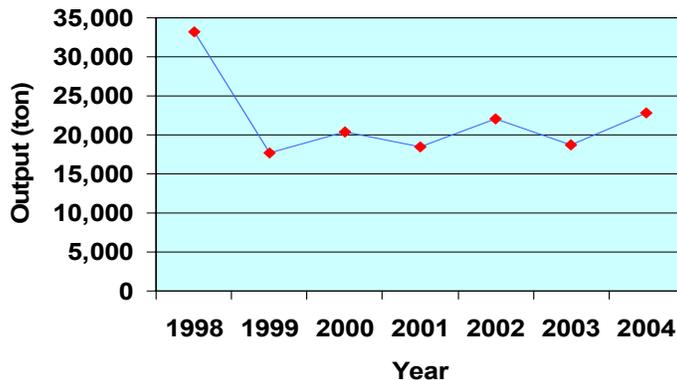
	2002	2003	2004	2005	2010
Reality (ha)	1,584	1754	1709	Not yet	Not yet
Plan	1.576	1.945	2.250	2.580	3.200

(Source 3, appdx.6 6)

Thus, with the actual situation of the grape tree and above reasons, we think that the Grape Growing Land Planning Program and Grape Development Plan over the years by the Ministry of Agriculture and Rural Development cannot succeed unless there's a really effective reform.

2.4.2. Output

Chart 8: Output of Ninh Thuan grapes from 1998-2004 (source 3, appdx.6)



**In February of 2005, there was a lot of hoarfrost in Ninh Thuan, which strongly affected the vineyards during harvest: making the grape fruit crack, spoiled and drop, grape bunch deformed and quality degraded. Also, the actual grape yield went down one-third, or even two-thirds, causing big loss. Till October 2005, the situation worsened: most of the fruit-bearing vineyards during this time suffered anthracnose so it's impossible to have a harvest. After several months of hard working and with a high spend for fertilizer, the farmer lost everything so they have no more money for re-investment. Any more lucky household lost up to 70-80% (Source 12).*

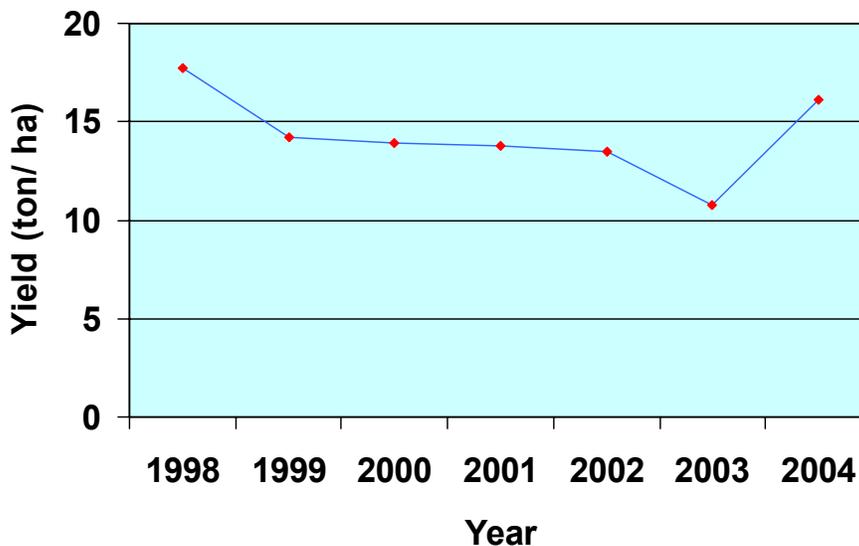
The chart shows that Ninh Thuan's average grape output has reached about 20,000 tons per year from 2000. Meanwhile the market demand for grapes is growing, making a rise of the imported grape quantity to between 3,500 and 4,000 tons per year from 2002.

2.4.3. Yield

The yield of Ninh Thuan grapes went down from 1997 to 2003: the yield was 26.6 tons per hectare on average in 1997, it dropped to 13.9 tons/ha in 2000 and only 10.8 tons per hectare in the end of 2003. (Source 3, appdx.6).

Therefore, in addition to narrowing cultivating area and many other reasons as analyzed above, soil getting barren, inappropriate care, only experience-based growing, not active in studying and learning more advanced cultivation techniques result in both the grape yield and output of the province is low and unstable.

Chart 9: Ninh Thuan's grape yield from 1998 to 2004 (tons per hectare): source 3, appx. 6).



2.5. Certification and trade name:

At present, the Ninh Thuan's grape tree has no name or any remarkable trade name on the market. In Ninh Thuan, green grapes are just found with a few trade

names like Ba Moi, Ninh Phú. Around 60-70% of Ba Moi's products are found in supermarkets and labeled, the rest have no brand name and are sold to other collectors in the area (source: in-depth interview with Mr. Ba Moi).

The Department of Agriculture and Rural Development says that the grape output which is quality-certified is very low, or less than 1%.

The quality certification can be conducted by the following agencies: The Center for Technological Progress Transfer, the Sub-institute of Agricultural Electro-mechanics and Post-harvest Technology, the department of Science and Technology, the Sub-department of Vegetarian Protection.

The Department of Agriculture and Rural Development also reported that less than 5% of the grape output had been labeled (mostly for sales at supermarkets).

2.6. Domestic consumption

The rate of domestic consumption is around 99% (source: in-depth interview with collectorss), mostly found in Hochiminh City, Hà Nội, Nam Định, Đà Nẵng, Nha Trang, and South Western provinces. Hochiminh City and Hà Nội are the two biggest marketplaces.

Chart 10: Market share of Ninh Thuan's grape consumption in 2004
(source: in-depth interview with Ninh Thuan's collectorss)

2.7. Export:

The exported grape quantity is very small, only around 1%, mostly by individual sales to Cambodia, China (source, appdx.6). Generally, the export of Ninh Thuan's grape is very limited and difficult. Even Ba Moi's safe grapes still cannot find its way out.

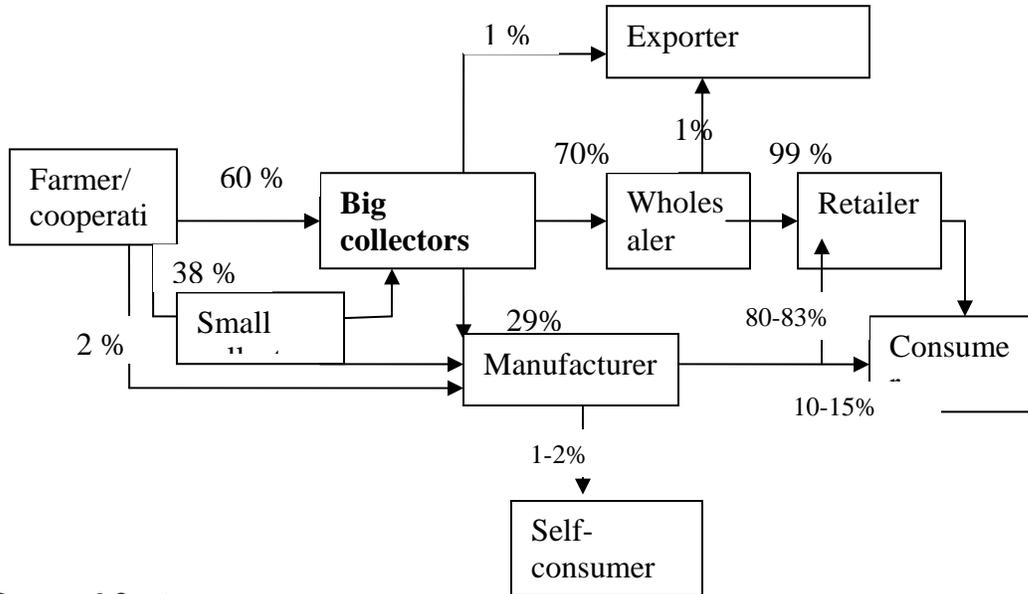
2.8. Import:

Currently the domestically provided grape quantity cannot meet the market demand so the import of foreign grapes is growing. The country that exports the biggest volume of grapes to Vietnam is Australia (or 60% of imported grape quantity), the US (almost 10%), following by Chile, Hong Kong, China, Iran, Malaysia, Japan, Turkey, Peru, Singapore. The below table shows details of the imported volume of grapes from various countries in the first 6 months of 2002 (Source: General Department of Customs).

Aside from clear origin and met quality standard, imported grapes generally have sameness of size, good packaging, packed in carton box, anti-smash layered, convenient for long distance transport, well-kept with refrigerated system of the importer and wholesaler (on average the duration of preservation lasts for 2-2.5 months). Source 3, appdx.6).

III. ANALYSIS OF THE VALUE CHAIN OF NINH THUAN GRAPES

Diagram 9: VALUE CHAIN OF NINH THUANS GRAPES



General features

Ninh Thuan grapes mostly are provided traditionally: Farmer → Collectors → Wholesaler → Retailer → Consumer.

In this value chain, the farmer in Ninh Thuan is very passive in harvesting and selling. Almost 99% of the grapes are sold directly to collectors. Only few people (like Ba Moi, Ninh Phu) can harvest themselves and find their way to supermarkets in HCM*

The farmer is also not active in retail because there's no market in the province.

In Ninh Thuan, the model of cooperative is also inefficient. There are just one or two cooperatives. Encouraging people to join a cooperative is difficult. Psychologically, the grape growers here have just go through a hard working time taking care of the grape tree and the grape is just like a "savage horse" which always threatens to cause harvest loss, therefore they are much worried about finding out a buyer (a collectors) to get back money right away. Meanwhile, cooperatives have not yet proved effective to farmers.

*Mr Ba Moi can be named as a typical for a closed model of self-production, self-search for grape markets. Ba Moi has succeeded in growing safe grapes and building up particular brand name. His customers are mostly supermarkets like Metro, Cora, Coop mart (consuming around 60-70% of his grape output). In Saigon, he set up his own premises for preliminary processing, packaging, packing in cartons, and labeling (100% for sales to supermarkets) and keeps direct contact with customers.

In the whole province, there are just a few big collectors who are active in searching for export to Cambodia, China or sales to big supermarkets in HCM. The rest are mostly small collectors, who collect and sell to big collectors or wholesalers in other cities and their business is based on acquaintances or verbal contracts.

From farmers and collectors, about one third of the annual grape output become secondary graded grapes (low quality grapes) and are sold to processing factories of wine, treacle, jam with very low prices (source: interview with Mr. Phạm Châu Hoàn, Ninh Thuan's Department of Science and Technology.)

Hereunder is our detailed analysis of this value chain to have a more in-depth look at each major step in the chain, so as to have timely and more effective actions for Ninh Thuan's grapes.

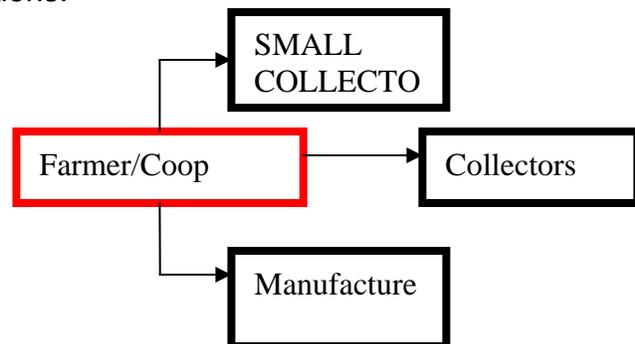
1. FARMER (IMAGE 7,8, APPDX.7)

As analyzed, the farmer has great difficulty in cultivation. At the time of harvesting, they also face problems of low selling prices or obligatory early harvests. On the contrary, they are always paid by cash and when selling well, they can sell to any collector who pays a higher price. (Source: farmers' group discussion).

Diagram 10: Farmer and direct relations.

Ninh Thuan's Encouraging Agricultural Expansion Center says that around 15,000 families join in growing grapes, mostly with small scale, on average from 2-4 sao (acre). Some possess from 1 to 3 ha.

The grape growing family leader is usually a man (90%). Laborers are mostly family members (husband, wife and children).



1.1. Grapegrowing process:

Grape is a kind of crop that requires a lot of care, the caring takes long time and rather complicated. After choosing a grape breed, the farmers usually grow grape in the period of November, December and January, in general, when the rainy season ends.

The grape growing process includes the following steps:

- Prepare soil, suitable density, weed, turn up, water and drain water.
- Fix sticks to build support frame
- Manure sapling.

- Make 1 and 2nd rank branch
- Design grape beg
- Mow off, turn up and break grape bed

- Cut branch (Winter-spring harvest: cut branch in Nov. and Dec.; Summer-autumn harvest: cut branch in Mar. and Apr.).
- Spray chemical to wash branch
- Tie branch, trim arm shoot
- Trim fruit
- Manure for the stage of trade
- Cover fruit (image 8, appdx 7)
- Harvest (image 9, appx.7)

1.2. Harvest

When harvesting, some families with large area use more available laborers with a salary of around 500-600,000/month/person/harvest.

The post-harvest process is very simple: if they “sell the whole garden”, they do nothing. If they sell selectively (a few people like Ba Mọi, Cường...), they normally do like this:

Cut → trim, categorize → packaging → transport

From the farmer, the product is bought mostly by big and small collectors. They keep a very small part to process wine, mostly for personal needs (Source: farmers’ group discussion)

1.3. Mode of transaction

Currently, the farmer sells grapes with the following two forms of sales:

- “Sell the whole garden”: it means they sell to the collectors all the products on their farm with a fixed price per farm. This takes majority of sales volume (around 90-95%). After an estimate of yield, quality, most collectors buy the whole vineyard. With good relations, a collector will pay a deposit and finish payment when harvesting.
- Secondly, they sell selectively, it means the farmer sort grapes out then sells per kg to collectors who will then resell it at wholesale markets. This takes minority of sales volume (about 5-10%). It is called “buy per kg” method. The buying price depends on the classification of product quality. (Source: in-depth interview with farmer and collectors, conducted by Axis).

The farmers’ group discussion conducted by Axis in Jul 2005 shows that grapes are divided into 3 types as follows:

Table 6:

Types of grapes	Average selling price at vineyard*	% of total quantity
Type 1 (grape bunch of above 300g, tight, good-looking)	7,000 VND	Around 30 – 40 %
Type 2 (sparse, bunch of under 300g)	4,000 VND	Around 40 – 50 %
Type 3 (ugly-looking, crushed, battered, damaged..)	< 3,500 VND	Around 20 %

Of these two forms of transaction, “selling the whole garden” is more used because the farmer does not have to worry about laborers for harvesting or loss**. Besides, they can get paid easily: receiving money right away or prepaid, and sell the entire product.

However, with this manner of selling, the farmer is usually under pressure of low selling price. This will lead to pre-mature grape harvesting, which affects grape quality***.

Particularly, safe grape growers also have some disadvantages as safe grapes has higher quality and requires more hard work for growing, more spending compared to normal grapes, but sometimes they have to sell safe grapes at the same price with normal grapes****.

Presently there’s also one grape-buying cooperative in Ninh Thuan. However, they usually request grapes to be kept longer to reach Brix degrees fully. As such, the farmer is always afraid of loss, low selling price. Therefore, in case they can sell to a collector at a higher price, they will neglect the cooperative. => This proves that the farmer is not highly aware and has no long - term vision of business with cooperatives. Besides, the cooperative has had no close cooperation and stable buying price as well as consumption assurance for the product.

1.4. Payment: Normally when selling products, the farmer receives cash immediately. As mentioned above, the collectors sometimes pay the farmers an amount as deposit so that they are able to “buy the whole garden” at harvest time.

1.5. Contract: Until now transactions between the collectors and the farmer are made verbally and there’s no official written contract.

**For green grapes, prices may be 20-30% higher*

***Because farmer usually sell the whole area when the grape is around 3 months 10 days old (close to harvest time), in the remaining 20 days, the buyer has to suffer in case the grape is damaged.*

****The grape is a kind of fruit that can’t continue getting ripe after being cut down. Therefore, early cutting will make it sour and the grape cannot reach the allowed brix degree.*

*****Due to the lack of a stable grape buying organization.*

1.6. Loss Rate

The farmer has to suffer a big loss. Rain, drought or disease can cause huge loss, sometimes the loss comes up to 100%.

During the harvesting process, and particularly in transportation, much loss happens. That's the reason why farmer like to sell the whole area because they will not suffer any loss due to not joining harvesting. When selling per kg, loss rate is calculated with additional quantity in weighing (for example, weighing 100 kgs for the collectors will make it 110 kgs, while the money is paid for 100 kgs). Farmers say that without the factors of weather or particular pests, the normal loss rate for one harvest is between 1 and 10%.

1.7. Expense and Profit

According to the results of the survey conducted by the Sub-institute of Agricultural Electro-Mechanics and Post-Harvest Technology of Hochiminh City (Aug 2004) (source 3, appdx.6), given unit prices of a working day of all farms are the same, the investment for one hectare including the fees for caring, cultivation, harvesting expenses is 48 million dong per ha (for green grapes), and 36 million dong per ha (for red grapes).

If the buying price is VND 7,000 per kg (Red Cardinal) each hectare of grape in harvesting time can bring about a turnover of 180-200 million (source 3, appdx.6).

Nonetheless, selling prices are unstable so it's hard to calculate the general profit of the farmer. Here all we can do is to state out an average profit rate.

- ❖ Ninh Thuan's grape growers often get a profit of between VND 60 and 100 million per hectare of red grapes per harvest.
- ❖ They can get a profit of VND 100 and 150 million per hectare of Green grape NH01 – 48 per crop.

After all, the profit from grapes for the farmers in Ninh Thuan is not really small if cultivation and caring techniques are proper, as well as harvesting is done at proper time. However, the grape is hard to grow, easy to lose, overdependent on weather, particularly green grapes which easily suffer from dangerous diseases, as well as the growing time lasts long. Therefore growing grapes is still very risky. Besides, Ninh Thuan's grape-growing farmers also lack information, keenness and team work.

The following summary will show more details of the **Problems** and solutions for grape growers in Ninh Thuan.

1.8– Problems and solutions

General Problems	Solutions
<p>Weather</p> <ul style="list-style-type: none"> - In dry season, almost 80-90% of flowers cannot blossom, fruits suffer damage, flower is withered especially when the temperature is over 36 degrees. - In rainy season, flood happens, causing diseases and big loss. 	<ul style="list-style-type: none"> - Scientists, Departments, Ministry of Agriculture, meteorologists, etc. need to provide timely information, support shelter system to stabilize temperature, minimizing the effects of the weather.
<p>Breed</p> <p>Old breeds are deteriorating, having low yield (red cardinal).</p> <p>New breed NH1-048 easily suffers from diseases and there is still no cure.</p> <ul style="list-style-type: none"> - Lack of breeds that are really suitable for Ninh Thuan's climate and land, and unsusceptible to diseases and easy to take care of. 	<ul style="list-style-type: none"> - With the combination of research centers, plant and seed centers (Nha Ho), it is necessary to offer grape growers more new grape breeds which are really effective and quality assured with reasonable price. - Urgently study measures to fight against flower burn, anthracnose and white powder of green grape trees.
<p>Soil</p> <ul style="list-style-type: none"> - Much deteriorating, lack of nutrition and frequent cultivation. - Cost for soil analysis is high: VND one million per ha. 	<ul style="list-style-type: none"> - Provide financial support and soil categorization techniques for farmers, as well as fertilizing methods to enrich the soil before crop time.
<p>Cultivating area of each family is small, sparse and unstable quality.</p>	<ul style="list-style-type: none"> - Expand and plan for a concentrated and large-scale production area in the form of advanced cooperatives in order to easily offer tracking, care, as well as consumption.
<p>Cultivation techniques (knowledge)</p> <ul style="list-style-type: none"> - Not yet follow a professional, proper and serious process. <p>(Growing and care mostly depends on</p>	<p>It is necessary to have cooperation between farmers/ cooperatives and Encouraging Agricultural Expansion</p>

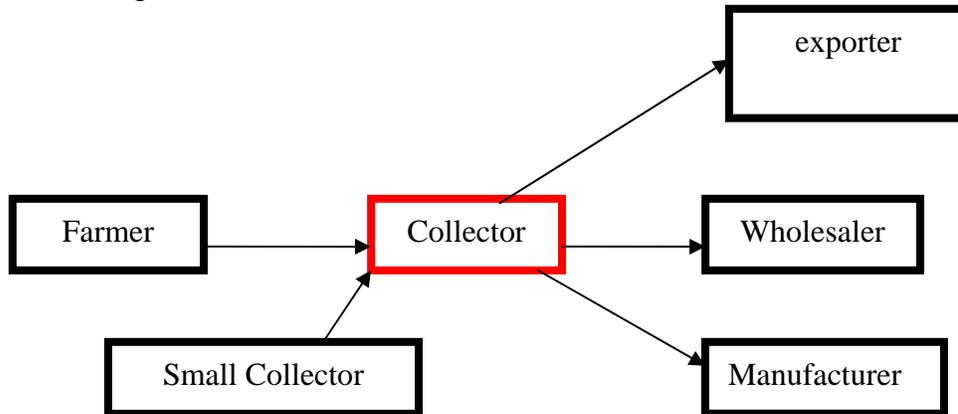
<p>experience, farmers have not yet grasp the growth and methods of preventing funguses and insects,...)</p> <ul style="list-style-type: none"> - People have not been able to refer to a successful model of growing grape in foreign countries. - Mr. Ba Moi's model is pretty good but few people pay attention to it. 	<p>Center, Technical Progress Transfer Center and related sectors in encouraging and assisting grape growers to use bio-organic fertilizers. This not only improves the soil, but also helps the grape grow better by eliminating funguses and pestiferous diseases.</p> <ul style="list-style-type: none"> - Apart from that, fruit covering is necessary and will help leverage the yield and quality of grapes, preventing insects that may damage the fruit.
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<p>Farmers' awareness</p> <ul style="list-style-type: none"> - The fact that farmer here is not aware of the benefit of the growing safe grape. They continue to use many chemicals, unmeasured spray which influences the quality of the grape fruit, threat environment and health. - Team work is low (not willing to join cooperatives to share experiences of cultivation and harvesting, etc.) - Most of them are lazy in studying, do not pay much effort to improve product quality, develop some new processed products and consumption. - Low compliance with law (being late in payment when a bank borrowing matures, unilaterally breaking contract)... 	<ul style="list-style-type: none"> - It is necessary to have stronger measures in pushing up the model of cooperatives, cultivating in a safe way in order to change the growers' customs. - It is necessary to have trust-worthy organizations to build up and develop a grape quality assurance system which is favourable to cooperatives. - Support, control and closely manage the quality from cultivation to consumption, particularly pesticide residue as well as other chemicals that can damage consumers' health with a clear rewarding and penalty system. - Provide anolyte washing machine in order to reduce chemical residue for the grapes at coops. - There should be courses on law and clear legal decisions in signing up and executing bilateral contracts, even material obligations of farmers if they break contracts.
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<p>Processing and Preservation technologies.</p> <ul style="list-style-type: none"> - Farmers are not able to apply post-harvest technologies such as preliminary processing, preservation and particularly processed products (wine, treacle, jam, raisin..) - The maintenance or preservation of grapes before harvesting, the speeding up or slowing down grapes' maturity is of great importance for the farmers. 	<ul style="list-style-type: none"> - Domestic and overseas organizations should provide supports in training basic techniques of grape processing and information on processed products from grape which are suitable with the Vietnamese manual techniques. - Study more about techniques of building wine trench and fermentation in order to help grapes meet export standards (instead of investing in refrigerated warehouses). - Invest to buy one refrigerated truck for a few cooperatives so that they can provide fresh grapes directly to supermarkets throughout the country.
<p>Capital</p> <p>Farmers have difficulty in approaching loans because of complicated procedures.</p>	<p>The Bank for Agriculture should have more convenient policies and mechanism to make it possible for farmers to approach the loans more easily.</p>
<p>Consumption</p> <ul style="list-style-type: none"> - Farmers are much dependent on collectors in consumption and selling price as they have no source of consumption and market information. - No organization/ association is in charged of stabilizing selling prices and consumption. 	<ul style="list-style-type: none"> - It is necessary to multiply models of production, consumption through cooperatives, associations, in order to make it possible for the synchronous application of cultivation techniques, prevention of pest diseases, distribution and consumption. - It is necessary to have a grape wholesale market and a middle agency that can boost up the sales between the farmer and the collectors and the enterprise. This agency will be responsible for forming a consumption system, agreeably maintaining selling prices, and facilitating communication among factors.

2. COLLECTOR (I. 11, 12, A. 7)

Diagram 11: Collector and direct relations



2.1. General Features

As mentioned above, the primary form of buying products from farmers is per the garden unit (“buying the whole garden”), collectors will be in charge of post harvest duty.

Normally, collector buy grapes from farmers or smaller collectors. Currently, in Ninh Thuan, there are about 60-70 collectors collecting grapes all year, including 6 big collectors who sell products to big wholesalers in far away provinces throughout the country and export products (please see diagram 9). Particularly, some of the collectors harvest products by themselves and transport products to main markets in other provinces and cities, without having other people to transport products by trucks*.

Collectors also sell a small quantity (Type 2) to local retailers. The low quality grapes (type 3) are sold to factories to make wine or treacle, etc...

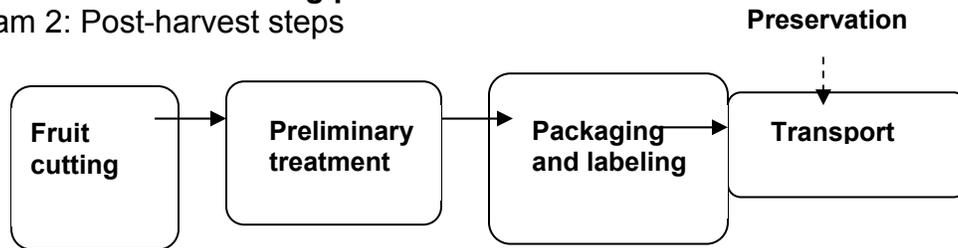
On average one collector can purchase around 1 ton per day in the crop.

Generally the collectors in Ninh Thuan are of small size, most of them use family laborers, premises that are in bad and dirty condition. Only few collectors can fulfill the post-harvest process which meets quality standards and safety requirements.

**Transporting products by truck or train is popular in Ninh Thuan, however by these means the loss rate is higher and the cost is expensive*

2.2. Collector s' Harvesting process

Diagram 2: Post-harvest steps



2.2.1 Grape Cutting (image 9, appd.7).

In general, collectors are in charge of harvesting (grape cutting). They usually hire laborers to work per day, per crop. Grape cutting usually takes place early in the morning, between 6 and 10 am **.

The grape fruit will not continue being ripe after-cutting. Thus, if the grapes has been cut early, it will not be sweet enough. On the contrary, when the grape become ripe enough, after cutting it is easy to get soft, spoiled bad and unsanitary. As a result, it causes higher loss, especially when transporting or preserving.

Until now, cutting grape is still done manually (using scissors to cut stem and bunch). The way of cutting grape also does affect to the quality of fruit bunch. ***

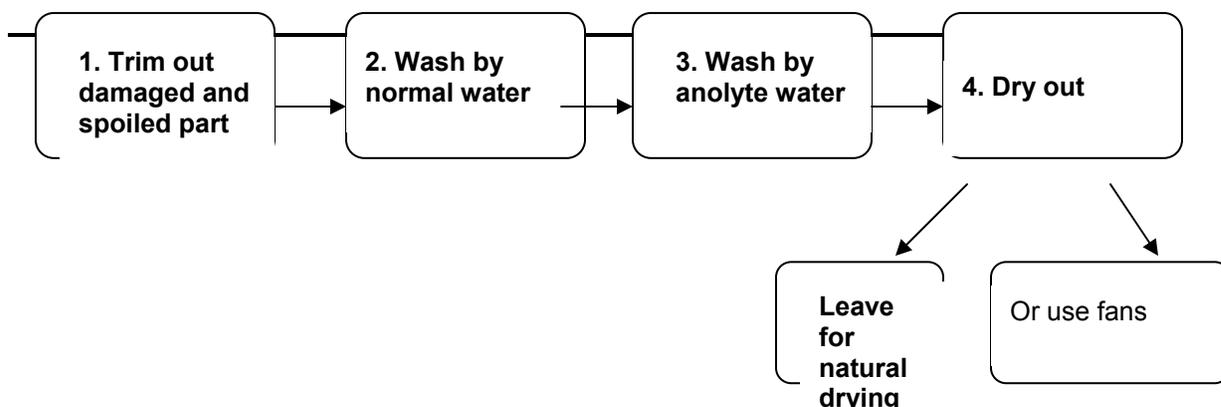
The grape has to be transported to sell within the day so the preliminary processing takes place quickly and roughly. Almost all of the preliminary processing places in Ninh Thuan are simply, poorly equipped and fail to meet sanitary requirements. (image. 11, 12, appx. 7)

Usually the Collectors just trims out the damaged or pest-havocked part of the fruit. Only when growing safe grapes, the post –harvest preliminary processing is done more carefully as follows:

****The cutting time fits the physical health of the grape tree (solid fruit, water volume is guaranteed and fresh).**

*****If cutting is done in a proper technical way (grape is smoothly cut), it was put gently into a plastic bag of about 5 kg with soft paper layers to avoid collision. But the grape in Ninh Thuan is now cut and put carelessly (usually into a rattan bag of 100kgs. (image, appx.) so its quality is seriously affected). (Source: farmers' group discussion, conducted by Axis).**

Diagram 13: Preliminary Processing process of safe grapes



The above preliminary processing is now applied in some places in Ninh Thuan with mechanical washing machine provided by the Southern Fruit Research Institute and the Sub-institute of Agricultural Electro-Mechanics and Post harvest Technologies (Source: in-depth interview with Farmer Ba Moi).

2.2.2. Packing and labeling

Packing: (image 14, 15, appdx. 7)

After getting dry, the grape is immediately packaged. In the past, the packaging is very simple, e.g. big bamboo basket of 100 kgs. Now there are many materials for packaging, based on customers' demand

- Table 7: Materials for packaging used for Ninh Thuan grapes (Source: farmers' group discussion, conducted by Axis).

Kind of packaging	Weight	Material	Times of use	Price (VND)/unit	Image
Small basket	10 kg	Bamboo, rattan	Once	2,000 – 3,000	No.14, appdx 7
Carton	10, 15 kg	Paper	Once	12,000	No.13, appdx. 7

Big bamboo basket	20 kg, 50 kg, 100 kg	Bamboo	Many times	50,000 (per 50 kg type), 95,000 (per 100 kg type)	No. 14, appdx. 7
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Spongy box		Spongy	Many times	10,000	No., appdx. 7
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Normally, only in high quality markets like Hanoi, Hochiminh or export markets, collectors pack the products carefully (using carton box which is covered, holed). Otherwise, the grapes are packed into big bamboo baskets or medium bamboo basket, then transported to the South or the Central of Viet Nam (Nha Trang, Đà Nẵng).

Labeling: (image. 13, appdx. 7) as showed above, Ninh Thuan grapes are rarely labeled, except Ba Moi grapes which is labeled before being brought to supermakrets (60-70% of his total volume). However, taking into account the total volume of Ninh Thuan, this quantity is very small: <5% (Source: Department of Agriculture and Rural Development).

2.2.4. Transportation

Farmers and collectors usually use bikes and tricycles to transport grape from garden to collectors' places (image. 16,17, appdx. 7)

After preliminary processing and packing, collectors use motobyke to transport grapes to a gathering location. From thia location, grapes are transported to other provinces by trucks (image. 18, appdx. 7) or trains.

Loss during transportation is an inevitable problem. The drivers are mainly responsible for product damage or spoilage during transporation. Meanwhile collectors will bear the cost of extra product (calculated by kg, approximately 5%) when arranging products into the truck.

Some collectorsss carry goods to wholesale centers in other provinces themselves. In order to minimize losses, they usually pack the products more careful (with spongy box) (image.19, appdx.7). Their loss rate is claimed around <5% (however, it varies by distances).

Besides, the collectors also has to bear the transport fee to wholesale sites, on the other hand they have no legal contract with the wholesalers. Therefore, they are at high risk of payment upon delivery*.

When transporting the products to far away markets like Hà Nội, Hải Phòng and Nam Định, the collectors have to incur higher transport fees so the product cost is higher than other locations.

**See more about payment*

2.2.5. PRESERVATION (image.19, appdx.7)

Since the grape fruit typically gets to be spoiled easily and hard for preservation, most collectors do not store grapes many days. For spare products, they will sell to winemakers, treacle makers or they will make their own wine for personal use.

In case of storing grapes many days, collectorss will use sulphur*. Some collectors use a modern method: dipping grapes into anolyte but this is not popular as it is expensive (source: in-depth interview Mr. Ba Moi)

There is only one cold storage warehouse which is located in the Ninh Thuan Institute of Technology and Science. However it is not yet put into operation yet. Most of products are transported in room temperature temperature. (Source: In-depth interview to Mr. Ba Mõi)

2.2.6 Loss

Collectors's loss can be summarized as follows:

- "Buy the whole garden": total loss during preliminary processing at vineyards and gathering location is between 5 and 15%.
- "Buy per kg": farmers are responsible for doing preliminary processing and classifying so collectors suffer a lower loss rate around 1%.
- Loss during transportation (for extra product weighed) around 5%.
- Therefore a collector's total loss is between 5 and 20%.

2.3. BUYER

After preliminary processing, collectors can sell grapes to many buyers, mostly to bigger collectors, wholesalers in other locations or wineries (for grapes of bad quality). Big collectors with big capital can export the products to border areas (see diagram 9).

Usually good grapes are sold to high quality required markets like Hochiminh, Hanoi. Grapes of medium class can be sold to Nha Trang or other provinces. Grapes of bad quality are sold to retail outlets or processing manufacturers.

When selling to far away buyers, prices are determined by buyers so collectors will take risks and suffer low price. The selling price is not stable, fluctuating according to the market and the season of other fruits**. Normally the selling price of the collectors ranges from 5,000-15.000VND per kg of type 1 grape. (Source: *in-depth interview with Ninh Thuan's collectors*).

*Until now, this method is still frequently used for fruits but very poisonous (Source) .

** For example, in the lychee season in the North (June), grapes will be cheaper in the North. The same situation is also found in the rambuttan or longan season in the South.

On festive days and Tet of the Khmer people (April), big collectors usually buy more grape to export directly to Cambodia so they will buy from smaller collectors.

2.4. Contract

In transactions with farmers, there's no paper contract, only verbally agreement (please refer to blue dragon fruit, page 14).

Between big and small collectors, contracts are also made verbally, prices are negotiated directly and quickly.

At the start of a new relation, the wholesaler will prepay to the collector about 5 - 10 million dong. After several times of doing business, they will no longer prepay. At that time, selling prices will be agreed on the phone only. Therefore, collectors of Ninh Thuan's grape are usually at high risk when transporting goods first and getting payment later.*

2.5. Form of payment

The form of payment for farmers as showed above is C.O.D (cash on delivery) or partial prepayment (on overall contract), then the rest is paid later (after harvesting).

Big collectors can delay payment to small collectors, i.e. they pay a few days later, depending on their relationship and by case.

As for the wholesalers in other provinces, they usually pay one third of the payment amount to the local collectors upon product receipt and he/ she finishes the payment 7 or 10 days later. The payment is usually made through postal service.

For small export, contract is as simple as selling to wholesalers in other provinces or cash is paid at the borders upon product delivery.

2.6. Profit:

Income of collectors is claimed rather unstable. Medium local collectors have an average income of between VND 1,000,000 – 1,500,000 per month, not mention to cases they get losses if being cheated or not smart in business (Source: In-depth interview with Ninh Thuan's collectors)

** The case has been seen many times for wholesalers in Hanoi. They only pay upon the good receipt. When the market price is lower than the agreed price (on the phone before), wholesalers in Hanoi sometimes refuse to pay the agreed price or do not pay after all. This causes big problems for the collectors who may lose the goods and money or have to travel to Hanoi asking for money. (Source: in-depth interview with Ninh Thuan's collectors)*

Some of the major reasons for their unstable income:

1. Buying price is unstable, dependent on the wholesaler.
2. Unexpected loss when buying the whole garden
3. Loss caused by categorization at preliminary processing.
4. Loss caused by weather during harvesting (rain or storm).

In brief, in comparison with collectors of blue dragon fruits, Ninh Thuan grape collectors suffer more risks because the product itself is very “choosey” in terms of harvesting time, dependent on weather, stops getting ripe after being cut, difficult to preserve, easy to be spoiled during transportation. Besides, collectors suffer an enormous loss (between 5 and 20%), sometimes 40-50% if it has been cut at rainy times.. Local collectors also have to deliver the goods first and get the payment later. Thus they might face problems of losing money in doing this business.

The following table will show more details about these problems and solutions.

2.7. Problems and solutions

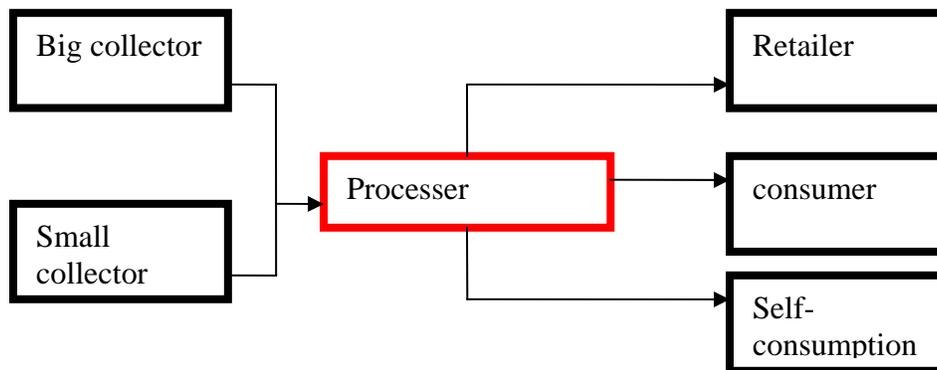
Problems	Solutions
<p>Grape supply volume</p> <ul style="list-style-type: none"> - Grape supply volume is unstable: “buying the whole garden” sometimes results in inefficient required volume. For the fact that if collectors do not harvest grapes right after buying (usually after grapes getting to an age of 3 months 10 days), grapes easily gets spoiled or diseases. When shorting of products, collectors have to buy grapes of lower quality at lower price. It is not good at all for their credibility towards wholesalers. - Even with contracts, farmers do not fully comply with its requirements. 	<ul style="list-style-type: none"> - Refer to the farmer section for organizing a middle agency who can help assure the business stability, market price and relationship between farmers and customers. - It is necessary to set up a website for Ninh Thuan grapes and a wholesale center in order to generate more transactions.

<p>Quality:</p> <ul style="list-style-type: none"> - “Buying the whole garden” may lead to high risk for product quality. - Grapes usually do not meet quality requirements because of being cut prematurely to catch up with market price and delivery time - Qualified grapes (safe grapes) is not enough. 	<ul style="list-style-type: none"> - See more about farmers’ awareness as mentioned above. - Besides, it is indispensable to train collectors about timely grape cutting, long-term benefits from good quality and high selling price (their immediate profits) as well as bringing benefits to end - consumers.
<p>-Contract and payment</p> <ul style="list-style-type: none"> - Trade relations between collectors and farmers, as well as far away wholesalers are not firm, easy to be broken due to competition (farmers) or low selling price (wholesalers). - Transactions are not formally contracted so risks of <u>cheating and delayed payment</u> are high. 	<p>See more about farmers in training about signing contracts, p.16.</p>
<p>Preliminary processing and preservation technologies</p> <ul style="list-style-type: none"> - Poor premises, low post-harvest and preservation technology. - Lack of information and grape processing technologies make processed products not yet diversified and safe. 	<ul style="list-style-type: none"> - For Ninh Thuan’s collectors, it’s necessary to build new preliminary processing sites. - Also, it’s needed to consider providing another washing machine and refrigerated warehouses (grapes cannot last as long as dragon fruits). - GTZ can combine with Nha Ho Center, Post-Harvest Sub institute to help collectors and manufacturers know how to make wine effectively. Moreover, it is necessary to provide information about processing grape juice, raisin, jam and other grape products.

<p>Capital</p> <p>Collectors need money to equip themselves with modern machines, particularly in building wine trenches (both for winemaking and storing in lower temperature than outside).</p>	<p>- The same with suggestions in the Farmer section, p.16.</p>
<p><u>Consumption</u></p> <ul style="list-style-type: none"> - Unstable price, usually influenced by wholesalers in other provinces - Unaware of market information, not being interactive with customers in terms of exchanging market information. 	<ul style="list-style-type: none"> - The same with suggestions in the Collector section of Dragon fruit. p. 23, 24

3. PROCESSER

Diagram 14: Processor and their relations



The processed product takes almost one third of the provincial grape output, mostly from low quality grapes (Source: in-depth interview with Ninh Thuan’s Department of Science and Technology).

Most of the processed products are purchased from big collectors (around 60%) and small local collectors (about 40%), mostly for winemaking (around 80%) and jam (20%).

3.1. Wine-making

The total number of wineries in the whole province (family based) is 30, most of the work is done manually with secondary grapes material (not selected, spoiled, in small bunch, or sparse grape) Among these are 4 registered trade names of grape wine including Việt Nghi, Cường, Ba Mọi and the Center of Scientific Technological Progress information and Application (Source: in-depth interview with Ninh Thuan's Department of Science Technology).

Besides, in this province, there are two wineries with mass production. One is Allied Domeq (foreign invested) which has a capacity of 10 million liters per year. However, due to many reasons, this factory has stopped production for over 2 years. Another is Thang Long wine Joint Stock Co. (Hanoi) with its branch in Ninh Thuan, which has a capacity of 3 million liters per year. They just signed with Ninh Thuan a contract to supply materials for winemaking under Thang Long brand in Ninh Thuan Province.

In order to develop grape products used for making wine, Ninh Thuan's People's Committee has just approved the target of 2010, in which develops wine production with an area of 100 hectares for growing grapes, provides annually between 2,500 and 3,000 tons of grapes a raw material for processing around 1.8 million liters of high quality wine. The basic target of growing grapes for making wine as a test and of processing high quality wine have increased the production values from VND 100 million/ha/year to VND 150 million/ha/year. (Source 11, appdx6).

The present winemaking process of wineries in the province is mostly manual with small capacity: each winery has around 20 pots (terra cotta) (image 20, appdx. 7), each pot contains 200 liters of wine. Therefore, each time one winery (like Viet Nghi) can sell up to 4,000 - 5,000 liters and Cuong Winery even sell more (double Viet Nghi) (please see more appdx.9).

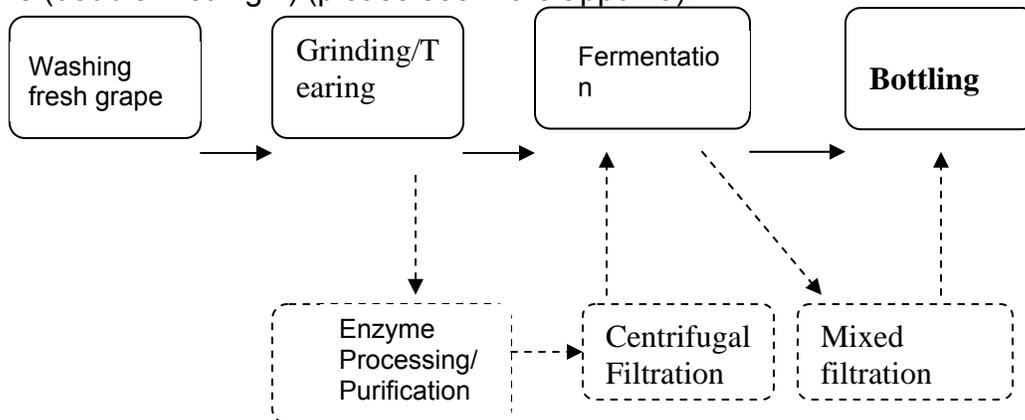


Diagram 15: Wine-making process

(Smooth Arrow = Manual method, Broken arrow = method of reasearch insititutes, wineries)

In reality, the wine in Ninh Thuan is made manuallly, very simply (please see the smooth arrows in the diagram). Important steps such as choosing grapes,

purification, centrifugal filtration, mixed filtration and even bottling, are not treated with care and do not follow any sanitary process, so the quality of Ninh Thuan wine is low and only consumed locally in a small quantity.

Presently, wines with brands (in glass bottle) (image. 29, appdx7) are mainly consumed in the province (mostly sold in hotels, tourists, retailers) or markets in other provinces. Those are Viet Nghi, Cuong with a retail price of VND 23.000 - 25,000 per bottle of 500ml. These are also two leading wineries which are very successful in labeling and marketing.

Besides glass bottle (can be reused), Ninh Thuan wine can be sold in plastic bottle of 1 liter or plastic cans of 2,5,10 liters.

3.2. Processing Treacle

Besides wine, secondary grapes can be used for processing treacle. There are about 20 manufacturers processing treacle. (source: in-depth interview with Ninh Thuan's department of Science and Technology), most of which are small and family-based. Treacle processing is simpler than winemaking (including only 3 first steps). The selling price of one liter of grape treacle is VND 20,000/plastic bottle (image.30,appdx.7).

3.3. Other processed products:

Currently there is almost no raisin manufacturer due to high costs and lack of high techniques to process raisin. Juice- making technique is now a result of scientific reseach, not yet applied for large-scale production.

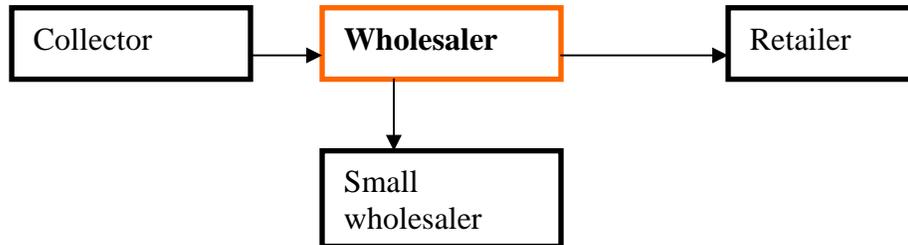
In short, there are not many grape processing manufacturers which are small-scaled, on family basis, mostly in the form of winemaking. The process is simple, only a few quality criteria are controlled by Ninh thuan's Department of Quality Criteria and Measurement (see appd.8). Most of them are spontaneous (self-make, self-pack and self-sell).

All of the processing manufacturers are doing business in many forms such as selling along National Highqgay No.1, opening agencies in other provinces or selling in the markets in such big cities as Hồ Chí Minh, Hà Nội, Đà Nẵng, Cần Thơ... some introduce their products in trade fairs (while local government agencies are not aware, in case of Viet Nghi).

As shown in the above section of collectors, problems of the processer are found as the manufacturing process of high quality wines, techniques and quality management from material to bottling, lack of information about other products processed from grapes and the consumption market.

4. WHOLESALER (IMAGE.24, APPX.7)

Diagram 16: wholesaler and direct relations



4.1. General features

In diagram 16, the wholesalers pick up goods from Ninh Thuan's collectors and sell to smaller wholesalers or to retailers, the volume of sales to end - consumers is very small (<1%) so it was neglected in the value chain.

In provinces, cities such as HCM, big wholesalers' premises are based in main markets (Tam Bình, Tân Xuân) whilst other small wholesalers are located in other markets such as Ba Chieu and Pham Van Hai.

Small wholesalers get their goods from main markets and distribute to retailers. Unlike wholesalers in main markets, some small wholesalers own preliminary processing places and cold storage warehouses (if a retailer's goods are not sold out during a day, he can store his goods at the wholesaler's cold warehouse for preservation).

In addition, small wholesalers in small markets have longer selling time than wholesalers in main markets so they have much more time for preliminary processing. Their business is not only about grapes but also another fruits.

As mentioned above, when buying goods from collectors, wholesalers often quote the price for collectors without official negotiation. Collectors and wholesalers usually exchange information on price over the phone. After wholesalers receive their goods and ask for market price for reference, they will justify their price and pay to collectors. Paid prices are often equal to or lower than the negotiated price.

Being active in giving quotation and capital, wholesalers in cities or other provinces have considerably less risks in business compared to collectors.

4.2. Post good receiving steps such as: preliminary processing, packaging, labeling and transportation are all similar to those of Binh Thuan Dragon fruit

wholesalers (please refer to page 25, Dragon fruit report). However, they suffer higher loss than those of Binh Thuan dragon fruits.

4.3 Loss

Loss in preliminary process and quality categorization: this loss is dependent on collectors' packaging methods in transportation. Loss is only 2-5% if well-packed. Wholesalers will determine the buying price after examining the product quality. Lower quality products will be sold out at lower prices, thus wholesalers at main markets hardly suffer loss in their business. However, smaller wholesalers have to incur higher loss due to the fact that they have to categorize and conduct preliminary process carefully after buying from main markets, their loss can be from 2 to 10% (source: in-depth interview with the wholesaler at Ba Chieu Market).

Loss in transportation: Higher loss caused by spoiling, dropping from bunch... will be born by transporters or collectors. However, if the grapes are transported by a local driver, the loss is lower compared to using another driver*. If a wholesaler has to transport grapes to retail sites, he has to suffer losses during transportation (usually very low, because the retailer is not far in the city).

4.4. Contract and payment (see collector's section)

Wholesalers at main markets does not have paper contract in trading, all transactions are agreed verbally.

Particularly, Metro uses paper contracts in their sales system. In which, it states quantity, quality, price changes, time of payment, form of payment, etc... Normally, the form of payment is bank transfer (Source: in-depth interview to Mr. Ba Moi).

When selling to smaller wholesalers or retailers, payment is made mostly in cash. A wholesaler seldom suffers losses in preservation because the trading time is short.

4.5. Profit

According to results from in-depth interviews, profit of wholesalers is between VND 500-1,000 per kg. In reality, their profit is higher, depending on grape types and quality. Small wholesalers can have a profit of 10% (in-depth interview to wholesalers at Ba Chieu Market).

* As mentioned above, the packaging for transportation is carefully done by wholesalers (packed in a spongy box by 10kg), loss is below 2% (Source: in-depth interview with the wholesaler)

4.6. Problems and solutions

In addition to same problems as those of Binh Thuan dragon fruit wholesalers (see p.), Ninh Thuan grape wholesalers have some other problems such as : Ninh Thuan grape quality is not stable so the wholesaler has to do transactions with small quantity*. Besides, they have to import foreign grapes and other fruits.

There's no preservation system for Ninh Thuan grapes so the wholesaler has to sell them out within a day and at low prices, which cause an effect on their profit. Please see more about improvement of the quality and output of Ninh Thuan grapes (farmer, collector p15, 22).

5. RETAILER

5.1. General features

The number of retailers in Ninh Thuan is not big, mostly concentrated along the national highways or in main markets (img.22, appd.7).

They usually have small business. The capital for trading fresh grapes is on average VND 2-4 million per year per household (source: indepth interview with Ninh Thuan;s retailers). As with small business, they buy small quantity each time: between 10 and 40 kgs of fresh grapes and/or 20-50 bottles of wine. As for grape treacle, they trade in smaller quantity, about 10-20 bottles each time. The wine and treacle that they are trading is processed manually by themselves partly, and mostly taken from private processing manufacturers in the province. (source: indepth interview with the retailer).

The customers of provincial retailers mostly are passers-by (not local people).

In other provinces: some retailers like supermarkets often have contracts and buy directly from collectors or well known grape growers in Ninh Thuan like Ba Moi. This farm will be in charge of transporting the grapes to the city and then do preliminary processing and packaging upon supermarket's requests (kg, bag or sponge) and labeling themselves.

Other retailers in the market, shops usually get the goods from main markets or smaller wholesalers. The average purchase quantity is between 20 and 30 kg.

5.2. Preliminary processing

Normally, the retailers will do the trimmings of spoiled parts and re-tie dropped fruits from a bunch, attach fresh leaves to the bunch to make it look better. At the same time, grape categorization will be done.

5.3. Packing and labeling

Only a small quantity of grapes are labeled (mostly Ba Moi grapes (img.15, appd.7), the remaining grapes at markets and shops are not labeled. When

* A small wholesaler buys between 50 and 100 kg each time (source: in-depth interview with smaller wholesalers at Ba Chieu Market).

selling to consumers, the packaging is also very simple, they often use nylon bags to contain grapes or put some paper inside. Only during transportation, the retailer will reuse the packaging materials which has been used by the wholesalers during transportation to the retail site or any available packaging materials.

5.4. Transportation

The means of transport is usually motorbike for short distance in the province, the loss is therefore very low, below 1% or less. Now some retailers have been door – to – door delivered with goods from small wholesalers, thus they are not in charge of transportation or selecting goods from main markets.

5.5. Preservation

Most retailers don't have any effective means or methods of grape preservation. Ninh Thuan grapes are particularly considered as the most difficult for preservation.

However, some small wholesalers have cold storage warehouses which keep retailers' goods if they cannot sell out during the day. Loss in preservation is rather big, about 5% (grapes is dropping and head-rotten during cold preservation or softened when exposed to wind when taken out of the cold warehouse). According to the retailers, the grape quality will deteriorate in 3 days at maximum

5.6. Loss

Retailers' total loss through the steps are found as follows:

Loss during categorization, preliminary process: 5-10%

Loss during preservation: (room temperature condition): below 10%, (cold preservation): 2-5 %.

Supermarkets suffer smaller losses because the sellers (collectors, wholesaler) are in charge of preliminary processing after transportation. Normally they will suffer losses in preservation (about 2% within the 3 first days; the loss rate is different, maybe 10% for Metro if the preservation takes longer time) (source: indepth interview with Metro).

5.7. Contract and payment

Between the retailers and collectors/ wholesalers, there is usually verbal agreement. For a few supermarkets like Cora, Coop mart, Metro, they use paper contract when trading grapes, especially with Ba Moi grapes (see more about the wholesaler, Page 27)*.

**It depends on the grape quality of each crop.*

Payment is made per installments (within 1 month or directly in cash upon delivery). Some supermarkets use bank transfer and payment within 15 days from delivery time (Source: Contract between Cora Supermarket and Ba Moi Vineyard).

For the buyers like restaurants, hotels, there are contracts (not just for grapes but also for vegetables in general). The major agreement in the contract is about grape bunch, fruit size, freshness, sweetness, fruit color and price (source: in-depth interview with retailers).

For consumers, there's no contract, all is done in cash directly.

5.8. Profit

Due to the fact that Ninh Thuan grapes are different from other fruits in terms of unstable quality and output, retailers cannot sell grapes all year. Therefore profits from grapes are irregular (Source: in-depth interview with retailers).

If sold to consumers, the profit of retailers (minus losses) can reach between 10-12%. If provided to restaurants, hotels, it may be higher, around 15% (Source: in-depth interview with retailers at Ba Chieu Market).

Besides similarities with dragon fruit retailers, Ninh Thuan grapes retailers have the following problems:

Problems	Solutions
<p>Low product quality: Ninh Thuan grapes are not nice looking with small fruits, sour, acid, and having many seeds. Customers are not fond of Vietnamese grapes yet due to low quality and high pesticide residue.</p> <p>Brand and origin: Grapes are now taken into wholesale markets with origin but have no clear brand name.</p> <p>Preservation: Most retailers at markets say that they have no effective means or methods of preservation for Ninh Thuan grapes in room temperature conditions. Cold storage can also cause damage if exposed to wind.</p>	<p>Farmers and grape breeds can solve this problem (see more about the farm, page).</p> <p>Encourage farmers to grow safe grapes with clear brand names and origin. Set out obligatory stipulations in encoding products to track down origins.</p> <p>The Sub-institute of Post Harvest Technologies should provide studies, necessary knowledge, supports and publicities suitable preservation methods for Ninh Thuan's grapes.</p>

6. CONSUMER:

The consumers' group discussion conducted by Axis shows the following results:

6.1. Concept of safe grapes

Most consumers think that safe grapes must have the following:

Table 8: Perception of safe grapes

Product part	Features	Perception
Stem	Fresh (close to stem, not crack)	Well treated and preserved
Fruit	Solid, glossy	Fresh grapes, high quality
Bunch	Big, solid	Good breed, quality
Color	Nice, evenly ripe	Nice looking and favorable
Flavor	Sweet (or a little sour)	Delicious, qualified
Hygiene	Fruit carefully covered	Clean, pestles

6.2. Grape Buying habits

Buying place

Consumers usually buy grapes (domestic) at markets and at Supermarkets (imported). However, they do more at the market due to the habit of frequently going to the market which is near their houses. They all assess grapes sold at supermarket are of higher quality and safety though they cost more". (source: consumers' group discussion, conducted by Axis).

Buy and use

Compared with other kinds of fruits, on average they consume fresh grapes with a quantity of around 5 kgs per person annually. Others mostly use grapes as gifts on festive days, Tet, worshipping, visiting patients, etc. because grapes are considered to be of luxury.

Price

At present, the price of small domestic grapes is the cheapest, between 5-8,000dong per kg. At the time of shortage, it may go up to VND 12,000 per kg (red grapes). Price of green grapes ranges between VND 25,000 to 45,000 per kg. American and Australian grapes are priced between VND 50,000 to 70,000 per kg.

** however, consumers of low socio-economic class claimed they would buy foreign grapes if the domestic ones are increased by VND 5,000per kg.*

Consumers are willing to pay a higher price of VND 2,000 -3000 per kg for Vietnamese safe grapes if domestic grapes are reliable (source: consumers' group discussion conducted by Axis).

Quality Assessment of Vietnamese grapes (compared with imported ones).

Hochiminh City consumers perceive Vietnamese grapes of inferior in terms of quality due to the fact that they are sour or acrid, small fruited, not nice looking, uneven sized, having plenty of pests or white fruited, thin peeled, having plenty of seeds and not long-lasting. (Source: consumers'group discussion, conducted by Axis). Besides, Vietnamese grapes are not of variety, very few branded and labeled or carefully packed or the designs and packaging are not good, the selling price is therefore much lower than the imported ones.

Consumers in the group discussion also claimed that they have been familiar with imported fruits. In the market, now there are many kinds of imported grapes with nice packaging, good quality, labeled with brand name, clear origins. Thus they prefer imported ones though the price is much higher.

As for high quality Vietnamese grapes, consumers insisted on buying labeled Vietnamese grapes which help reinforce their trust in quality and proof for any dispute (Source: Group discussion conducted by Axis).

6.3 Problems of consumers

Major problems	Solutions
1. Have not yet been able to differentiate high quality domestic grapes (mostly by high or low selling prices only) 2. Have poor perception on safe grapes (mostly justifying safe grape by its appearance only). 3. Mainly buy grapes of unknown origins at markets. 4. Lack information and reliable sources of high quality domestic grapes (with labels and origins). 5. Grape price is still high, unstable (grape is still unaffordable for working class and rural people)	→ There should be propaganda campaigns for domestic grapes, high quality Vietnamese products which are good for health and how to differentiate domestic grapes. → Together with consumers' organizations, help generate feedbacks from consumers, and encourage safe grape growers to be confident in registration for product quality and labels. → The improvement of grape quality will be settled as long as producers and distributors are in good cooperation.

7. Role of organizations in developing Ninh Thuan's grapes.

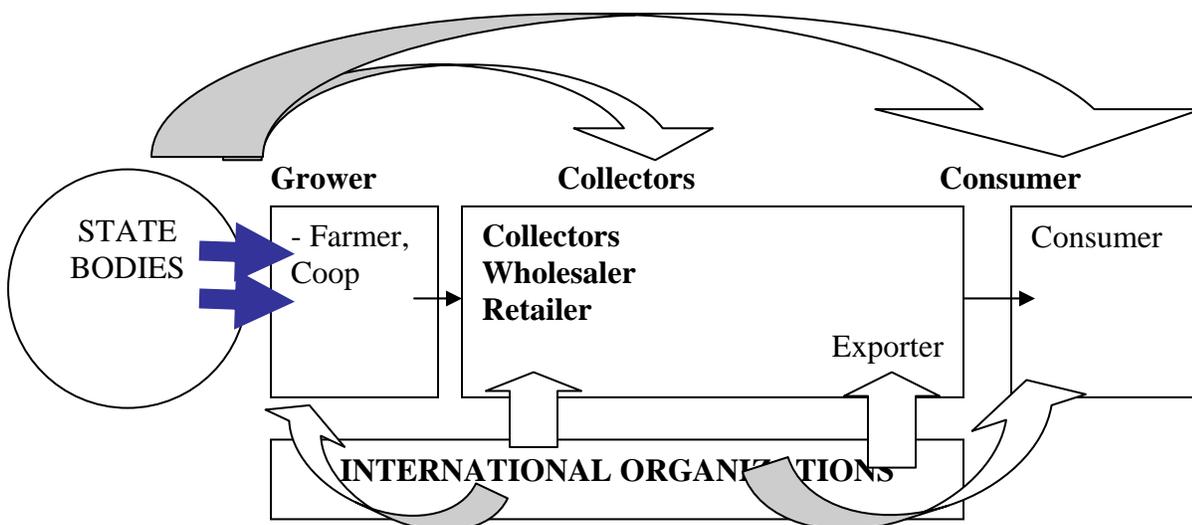
Generally the role of relevant governments in Ninh Thuan is not different from Binh Thuan in most of aspects except management effectiveness and work efficiency. For the grape, these governments have showed low concern as they have limitations on technologies, human power and management expenses.

The Department of Science and Technology, Nha Ho Plant and Seed Center have been attempting to assist Ninh Thuan's grapes building up a model of transferring advanced technology in order to make the grape growing highly economical; helping farmers grow safe grapes, controlling and certifying processes of safe grape growing techniques, studying products from the grape,... However, they still have a lot of difficulties in conducting the project till the end.

Ninh Thuan's Department of Trade and Tourism has performed poorly in trade promotion for the grape. Publicity activities on product, building up the image for Ninh Thuan grapes have not yet organized or structured into systematic and large-scale campaigns. Besides the reasons showed, there's a fact that Ninh Thuan grapes are not high quality fruits having export potentials for the province.

Compared to Binh Thuan dragon fruits, organizations in Ninh Thuan are less likely involved in any factors of the grape value chain. If any, their involvement is considered rather low, especially foreign organizations have not shown their concern on growing grape (in comparison with Vietnamese original fruits or tropical specialties) during both pre and post – harvest. Furthermore, all organizations have not yet properly care for export and product publicity to consumers. Those are actually major obstacles for the development of the grape in Ninh Thuan (see diagram 17).

Diagram 17: **Factors of Ninh Thuận grape value chain**



Blue arrow: → Have effect
Gray white arrow: ↪ Lack effect

IV. ANALYSIS OF STRENGTHS, WEAKNESSES, OPPORTUNITIES, THREATS

1. STRENGTHS, WEAKNESSES

	STRENGTHS	WEAKNESSES
Breed	<ul style="list-style-type: none"> - Not yet obvious 	<ul style="list-style-type: none"> - Compared to other fruits, grape is the most difficult to grow and cultivate. - There's no breed that really suits with Ninh Thuan, particularly in terms of disease resistance, high yield. In spite of being familiar, Red Cardinal has deteriorated. There are a lot of new breeds at Nha Ho Center. NH01-48 is able to give high yield but it is easier to have lean harvest than red cardinal (flower burn disease ..) Until now, Ninh Thuan grapes are still fresh eating with seeds. It has not yet been diversified with new breeds.
Land	<ul style="list-style-type: none"> - Ninh Thuan's land and climate conditions are most suitable for growing grapes. - There has been land planning and grape developing program until the year of 2010 	<ul style="list-style-type: none"> Due to being sparsely grown in small areas, quality of grape is not consistent, and it is difficult to set up infrastructure on a large area. Cultivated land for many years has deteriorated and does effect to quality of grape. Planning is unclear, which make farmers be embarrassed about cultivated land and hesitated in large scale investment.

<p>Product quality</p>	<p>Unclear, except a few farms like Ba Moi who have good quality products meeting safety standards</p>	<ul style="list-style-type: none"> - Generally, the quality of Ninh Thuan 's grapes is going down due to weather, land, deteriorating breeds, early grape cutting, etc. - The perception of farmers on growing grape is low. They hardly comply with strict growing rules. They particularly overuse insecticide, which leads to big problem for Ninh Thuan grape in terms of hygiene and safety.
<p>Price</p>	<p>Price of domestic grape is much lower than that of foreign grapes.</p>	<ul style="list-style-type: none"> - Product quality generally has not met normal Vietnamese standard of food safety, let alone international standard for export. - Price of domestic grape price is much lower than that of foreign grapes. Low selling price has seriously influenced on farmers' profit.
<p>Demand and yield</p>	<p>Domestic need is increasing, imported grape volume has been considerably growing for the past 5 years (see Import).</p>	<ul style="list-style-type: none"> - Ninh Thuan's grape output is low. It has not able to meet domestic market demand, which is a great opportunity for other countries being imported to Vietnam in high volume. - No export activities

<p style="text-align: center;">Post harvest technology</p>	<p>Machines for washing and drying products (preliminary processing) have been invented domestically.</p>	<ul style="list-style-type: none"> - Prices of machines are still high, making it unaffordable for many people. - Packaging techniques are too simple, which causes high loss for collectors in preliminary processing and transportation. - There is no available preservation method for fresh fruit at room temperature. - There is no labeling technique, mean and support, which have influences on the general image of the domestic grape brand. - There is no synchronous solution for the whole value chain of a suitable closed technology, particularly experienced management resources.
<p style="text-align: center;">Relationship in value chain</p>	<p>- Not yet obvious</p>	<ul style="list-style-type: none"> - There is no available team work, cooperative model, thus “Ba Moi” model is not yet considered as an example. - Relationship of factors in the value chain, especially that of farmers and collectors in reality has not yet been enough to ensure supply quantity and quality as expectation; moreover the relationship between collectors and wholesalers in other provinces has not yet established legally, thus this might cause big loss in business. - There is almost no feedback from end-consumers to other factors in the value chain. There is no interactive communication and no feedbacks to government officers.

The interest of organizations	<ul style="list-style-type: none"> -The province had such concerns as the planning programs to expand the grape-growing area, encouraging cultivation and giving priority to investing in grapes to make it become a top fruit of the province in the future. - Fruit associations together with institutes aslo have programs of uniting 4 factors to help grapes. 	<ul style="list-style-type: none"> - Overall, organizations' interest is not yet systematic and highly effective, particularly at the stage of product consumption. - Organizations have not yet showed sufficient interest in the grape growing, not yet had proper management of collectorss, wholesalers, retailers and particularly not yet conducted market reasearch, trade promotion for Ninh Thuan grapes, as well as study on products processed from grapes. - There is not yet capital supports to projects that develop Ninh Thuan grapes, especially from international organizations.
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OPPORTUNITIES AND THREATS

	OPPORTUNITIES	THREATS
Market demand	<ul style="list-style-type: none"> - Domestic demand of grapes is growing => possible to generate to a big volume. - Customers need high quality products and accept high price => opportunity to increase profit for Ninh Thuan grapes if product quality is guaranteed. - Domestic demand of materials for wine making grows (wineries of Thang Long ,Da Lat...) 	<p>The import of foreign <u>grapes is hard to control</u>, easily affecting domestic grape as a whole and Ninh Thuan grapes in particular.</p>
Product	<p>Based on studies of fruit-tree institutes, supported by international organizations, there are many oppotunities for Ninh Thuan to diversify seeds and products including wine-grapes , seedless grapes for fresh eating and for producing rasins etc...</p>	<ul style="list-style-type: none"> - <u>Image</u> of domestic grape in general and_Ninh Thuan grape in particular is <u>not highly perceived</u> => having influenced on selling price => generate low profit

Export	Demand for export to Cambodia ,China and surrounding markets is increasing, current yield and quality has not yet been qualified.	Official price of Vietnamese grapes imported to the surrounding countries (after AFTA and WTO) is high, which definitely make itself difficult in the competition in both local and international markets.
Trade Name	Ninh Thuan grapes have been well known domestically , with the trade name of “Ba Moi” from Ninh Thuan . Some farms are registering trade names for fresh grapes and processed products => opportunity to find market domestically and overseas.	

V. CONCLUSIONS AND RECOMMENDATIONS

After studying in detail, we realize that the value chain of Ninh Thuan grapes is facing a lot of external difficulties such as geographical situation, climate , grape breed, requirements of cultivation techniques, harvesting; and internal difficulties like people’s awareness, awareness of any factor in value chain, team work, creativityIn addition, the management is not yet tight, synchroneous. Therefore, assistances in building up the value chain for Ninh Thuan grapes are not simple, even more difficult than for other fruit products in other provinces.

However, with the limitations of the project, based on the above analysis, we have tried our best to provide some directions that GTZ ,MoT and Metro can help affect on some factors of the value chain as follows:

1. ORGANIZING

- GTZ should combine with Ninh Thuan people’s committee directing the Department of Agriculture and Rural Development as well as the participation of typical co-operatives (Mr. Ba Moi, Mr. Phuc) to build up the model of co-operative, to multiply the models of growing safe grapes, to help the product consumption at supermarkets and export companies or to actively export.
- Frequently organizing experience –sharing activities between co-operatives,communes, districts , mobilizing individuals to join in co-operatives.
- Taking up examples, rewarding and encouraging with valuable rewards

- Organizing visits to models of growing grapes locally or oversea in order to gain experience for Ninh Thuan grapes.

- TRAINING

These are similar to the recommendations of training courses for all factors in the value chain of Binh Thuan dragon fruits.

2. SUPPORT

- In addition to general recommended supports which are similar to that of dragon fruits of Binh Thuan, especially about building up a concentrated grape trading centre in the province (see the model of Binh Thuan dragon fruits , page...) GTZ should have a supporting program to help Nha Ho center study more about new breeds which are suitable with the land and climate of Ninh Thuan province. At the moment, the center expects to have more information on the grape breeds of the Federal Republic of Germany (including breeds for fresh-eating and wine-making)

- Moreover, should technicians, foreign engineers (from Germany) give helps to further study about pests and prevention methods , especially flower burn disease for green grape NH01-48, it will be of crucial support.

- GTZ should strengthen their supports by providing more information about processed products from grapes and processing techniques in a small model and preservation in room temperature.

- Instructing people how to build wine cellar as a container keeping product cool, which will save more money in comparison with building cold storage warehouses (more expense in construction and electricity).

- However, GTZ and Metro can consider giving financial supports in order to buy more Anolyte washing machine for communes, cooperatives , preserving system and/or means of cold transport for the province.

- Besides training on building brand name (as mentioned in the part of training), GTZ helps Ninh Thuan set up one website to publicize Ninh Thuan grapes, searching for opportunities to export grape products (fresh and processed).

- Moreover, GTZ can help introduce business partners, organizations who want to invest in Ninh Thuan like wineires, treacle or softdrinks manufacturers etc,.. in order to improve the local people's living standard.

Appendix 5: List of in-depth interviewees on Ninh Thuan grapes.

STT	Full name	Position	Address / Agency	Contact number
1	Phan Quang Thụ	Manager of Agriculture	Department of Agriculture and Rural Development	0918560349
2	Nguyễn Văn Thiện	Vice Director	Encouraging Agricultural Expansion Center	0903983215
3	Trương Văn Xa	Manager of Technologies and information	Encouraging Agricultural Expansion Center	0908138034
4	Nguyễn Sửa	Manager of General Administration	Encouraging Agricultural Expansion Center	0919062706
5	Phạm Châu Hoàn	Manager of Technological Management	Department of Science and Technology	0913641324
6	Lê Công Nông	Deputy Director	Nha Hố Institute of Seed Study and Development	0913709940
7	Phan Văn Luông	Deputy Manager of Investment Promotion	Department of Trade and Tourism	

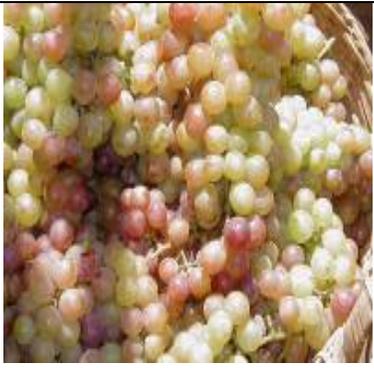
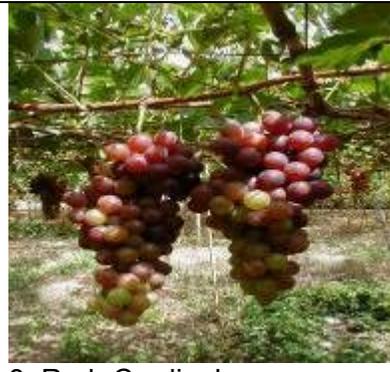
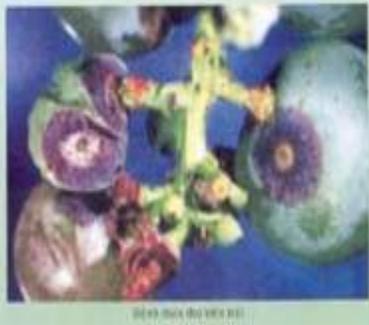
8	Ông Minh	Collectors		068 888050
9	Trần Thị Hoa	Collectors	Area 9, Phước Dân, Bình Quí	068868149
10	Đông Thị Tuyết Mai		Provincial Road No.703 Ward 1, Phước An	068889453
11	Nguyễn Thị Thu Thủy	Wholesaler	Cầu Nóng Relocation Area	068889590
12	Phạm Thị Thoa	Retailer	Long Bình, An Phước, An Hoi	
13	Huỳnh Bích Huyền	Retailer	Long Bình, An Phước, An Hải	068868108
14	Viết Nghi	Wine and treacle manufacturer	88 Hải Thượng Lãn Ông	0918298708
15	Nguyễn Thành Trường	Farmer	20/16/41 Thống Nhất	0913785537
16	Phạm Văn Khá	Farmer	402/3, 21/8 Street	831085
17	Trần Hoàng Ngọc	Farmer	Xã Thành Hải	837503
18	Lê Phúc	Farmer	21/9 Thống Nhất Phan Rang	837536
19	Phạm Văn Lợi	Farmer	Vĩnh Hải	870002
20	Bá Trung Trình	Farmer	Xã Phước Nam	068 864368
21	Diệp Hìn		TT Phước Dân	068 864205
22	Lê Văn Thân	Farmer	Long Bình, An	068 868042

			Hải	
23	Nguyễn Văn Mọi	Farmer	Thuận Hòa, Ninh Phước	068 968048
24	Nguyễn Đắc Thành	Collectors	Khu phố 9, Phước Dân, Bình Quý	068868149
25	Nguyễn Thị Mai	Retailer	Lot 796, Bà Chiểu market	
26	Cao Thị Thanh Lan	Wholesaler	6/ 1 ^E Diên Hồng, Bình Thạnh, HCM	

Appdx.6: Documents for reference

No	Article title	Report/Magazine./Website	Date
1	<i>Grape Area and Yield per district.</i>	<i>Department of Statistics</i>	
2	<i>Information of Ninh Thuan grape tree of 2004</i>	<i>Ninh Thuan's Department of Agriculture and Rural Development</i>	
3	<i>Report of Project: "Building model of technical equipment transfer to develop grape tree for economic effectiveness in Ninh Thuan" (Part of market survey)</i>	<i>Ministry of Agriculture and Rural Development – Institute of Agricultural; Electro-Mechanics and Post-Harvest Technologies</i>	8/2004
4	<i>Growing techniques of Safe Grape breed NH01-48 toward bio-organism.</i>	<i>Ninh Thuan's Department of Agriculture and Rural Development – Encouraging Agricultural Expansion Center</i>	12/2003
5	<i>Information of the grape tree</i>	<i>Ninh Thuan's Encouraging Agricultural Expansion Center</i>	2005
6	<i>Trade Cooperative contract</i>	<i>Encouraging Agricultural Expansion Center</i>	2003
7	<i>Some additional information of Ninh Thuan grapes</i>	<i>Encouraging Agricultural Expansion Center</i>	5/8/2005
8	<i>Grape growing techniques</i>	<i>Publishing House of Agriculture</i>	2000
9	<i>Ninh Thuan strengthens producing clean and safe grapes</i>	http://www.ticay.com.vn/index.cfm?view=new&d=956	20/05/2005
10	<i>WTO integration: searching for a standing place of Ninh Thuan grapes</i>	http://www.agroviet.gov.vn/oadasp/tn/tn-spec-nodate-detail.asp?tn=tn&id=1305367	30/ 09/ 2005
11	<i>Ninh Thuan enlarges wine-grape growing area to 100 ha in 2010</i>	http://www.agroviet.gov.vn/oadasp/tn/tn-spec-nodate-detail.asp?tn=tn&id=1306406	2005

Appx. 7: Grape images

<p>Grape variety</p>	 <p>1. Safe green grape NH01-48</p>	 <p>2. Mixed colour grape</p>	 <p>3. Red- Cardinal grape</p>
<p>Grape's diseases</p>	 <p>4. Anthracnose</p>	 <p>5. Mildew</p>	 <p>6. White powder</p>
<p>Planting & harvesting</p>	 <p>7. Red cardinal's garden</p>	 <p>8. Covered green grape</p>	 <p>9. Harvesting</p>
<p>Preliminary treatment, classification</p>	 <p>10. Preliminary processing at</p>		

	garden	11. Preliminary processing at collector's place (1)	12. Preliminary processing at collector's place (2)
Pakaging, labeling	 <p>13. Pakaged by carton & labeling (Ba Mội grape)</p>	 <p>14. Pakaged by bamboo basket & plastic basket</p> 	 <p>15. Packing & labeling fresh grape (at supermarket)</p>
Transportation	 <p>16. Using motorbike to transport grape to collector's place</p>	 <p>17. Using delivery tricycle to transport grape to collector's place</p>	 <p>18. Using truck to transport grape from collector's place to wholesaler's place</p>
Storage	 <p>19. Storing fresh grape in cool room</p>	 <p>20. Storing wine before pouring in to bottle.</p>	 <p>21. Storing wine & treacle (after bottled)</p>

<p>Trading place</p>	 <p>22. Retail outlet (at Ninh Thuận)</p>	 <p>23. Retail outlet supermarket (in HCMC)</p>	 <p>24. Wholesale place</p>
<p>Processing</p>	 <p>25. Washing</p>	 <p>26. Boiling</p>	 <p>27. Fermenting in tight pot</p>
	 <p>28. Pouring wine machine (Viết Nghi)</p>	 <p>29. Grape wine (end product)</p>	 <p>30. Grape treacle (end product)</p>

Appx. 8: Ninh Thuan's manufacturers with product quality criteria certified
 . (Ninh Thuan's department of Standard and Quality Measurement)

N o.	Name of business	Rep.	Address	Name of commodity	Standard announced
01	Mỹ Hồng Wine treacle factory	Trần Thị Đường	Long Bình An Hải Ninh Phước	Wine	TC 01:2004/RN-MH
02	Mỹ Hồng Wine treacle factory	Trần Thị Đường	Long Bình An Hải Ninh Phước	Treacle	TC 02:2004/MN-MH
03	Đức Wine treacle factory	Nguyễn Văn Đức	Long Bình An Hải Ninh Phước	Wine	TC 01:2004/RVN-Đ
04	Đức Wine treacle factory	Nguyễn Văn Đức	Long Bình An Hải Ninh Phước	Treacle	TC 02:2004/MN-Đ
05	Thành Hoàng Wine treacle factory	Hoàng Quang Thành	Long Bình An Hải Ninh Phước	Wine	TC 01:2004/RVN-TH
06	Thành Hoàng Wine treacle factory	Hoàng Quang Thành	Long Bình An Hải Ninh Phước	Treacle	TC 02:2004/MN-TH
07	Viết Nghi Wine fermentation factory	Nguyễn Viết Ngọc	88 Hải Thượng Lăng Ông, Phan Rang	Fermentation of wine, treacle	TC 01/2004/MR

* **Cuong Wine treacle factory is now certified as “high quality Vietnamese product” for wine and treacle.**