

## **CHAPTER 1: VALUE CHAIN OF DRAGON FRUIT OF BÌNH THUẬN PROVINCE**

### **I. INTRODUCTION:**

Dragon fruit had been long before imported into Vietnam, particular in Binh Thuan it was known of in the beginning of the 20<sup>th</sup> century. However, Dragon fruit has really been developed into a line of merchandise affecting the living of Binh Thuan people from 1989-1990 until now.

Back to 25 years from now, Dragon fruit trees planted by farmers mainly for decoration or for use in ritual worshipping. Until 1985, Binh Thuan people planted and used dragon fruits but still limited. From 1990, these fruits had been used widely, and Binh Thuan farmers had paid their attention to dragon fruits and the surface for growing these trees had been enlarged significantly because dragon fruits had given high economic value. But dragon fruit fruits were used domestically; no exportation effort had been exercised. In 1993, the Communist Party and the Government decreed a policy of product contract basis for the benefits of farmers and a policy open to international incarnation and business relationship, the dragon fruit fruits thereof have set their standing in local and international markets (source 6, apdx 2).

With favourable weather and soil, Binh Thuan before and now, has been considered the most advantageous province to plant and develop dragon fruits in Vietnam. Now Binh Thuan province is considered a principal place producing dragon fruit fruits in Vietnam

Developing dragon fruit brings lots of benefits directly to regional cultivation, such as using idle time of local labor force in dry seasons, giving more farming jobs; improving household land use, diversifying local products, preventing usual inconvenient farming productivity, contributing to the variety of growing structure and to development of regional farming economic development. (source: Local Agriculture Dept.)

Therefore, effort has been exercising by the Province to find a sustainable development method for this kind of fruits, from production to consumption; especially the export value of dragon fruit has drawn the attention of the Ministry of Agriculture & Rural Development and other Binh Thuan provincial concerning departments. Other international organizations also concern and help to conduct research of dragon fruits in Binh Thuan, especially the VNCI with the program surveying the competitive nature of dragon fruits of Vietnam and Binh Thuan in particular.

German GTZ technical development, Metro Vietnam and the Ministry of Commerce would like to have a survey to establish a proper value chain for dragon fruits of Binh Thuan, to help the Province with a correct view on value chain of dragon fruits regarding its structure, relationship, mutual corresponding influence and drawbacks as well, in order to have a prompt support for changing, also necessary measures to be applied in the future.

## II. GENERAL INFORMATION

### 1. Binh Thuan Province

Binh Thuan province locates at the southernmost part of Vietnam Central, 188km from Ho Chi Minh City. At North and Northeast is Ninh Thuan province, north and northwest is Lam Dong, Dong Nai is at its west, its east and southeast border the ocean and southwest is Ba Ria Vung Tau.

Natural surface is 782,846 ha, in which 219,741 ha is farming soil. (Statistics Report 2004)

#### BẢN ĐỒ BÌNH THUẬN



Weather condition in Binh Thuan is hottest of the country. A tropical climate, dry and sunny, its high climate is good for growing dragon fruit trees.

There are 2 different seasons in Binh Thuan. Rainy season is from May to October and sunny season from November to April. Rain quantity is low, an average of 1,000 to 1,600 mm/ year (equal to ½ of average rain quantity in the South). Annual average humidity is 79%. Average heat of Binh Thuan is 27°C, in January or February, lowest heat is from 24°C - 25°C. In May and June highest heat attains 28°C – 28.5°C. Sunny days could count for : 2,556 – 2,924 hours. While in July, August and September are the months with least sunshine of the year. (Source 12, apdx 2)

According to the Statistics Department, the population of Binh Thuan in 2004 is 1,135.9 thousand people, density is : 145 people/ km<sup>2</sup>. From 1991 to 1999, dragon fruits have given an annual income of 25 bn to 30 bn dong for 8,500 farmer households of 5 districts and city participating in the cultivation. (source 1, apdx 2). In recent years, Binh Thuan dragon fruit has brought back rather high income (150-180 bn dong) for more than 9,500 farmer households of 6 districts and city (source 7, apdx 2).

In 1995- 2000 and from 2000 until now, the economic growth of Binh Thuan is rather high. Partly because of tourism development and the encouragement of investment into the province, Binh Thuan GDP is very high.

Table 1: GDP Growth Speed (%)

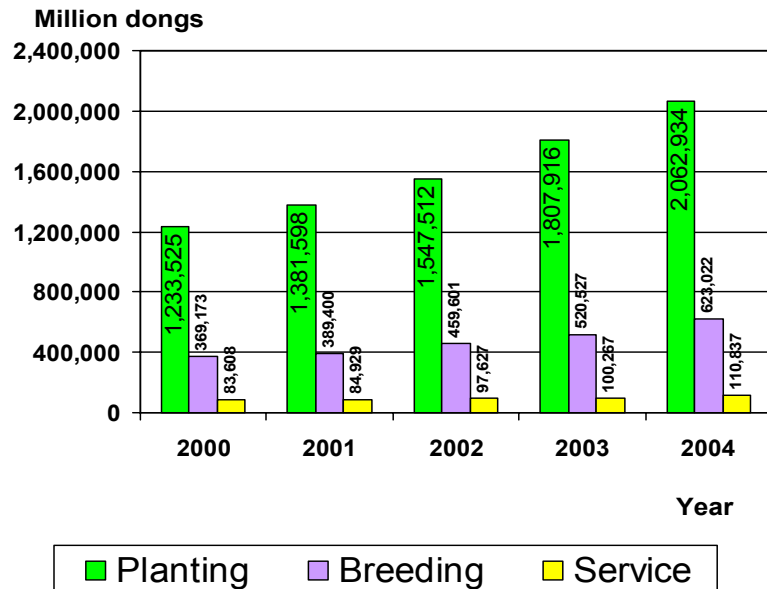
Year	2001	2002	2003	2004
<b>GDP</b>	<b>10.4</b>	<b>11</b>	<b>12.1</b>	<b>13.02</b>

(Source No.13, apdx 2)

Consequently, the stable economic growth speed in recent 5 years has given certain advantages to Binh Thuan regarding rural cultivation and other economic business in general

Chart below shows production value Binh Thuan of agriculture and growth speed in the last 5 years:

Chart 1: Agricultural production value of Binh Thuan (per current pricing):



(Binh Thuan 2004 Statistics Report)

However, compared to other economic branches, the agricultural and rural development of Binh Thuan is still being influenced by natural hard conditions, diseases and material prices. The percentage of agriculture compared to total provincial economic output is 37.49%, in which the cultivation production value holds over 1/3 (37.2%) with an average growth from 2001 to 2004 is 14% (source 8, apdx 2).

## 2. Binh Thuan Dragon Fruit

### 2.1 Species and Categories

Dragon fruit tree (*Hylocerut undatus*) belongs to cactus family (Cactaceae), originated from Central and South America. Dragon fruit is a kind of tree suitable with regions of hot and dry earth. So, the weather and soil conditions in Binh Thuan suit properly for this tree to grow and develop.

Dragon fruit has to undergo a long process of photosynthesis. The longer the sunlight lasts, the better the flowers are (source No. 3, apdx). In such condition, dragon fruit trees blossom from April to September (favorable season) but most centralized from May to July when daytime is longer than nighttime (daytime lasts from 12.5 to 13 hours). From October to February, daytime is shorter, therefore farmers use electric power for lighting flowers (source 3, apdx 2).

Dragon fruit is a kind of tree for fast cropping with just one year. Average production is about 20 – 30 tons/ ha in favorable seasons, and 20 tons/ ha in other seasons (see more on dragon fruit production section)

Main dragon fruit species in Vietnam have white inside and red skin (see picture 1, apdx 4), the most famous ones come from Binh Thuan and Cho Gao (Tien Giang province).

In 1994, the Southern Fruit Tree Institute imported dragon fruit with red inside from Colombia, and some with yellow inside. There're also over the world those dragon fruits with white inside and yellow skin (see picture 3, apdx 4). Those with red inside have become a line of merchandise, fruits with dark rose skin, red inside, black seeds and straight ears (see picture 2, apdx 4). They are sweeter and contain higher vitamin C than those from Binh Thuan and Cho Gao. Average weight is about 0.5 kg/fruit. Biggest is 0.8 kg/ fruit, retail price is 3 or 4 times more than white inside. (source 14, apdx 2).

Beside the Binh Thuan dragon fruits of red skin, there are also green skins for export demand (source : Axis – indepth interview).

In addition to above species, the Southern Fruits Research Institute also has imported 6 species from Taiwan, they are A1, B1, VN, and C1A15. C1A6, red skin ones have been experimentally planted in the garden of the Southern Fruits Research Institute (source 1, apdx 2)

## **2.2. Characteristics of Binh Thuan Dragon Fruit** (compared with those from Chợ Gạo) (see picture 4, 5, apdx 4)

Main characteristics of dragon fruit of Binh Thuận:

- ❖ Branches develop strongly, big and long

- ❖ Fruits look rather round, thick skin 2 – 2.5 cm, big pips (ears), good looking skin
- ❖ Percentage of fruit meat: 68 – 72 %
- ❖ Strong meat, sweet
- ❖ Brix taste 13 – 14 %,
- ❖ Sour taste PH / ep: 4.8 – 5.0,
- ❖ Tiny seeds at 1.000 seeds: 1.1 – 1.2 g  
(source No. 3, apdx 2)

Both species in Binh Thuan and Cho Gao blossom according to seasons, from May to October and give 100% fruits on flowers count.

- ❖ Compared with dragon fruits of Binh Thuan, those from Cho Gao are with thin skin, big fruits and a little different flavour. Farmers in Cho Gao seldom use pole for hanging, but they let them climb on India bean trees to create special flavour (see picture 6, 7, 8, apdx 4)
- ❖ In general, the outlook of dragon fruits in Binh Thuan is better, thicker skin for long lasting colour and storage, good for transportation to consuming place.
- ❖ Chemical facts, Binh Thuan dragon fruit has higher contents of Protein, Vitamin C, Calcium, Phosphorus, magnesium and Nátri than those from Cho Gao, but with lower contents of Glucose, Fructose, Carbonhydrate. (source 3, apdx 2)
- ❖ But as for prices, Binh Thuan dragon fruit sells at higher price (see table 3), mostly due to its good-looking outward. In addition, as Binh Thuan has been noticed by its dragon fruit with highest productivity that gives its dragon fruit a competitive advantage in consuming markets.

Table 2: Prices of two dragon fruit categories at Tam Binh market (HCMC, Sept. 2005)

No.	Kind of dragon fruit	Special Categ.	Category 1	Category 2
1	Cho gao dragon fruit (Tâm Vu) VND	5.000	4.500	4.000
2	Binh Thuan dragon fruit VND	6.000	5.000	4.500
	Price difference 2 to 1(%)	<b>20%</b>	<b>11%</b>	<b>12.5%</b>

(source No. 15, Apdx 2 + Axis Research)

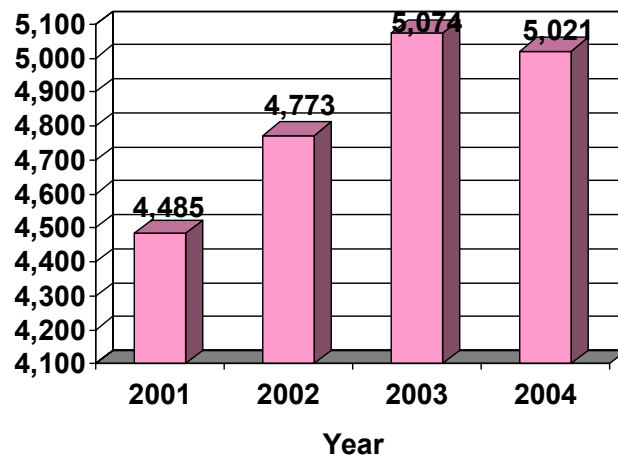
## 2.3 Surface, yield, output

### 2.3.1. Surface

Now the surface growing dragon fruits is about 5,000 ha (Chart 2). Growth speed of surface in 2001-2003 is about 6%/year. Just in 2004, surface for dragon fruit decreased smoothly (about 1%) due to urbanization progress, the price of farming land soared significantly (Source 5, apdx 2)

Chart 2: Surface growing dragon fruits in Binh Thuan 2001-2004

**Area : Ha**

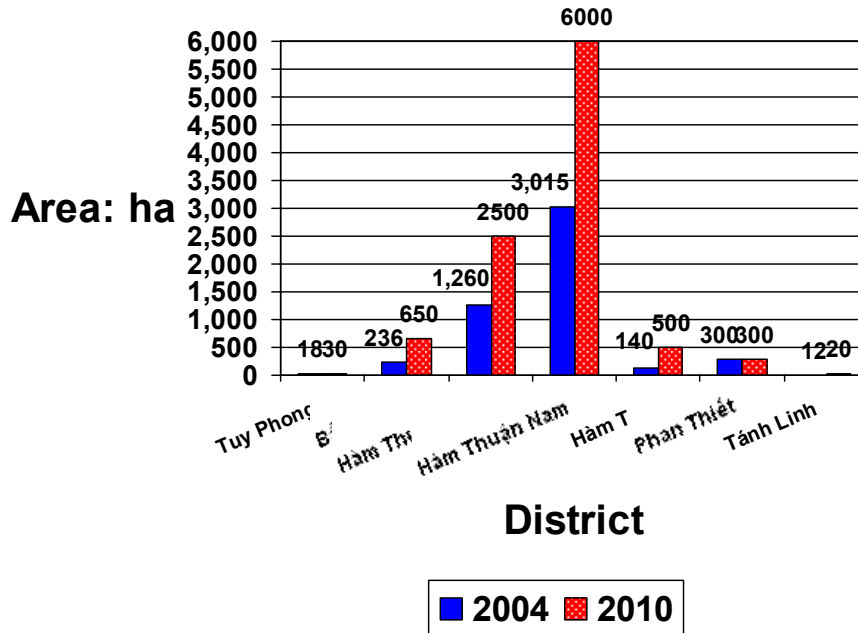


(Source 5, apdx 2)

As for allocation of growing land, dragon fruit trees have been mainly planted on sandy earth, at districts and city as follows: Hàm Thuận Nam, Hàm Thuận Bắc:, Phan Thiet city, Bắc Bình, Hàm Tân: và Tuy Phong. The two most dragon fruit concentrating places, Thuận Nam 3,222 ha and Hàm Thuận Bắc 1,156 ha, account for about 86 % dragon fruit surface in the province. The rest four districts and city have only 150- 200 ha (according to The People’s Committee of Binh Thuận)

In order to continue the development of growing dragon fruits, Binh Thuan People’s Committee has issued a decision to adjust the surface planning for growing dragon fruits in Binh Thuan until 2010, stipulating the area for growing dragon fruits in Binh Thuan in the next 5 years must increase to 10,000 ha, as below:

Chart 3: Planning for development of dragon fruit surface in Binh Thuan to 2010 compared to 2004.



(Source2, apdx 2)

According to Chart 4, regions with large land growing dragon fruit are still the districts of Hàm Thuận Nam and Hàm Thuận Bắc. Especially, Hàm Thuận Nam, regards to the surface planned until 2010, is over 1.3 times compared to Hàm Thuận Bắc, and both districts make up 86% of land growing dragon fruits.

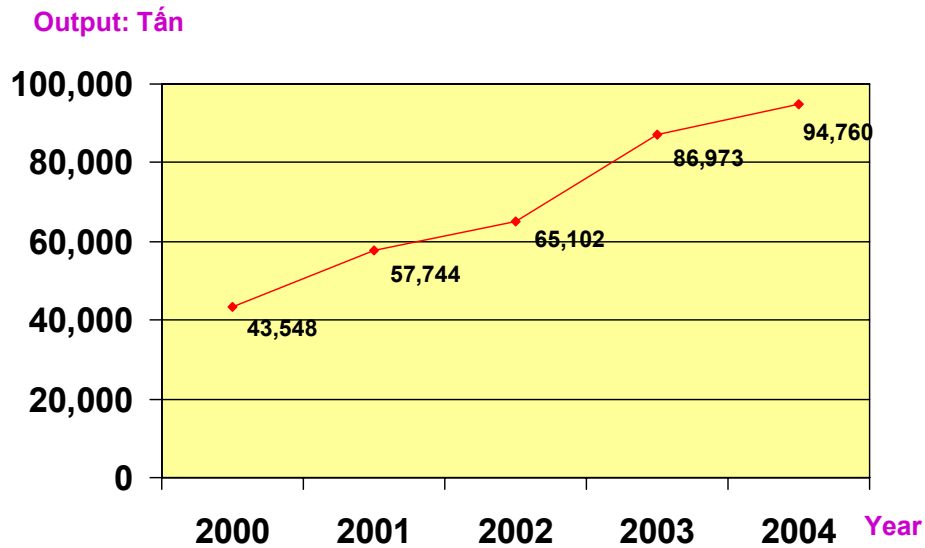
However, depending on the progress of increasing land for growing dragon fruits in Binh Thuan from 2001-to 2010 (chart 3) according to our studies and evaluation, the plan to increase land growing dragon fruits to 10,000 ha in the next 5 years is not feasible, unless the People's Committee and the Agricultural & Rural Development Department have special programs to rapidly increase land for growing dragon fruits.

### 2.3.2 Yield and output

Dragon fruits of Binh Thuan produce relatively high yield, in favourable seasons, 30 kg/ tree and in inverse seasons 20 kg/ tree, equal to 20 tons/ha (source 1, apdx 2)

Dragon fruit output in 2004 attained 94,760 tons, increased 9% compared with 2003, and 117.6 % compared with 2000 (Source 3, Apdx 2). The biggest output was in 2003 at 33.4%. (see chart 4)

Chart 4: Dragon fruit output from 2000 to 2004.



(Source 3, apdx 2)

So we can see from chart the output of dragon fruit of the province increased rapidly in recent years thanks to many reasons, but most important one is farmers know how to keep lighting for trees to blossom in adversary seasons. Lighting to have inverse cropping, the output increases from 30-40 tons/ha/ year. Main season output is always higher than that of adversary season, but the quality and sale prices lower than that of adversary seasons, so the value of adversary season is higher than that of main seasons about 4,000-5,000 đ /kg That's the reason why many households growing dragon fruits have a better living, they don't hesitate to spend tens of million dong for installing lighting system to stimulate dragon fruits to have flowers and fruits for fast cropping (Source 17, apdx 2)

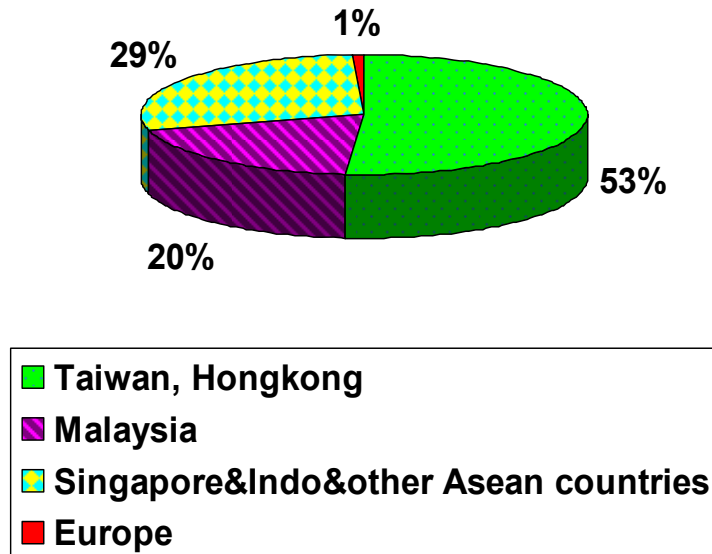
**However, in order to meet the targets of Binh Thuan People's Committee regarding output until 2010 for a result of 338,000 tons (source 7, apdx 2) there should be a program increasing surface at large scope, besides the enhancement of cultivation techniques of dragon fruits. In addition, Binh Thuan province need lots of support from the government and international organizations in an effort to enlarge markets for export of dragon fruits, otherwise, when the output of dragon fruits increases and consuming market could not respond, it shall cause losses to farmers and Binh Thuan province in particular, and also to nationwide market consequently.**

#### 2.4 Export and exporting value

As dragon fruit has nutrition value, special outlook and attractive colour, specially its name "Dragon", the name of an animal considered holy to Asian people, so the dragon fruit product has been consumed mostly in Asian countries, accounting for



90% of the export quantity, of which Taiwan and Hong Kong markets have consumed 50% (source 7, apdx 2). Here below is a chart of export market share:  
Chart 5: Export market share



(Source 7, apdx 2)

So as per above chart, Binh Thuan dragon fruit is not only present in Taiwan, Hong Kong, Singapore, it has also been imported to high demanding markets like Japan, Europe even the market share's still small.

According to statistics figures recorded from enterprises, the export of dragon fruit increases an average of 32% and 51% in respect of turnover value and output export. (source 7, apdx 2). As of today, the directly exported output of dragon fruit by enterprises in the province, makes up only 9,6 % of total output and about 35-40% of the output of dragon fruit which is qualified the export standards. Taking into account the output from local enterprises to offer for annual export about 15,000 to 20,000 tons, we can see that the export transaction has not yet been responsive to production result (source 7, apdx 2). Below is the output and export value of Binh Thuan dragon fruits from 2001 -2004

Table 3: Export quantity and value of Binh Thuan dragon fruits from 2001 to 2004

Year	Quantity exported	% exported/ total output	Value (1,000 USD)	Average price (USD/ ton)
2001	3,494	6,05	2,000.50	572.42
2002	7,828	12,02	4,790.77	621.00
2003	16,682	19,18	5,979.50	358.44
2004 (estimate)	25,000	26.38	8,961.00	358.44

(Source 3, apdx 2)

Above table shows percentage of dragon fruits export increases rapidly: in 2000, it takes 4.09 % of output; 2002 is 12.02 % of output ( 3 times compared to 2000). But export turnover of dragon fruits in recent years is decreasing, especially in European markets (from 80% to 40% in 2004). The cause leading to this situation is too fast increase of growing land (because of spontaneous cultivation, project planning) without paying attention to quality demand from consumers and competitive prices (Source 18, apdx 2). In addition, **from 2003 to 2004 the percentage of exported dragon fruit increased but export price decreased significantly and was not stable due to competition with other countries like Thailand, Israel, Colombia etc. with a variety of species and better stable quality, including competitive advantage of fees, mainly transport fees.** Dragon fruit of Vietnam has to suffer rather high transport fees. Two means of transport being used for dragon fruits of Vietnam are by boats and airplanes. Air lines from Vietnam to Europe are not many, we can name only Việt Nam Airlines, Air France, Singapore Airlines or Cathay Pacific...Transport fee is from 3.6 – 3.7 USD/ kg in Vietnam. Besides the fact that there are not many flights, the quantity of Vietnam dragon fruits to be transported is not big enough for enjoying special price. Compared to Thailand and Israel, this is a disadvantage that could not be overcome for Vietnam dragon fruits while their transport fee is not more than 2.5 USD/ kg. Israel's is even lower, only 1 USD/ kg. (source 19, apdx 2)

## **2.5 Product quality and certification**

Now, the quality of Binh Thuan dragon fruits is relatively good. According to regional authority, dragon fruit quality could attain 40% of the quality for export (indepth interview with traders). However, due to inconsistent quality of Binh Thuan dragon fruits, caused by many farmers who have less experience in cultivation that leads to low quality and output. More over, the speed of cultivation of dragon fruits goes too fast that the quality control could not be done properly, this also influences the quality of dragon fruits in general (indepth interview with traders).

Dragon fruits of Binh Thuan has not been officially certified of quality standard from certain international organizations. The reason they could be exported is that the importing countries have no requirement for quality standard, or being exported through unofficial channel. Even dragon fruits of Hoang Hau or Long Hoa have also been exported through these channels.

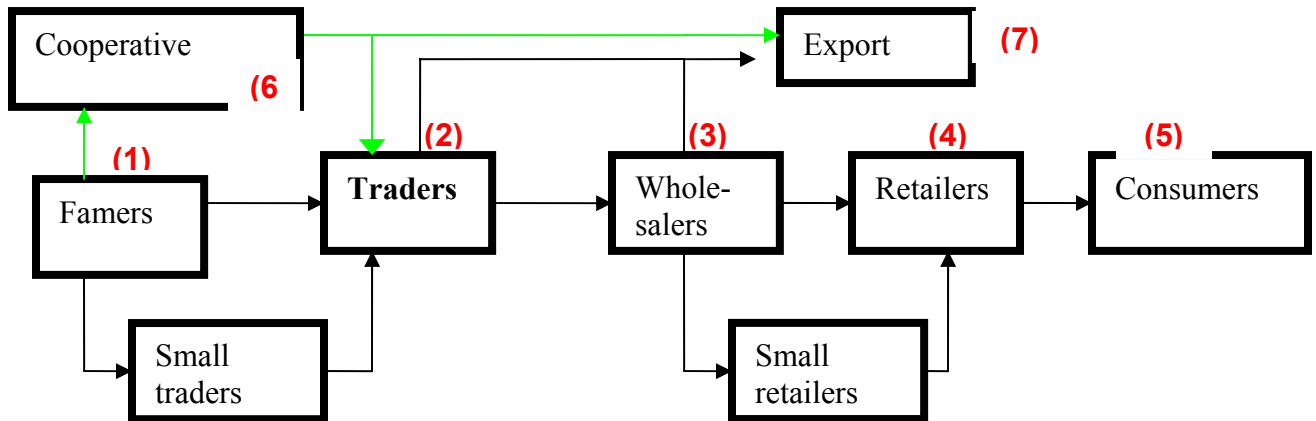
There're now 3 cooperatives that plant dragon fruits in the province: Thanh Long organic of Hàm Mĩ village, Hàm Thuận Nam district, Dragon fruit organic cooperative of – Hàm Hiệp village, Hàm Thuận Bắc district and only one cooperative produces dragon fruits according standards of Europgap in Hàm Minh village, Hàm Thuận Nam district.

## **2.6 Trademark, Label**

Only 3 trademarks have full labels: they are Phương Giảng, Long Hoà and Hoàng Hậu. Except Hoàng Hậu that has been selected to enjoy support for promoting its Vietnam farming product trademark (group G11), other enterprises are still standing outside and trying to look for markets by themselves. (source 20, apdx 2)

### III. ANALYSIS OF VALUE CHAIN OF BINH THUAN DRAGON FRUIT

Chart 1: Binh Thuan Dragon fruit value chain.



#### 1. General observation

##### Supply channel 1

Binh Thuan dragon fruit is mainly supplied through traditional channel: Farmer → Trader → Wholesaler → Retailer → Consumer. On chart 1, this is a value chain including 1-5, black arrows.

In this value chain, some farmers who are very active, besides being owners of certain land growing dragon fruits, they are also in charge of all workphases from cultivation to consumption, including the role of traders to collect enough quantity for export (Long Hòa, Hoàng Hậu\*).

Because Binh Thuan dragon fruits have been trading on large scope, so this value chain has to count for small traders who support bigger traders. Small traders collect products from farmers to sell to bigger traders.

##### Supply Channel 2

Another channel in the map of value chain of dragon fruits, rather popular, originating from a group of farmers in certain cooperative. The leader of cooperative develops their products to sell to other clients like retailers or exporters.

\* Hoàng Hậu Private Limited Company: A biggest enterprise of Binh Thuan that cultivates and exports dragon fruits with surface of land larger than 100 ha, which shall be enlarged to over 300 ha. Mr. Trần Ngọc Hiệp is the Director. Its export value is over 3 mn USD (2004) and projected for 2005 to attain 3,5 mn USD. Thanh long Hoàng Hậu has been available in markets of EU and in 2006 it shall get EUREPGAP certificate. This is a prestigious and unique dragon fruit trademark presently known to consumers. (source 20, apdx )

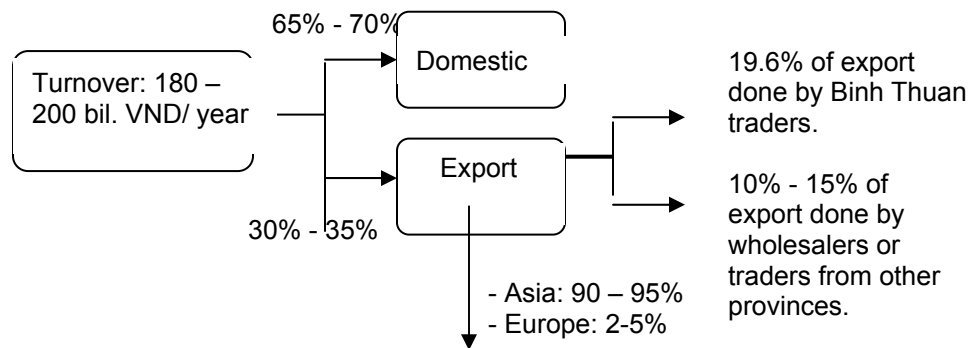
\* Long Hòa Pte Ltd. Co.with Mr. Tô Văn Hòa, a farmer is the Director, is one of big enterprises growing and exporting dragon fruits of Binh Thuan with its own land of 14 ha. It also collects products from other farmers for export. Its annual export value amounts to 480 tons/year.

(chart 1, from 1-6-2-7, green arrows stand for trees). Part of products have been sold to big traders like Hoàng Hậu, Long Hòa for exporting later.

In both channels, Traders play a very important role in consuming locally and exporting dragon fruits as well.

According to report from Binh Thuan Commerce Department in 2004, the output of dragon fruits has been allocated as shown below:

**Chart 2: Dragon fruit allocation**



Below, we shall go into details of the role of each factor that contributes to the value chain of Binh Thuan Dragon fruits, after cropping.

**2. FARMERS**

As mentioned above, there are now in Binh Thuan about 9,500 farmer households planting dragon fruits, mostly grouping in two districts of Hàm Thuận Bắc (North) and Nam (South).

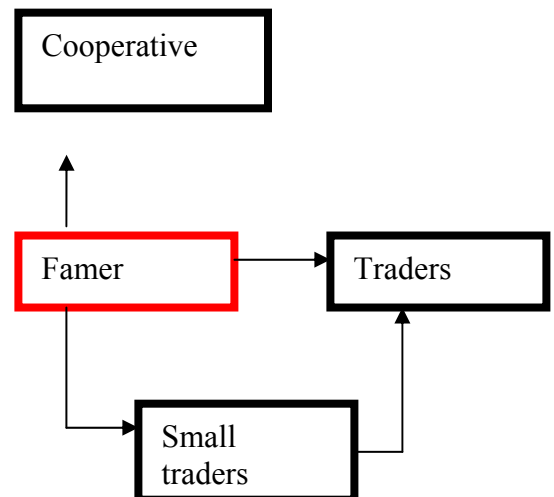
**2.1 Typical traits**

After cropping, farmers usually sell directly to traders (big or small), or through Cooperative for consuming products. (see chart 3).

Actions taken by farmers after cropping:

- a. Transport to big traders/ Cooperative or:
- b. Storing-> packaging -> transport

**Chart 3: Farmers and direct contacts.**



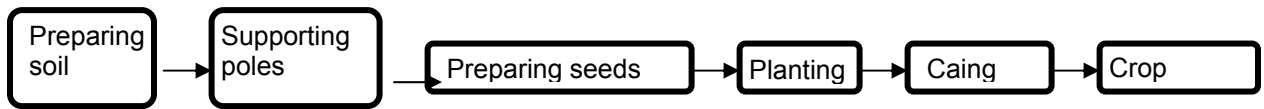
Above forms depend on the sizes of each farmer household as below:

*Small farmers:* About 95 %. Smallest one has some 1 – 2 acres. These farmers could not develop bigger and get influenced by traders, or cooperatives in regards to prices, means of transport, cropping etc. They don't have early stage processing point, if they don't sell off they have to do the cropping themselves with old carts (pictures 10, 11, apdx 4) then handle by big baskets for loading on trucks (of traders) (picture 22, apdx.4), or they can use other means of transportation such as bicycle, motorcycle, three-wheel cart to carry dragon fruit from garden to traders collecting point. (picture 21, apdx 4 ).

*Big farmers:* about 5 % of those who plant dragon fruits possessing from 10– 20 ha (like Mr. Tô Văn Hòa, Trần Ngọc Hiệp as mentioned above). Big farmers not only do the farming but also sell their product to clients or do the exportation as traders (see trader section). They build their own early stage processing point for quality classification, packaging and storing\*. Their means of transportation are more various and modern than those of small farmers (including pickup trucks) (picture 22, apdx 4)

## 2.2 Cultivation process

The cultivation process of dragon fruits in Binh Thuan is simple, as below:



The cultivation process is simple but in order to raise quality and output of dragon fruits, farmers in Binh Thuan are very concerning to the techniques of cultivation.

Besides preparing soil, supporting poles are very important for dragon fruits, much different from planting other fruit trees. Poles could be made of cement or wood (Pictures 2, 3, apdx 4). The height is from 2.2m – 2.5 m. Diameter is about 20 –25 cm. Price for one pole is about 50,000 VND. Total cost until cropping for one pole is 100,000 VND.

In caring stage, using biological and chemical agent to stimulate blossoming in inverse seasons is very important, it helps to increase the yield of dragon fruits. In inverse seasons (from December to March), farmers use electric power to stimulate flowers. Usually they use power at 75W to 100W for lighting from 4 – 6 hours during nighttime for better results. This lighting action shall continue for 12 – 15 days. (Source: farmer's discussion conducted by Axis)

Until now, farmers have been applying their own experience of cultivation, but in order to have dragon fruits with standard for exportation, they must obey a correct process. So, many projects have been adopted for supporting dragon fruits to develop. GAP project is an example – production shall be conducted according to hygienic and safe process for human and environment. It shall be supported by AUSAID to improve method of producing dragon fruits, in an effort to obtain standard certificate from GAP/EUREPGAP and increase markets in Europe (source: farmer's discussion conducted by Axis. )

### **2.3 Cropping** (see picture 9, apdx 4)

Depending on agreement, either traders or farmers do the cropping of dragon fruits. One thing to be noted is how to cut. It should be cut at the long end of fruit stalk without scratching the fruit so that it could be kept for long time and should not cause damages to the trees. To protect the products, farmers use small one-wheel cart for transport. (see picture 10, 11, apdx 4).

Dragon fruits could be ripe in 3 – 4 days during the cropping time, so cropping time could last for 3-4 days for one garden as agreed upon by farmers and traders.

Cropping time of a season could last as long as the buyers want (traders). Buyers pay a deposit and can keep fruits in garden for 10 days and the quality of fruits shall be maintained thanks to the care of farmers.

### **2.4 Contract procedure:**

Usually verbal agreement shall be applied between farmers and traders for following deals: :

#### *Evaluation for each garden – sell-up (Bán Mãi)*

Before fruits become ripe, traders set a price for one garden. That price shall be kept unchanged even market price is changing. Depending on agreement that farmers or traders shall take care of handling the cropping.

When the fruits are ripe, traders and farmers shall estimate the quantity, size of fruits according to formula:

$$\text{Quantity estimate} = (\text{Fruits number estimate}) \times (\text{average weight of fruits})$$

This formula is being applied for large garden of dragon fruits. In certain occasions traders pay a little higher so that fruits could be kept in garden for some more days for bigger sizes or for better market prices.

Fees for cropping and transport shall be about 100 VND/kg (Source: farmer's discussion conducted by Axis)

In this case, *there's no weighting after cropping*, payment shall be made in cash. Prices on agreement should be estimated by farmers and traders.

Sale price in this case is always cheaper.

#### *Trading settled in the same day – selectively sell*

When traders buy in same day, traders choose and cut the ripe fruits at time of the day (no worry about quality). Prices shall be higher naturally. Usually traders do the cropping, weight and count and pay in cash. Price is the current price of the day.\*\*.

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\*, \*\* We shall discuss about this in traders section.

### *Long time agreement*

Only applicable for exporters. Exporters guarantee to buy from farmers at market prices (in some case they invest in farmers' cultivation expenditure). In order to attain high quality, traders select certain farmers to do the cultivation according to their techniques.

In reality, traders only choose and buy good quality fruits at higher prices and farmers have to sell the rest at market for lower prices.

This formula shares about 5% the total output of Binh Thuan. Payment shall be made in cash and on verbal agreement.

Because of the habit of verbal agreement that sometimes hurts the relationship of traders and farmers, because farmers should be ruled by the prices set by traders, and in other way they don't want to be loyal to "verbal agreement", and want to sell their own products to those traders who pay higher prices for better income. An estimate of about 30% of farmers who are loyal to traders.

Written agreements have not been applicable here.

## **2.5 Loss**

In general, traders have to suffer loss, not farmers.

After cropping, dragon fruits shall be handled directly to traders' storage without going through any early processing stages, so farmers only suffer some losses in handling (if they have to do the delivery).

Collecting points of traders shall usually be found along main roads, not far from dragon fruit gardens (some hundred meters or 1km), so the loss in handling from gardens to processing points means nothing (< 1 %).

## **2.6 Value and income**

According to the experience of symbolic farmers (Mr. Nguyễn Thuận, Head of Cooperative of dragon fruits, applying the standard of Eurogap), income could be calculated as below:

*Business turnover* (per 1 ha)

Favourable season: 1000poles x 30kg x 2,000 = 30,000kg x 2,000=60,000,000 VND

Inverse season: 1000 poles x 20 kg x 6,000 = 120,000,000 VND

Total: 180,000,000 VND/ year

Fees (1 year):

- Labor costs: 25,000,000 VND
- Electricity: 24,000,000 VND
- Fertilizer: 28,000,000 VND
- Chemical: 1,000,000 VND
- Other costs to recover earth: 4,000,000 VND
- Taxes and others: 1,000,000 VND

Total fees: 82,000,000 VND /year

=> Income = 180.000.000 VND - 82.000.000 VND = 98.000.000 VND

So, the estimate income for one hectare, in general, of farmers attains from 50.000.000 – 60.000.000 VND, higher compared to some farmers like Mr.Thuận (source: indepth interview)

## 2.7 Label

Due to the fact that farmers sell directly to traders, they don't care about labels of their products. For big farmers acting the roles of traders, the labeling and product standard shall be discussed in traders section.

## Summary

In the value chain, farmers play an important role in determining products and output of dragon fruits. Until now, the dragon fruit cropping is still simple, without going through any early stages of processing, the losses from farmers are too low (about 1 %). Most farmers use the procedure of selling up (verbal agreement) and the classification of products is at the traders' responsibility.

Particularly, some farmers do the quality classification, packaging, storing and looking for consumption outlet for their products. This procedure not only helps farmers to get away from being dependent on traders but also reduce the transportation stages of dragon fruits. However, in the value chain of Binh Thuan dragon fruits this formula are relatively new and requires big capital, that's the reason why we can only see this formula at certain households like Mr. Hiệp, Long Hòa.

Income comes from dragon fruits for farmers in Binh Thuan is rather stable, no risks from crop failure and diseases like other fruits, that's the main reason that



organizations, in and out of the country, are trying to help Binh Thuan to develop dragon fruit species with high export value for Binh Thuan farmers.

## 2.8 Difficulties and supports requirement for farmers.

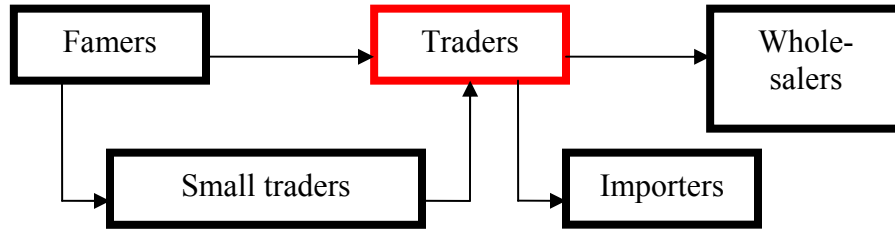
Farmers planting dragon fruits in Binh Thuan encounter some difficulties in the cultivation and consumption of dragon fruits, shown in the table below:

Difficulties	Way of overcoming
<p><u>1. High costs of investment:</u></p> <ul style="list-style-type: none"> <li>- Costs for poles, especially for small farmers.</li> <li>- Electric generator for electric network in inverse season.</li> <li>- High electric prices, and no special support.</li> </ul> <p><u>2. Cultivation knowledge:</u></p> <ul style="list-style-type: none"> <li>- Cultivation techniques mostly depend on farmers experience, lack of knowledge of proper safe cultivation as being done in Europe, America and Japan.</li> <li>- no perception of obeying provisions relating to stable consistent quality.</li> <li>- lack of sharing knowledge among farmers of the same region, province, therefore the knowledge of dragon fruit cultivation is not equal and there's a difference in quality consequently.</li> </ul> <p><u>3. Product quality</u></p> <ul style="list-style-type: none"> <li>- Product quality not equal in the same garden and among farmers households.</li> <li>- Products not diverse because they all come from the province, poor source of species.</li> <li>- Dragon fruit products attaining export value are not many, they don't meet standard of safe foods, safe for producers and environment.</li> </ul> <p><u>4. Consumption</u></p>	<p>→ Bank of Agriculture &amp; Rural Development should have policies, funds supporting development, especially <u>favorable mechanism</u> (loan sources, loan standard and procedure) easier conditions for loan approaching.</p> <p>→ <u>Enlarge electric network</u> to serve cultivation for far away regions, support for electric prices.</p> <p>→ The province should inform cultivation knowledge and new species to farmers through different ways such as, seminar, leaflets, movies etc. Specially building a model for farmers to learn and multiplying this model.</p> <p>-&gt; Call upon farmer households to participate in cooperatives to share cultivation experience and to easier find consuming markets.</p> <p>-&gt; Help farmers <u>to get in touch with projects producing dragon fruit according to proper process</u>. Such as GAP project, supporting certain farmer groups and enterprises exporting dragon fruits, enhancing production techniques in order to obtain the GAP standard. Quarantine and Certificate IMO (Headquarter in Switzerland) shall assist in obtaining GAP certificate for producers attaining quality standard. (source from Metro)</p> <p>→ Institutes, Species Centers like Center of Trees and Species, Fruits research Institute <u>...should do the research and announce widely the species that give high</u></p>

<ul style="list-style-type: none"> <li>- Farmers have to rely on traders because they don't have consumption outlet due to lack of market information and experience.</li> <li>- Some farmers want to have consumption outlet for their products but short of basic facilities and technology after cropping.</li> <li>- The business procedure of farmers don't go through any official agreement, they have to put up with a loss like it's difficult to control big quantity they sell out, with forced prices, there's no way to protect the right and responsibility of buyers and sellers.</li> </ul>	<p>productivity and quality appreciated by consumers.</p> <p>→ The Ministry of Agriculture &amp; Rural Development order the Encouragement Office, its scientific departments <u>to support with professionalism, financial help</u> and help farmers to get contact with technology after cropping. In addition, <u>the establishment of a regional wholesale market</u> shall procure opportunity for farmers to contact directly with clients (not depending on certain persons like now).</p> <p>-&gt;Open a trading information system (like a <u>website, village and district information offices etc.</u>) and facilitate the investment from outside, assist Cooperatives to establish a close chain from cultivation to consumption.</p> <p>→ Do the research and orientation for regions to develop a model in order to experiment <u>the multiplication of a consumption model of farming products through contracts</u> relating to dragon fruits according to Decision No. 80/QĐ – TTg of the Government Prime Minister.</p>
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### 3. TRADERS (pictures 24, 25, 26)

**Chart 4:** Traders and direct contacts.



#### 3.1. Typical features

Usually, traders collect dragon fruits from farmers or traders themselves cooperate with farmers in cultivation. From traders, products shall be exported, or consumed locally through wholesalers (see chart 4)

Numbers of labors who work for traders are very different. Some traders have only 3 – 5 workers (small traders) but some have hundreds of workers (big traders). But small traders are anywhere there are sources of dragon fruits so that they can sell them to big traders.

Now in Binh Thuan territory there are about 33 traders who buy products from farmers and a lot of small traders who supply products for them, only 2 enterprises that produce and collect additional dragon fruits for export (Hàng Hậu, Long Hòa).  
\*\*

For local consumption, wholesalers used to contact traders to notify market prices or traders contact them to notify prices. Then traders inform farmers the prices that they can buy. So, the relationship between above value chains (chart 4, stages 1, 2,3) is a reciprocal one.

Selling prices of traders depend mostly on market prices. Local selling prices from traders to wholesalers are 10 -15 % higher than the prices they paid to farmers. However, the prices are changing intermittently according to seasons, so, that figure shall not be confirmed (Source: indepth interview with traders)

Only the prices of products to be exported are fixed for a short period of time (some contracts fixed the prices for several seasons). Price for export is always much higher, but requirement for export products is also much strictly (see export prices, page...)

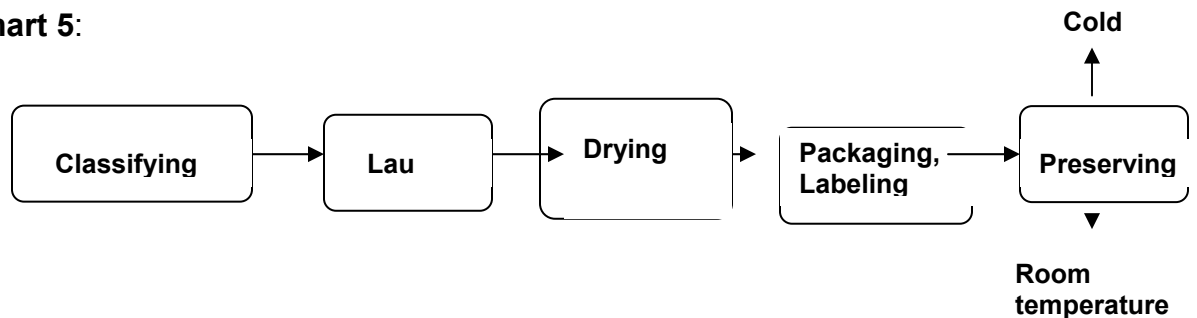
\*\*Information relating to enterprises that export dragon fruits shall be presented in appendix 3.

### 3.2 Cropping process

In order to guarantee quality, traders take care most of the stages after cropping.

As a large quantity of dragon fruits (about 40 %) is reserved for exportation, so compared to other fruits, Binh Thuan dragon fruit is a fruit that has to undergo all after cropping stages as below:

**Chart 5:**



Due to restriction of basic structure and technical capacity, only some traders could conduct the process of close chain from warehouse to water basin, into fresh room, sterilization by ozone water, fresh storage, wrapping room, packaging etc... (like at Long Hòa). Most traders stop at the first stage (classification) then loading on for transport..

#### 3.2.1 Classification (picture 12, apdx 4)

At traders', dragon fruits shall be classified as requested by clients. Prices for best quality products could triple the price of poor quality. Dragon fruit is usually classified according to experience, mainly on outward look, colour, size, fresh degree, sweetness, then the quality shall be evaluated. Of which the outlook and size are two important factors. (Even in export contracts, quality standard also mention size and outlook features)

There are 3 categories for classification.

1. *Category for export.* Fruit weight is from 300g-1kg, even size, fresh, full and round, shiny nice, full ears, even red colour, not rough, no damaged. Depending on destination that the weight differs.

- Asian countries: mostly love big fruits (500g-700g). as for Singapore, the requirement of big and small fruits is 50/50. export price to Asia is about 0.5 USD/kg

- European countries: smaller fruits of 700g (most are 300g-500g). export price is about 1.5 USD/kg.

2. *Local best category*

- Up to HN: fruits bigger than 500g, fresh, enough pips, even red, or two skin colours, (rose and green) price is 2,500-4,000đồng/kg

- Down to SG: fruits smaller than 300g including 'longan' dragon fruits (dark rose, size of man's fist). Other requirement is the same as in HN. Price is about 1.500-3.000 đồng/kg)

3. *Poor category*: the rest or smaller than 300g, or bigger but out of good look (no pips, not fresh etc...). price is about 1.000-1.500đồng/kg

Among 3 categories above, category 1 if could not be exported, its price is about the same as category 2 when consumed locally.

### 3.2.2 Processing facility (Pictures 13, 14, apdx 4):

Usually, traders have their own processing points but simple, dragon fruits could stand hot storage within one day. Professional exporters have their own processing points equipped with warehouse system with cool storage.

Degree of careful processing action depends on buyers.

- When traders sell to wholesalers in the country: dragon fruits shall be simply processed, mainly to clean the fruits and keep fresh (in big baskets), or to pile at collecting points. If business time is short, traders shall not do any early processing works and load them on means of transportation.

- For export, dragon fruits shall be processed more carefully (see chart 5). Water is usually used to clean fruits.\* Traders could use OZONE to clean the surface of dragon fruit. The process of using ozone is extremely simple but it kills germs, virus, fungus, spore and delete the remnants of insecticides \*\*

### 3.2.3 Packaging and labeling (pictures 15, 16, 17, apdx 4):

In general, traders in Binh Thuan have concerned with the guarantee of quality and advertisement of products through the process of packaging and labeling. But the packaging or labeling is mostly for foreign markets or for big supermarkets in the country.

*Packaging*:: dragon fruit is a kind of fruit that suffers less loss in transportation, so when selling products to wholesalers at regions, traders do a simple packaging, they just load them in big baskets and put on trucks on wood palette to reduce damages (picture 22, apdx 4).

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*\*\*Now in Bình Thuận, there's 6 enterprises that have applied this process for treating safe fruits, safe vegetables. After being dried by fans, or left at normal temperature, dragon fruits shall be put in cool warehouse (if stay for long time), or at normal temperature (if stay for several days). Some traders still use chemical to keep fruits fresh for several days. These techniques have been kept secret by traders, they don't disclose to others (see more on storage section)*

*\* Private enterprise Hoàng Hậu has just brought into use a new auto-cleaning equipment. But there's still a simpler cleaning system. .*

Packaging method depends on prices of dragon fruits. If packaged in carton box, price shall be added another 1.000 VND/ kg. this method is used only for high quality dragon fruits like for export or for big city like Hanoi, Ho Chi Minh city. But if products for export, carton box shall be used for packaging. There are also some countries that ask for wooden box packaging (like Europe, Japan)

*Labeling:* packaging method relates to labeling, if package is a carton box label shall be stucked.

Label could be trademark of traders or from clients depending on their request. Hoang Hau enterprise sticks only about **40%** label of Hoang Hau for export, the rest is for client's label as required., such as Metro, or Taiwanese clients.

Two companies use their names, they are Long Hòa and Ticay when they export dragon fruits. No matter who are their clients they use **100 %** of their label. It also depends on clients that the size of carton box could be used: 4 kg, 7 kg, 10 kg, or 20 kg

### **3.2.4 Preserving and storing** (pictures 18, 19, 20, apdx 4)

Traders mainly sell fresh dragon fruit therefore most dragon fruits have been stored in one or two days at their places in normal temperature. They try to distribute to clients as soon as possible to prevent loss and damages.

As for dragon fruits for export, main preserving method is to use ozone water to clean fruits in order to cover with a film of wax, dragon fruits shall be kept fresh then put into cool storage while there's not enough warehouse system. Now there are several enterprises (Long Hòa, Hoàng Hậu) that have cool warehouses for storing about 120 tons.

For exporting services using marine lines or cool trucks for a long period of time, traders need at least 2 days to get ready enough dragon fruits.

Some traders now use Anolyte to preserve dragon fruits in Binh Thuan and grapes in Ninh Thuan. Mr.Tô Văn Hòa who is a pioneer in this technology living in the village of Hàm Hiệp, Hàm Thuận Bắc district of Bình Thuận province, disclosed that with Anolyte spray, dragon fruits could stay fresh for 20 days, compared to 5 days without any preservation effort. (Source: indepth interview).

### **3.2.5 Transportation & losses** (Pictures 21, 22, 23, apdx 4)

As mentioned in farmers' section, transportation from farmers' to traders' place caused loss of less than 1%. Usually traders hire farmers themselves, or other laborers to do the transportation to collecting points (accounts for 60%, compared with traders themselves do the transportation – 40%). Transportation fee is about 100đồng /kg (source: indepth interview with traders)

The destination decides the means of transportation and packaging method:

- If transport to HN and up north provinces, loss is about 200 đồng/kg
- If transport to SG and southern provinces, loss is about several kg/10 tons
- Transporting to China, traders do the export through an intermediary (like Hoàng Hậu, Long Hòa)

When transporting to wholesalers, traders load products on trucks with wooden pallets. This is still being used by traders as most effective way to reduce losses.

If using cool transport, carton boxes shall be used to package products and it's easier for loading on trucks.

Export services shall be transported on roads (to China) or by boats or airplanes (to other countries). Transportation fees now are rather high due to increasing fuel costs.

So, with special features of dragon fruits and fresh fruits business during the day, loss that traders have to suffer is not high, including:

- Products distribution from farmers' to early processing stages: <1%
- Early processing stage 0.5 –1%
- Loss from loading on trucks or on boats 0.5% - 2% (depending on distance and time of transport)

Total loss in this link is about: 1% - 4%

### **3.3 Contract**

In general, between traders and wholesalers or farmers, just verbal agreement is being done. Two necessary factors should be mentioned are prices and quality of fruits (outlook, colour, ears, sizes...). Contracts with exporters should be made in writing. Besides above two factors, it should clearly mention times and other provisions and conditions in written contracts. (method of payment, legal obligations etc. ).

Here below are main kinds of contracts:

With farmers: *Verbal contracts and investment:* When traders buy directly from farmers, there's only verbal contract between them. Payment to farmers shall be done in cash. If having good relationship with farmers, traders could settle the payment in 3 or 4 days.

In addition, some traders also invest certain capital to support farmers in cultivation such as poles, fertilizers...And they also can transfer cultivation technologies to farmers. In return, farmers sell dragon fruits to traders when season coming. Traders usually select capable farmers or good relatives for this deal.

With foreign clients *Written contract shall be applied in this case.* Prices shall be determined in contract. Specific quality is required in terms of the sizes of fruits, colours, outer forms. For most export services to Asia countries this provision depends on a certificate issued by Vietnam Spore Department (source: indepth interview with traders).

### **3.4 Income**

The output of traders changes everyday, depending on product order, ranging from 3 – 20 tons. Some big traders involving exportation, the output could reach 70 tons in a day. Income varies from business output.

*Income of local traders*

If traders buy the whole garden, price is at 2,500 VND/kg, the total income (minus all costs) shall be about 300 – 500 VND/kg, equal to 20%.

*Income of exporters*

Exporters usually pay high prices to have good quality products (it may reach 6.500 VND/kg). In Europe, CIF price is about 1.5 Euro/kg ( VND 30,000/kg). After deducting cropping fees, early process fees, transport fees, the rest shall be their income equal to 50%.

As for Asian countries, sale price is diverse that depends on distance and clients. The income of traders is usually very high, it may reach 60-70%

**3.5 Difficulties of trader**

Trader is an important factor in the value chain of Binh Thuan dragon fruits, helps with stable outlet for farmers, also is the person who set the price of products in local markets. However, trader himself also encounters certain difficulties as below:

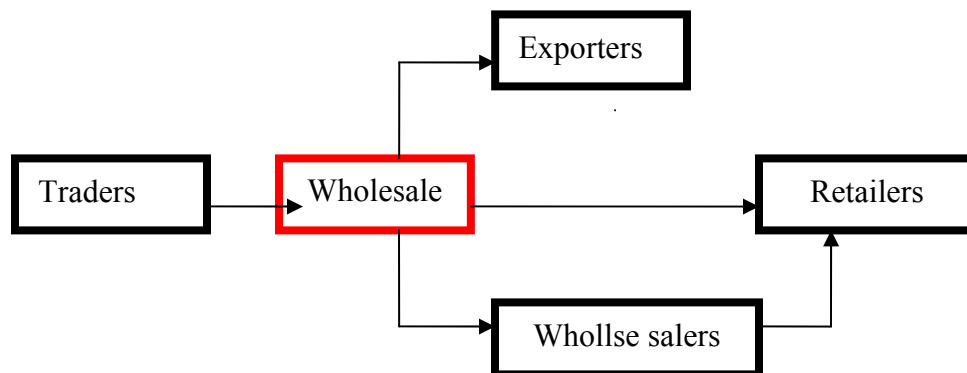
Difficulties	How to overcome
<p>1. <u>Capital</u>: trader needs capital for basic structure, modern equipment, but the approach to loans is still limited and difficult</p> <p><u>Contact</u>: The business relationship between farmers and trader is not consistent. Just a few traders have good business relationship with farmers years after years. There's almost not any an organization or wholesale centers to undertake the exchange of market information or to promote the business of dragon fruits between trader and farmers.</p> <p>3. <u>After cropping technology</u> Very few traders possess basic structure and knowledge of modern technology for after cropping service.</p> <p>4. <u>Label</u>: Because of income or due to lack of perception of the importance of label, trademark, the</p>	<p>→ Agribank is requested to have better policies and priority for enterprises and traders to proceed with favorable procedure for loans.</p> <p>→ Solicitate easier contacts in markets for all farmers and traders. This will improve the relationship between them for better reliable confidence. <u>The establishment of a wholesale center in Binh Thuan province</u> is necessary to promote business contacts.</p> <p>Traders also need a <u>trader association</u> to keep stable prices and outlet for dragon fruits market.</p> <p>→ As farmers, traders also need help regarding professionalism, technique demonstration, develop publicly systems of industrial process relating to after cropping. Institutes, Universities, Science Centers, Ministries and governmental departments should support them with studies and introduction of new technologies, investment opportunities in order to develop techniques of processing products from dragon fruits.</p>



<p>labeling for products of traders is still limited.</p> <p>5. <u>Promoting export and building trademark.</u>: the province now has a Dragon fruit Association but it don't do good its role in promoting business and building trademark for dragon fruits of Binh Thuan, so the export services don't keep up with production results.</p> <p>7. <u>Export price</u>: export prices of dragon fruits continue to decrease, export price equally reach 467 USD/ ton ( in 2001), down to 374 USD/ ton (in 2002) and 352 USD/ ton ( in 2003). In addition, the price of Vietnam dragon fruits is higher than other countries due to high transport fees.</p>	<p>→ The Ministry of Commerce should establish a standard for packaging of dragon fruits and train traders according to the export demand of certain markets. Metro and GTZ could help with these training courses.</p> <p>→ We should consider dragon fruits export as one of national business promoting programs. For new markets, the Commerce Ministry should ask its permanent office to study and provide with concerning information to help regional enterprises to develop into these markets. GTZ could cooperate with VNCI to help building trademark for dragon fruits of Binh Thuan, and looking for new markets in Europe.</p> <p>→ It's necessary to conduct studies and analysis in details in respect of exporting markets before and now, competitors and weak points in exporting dragon fruits of Vietnam compared to other countries, so that we could have a proper strategy for exportation, otherwise it's difficult to maintain the present markets and get into new markets.</p>
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#### 4. WHOLESALER (Pictures 27, 28, 29, apdx 4)

**Chart 6: Wholesaler and direct relationship**



##### 4.1 Typical features

We could say the function of wholesaler of dragon fruits in Binh Thuan is somewhat like trader. The only different point is the wholesaler can sell a smaller quantity of products to retailer in the region or nearby provinces.

In the province, wholesaler's base is located mostly along the roads, easier for concentration and fast transportation. The majority of wholesalers concentrate in the

cities of HCM, HN and in big cities and provinces of the country. In these cities they are operating mainly in wholesale markets.

Trader and wholesaler exchange information of prices daily. When buying products the wholesaler could check prices from different traders. Wholesaler could have built a long business relationship with one or more traders. Consequently they can exchange price information with a mutual confident manner.

In business, the quality of products shall be evaluated according to experience. Main customers of wholesaler are retailers and some consumers. They not only do business of dragon fruits but also other kind of fruits.

The wholesaler could also be an exporter who mainly exports to Asian countries, the product output could attain 10 – 15 % of total output. However his role here is the same as a trader exporter, so in this section we just mention the local consumption process of wholesaler.

## **4.2 After cropping process.**

### **4.2.1 Early processing stage.**

In wholesale market, usually space is narrow. Most fruits business shall be settled in the same day. So, the wholesaler doesn't do any early process for fruits. However, quality shall be re-classified right here because fruits quality shall be decreased as time glides by.

### **4.2.2 Packaging and labeling**

Because transporting from afar, packaging is mostly taken care of by traders. If distribution to local markets, the wholesaler uses big baskets, carton boxes or any things that could be used for holding dragon fruits. At wholesalers, the labeling shall not be proceeded => we can say that in the wholesale stage, packaging has not been concerned due to competitive prices (packaging fees rather high)

### **4.2.3 Storing**

In general, the wholesaler stores fruits in normal condition because he could keep dragon fruits fresh for 2 days.

### **4.2.4 Transport**

Most retailers go to wholesale place to buy fruits. However, in certain occasions, the wholesaler distributes products to retailers' directly. Price could include some transportation fees depending on the distance of handling.

### **4.2.5 Loss**

Loss of wholesaler occurs when wholesaler does the re-classification or transportation.

Depending on fruits reclassification, wholesaler determines again new price for products. Loss from reclassification is about <1%

In the transporting process (if trader transports products to retailer's), he has to suffer a loss in weight from transporting (it's usually very low, because retailers are not far in the city).

Dragon fruits must be fresh for dealing, so the wholesaler shall not store fruits for a long time and the loss from storage is not high for the wholesaler, about < 0,5%. So, total loss wholesaler has to suffer is about 1% - 1.5 %

**4.3 Settlement contact.**

In general, the business between wholesaler and retailer or with trader shall only be done through verbal agreement and settlement shall be made mainly in cash.

As for exporting activities, the settlement could be done by LC or credit.

**4.4 Income.**

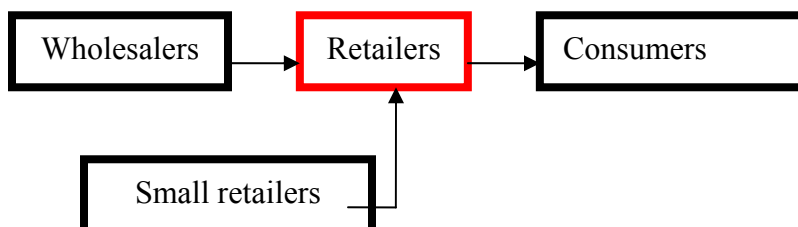
In general, total income of wholesaler (minus all fees) is about 300 – 500 VND/kg. Income is estimated about 6- 10%

**4.5 Difficulties of wholesaler.**

Difficulties	Support request
<p>1. <u>Packaging and storing</u>: The wholesaler thinks that this job is not his responsibility, it belongs to trader or farmer, that's why most products from wholesaler to retailer have been packaged by trader, or the wholesaler re-do it at random.</p> <p>2. <u>Storing and preserving</u>: the business activity lasts for a short period of time at the wholesaler's point, the wholesaler shall meet with difficulty if the products could not be consumed in the same day, while the wholesaler don't have any modern storing facilities.</p> <p>3. <u>Contact procedure</u> is still simple and incoherent.</p>	<p>→ Packaging should be insistent and become a standard for all stages, including wholesaler's. Packaging form shall be applied through the chain, from farmer, trader to wholesaler and retailer. The Commerce Department should coordinate with a service supplier (like Metro) in order to assist them in this job.</p> <p>→ GTZ could along with Metro help with training courses about the techniques of storing, preserving, necessary for wholesaler.</p> <p>→It's necessary to establish a contact system for the whole supply chain. This could be realized by a contact center at the wholesale market and the association / of dragon fruits of Binh Thuan.</p>

**5.RETAILER** (Pictures 30, 31, apdx 4)

**Chart 7: Retailer and direct contacts.**



## **5.1 Typical features**

Retailer usually comes to wholesale markets or wholesale points to buy dragon fruits. Some retailers have good relationship with wholesaler, he could check prices and order the products, he also gets the product delivered to his place. Therefore, the relationship between wholesaler and retailer is a two way contact.

The retailer goes to wholesale market to select products of good quality, the selection is depending on experience and on what is available at the market, so the selection of quality is difficult (at wholesale market, there are many customers buying at big quantity so the quality may not be good if you come late, or you're a stranger to seller). That's why all retailers interviewed respond that *the quality of wholesale products is not stable*. (Source: indepth interview conducted by Axis).

Retailer also maintains special relationship with customers such as restaurants, hotels (especially supermarkets). They have to select the right quality products to offer to these customers. In turn, they sell at higher prices or with bigger quantity.

## **5.2 Process after cropping.**

### **5.2.1 Early process**

The early processing stage of dragon fruits retailer is very simple, just cutting, trimming to make the fruits look nicer and fresher.

### **5.2.2 Packaging and labeling.**

If retailer needs to handle fruits to large quantity buyers (restaurants, hotels) he can use carton box (re-use) or big baskets for transportation. Beside, he could transport dragon fruits along with other fruits by a pick-up truck or motorcycle.

Usually when selling to consumers, he uses plastic bags to hold products. (picture 32, apdx 4)

He doesn't label dragon fruits (including supermarkets).

### **5.2.3 Storing, preserving.**

We can say retailers are the ones who try their best to keep dragon fruits fresh as long as possible without being damaged, this will influence directly to their income. they have to spray water all day. Some households use chemical to keep freshness longer. (Source: indepth interview with retailers).

Some retailer's places equipped with cool system such as supermarkets, shops. But the majority of retailers still preserve dragon fruits in normal condition.

### **5.2.4 Loss**

Loss by transportation from wholesalers to retailers has not been noticed because to the hauling distance is short. They just estimate the loss in re-classification and storing as follow:

- Loss in re-classification is up to 5 %
- Loss in storing is about 2-5 %

*So retailers are those who suffer most in the supply chain, total loss could be up to < 10%*

### **5.3 Contract and payment.**

For customers like restaurants, hotels, contract is not just for dragon fruits business, but also for vegetables and fruits in general.

Main agreement is for the standard sizes of fruits and prices. Prices changing could be updated after a period of time as agreed upon. Therefore, retailers raise prices to assure safety in business. The raising ratio could be up to 30% of total buying price. (Source: indepth interview with retailers)

Restaurants and hotels usually settle the payment within one month in credit. While consumers pay in cash.

### **5.4 Income.**

The retailers have to re-classify fruit quality after they bought from wholesalers, therefore, the selling prices differ according to quality classification.

If the products sold to consumers, income for retailers could be up to 15% - 20%.

If the products sold to restaurants or hotels, income shall be higher than 20-30%

### **5.5 Difficulties and support requirement.**

<b>Difficulties</b>	<b>Support request</b>
<p>1. <u>Packaging</u>: Retailers complaint that the packaging method in transportation causes fruit quality to change.</p> <p>2. <u>Product quality not stable</u>. They assume that the outlook is good but sour fruits are many. The reason the quantity of dragon fruits consumed locally is not high because most good product has been chosen for export.</p> <p>3. <u>Storing, preserving</u>: Retailers are those who have difficulty in storing and preserving dragon fruits because it takes long time for them to sell all their products..</p> <p>4. <u>Receiving feedback information</u>: retailers contact directly with consumers and directly receive feedback. However the receiving and transferring these feedback information is still limited. Just now only supermarkets or Metro do good job on this.</p>	<p>→ To find out an effective way of packaging in order to protect quality. Publicize and apply method of packaging by using carton box for those who are responsible to do the packaging in the long supply chain (most important are traders and wholesalers).</p> <p>→ The Ministry of Agriculture &amp; Rural Development should take measure to support and encourage producers and enterprises as well to apply widely methods of production, early process, packaging, labeling for export dragon fruits.</p> <p>→As other phases in the supply chain, the assistance of knowledge and equipment that are essential for keeping products fresh longer are very essential. The Commerce Department should coordinate with a service</p>

	<p>supplier (it could be a company) to help to do this job better.</p> <p>→ GTZ could help to train retailers the way to approach feedback information and transfer these information through press media or to consumer protection organizations (VINATAS). In addition, the departments concerning to production and consumption of dragon fruits must listen to feedback information in order to have proper adjustment.</p>
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## 6. CONSUMERS.

A group seminar for consumers conducted by Axis procures a result worthy of concern as below:

### 6.1 View on safe dragon fruits.

The consumers observe and evaluate dragon fruits from outward look when doing the selection. Three important elements that help them distinguish a safe dragon fruit are:

- No disease.
- No white powder on fruit.
- Skin is not shiny (it's shiny because of insecticide spray.)

### 6.2. Perception of a high quality fruit.

Consumers are ready to pay higher price than 2.000 – 3000 VND for safe dragon fruits with above criteria. In addition, the majority of them want to buy dragon fruits that have special features following because they assume that these fruits have high quality.

- Green fruits/ strong
- Red skin
- Average size (300g)

### 6.3 Buying and consuming habit.

Consumers use dragon fruits frequently because they say dragon fruits are good fruits, good for any ages, not being tired of if eating a lot, good for refreshment, for more vitamins, good for health and digestion.

Dragon fruits have been consumed an average of 2 – 3 kg/ person/ week (in season) in HCMC. Here they buy at markets and supermarkets (80/20)

People who have high living standard assume that dragon fruits in supermarkets have better guaranteed quality safety. But common people are used to buy at markets because:

- Products in supermarkets are not always fresh because cool preserving time in supermarkets is too long.
- Products in markets are always fresh because they have been consumed everyday.
- Markets are closer, one can bargain, price is cheaper.
- Free to choose because no packaging.

Consumers in group seminar disclosed that they *have never seen dragon fruits with label* while they really want to buy dragon fruits with label so that they could trust the products and request for compensation in case of certain incident => this indicates that distributors of dragon fruits just only concern with the exportation of products and not yet pay attention to local markets, that restricts the majority of consumers from (specially common consumers) enjoying dragon fruits at high quality with full label and packaging.

#### 6.4 Problems of consumers.

Difficulties	Way to overcome
1. the majority of consumers don't pay attention to safe or unsafe dragon fruits (including those who have correct view). 2. When encountering a fruit of unexpected quality, most don't have notion of complaint, or don't want to notify the retailers (specially supermarket) because the value is low and they don't want to waste time. 3. Lack of information on source of dragon fruit bought. 4. Lack of information on supplier of dragon fruits of high quality, label and clear source of supply.	→ Multimedia should help consumers to distinguish and recognize different categories of dragon fruits (Bình Thuận, Cao Lãnh etc.), dragon fruits safe and not safe, the benefits of eating safe fruits for the body.  -> to support suppliers of dragon fruits like Cooperatives, traders, wholesalers... to have label when packaging, shall partly help consumers to be confident with the quality of products.

### 7. The role of all levels of governmental authority in the development of dragon fruits in Binh Thuan.

#### 7.1. PEOPLE'S COMMITTEE OF Bình Thuận

The people's Committee of the province has issued guidance for the Agriculture & Rural Development Department, Science & Industry Dept., Tourism & commerce Dept. to execute their state managerial functions in establishing plans to participate fairs and expo's, to advertise products and build trademark for dragon

fruits of Binh Thuan. In addition, the People's Committee of the province has issued decision to adjust earth surface plan in order to develop dragon fruit trees of Binh Thuan for the period of 2005-2010, and to support enterprises to enlarge their working facilities.

### **7. 2. The Agriculture & Rural Development Department.**

The Agriculture & Rural Development Department of Binh Thuan is under the supervision of the Provincial People's Committee. This Department is the office that establishes plans for the cultivation of dragon fruits in the province, manages agricultural services from selecting species, farming techniques, applicable steps in farming process... and organizes training courses through the support of Farming Encouragement Centers, directs the Farming Encouragement Centers to establish demonstration models of technological advances, farming systems, and orders the Plants Protection Office to observe and train farmers the rules for protecting plants and human consequently. In addition, this Department should have technical specialists to care for and "cure diseases" for plants as requested by farmers.

### **7.3. The Plants Protection Office.**

The Plants Protection Office of Binh Thuan is in charge of the duty of foreseeing possible diseases that may harm dragon fruits, training farmers know how to protect harvest from insects, or assisting them how to use insecticides for best result but safe for human health.

### **7.4. The Science and Industry Department of Binh Thuan.**

To study new farming technology and transfer to the Agriculture Department. .

### **7.5. The Commerce & Tourism Department of Bình Thuận**

The Commerce and Tourism is a professional office of Binh Thuan People's Committee that does the management functions of all commercial and tourist activities including import and export, trading in local markets.

This department coordinates with the Center of Support Services of Binh Thuan to organize training courses for the members of Binh Thuan Dragon fruit Association and those farmers planting dragon fruits to know how to do the cultivation and trading of dragon fruit for export, in an effort to update knowledge of applicable technologies for better economic result in the cultivation and exportation of dragon fruits.

In addition, the Commerce and Tourism Dept. has to coordinate with concerning departments and originations, such as the Science and Industry Dept., the Agriculture and Rural Development Dept., the Dragon fruit Association and Dragon fruit Export Business etc... to set up planning for participation in all fairs and expo's to advertise products and trademarks of Binh Thuan.

This department also helps to develop exporting activities from farmers, traders and set up orientation of export for enterprises, of which are the orientation of targeting



markets and supporting efforts that are to encourage enterprises to export through official channel, minimize exports through small channel or just only supply dragon fruits to exporters from other provinces.

#### **7.6. The Dragon fruit Association of Bình Thuận**

This organization has been established to support the development of dragon fruit in the region. But it did not bring result as expected. Just only several members participate in the association activity. Until now it has not fully developed its functions. Farmers have not known the benefits and income they can have from this organization and the participation is not effective.

#### **7.5. The Industry Institute for after cropping of Ho Chi Minh City.**

To study technology for after cropping services, specially the techniques for early process, packaging, storing, fruits transportation (in general. This Institute has coordinated with foreign organizations to study the technological topic for after cropping, but not including dragon fruits.

#### **7.7. The Southern Fruit Research Institute. (SOFRI)**

SOFRI plays an important role in developing species and farming process in order to develop quality and output of fruits. Almost dragon fruit species come from this institute. This is the most effective research organization that provides species and farming process to diversify dragon fruit fruits..

#### **7.8. Vietnam Fruit Association (VINA FRUIT)**

Vina Fruit is the place where information could be exchanged, coordination could be made with other relating fruit organizations in the process of development. Vinafruit is coordinating with Sofri and international organizations to develop effectively the export of dragon fruits.

#### **7.9. International Organizations.**

VNCI is researching a competitive capability of Vietnam Dragon Fruits. Recently, one part of the research of VNCI is the possibility that dragon fruits could be welcomed in Europe Châu Âu (August 2005), with some important information relating to Vietnam and world dragon fruits.

For the time being, VNCI is supporting the development of a cooperative model that could be able to get the standard of Euregap in Bình Thuận (established in July 2005) and a project approaching the standard certificate of Euregap.

In short, all levels of the government from the Ministry of Agriculture, Commerce Ministry, Universities, Fruit and Agricultural Research Institute are very concerned to dragon fruits. Besides GTZ, other international organizations such as VNCI, Usaid, Ausaid, CiRAD, etc., have positively participated in raising the competitive capacity for Vietnam dragon fruits and try to find export markets as well.

The Ministry of Agriculture & Rural Development has had programs encouraging the cultivation of dragon fruit trees on large scope in Bình Thuận and raising output for

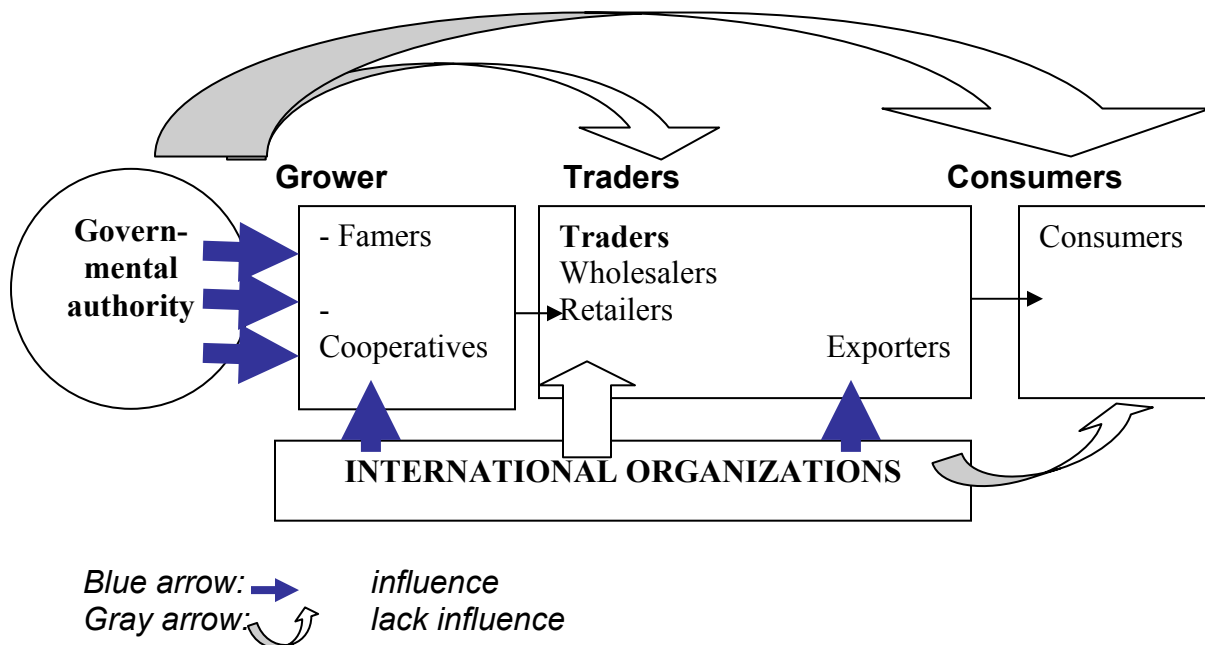
export, also making dragon fruit a key fruit in the near future (Source: accumulation of info. From Agriculture, Commerce and Tourism Dept. of Bình Thuận)

However, according to the result of this research, the organizations and association concerned have just only paid attention to the stages of planting and caring for the trees (farmers), without any close concern about the stages after cropping, particularly on processing and consuming stages.(businessmen, consumers). See chart 7.

In the above analysis of the value chain of dragon fruits, farmers, Traders are the persons who play a very important role in the stage of consuming products, now is the most difficult stage, that's not been properly concerned by governmental agencies, and international organizations as well. Beside, traders have not been administered strictly, that their affective action on the value chain of dragon fruits is not as good as expected, so that the effort in stabilizing market prices, quantity consumed and also quality products for export... has not been positively developed.

As for consumers, the product end-users, are in need of support from mass media for announcing safe products, and danger caused by unsafe products to health and environment. Here below is a show of agent affecting the value chain of dragon fruits of Binh Thuan.

**Chart 7. Agent Affecting the Value Chain of dragon fruits in Bình Thuận**



#### IV. ANALYSIS OF WEAK AND STRONG POINTS, OPPORTUNITIES, CHALLENGES TO DRAGON FRUITS OF BÌNH THUẬN

In the above sections, we have centered around the evaluation of difficulties of each link in the value chain of dragon fruits and ways to overcome. In this section, we would like to sum up the general situation of the value chain of Binh Thuan dragon fruits (including species, planting, cropping and consumption in markets, domestically and abroad.), involving general situation of dragon fruits of Vietnam, in respect of strong and weak points, opportunities and challenges in the future.

##### 1. Strong points, weak points.

	<b>Strong points</b>	<b>Weak points</b>
<b>Species</b>	<ul style="list-style-type: none"> <li>- Dragon fruit species of Binh Thuan have red skin, white inside, easy to grow, easy to care, less disease.</li> <li>- Skin is relatively thick, less loss in cropping and transports (10%).</li> </ul>	<ul style="list-style-type: none"> <li>- Not diverse in species and categories. until now, there's only one specie and category, while other countries have exported 4 categories.</li> <li><i>(new category with red skin and inside newly grafted, not yet spreading for export value. Other species still being experimented in lab)</i></li> </ul>
<b>Land</b>	<ul style="list-style-type: none"> <li>- The conditions of weather and soils in Binh Thuan are favorable for dragon fruit development over the provincial territory.</li> <li>- There's planning for land and development program for dragon fruit until 2010 with land source to come to a double.</li> </ul>	<ul style="list-style-type: none"> <li>- the cultivation has been long at random, not centered around, building of basic structure is difficult with large scope.</li> <li>- Land price is still high, there's no policy supporting price for farmers.</li> </ul>
<b>Product quality</b>	<ul style="list-style-type: none"> <li>- It could result in different sizes, fruits with export quality responding to various markets.</li> </ul>	<ul style="list-style-type: none"> <li>- Quality is not stable due to the fact that farmers don't obey cultivation process.</li> <li>- Care for the safety of dragon fruits is not consistent (the remnants of insecticide still high..)</li> <li>- The product quality, in general, doesn't attain the standards of difficult markets like Europe, America and Japan.</li> </ul>

<p><b>Prices</b></p>	<p>In general the selling price of dragon fruits is cheap, compared with some other fruits which produces high income when export.</p>	<ul style="list-style-type: none"> <li>- Market prices could not be controlled, lack of attention from organizations, enterprises and authorities, specially in favorable seasons, supply which is bigger than demand makes prices lower and influences the income of farmers.</li> <li>- Transport fees for export is high, while purchasing price for export is low.</li> </ul>
<p><b>Output &amp; export</b></p>	<ul style="list-style-type: none"> <li>- Until now, the planting and consuming of dragon fruits in Binh Thuan have achieved significant results, concretely the growth of output is very fast in recent 5 years as mentioned above.</li> </ul> <p>Dragon fruits of Vietnam already have markets for export, a country possessing high export market share, first country to export dragon fruits in the region, known to many countries and an example for learning.</p>	<ul style="list-style-type: none"> <li>- The export transaction not yet responds to production result, although the growth of export quantity is high in recent 3 years (above 50 %) but this doesn't meet the regional product consumption.</li> </ul>
<p><b>Technologies after cropping</b></p>	<p>None</p>	<ul style="list-style-type: none"> <li>- The techniques of packaging and labeling are not the same, due to short of modern tools, this influences the end product quality, increase product price due to losses in early process and transport.</li> <li>- Lack of techniques to keep fruits fresh longer, specially the product processing technique.</li> <li>- Lack of a synchronically solution for the value chain of a proper close chain industry, specially people for this job.</li> </ul>

<b>Relationship in the value chain</b>	<ul style="list-style-type: none"> <li>- The citizens of Binh Thuan have already had experience in planting dragon fruits for long time, can manage blossoming in inverse seasons, keep lighting on for better fruits output.</li> <li>- Active and rather creative, there's some good advanced symbolic persons who know how to set up a close chain for production from planting to exporting, including building trademark for their dragon fruit fruits (Hòang Hậu, Long Hòa)</li> <li>- The consumption system of dragon fruits (as other fruits in Vietnam) until now depends on confidence and verbal agreement, this also has strong point that helps to realize "agreement" in a simple, fast and complete manner.</li> </ul>	<ul style="list-style-type: none"> <li>- Share of experience is not yet applicable, just personal character habit, no team spirit, no cooperative model.</li> <li>- Perception is still limited that leads to late application of safe production process.</li> <li>- Two way-relationship of farmers and traders has not been established on legal basis, so there's no guarantee of supply source and quality as expected.</li> <li>- The coordination and cooperation have not been really established among export enterprises, consumption outlets and dragon fruit farmers, which limit the general activity of production of dragon fruits.</li> <li>- Short of feedback information from consumers to dealers and producers, lack of 2-ways information and to the authorities.</li> </ul>
<b>The concerns of organizations</b>	<ul style="list-style-type: none"> <li>-The Binh Thuan Province has had many contributions and concerns such as planning programs to enlarge cultivation land for dragon fruits, encourage the cultivation and invest into dragon fruits and establish certain fruitful models etc.</li> <li>- Some international organizations also participate in many projects to raise competitive capacity for dragon fruits.</li> </ul>	<ul style="list-style-type: none"> <li>- The concern has not become a system and not aimed at the after cropping stage (only at pre-cropping stage).</li> <li>- No proper concern and administration of traders.</li> <li>- Market research and business proceeding in this area is still limited. No strong infiltration into potential markets likes Europe, America and Japan although demand for importing into these countries is very high. .</li> <li>- The development of dragon fruit trees long before has had been a spontaneous movement with dispersing planting areas, this influences a lot to the present centralized planning, it's therefore difficult to invest into basic structure and economic structure transformation.</li> </ul>

## 2. Opportunities and challenges.

	Opportunities	Challenges
<b>Products development</b>	Việt Nam now has big opportunities in developing new tree species, diversifying products for export like using new species, applying technique for changing fruit colour, keeping colour fresh etc., thanks to the help of research institutes of fruit trees and support of international organizations as well.	The output of dragon fruits becomes higher day after day, but lack of export market – consumption outlet for the product, influences the income of farmers.
<b>Market demand &amp; export</b>	The quantity of dragon fruit fruits exported to Europe is still very limited (about 10% of present output), while the import demand increases in the countries of Europe, America and Japan.	<p>The gradual loss of Vietnam dragon fruit market share now in Europe is the truth, while our export quantity is unchanging, the export quantity of our competitive countries increases in the last 3 years (Source: VNCI), this brings a big risk of loss of our market share in Europe.</p> <p>In Asia, the strong development of Thai dragon fruits with more stable quality and diverse than ours, is also a challenge to our export to familiar Asian countries.</p> <p>- Dragon fruit export prices decrease intermittently, export price average at 467 USD/ ton ( in 2001), down to 374 USD/ ton (in 2002) and 352 USD/ ton (in 2003), while transport fees increases (inverse ratio) this influences a lot the income of VN dealers of dragon fruit.</p>
<b>Trademark</b>	There are some trademarks for dragon fruit like Hoàng Hậu, Ticay, Long Hòa, known to world markets with best opportunities for more market shares.	Although there have been some trademarks of dragon fruit of Vietnam, but more than 60% of export product is still going under the trademark of the importing country, this makes dragon fruit of Vietnam in general and Binh Thuan in particular encounter a risk of losing trademark in certain world markets.

<b>Competition</b>	The fair competition is also an opportunity for dragon fruit of Vietnam to establish position in world market (obtaining necessary certificates, guarantee stable quality etc.)	The participation into AFTA, especially WTO will make the competition very difficult for the dragon fruit of Vietnam on our own court directly or indirectly, when no tax shall be imposed on fruits of Thailand or China coming to our market.
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According to our general evaluation, if Vietnam don't have breakthrough and synchronical measures to apply in coming time for the dragon fruit value chain of Binh Thuan, such as there should be changes and unification among every link (horizontal line), particular the relationship between farmers and traders, and a thorough management from high level down to those who actually carry out the jobs (vertical line), difficulties shall be met even whenever there's an increase in land and better output.

In the limit of this report, we would like to present certain rapid solutions for GTZ – Mot - Metro in order to contribute to and perfect the value chain of Binh Thuan dragon fruits.

### III. SOLUTION PROPOSAL

#### 1. Organization

- Organize more models of Cooperative, multiple good model like Hoàng Hậu, Long Hòa, for easier application of modern science and techniques and transfer of technologies.
  - Organize concrete sightseeing of models in and out of the country for farmers/ representatives of cooperative.
  - Organize working tour for foreign enterprises to come to the province for exchanging experience and signing contracts.
  - Promote meetings for sharing experience between Cooperatives, villages, districts and provinces.
  - Promote advance symbolic persons, merit certificates and encouraging by material appraisal.
- ⇒ *This stage, GTZ should proceed with MoT to realize and supervise the progress. The organization should have the participation from authorities like province People's committee, Agriculture Dept. Farming Encouragement Center etc.*

#### 2. Training

- For farmers: Conduct training courses to upgrade cultivation knowledge involving safety guarantee process, and the techniques of cultivation of safe dragon fruits.

- ⇒ *This stage, GTZ could proceed along with the Agriculture Dept. Science and Industry Dept of the province and the institute of tree species.*
  - For both farmers and traders: it's necessary to have training programs, point out the importance of written contracts, obligations and the 2-way relationship and instruct the legal procedure for signing contracts, procedure to lend money from banks etc.
  
- ⇒ *This stage, GTZ could proceed by coordinating with representatives of certain banks, lawyers, service consulting agencies, and Chamber of Commerce and Agriculture Dept. of the province.*
  - For the stages from 1-4 (chart 1) it's necessary to conduct training courses for early process, preserving, packaging and proper transportation to minimize loss, and training courses aiming at obtaining capacity certificates that enable working in markets in the country (supermarkets, restaurants, hotels etc.) and abroad (markets in Europe, Asia, Africa and America).
  
- ⇒ *This stage, Metro should coordinate to proceed with Commerce Dept., Agriculture Dept, After Cropping Research Institute. It should be advisable to invite certain symbolic individuals who have obtained certificates from important markets to exchange experience. In addition, it's necessary to have foreign experts to consult about certificates of certain markets.*
  - Enterprises (big traders) need refreshment training courses and update information, techniques for creating websites, information from internet and treat them quickly and methods for market study etc.
  
- ⇒ *This stage, GTZ should coordinate with companies specializing in informatics, market research and research institutes etc., and other international organizations in order to exchange experience relating website solution and agricultural studies.*

### **3. Support**

3.1 Mot and GTZ along with the People's Committee of Binh Thuan and provincial Chamber of Commerce should consider the establishment of trader association of dragon fruits of Binh Thuận. This helps to control traders who deal with dragon fruits in and out of the province, to distribute dragon fruits to other provinces and through consulting and techniques support agency, to supply information of international markets and to proceed business for enterprises and traders as required.

3.2 Metro along with GTZ should have program for the establishment of wholesale market of dragon fruits in Binh Thuan, where traders, Cooperatives and



wholesalers could meet and exchange business, beneficial to all people who don't have to waste time to examine the situation and at the same time, it's the place where Cooperatives and farmers can directly find more business partners, prices and proper method of payment.

- 3.3 Establishment of an information center to manage the value chain of fruits in general, including information update for each provincial market (including Binh Thuan dragon fruits), it also helps to receive feedback from each stage of the value chain on 2-way manner and this is very important prompt adjustment of drawbacks, or distribution of information to the right partners in order to solve problems, consequently the value chain shall become more effective.
- 3.4 The value chain of vegetables and fruits, including dragon fruits of Binh Thuan could be adjusted according requirement, MoT-GTZ should have 1 administration center of value chain for these vegetables and fruits (offices could be at 2 big cities, possibly in Vinafruit), it shall be separately managed by a group of experts, not belonging to governmental structure, with representatives of provinces, it shall receive feedback from provincial organizations and transfer information and organize necessary activities for Cooperatives, Traders association, wholesale distributors and retailers association and it also works closely with the office of consumers protection Vinatas Vietnam and other important organizations as well. This is also an information center that administers and realizes the value chain of fruits in general. Transmission of 2-way information is essential for immediate adjustment of mistakes, or correct destination, so that solution for problems could be made to better the value chain.

**Appx. 1: Bình Thuận province- List of indepth interview**

STT	Full name	Role in the value chain	Position	Address / Agency	Contact number
1	Nguyễn Ngọc Hưng	Authority	Deputy Director	Agricultural & rural development department	0913786995
2	Đào Thị Kim Dung	Authority		Agricultural & rural development department	0918210403
3	Chú Chinh	Authority	Manager	Agricultural & rural development department	
4	Tô Quang Bình	Authority	Deputy Director	Encouraging agricultural expansion	0903370217
5	Trần Ngọc Hiệp	Authority	Chairman	Dragon fruit Association	0903904680
6	Phan Bảo Long	Authority	Chairman	Organic cooperative	0909352611
7	Trần Văn Đức	Collector		Hàm Mĩ commune, Hàm Thuận Nam district	898641
8	Huỳnh Thị Ngoảnh	Collector		Hàm Mĩ commune, Hàm Thuận Nam district	898497
9	Nguyễn Trọng Hùng	Collector		Hoàng Hậu dragon fruit	0913932123
10	Nguyễn Thị Nghĩa	Collector	Long Hòa enterprise	Hàm Thuận Bắc district	864908
11	Lê Văn Hai	Wholesaler		Hàm Mĩ commune, Hàm Thuận Nam district	898639
12	Nguyễn Thị Thanh Hoa	Wholesaler		Hàm Mĩ commune, Hàm Thuận Nam district	898916
13	Đỗ Văn Lâm	Retailer		Hàm Mĩ commune, Hàm Thuận Nam district	898213
14	Đặng Thị Thu Nghĩa	Retailer		Hàm Mĩ commune, Hàm Thuận Nam district	898597
15	Tâm Hường	Collector		Phan Thiết town	824528
16	Nguyễn Xuân Thành	Farmer		Hàm Cường commune	
17	Lại Văn Còn	Farmer		Mương Máng commune	
18	Trần Văn Nghĩa	Farmer		Hàm Minh commune	0918680235
19	Phan Bảo Long	Farmer		Hàm Minh commune	0909352611
20	Nguyễn Thị Thủy Tiên	Retailer		108 Phan Văn Hân street, Gò Vấp district, Hồ Chí Minh city	
21	Chị Hoa	Retailer		Phú Nhuận	
22	Trần Thị Phụng	Wholesaler		Tam Bình market, Thủ Đức district, HCMC	
23	Lê Thị Trang	Wholesaler		Tam Bình market, Thủ Đức district, HCMC	

## Appx. 2: Documents for reference









No	Article title	Report/Magazine./Website	Date
1	Binh Thuan dragon fruit scientific seminar	Binh Thuan people's committee technology & environment department, Agricultural & rural development department, SeDec Binh Thuận	12/ 1999
2	Decision of Binh Thuan people's committee	Binh Thuan people's committee	4/ 3/ 2005
3	Typical of Binh Thuan dragon fruit	Binh Thuan people's committee, Agricultural & rural development department	5/ 2004
4	Bình Thuận statistical book 2003	Statistical office	
5	Information of Binh Thuan dragon fruit	Binh Thuan people's committee – Agricultural & rural development department	7/ 2005
6	Seminar: discuss about experience and methods to export Binh Thuan dragon fruit	<a href="http://www.agroviet.gov.vn">http://www.agroviet.gov.vn</a>	
7	Some problems about production and export Binh Thuan dragon fruit	<a href="http://www.agroviet.gov.vn">http://www.agroviet.gov.vn</a>	2/ 2004
8	Infotmation about dragon fruit	Agricultural & rural development department	8/ 2005
9	Become rich due to dragon fruit	<a href="http://www.ticay.com.vn">http://www.ticay.com.vn</a>	
10	Export Binh Thuan dragon fruit	VN economy, số 17	27/4/2004
11	Strategy for Binh Thuan dragon fruit	Ho Chi Minh police newspaper	06/8/05
12	Bình Thuận province	<a href="http://www.binhthuan.gov.vn">www.binhthuan.gov.vn</a>	
13	Flexible investing market	<a href="http://nguoivienxu.vietnamnet.vn">http://nguoivienxu.vietnamnet.vn</a>	
14	Successfully create red flesh dragon fruit	<a href="http://www.nhandan.com.vn">http://www.nhandan.com.vn</a>	28/06/2004
15	Refer the price Binh Thuan dragon fruit in Tam Bình market (Thủ Đức)	<a href="http://www.agroviet.gov.vn">http://www.agroviet.gov.vn</a>	06/10/2005
16	Unite 2 trade marks Tiền Giang – Long An, permanent combination	<a href="http://www.baocantho.com.vn">http://www.baocantho.com.vn</a>	15/3/2005
17	Binh Thuan dragon fruit	<a href="http://www.vietlinh.com.vn">http://www.vietlinh.com.vn</a>	
18	Gap program on dragon fruit	<a href="http://www.saigonnews.vn">http://www.saigonnews.vn</a>	
19	Bring dragon fruit over sea	<a href="http://vietnamnet.vn/kinhte">http://vietnamnet.vn/kinhte</a>	2003
20	Find trade mark for Binh Thuan dragon fruit	<a href="http://www.vietrade.gov.vn">http://www.vietrade.gov.vn</a>	2005

**Appx. 3: List of export enterprises**

STT	Name	Output (ton)	Value(1,000 USD)	Average price (USD/ton)
1	Planing and exporting dragon fruit company	6,802.65	2,949.53	433.58
2	Phường Giảng enterprises	4,516.89	1,739.58	385.13
3	Export fruit and vegetable enterprises	2,565.37	861.60	318.31
4	Hoàng Hậu LTD	1,689.02	664.88	393.65
5	Long Hòa enterprises	152.48	99.97	655.62
6	Kiều Nga enterprises		65.00	
7	Văn Bình enterprises		50.00	
	Total	15,726.41		401.60

**Appx 4: Picture**

**(A. Seed; B. Process; C. Members)**









<p><b>A. Seed</b></p>	<p>1. White flesh and red or pink skin</p> 	<p>2. Violet flesh and red or pink skin</p>  <p>pink skin</p>	<p>3. White flesh and red or yellow skin</p> 
<p>Southern dragon fruit</p>	<p>4. Chợ gạo dragon fruit</p> 	<p>5. Bình Thuận dragon fruit</p> 	
<p><b>B. Cultivation process</b></p>			
<p>Growing</p>	<p>6. Concrete pile to support (Bình Thuận dragon fruit)</p> 	<p>7. Wooden pile to support (Bình Thuận dragon fruit)</p> 	<p>8. tâm vòng pile to support Cho Gao dragon fruit</p> 

Harvest	<p>9. By hand</p> 	<p>10. Using wheel barrow</p> 	<p>11 Using wheel barrow</p> 
Preliminary treatment	<p>12. Classifying</p> 	<p>13. Preliminary treatment place</p> 	<p>14. Preliminary treatment place</p> 
Packing, labeling	<p>15. Packing for export (carton)</p> 	<p>16. Packing for local consumption (bamboo basket)</p> 	<p>17. Packing, labeling (export)</p> 
Storage	<p>18. Storage for local consumption (collector's place)</p> 	<p>19. Storage for local consumption (collector's place)</p> 	<p>20. Storage for export (cold storage)</p> 



<p>Transportation</p>	<p>21. Transport from farmer to collector (tricycle)</p> 	<p>22. Transport from collector to wholesaler (slight truck)</p> 	<p>23. Weight and discharge</p> 
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**C. Members in the value chain**

<p>Collecting place</p>	<p>24. Collecting place.</p> 	<p>25. Collecting place</p> 	<p>26. Collecting place</p> 
<p>Wholesaler's place</p>	<p>27. Wholesaler's place</p> 	<p>28. Wholesale market</p> 	<p>29. Wholesale market</p> 
<p>Retailer's place</p>	<p>30. Binh Thuan Retailer's place</p> 	<p>31. Retailer's place in the market</p> 	<p>32. Retailer uses plastic bag to pack dragon fruit</p> 