



Cash & Carry Vietnam Ltd.



MINISTRY OF TRADE
OF S.R. VIETNAM

ANALYSIS OF WATER MELON VALUE CHAIN IN LONG AN PROVINCE

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2006

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CHAPTER 1: INTRODUCTION

I. Background

Project 'Development of value chain for fruits and vegetables in Viet Nam' was initiated in the year 2005 by cooperation between German organization GTZ and Metro Cash & Carry Viet Nam, Ltd and Ministry of Trade of Viet Nam. Simultaneously, a Small and Medium Enterprise Promotion Program, under cooperation of Viet Nam and Germany governments, were also undertaken by GTZ and Ministry of Planning and Investment of Viet Nam in order to strengthen competitiveness of agricultural sub-sectors perfectly, based on approaches 'Development of value chain'.

In order to make a suitable plan for developments of fruit and vegetable industries for recent requirements of society and to estimate practical impacts of other supporting activities of different organizations on such developments, the above project and program had been carried out in 2 stages: The first was to collect general information on production and cultivated area of fruits and vegetables in different provinces of the country, focusing in 4 selected provinces, those are Hung Yen, Quang Nam, Dak Lak and An Giang, the second was to conduct 18 investigations on value chains of 12 kinds of fruits and vegetables in 18 provinces in order to determine necessary supports.

Southern Fruit Research Institute (SOFRI) had been nominated to carry out value chain analysis for mango in Tien Giang and Dong Thap, water melon in Long An and pomelo in Ben Tre province. Results of investigation on value chain of water melon of Long An province will be presented in this report.

II. Objectives

To collect relevant information from growers to consumers on current farming and marketing practices of water melon in Long An province.

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

III. Methodology

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

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

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

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

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

CHAPTER 2: ANALYSIS OF WATER MELON VALUE CHAIN IN LONG AN PROVINCE

I. Summary

Long An belongs to basin of Viet Nam Mekong River Delta (MRD) which has good weather and soil conditions for agriculture, forestry and aquaculture. Beside of rice as a main crop, Long An has been carrying out "the converting agricultural structure program", growing diverse crops like fruits, vegetables, short term industrial plants, etc.. in order to develop a sustainable agricultural system. Sugarcane and groundnut are grown mainly in western districts of the province since soil is suitable for these crops. In recent years, farmers often get good income from water melon as this two-month crop could give high yield and good quality when it is grown on different soil types in Long An as compared to that in other places. Many farmers, after several years converting from rice to water melon cultivation, had become professional water melon growers who are able to produce high yield and good quality water melon.

Different varieties of water melon had been commercially growing in Long An like Hac My Nhan, Hac Long, An Tiem, Xuan Lan, Bao Long, Nhat Bao, etc.. Other melons are also cultivated such as Kim Co Nuong, cantaloupe. Seeds are provided to growers by different companies or by agro-chemical agents. Such companies or agents also provide technical support to farmers. Growers are enthusiastically recommended cultural practices of water melon by staffs from provincial Agriculture Extension Center. However, a number of growers had low income or even loss water melon crop due to lack of experience or limit in cultivation techniques. In practice, good income is always proportional to high production of water melon as growing cost is not much fluctuated, good cultural practices always give better returns.

Water melon marketing chain could be divided into two main channels: growers sell their fruits at the field to local collectors or to local packing houses owners, then fruits are transported to packing houses and classified into different classes, water melon fruits are subsequently sold to wholesalers or to traders come from other provinces. Wholesalers supply fruits to retailers in different cities like Ha Noi, HCM city, etc. Consumers buy fruits from retailers. The second channel is some what same as previous one at first stage, however, fruits are classified at local packing houses and then packed in certain boxes as required by traders or exporters from Chinese borders, and subsequently, those transported fruits to China to sell to Chinese traders.

In the above channels, practices of all players in the value chain are seem to be harmony to each other as water melon could be cultivated all year round, fruits could be easily handled or be easily applied post harvest treatment for long shelf life, price of fruit was almost stable at different members of the chain. However, the price of fruit is still high (1,500-1,700 VND/kg) which could be due to high price of fertilizers, pesticides and labours. Members of the chain mostly lack of financial, however, fund with favourable

interest rate is limited and procedures for borrowing are complex. Therefore, most of members get loan from other sources with high interest rate.

Fruit classification between players was not based on any fixed standard. Such grading caused a problem for fruit trading. Farmers usually receive money from collectors and/or packers immediately after selling fruits while packers receive money from other wholesalers or retailers in way of latter payment. It means that payment to packers is normally done in second fruit providing once retailers/other wholesalers completely sell all the received fruits. This situation causes monetary problem to wholesalers, they do not have enough floating capitals for payment especially on new-year holidays. Retailers in cities get money immediately after selling fruits so that they get high profit base on purchase price as compared to other members of value chain. However, the retailers do not get high income as not so much quantity of fruit could be sold within a day.

Although water melon produced in Long An have good quality, advertisement activities for trade mark of Long An water melon has not been considered. This could affect possibility of distribution and consumption, especially to Chinese markets. Farmers are not able to access to information regarding to price and marketing of their fruits as such information is not available and very few studies on this area.

Players in water melon value chain are not fully working cooperatively to each other so that many expenditure arise and they have to spend much for production. This makes cost of production increases and benefit through production and marketing of the whole chain decreases.

In order to overcome these above problems, members in the chain should be supported in different ways such as training of advanced cultural practices of water melon to farmers, especially growing of new desirable varieties; they should be assisted to borrow money from banks with low rate of interest. Market information and market price of water melon should be provided in the way which can be accessed by players. Trade mark and advertisement promotion, development of new products of water melon should be considered. In addition, local government should also have suitable policy and plans to encourage development of the water melon industry in the province.

II. General information

2.1. Introduction to Long An province

Long An is an agricultural province of Mekong River Delta, bordering with Ho Chi Minh City in east, Dong Thap province in west, Tien Giang province in south, and Tay Ninh of Viet Nam and Svay-Rieng of Cambodia in north.

Long An province locates at 10°08'30" N. latitude and 11°02'30" S. latitude, 105°0'30" W. longitude and 106°47'02" E. longitude.

Total area of Long An is approximately 4.491,2 km² in which cultivated area for agriculture, forestry and aquaculture is about 378.007 ha (in the year 2005). Population of Long An is about 1.412.834 peoples in the year 2005, mainly Kinh people (99%), with an average density of 315 peoples/km², Tan An – the capital of Long An is about 50 km to the west from Ho Chi Minh city. It should be considered that Long An is the first province from Ho Chi Minh city to other provinces in the south. Long An has 14 administrative districts : Tan An, Tan Hung, Vinh Hung, Moc Hoa, Tan Thanh, Thanh Hoa, Duc Hue, Duc Hoa, Ben Luc, Thu Thua, Chau Thanh, Tan Tru, Can Duoc and Can Giuoc.



Climate: Long An is in tropical humid region which has mainly 2 seasons in a year, rainy season starts from May to November, distributing 92-95% annual rainfall, dry season lasts for 5 months from December to April of about 5-8 % annual rainfall. Average annual precipitation of Long An was estimated about 1.636 mm with maximum of 2,231mm and minimum of 746 mm. Average temperature is 27.5°C with the highest 28.9°C in April and the lowest 25.2°C in January. Average annual humidity of Long An is about 80%.

Soil: The soil of Long An could be classified in to 4 main types: grey soil of old silt, river silt, acidic and acidic - salinity soils.

Grey soil of old silt is in western districts such as Duc Hoa, Duc Hue, Moc Hoa and Vinh Hung. Erosion is a problem of this type of soil due to difference in elevation of soils.

River silt soil is mainly in districts of Tan Thanh, Tan Tru, Can Duoc, Ben Luc, Chau Thanh, Moc Hoa and Tan An. This type of soil is naturally fertile.

Acidic soil is found in the area of Dong Thap Muoi and between Vam Co Dong, Vam Co Tay rivers. This soil has rich organic matters; however, its contents have high level of toxicity. Acidic-salinity soil is in low land of Long An, it is affected by salinity in the dry season.

Salinity soil is found in eastern districts such as Can Duoc, Can Giuoc, Chau Thanh, Tan Tru. This soil is fairly fertile, however, it is seriously affected by salinity water from the sea during dry season.

Long An naturally has a network of rivers and canals which join together to provide a good water supply to farming. Two main rivers are Vam Co Dong and Vam Co Tay. Vam Co Dong is about 200 km long, originated from Cambodia flows through Tay Ninh province into Long An via districts like Duc Hue, Duc Hoa, Ben Luc, Tan Tru and Can Duoc. Vam Co Tay river is about 250 km, also from Cambodia flows into Long An via different districts like Vinh Hung, Moc Hoa, Tan Thanh, Thanh Hoa, Thu Thua, Tan An town, Tan Tru, Chau Thanh, Can Duoc. Two above rivers merge into Vam Co river at 3

districts Tan Tru, Chau Thanh, Can Duoc, this river goes to Soai Rap river and then flows to the sea.

Having good natural conditions and appropriately provincial policy planning, Long An had made a big progress in economy in recent years with average growth rate of GDP estimated about 9.38% annually since the year 2001. GDP in the year 2005 was estimated 11,750 billions VND in which agriculture, forestry and aquaculture contributed 42.61%, industry and construction fields contributed 27.92%, and other services occupied 29.47%.

As an agricultural province, agro-aquatic-forestry productions play an important role in economic development and in social aspects of Long An with gross output value of agriculture was about 6,980.7 billions VND in 2005, having rate of increasing 76.6% as compared to that in 2000.

Table 1: Economic structure of agriculture, forestry and aquaculture of Long An from 2000-2005.

Economic components	2000	2001	2002	2003	2004	2005
GDP (billions VN D)	2,876.1	3,070.1	3,499.1	3,686.3	4,052.5	5,006.8
Agriculture (%)	81.24	76.09	77.71	76.20	76.98	80.14
Aquaculture (%)	8.22	11.67	11.37	12.42	11.80	10.38
Forestry (%)	10.54	12.23	10.91	11.39	11.22	9.48
Total (%)	100.00	100.00	100.00	100.00	100.00	100.00
In agriculture						
Gross out put (billions VN D)	3,952.1	3,952.7	4,639.6	4,803.2	5,439.2	6,980.7
Cultivation (%)	75.7	77.7	77.3	78.1	79.9	79.9
Animal husbandry (%)	15.5	14.6	16.2	15.3	14.0	15.0
Agricultural services (%)	8.9	7.7	6.6	6.6	6.1	5.1
Total (%)	100.00	100.00	100.00	100.00	100.00	100.00

Agriculture, aquaculture and forestry production occupied approximately 56.3% of total production in the year 1995, however this rate has been gradually decreased due to development of industrial areas and other services, only 42, 61% in 2005. Agriculture contributes highest proportion in total agricultural, aquacultural and forestry products, 76-81% in 2000-2005 period with a rate of economic increasing in agriculture 6.7% in 1991-2000 and only 4.37 % in 2000-2005.

Animal husbandry contributed a small proportion in gross out put of agriculture (14-16%), in which pig is a major livestock, followed by poultry. Silviculture is developed mainly in Dong Thap Muoi, a low land area affected by sulphate and aluminum toxicities, not suited for cultivation of rice and other crops. In these areas, cajuput, acassia aneura, "bang" (small plants providing materials for making mats and handicrafts) are major

forest plants. Aquaculture has been advanced in recent years with a total area of raising about 6,893 ha in 2003, including several production models of fishes, prawns and crabs.

In agriculture, farming plays a main role, contributing 75-80% of agriculture production value. Rice is a main crop which contributes 81-82 % agriculture value. Production of rice has been yearly increasing with 0.82 billion tones in 1990, 1.05 billion tones in 1995, 1.57 billion tones in 2000 and 1.7 billion tones in 2003.

Sugarcane is second important crop after rice in Long An. Total area of sugarcane cultivation of Long An is approximately around 16-18 thousand hectares with production of 900 thousand tones per year. As compared to rice, there are certain problems in sugarcane cultivation such as low yield and quality, low price, non-organized trading mode, mis-contracting between farmers and buyers/ companies.

The third important crop is groundnut which is well grown in grey soil of districts Duc Hoa and Duc Hue with cultivated area of 6,000-7,000 hectares and production of 14,000 tones. The cultivated area of groundnut could be expanded up to 20,000 hectares, however, unstable price of this crop is the major barrier for expanding area of cultivation.

Besides, fruit crops like pineapple, dragon fruit, water melon and vegetables are also commercially grown in order to provide fresh produce to consumers in local and outside province markets or export. Dragon fruit and water melon cultivated area have been expanding in recent years due to high demand from markets and by agricultural crop structure conversion policy of the local government.

Special products of Long An are as follows: Nang thom Cho Dao rice, Go Den alcohol, Long Tri water-melon, Hiep Hoa sugar. These products are well known for its quality and high production.

2.2. Water melon in Long An

Water melon (*Citrullus lanatus* Thumb.) Mansf. belongs to family Cucurbitaceae which includes watermelon, honey dew, cantaloupe and cucumber. Water melon performs well in warm dried tropics which shave enough sunlight for the growth.

Water melon has been commercially grown in many provinces of the country. In recent years, water melon is considered a cash crop of farmers who apply advanced cultural practices such as using plastic sheets to cover soil, formula of fertilizers, especially new wide adapted and high yield varieties. Water melon is an alternative crop for rice in certain areas in Mekong Delta.

As diversity of crop plants and animals is one of objectives for rural development of Long An province. Many districts of Long An has successfully grown water melon in large scale in rice fields so that water melon has been considered as a profitable and stable crop for the markets.

Cultivation of rice in Long An has been practiced since years, however, income from rice field to farmers is not high (1-2 millions VND/ha) due to only 2 rice seasons in a year with an average production of around 10 tones/ ha/year. Moreover, risk of grain loss is still high due to pests and disease and other weather disasters. In past 5 years, water melon was recommended to cultivate rotationally with rice in a system of 2 rice seasons and 1 water melon or 2 water melon seasons and 1 rice alternately. Water melon could give a fruit yield of 20 tones /ha/season. Productivity of water melon could reach 25 tones or more/ ha/ season if good cultural practices are followed. In average, farmers

could get a net income of 20 millions VND per ha after deducting all expenditures (10 times as compared with rice).

Crop season: Most of farmers in Long An grow water melon in following seasons, mostly depending on holidays of the year: Christmas, Lunar New Year, after Lunar New Year and summer. However, some new cultivars could be grown year around.

Variety: Many new varieties of water melon has been introduced to farmers, however, cultivated area of particular variety is mostly depend on demands of such variety from markets and on growing conditions of farmers. Three main groups of water melon are described as follows:

Round shaped fruit varieties: these are 'An Tiem 95', 'An Tiem 100' provided by Southern Seed Company. These varieties are characterized by round shaped fruit of average 2-3 kg. An Tiem 95 variety has fruit weigh of 4-6 kg with smooth dark green, dim stripe and polished skin, red fresh, many black seeds. The period from sowing to harvesting of this variety is about 70-75 days. The fruits of this variety has high demand from markets, especially on Christmas and Lunar New Year holidays as fruits of this water melon variety when decorated by other fruits becomes more beautiful in a dish of 'five special fruits' for ancestor. Beside, 'Kim Chau' water melon introduced by ADC Company is also important variety characterized by oval shaped fruit with weight of 3-4 kg, bright yellow skin. Variety Hac Long from Trang Nong Company has oval fruits which are recognized by dark green skin without stripes. These 2 varieties have shorter growing period (60-62 days) than that of An Tiem water melon. Fruits of 'Kim Chau' and 'Hac Long' varieties are easily marketable on holidays of Lunar New Year due to red flesh and less number of seeds.

Oblong shaped water melon with green striped skin, red flesh: varieties of this type of water melon are Hac My Nhan, Tieu Long, Thanh Long, Bao Long (introduced by Trang Nong company), Chau Long, Tien Long, Tien Dong, Ngoc Nu (from ADC company). These varieties have fruit weight of 2-4 kg with yielding of 20-25 tones/ha. As these varieties are highly adapted in different soil types and resistant to major pests and diseases, they can be popularly cultivated and marketable year around. Fruits of these varieties have high demand from markets because of high quality, especially sweetness and hard skin.

Striped fruit skin with yellow flesh water melon: These varieties include Xuan Lan 130 (from Trang Nong company), Kim Phung (from ADC company). Xuan Lan variety could be characterized by egg shaped fruits with bright green skin having dark green stripes, firm bright yellow flesh, sweetness, weight of 2-3kgs/fruit, resistance to pests and diseases, harvesting of 58-60 days after sowing. These varieties give fruits of excellent quality in river silt and sand soils which are little affected by salinity from sea water.

Presently, a seedless variety Nhat Bao is introduced to farmers by GINO company. Fruits of this variety are easily recognized by round shape, thick dark green skin with light green stripes, weight of 4-7 kg, red flesh, sweetness with 11-12 % Brix, long shelf life (15-20days), suited for long transportation. An other seedless water melon 'Happy sweet' is also recommended by Syngenta company. This red flesh variety is fairly high yielding.

Besides of these above mentioned varieties, other varieties of water melon are also cultivated in small area due to their susceptibility to diseases and low yielding.

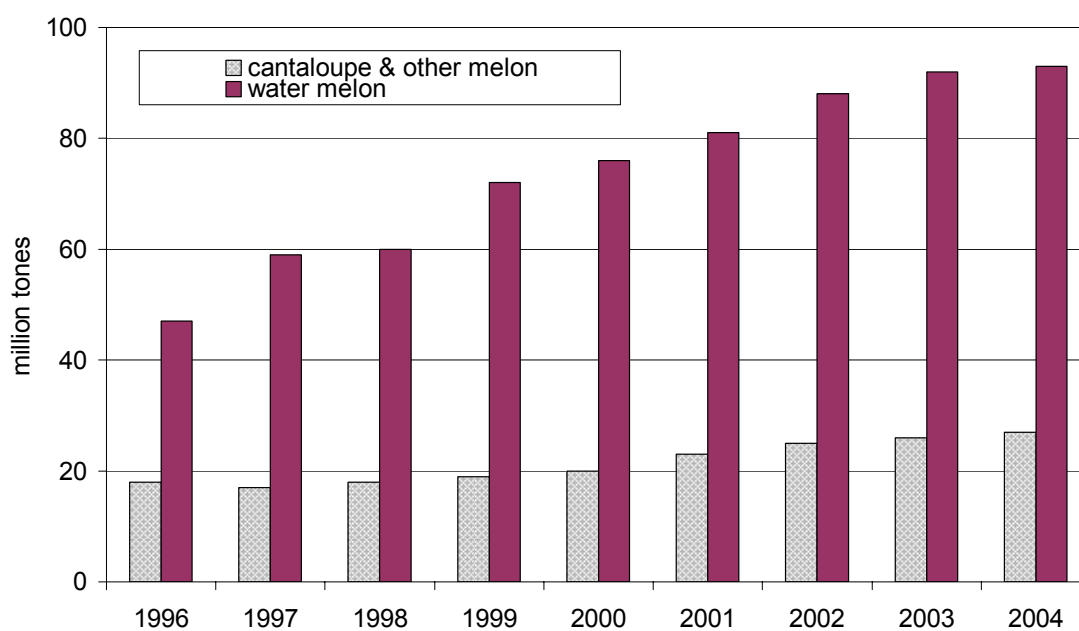
In recent years, seeds of honey dew and cantaloupe are introduced to farmers who also get trained on cultural practices by different companies in order to expand cultivated

area for these melon due to high demand from markets. However, the cultivated area for these melon is still limited to some extents as farmers are reluctant to grow these new recommended crops due to lack of experience.

III. Market information and product competitiveness

3.1. Market prospects of water melon

Water melon is commercially grown not only in Viet Nam but also in other countries of the world due to high demand for both fresh fruits as well as processed products such as canned water melon slices, water melon juice,.. World production of water melon has been yearly increasing, 93 billion tones in 2004 as compared to 47 billion tones in 1996. Production of other melon gained one third of water melon production.



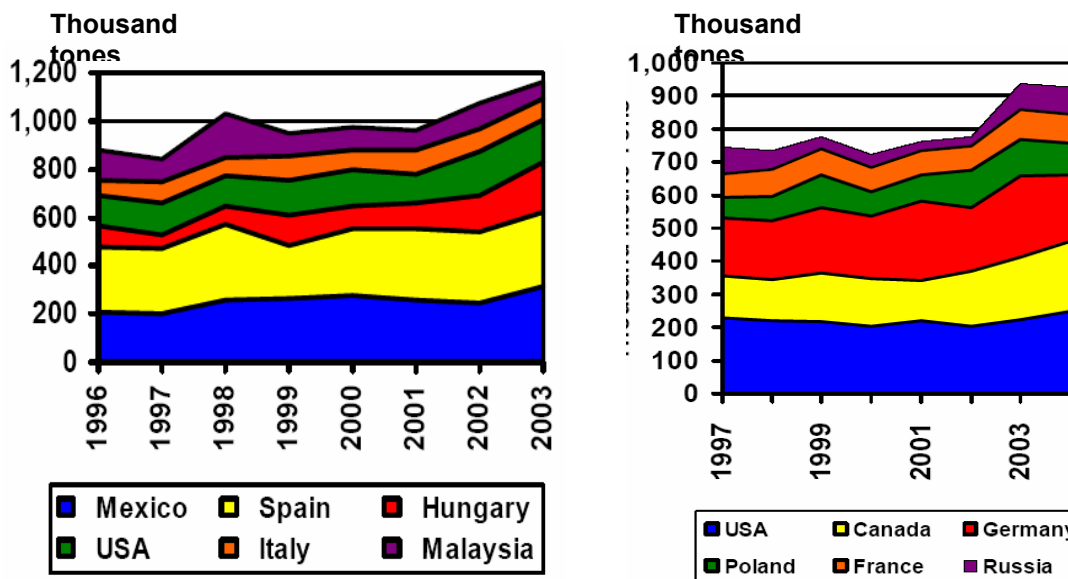
Melon world production, source: FAO, redraw from USDA, Horticultural & Tropical Products Division

China is the main producer for water melon with production of 60 billion tones in the year 2002. Other producers are Turkey, Iran, USA, Egypt, and Mexico. China is also main producer for other melon (50% production of the world), followed by Turkey (6.1%), Iran (4.4%), USA (4.2%) and Spain (3.9%). However, China is not an exporting country for water melon and other melon as there is a great demand for melon in Chinese markets.

Spain is a major exporting country for honey dew and cantaloupe (more than 300 thousand tones per year), followed by Mexico and Costa Rica. Although USA is an importing country for melon, however, USA also exported melon of 98.1 billions USD in the year 2004, mainly to Canada (85.2 billions USD) and Japan. In Asia, Malaysia is major exporter for water melon of 70 thousand tones in 2003 and it is presently the fifth big exporter of the world for water melon after Spain, Mexico, USA and Hungary.

USA is a major importing for melon. In the year 2004, USA imported melon of 100.6 billions USD from Mexico (91.2%), Costa Rica (2.4%) and Guatemala (3.5%). However,

Germany is biggest importing country for water melon, followed by USA and Canada. Other importing countries for honey dew and cantaloupe are France and England.

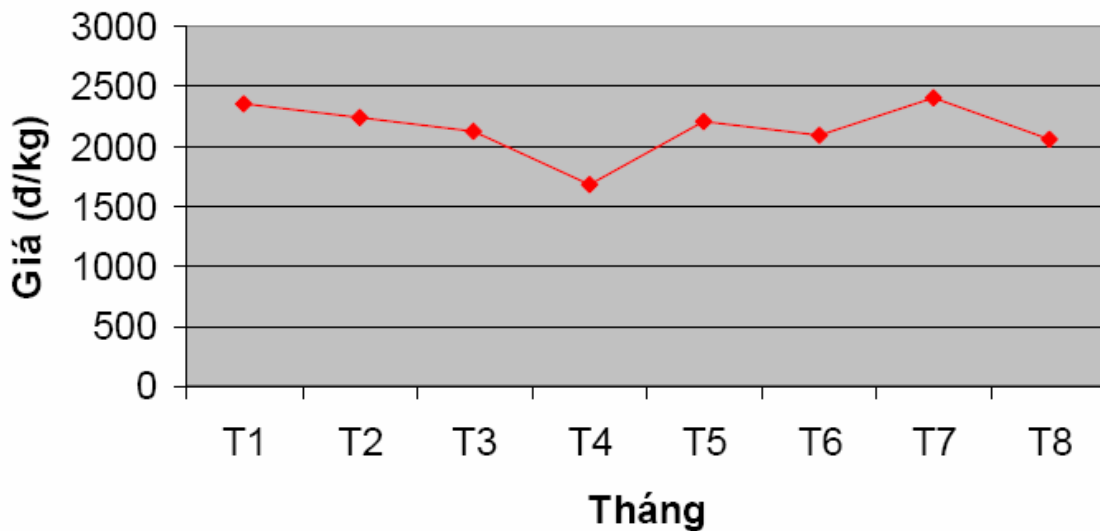


Major importing and exporting countries for melons of the world. Source: Horticultural & Tropical Products Division, USDA

In USA markets, highest price for honey dew was recorded in 1981 (512.8 USD/tonne) but the price was down in 320.3 USD/tonne in 2004. Similarly, price for cantaloupe was highest (495.5 USD/tonne) in 1980, the price of honey dew was yearly fluctuated with a little increase in 1990 and decrease in 2004 (269.3 USD/tonne). In last decade, price of water melon varied from 118.1 USD/tonne to 196.8 USD/tonne, highest in 1980 (240 USD/tonne), lowest in 2004 (154.9 USD/tonne).

In Chinese markets, there was 3000-4000 thousand tonnes melon daily imported to China from Viet Nam through different border gates in early months of the year 2005. However, the price for water melon went down to 1,0-1,2 Chinese Yang/kg (1,800-2,200 VND/kg) for class 1 fruits, 0.5 – 0.8 Chinese Yang/kg (900-1,500 VND/kg) for class 2 fruits, which was only one third of normal price due to crisis of considerable quantity of melon gathered at gates and due to problems of formalities for importing from Chinese authorities. This trading situation also resulted in very low price of water melon in Viet Nam. Surprisingly, price for water melon was little increasing in later months of the year 2005. The price for water melon class 1 was 2,500-3,500 VND/kg at the fields on Lunar New Year holidays 2006, giving a great benefit to growers. The price of water melon on the New Year 2006 festivals was recorded as high as 3.800 VND/kg in Thu Duc market.

The normal price of water melon at farm gate was recorded as 1,800-2,200 VND/kg, at wholesalers 3,000-3,500 VND/kg and retailing at higher rate of 500 VND/kg. In Ho Chi Minh city, price of water melon was found higher 4,500-5,500 VND/kg at shops and higher rate of 500 VND/kg at supermarkets (Survey of SOFRI, 2006).



Source: Nguyen Mai Oanh, Office of Information Center in Ho Chi Minh City

Long An is major province to produce water melon in Mekong Delta with annual production of 75,000 tones from cultivated area 4.500 hectares. However, farmers in other provinces are also encouraged to grow water melon in rice fields. An Giang produced 26.560 tones water melon from 1.469 hectares in 2004 and 32.875 tones from 1.558 hectares in 2005. Tien Giang is the third province to produce water melon with annual production of 36.000 tones from cultivated area of 2.000 hectares. Tra Vinh province also has a plan to produce 138.000 tones of water melon from area of 4.600 hectares in next few years. With the fast increasing in both cultivated area and production in Mekong River Delta, the price could be low as water melon is mainly consumed in domestic markets, although there is a great demand from exotic markets but still limited to some extents. It should be considered that growing season of water melon in Long An should be planned in proper time to avoid crisis of abundance of water melon in markets, especially in winter-spring and spring-summer seasons in which price of water melon is very low.

3.2. Potential production of water melon in Long An

Water melon is a potential cash crop of farmers in south provinces of Viet Nam in recent years as it is well adapted to different soils, especially in fields in which cultivation of rice does not give much benefit to farmers. With advantages of short term crop and easy growing in different seasons of the year, water melon could be grown successfully in rice-water melon intercropping system, giving a great income to farmers if all cultural practices are followed properly. Although, price of water melon in cultivated area is till low as compared to that in exotic markets, benefit for farmers from water melon is 4-5 times higher than that of rice. Water melon is well adapted and high yielded in rice fields, especially in the first two seasons of intercropping with rice, it could yield 20-25 tones /ha if proper cultural practices are taken. Due to high benefit, cultivated area of water melon has been increasing considerably in Long An in recent years.

Long An has approximately 290 thousand hectares for annual crops in which rice and vegetables occupy nearly 87.8%, these areas could be used for water melon cultivation intensively. Problem of water melon in Long An is not of the potential area for larger

production but is of marketing the fruit in prime seasons of growing. Farmers prefer to water melon growing rather than rice and vegetable cultivation as water melon is easily cultivated and gives good income to growers in a short period. However, low price in prime seasons is a big problem to impede the expanding of cultivated area for higher production of water melon of Long An.

Production of water melon of Long An is approximately 70 thousand tones per year. With an estimation of annual requirement for water melon of 10 kg per head, Long An needs approximately 9,000 tones water melon to meet 900 thousands citizens at the working ages. Similarly, 550 thousand tones of water melon is annually required to meet 55 billion citizens at the working ages in the whole country.

Long An is the first province in Mekong Delta to take water melon as an intercropping plant in the rice fields. As a result, Long An is well known to customers from different places of the country for its quality, however, a large quantity of water melon from other provinces are also gathered in Long An for easy trading. It should be considered that a great benefit to growers of Long An could be explored if trade mark could be indulged to make water melon of Long An being more competitive to water melon from other provinces.

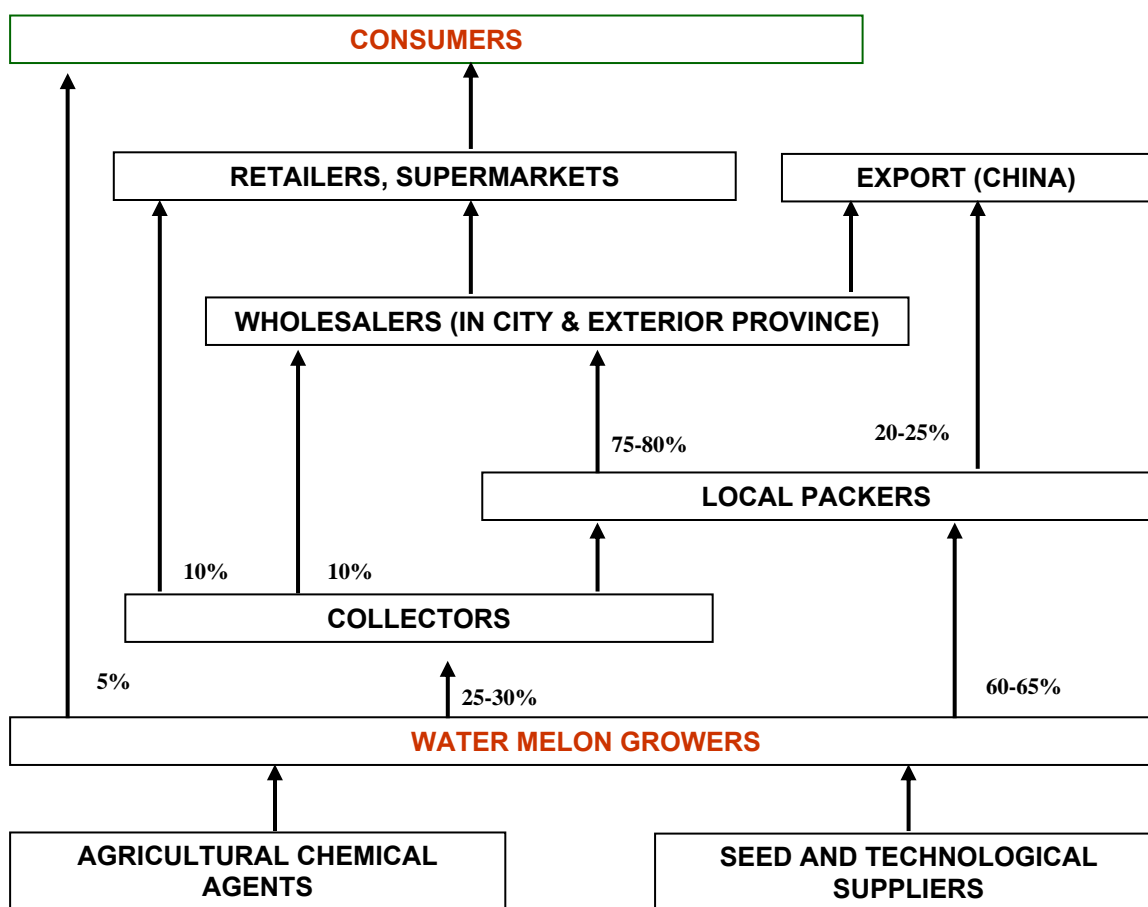
Table: Area, yield and production of water melon in Long An in 2006

No	District	Area (ha)	Yield (tones/ha)	Production(tones)
1	Tan An town	50	18	900
2	Vinh Hung	1,200	20	24,000
3	Moc Hoa	800	13,5	10,800
4	Tan Thanh	120	10	1,200
5	Thanh Hoa	500	15	7,500
6	Duc Hue	100	17	1,700
7	Duc Hoa	180	20	3,600
8	Ben Luc	-	-	-
9	Thu Thua	600	18	10,800
10	Chau Thanh	200	15	3,000
11	Tan Tru	300	16	4,800
12	Can Duoc	-	-	-
13	Can Giuoc	-	-	-
14	Tan Hung	200	20	4,000
	Total	4,250	17 (average)	72,300

Source: Service of Agriculture and Rural Deveopment of Long An

Long An has a potential source of manpower to work in the fields. Most of farmers are very experience in cultivating of water melon. They are constantly supported by companies like GINO, Syngenta in different aspects such as training on advanced cultural practices for water melon, seedless varieties and even buying products of farmers.

IV. Water melon value chain map in Long An



Value chain of Long An water melon is not complicated as those of other fruits, different channels of the chain are as under:

Channel 1: Farmers → Collectors/ small wholesalers → Local packing houses → Distributing wholesalers or inter-provincial traders → Supermarkets/ Retailers → Consumers

This is a main channel for trading water melon in Long An. After sowing water melon of about 50-55 days, farmers usually contact with local packing houses to estimate productivity of their fields as well as quality of their fruits, a contract then is unofficially made between the holder and packing house about harvesting date of water melon. An advance money of about 0,5-1,0 millions VND is given to farmer for each 0.1 ha water melon, price for fruit is depend on market price on the day of harvesting. Farmers harvest and transport water melon to such places easy for packing houses to collect fruits. All labour expenditures are born by farmers, depending on distance from field to gathering place. Fruits are then classified and weighed for each class by both farmer and packing house.

Normally, water melons are classified into 3 classes. Fruit of class 1 is of 1.5 kg or bigger, symmetrical in shape, smooth skin without any scratch. Class 2 is of 1.0-1.5 kg without injury by insects. Fruits in class 3 are those of less than 1 kg. However, packing

houses require only fruits of class 1 and 2. Farmers have to retail fruits of class 3 to local person at their fields or at local markets or even at roadside. Fruits of class 1 and 2 are then transported to the packing house, reclassified and then packed for demands of different customers. Subsequently, fruits are supplied to customers or sold to inter-provincial traders. In most cases, wholesalers or inter-provincial traders take responsibility to distribute fruits to retailers, however, retailers sometime also transport fruits from wholesalers and sell the fruits to consumers.

This type of channel is some what like those in other fruits. It is gradually considered as a perfect channel for water melon in respects of efficacy and fastness. In other fruit crops, however, fruits are oftenly sold to collectors as the fruit is in small quantity at each harvest as compared to large quantity of water melon at only one harvest, at least production of 2 tones water melon for 0.1 ha so that farmers often sell the fruits to local packing houses. Some small farmers (0.1-0.2 ha) also provide water melon to collectors or small wholesalers who subsequently sell the fruit of 2-5 tones to inter-provincial traders. Wholesalers often work on large quantity (more than 20 tones) of water melon from each farmer.

Channel 2: Farmers → Local packing houses → Exporting agencies

In this channel, water melon is normally transported in shorter ways. Farmers sell fruits to local packing houses like that in channel 1. Packing houses take responsibility for grading and packing the fruit in different classes, depending on requirements of customers in other provinces. Fruit classification and packing are usually supervised by those customers who then transport fruits to border for Chinese consumers. Water melon of Long An is exported to China in the months of December to April, especially in early months of lunar New Year as quality of water melon normally gets better, moreover, there is a big demand for water melon from Chinese markets in summer.

Channel 3: Farmers → Consumers/Retailers → Consumers

Farmers usually sell water melon class 3 directly to consumers or to retailers who latter sell fruits to consumers. After selling fruits of class 1 and 2 to packing houses, farmers personally transport class 3 fruits (5-7% of total production) to retail in local markets or sell these fruits in 1-2 days at their fields which are near main roads. These fruits are also provided to local retailers if farmers get problem of time. Normally, class 3 water melon is sold in low price so that farmers are not interested in trading such kind of fruit. In economic point of view, this channel is not important.

In general, beside of fluctuation in price of water melon in different seasons of the year, grading the fruits in different classes is a big problem for farmers and customers as it is often not based on any unified standard. The current grading of water melon is not yet fully complied by producers and collectors and even exporters. The grading is very much depend on demands of water melon from markets. When water melon is in great demand, class 1 fruits are those of only 1.5 kg with 'handsome' appearance instead of 2kg/fruit with nice dark smooth green skin, without any scratch otherwise class 2 when water melon is unmarketable. Difference in price for water melon class 1 and 2 is approximately 400-500 VND/ kg, so farmers could easily lose 400-500 thousands VND/ tone if their fruits are suddenly fallen into lower class. On the other hand, stopping irrigation some days before harvesting for better quality of water melon and transportability as well is not followed by most of farmers due to problem of losing fruit yield. As a consequence of watering, water melon fruits could become more fragile when transported and distributed. These losses are often born by wholesalers.

SWOT analysis:

Strength: Long An has been a leading province for water melon cultivation in off-seasons for more than 10 years. Farmers in Long An have been applying advanced cultural practices as well as new varieties for higher productivity, quality and profitability of water melon. Many farmers are very experienced in cultivation of water melon as they grow only this crop from season to season. Having advances in yield as well as in cultivated area, Long An had gained a very fast increasing in production of water melon so that customers from different places of the country could come to Long An for this kind of special fruit. This was a reason for water melon markets being accidentally set up as provincial gathering markets along roadsides of National Road No. 1, at about 5 km away from Tan An district, to Ho Chi Minh city direction. In these markets, water melon was graded under supervision of traders, then fruits were carefully packed and distributed to different places of the country as well as abroad. The same practice of trading had been also found in water melon markets which were set up latter in Thu Thua and Vinh Hung districts. Not like low production of other fruit crops in Long An, however, a large quantity of marketable water melon fruits could be collected and provided to urgent needs of markets at a particular time as each farmer in Long An has an average of 0.5-1.5 ha cultivated area for water melon, normally with class 1 fruits of 70 -80% production. As a result, it is easy to estimate production of water melon required for markets at particular time from a cultivated area due to short term cropping of this special fruit.

Weakness: There were still farmers not fully applying advanced cultural practices transferred from training courses due to problem of understanding of these farmers. They could not control properly some serious pests and diseases in their own fields so that epidemic could cause problem to larger area, difficulty in pest integrated management, leading to loss in yield and economics point of view of water melon although these farmers were well trained on symptoms of pests and diseases and control methods. This situation often occurs so that much chemicals were used in water melon fields to suppress the epidemic, leading to high level of chemical residues in water melon fruits at harvest although those fruits still remained nice appearance and good quality. Another problem is that members of water melon value chain did not know or could not anticipate information regarding to requirements and market price of water melon, especially on New Year holidays. Due to lacking of such market information from research organizations, farmers in Long An automatically grew water melon in area as large as they could afford to invest without any consultants from market studies. This problem could also result in low price of water melon on New Year holidays. In addition, price of water melon on New Year holidays is normally very much influenced by fact of demand and supply in city markets. Moreover, price is also internally fluctuated in particular local markets, even in particular cultivated area. In the same day, price of water melon in one market is 2-3 times higher than that in other markets nearby due to demand-supply problem. It should be considered that market information and planning for cultivated area very important to farmers of Long An to produce this special fruit more effective otherwise water melon cultivation is like playing a game in casino, just depending on luck of farmers with more chance of loss than that of win.

Opportunities: There is a big demand for water melon and other melon from both domestic and exotic markets in recent years. With an estimation of fruit requirement of about 140 kg per head in 2010, water melon could give a great benefit to growers as price of this crop is somewhat stable in good price as compared to those in other fruit

crops if exotic markets such as these in China, Laos and Cambodia could be reached for better price of water melon.

Threats: There are also challenges for water melon of Viet Nam to compete with high quality melon from nearby countries like Thailand, Malaysia, China. It had been found that so much chemicals had been recently applying to control pests and diseases in water melon that residues could be found in non certified fruits at high level to consumers. Besides, cultivated area for water melon could be reduced due to high risk of pest and diseases in already planted soils and weather problem such as flooding which annually affects adversely on yield and production of water melon, especially in the months of August, September and October. As a consequence, produce supplied to markets as well as price of water melon could not be anticipated.

V. Description of value chain members and inter-firm relationships

5.1. Growers

Most of water melon growers in Long An have been hardly working in rice fields for years so that they got experience not only for rice but also for water melon as well with supports from different organizations, companies and even agro-chemical shops for advanced cultural practices and new varieties. It had been found that 70 % growers in Long An have been cultivating only water melon as a cash crop for their income. These growers started growing water melon in their own fields, however, they latter shifted to new soils for better cropping due to high risk of pests and diseases in already grown fields. They preferred to new soils for water melon so that they hired lands in anywhere to cultivate this crop for better production. The remained growers were those who erratically grew water melon in their own fields, normally 1-2 seasons/year.

Cultural practices for water melon:

- Proper soil preparation with plastic cover: It was found that plastic cover could give better water melon cropping as this kind of material could reserve water for plants, control weeds and even some diseases and insects as well, leading to high benefit and better working environment to farmers.
- Note: Water melon could not be grown perfectly in already cultivated soils due to rich sources of deadly diseases, especially *Fusarium* in these soils. Cultivation systems like those in new soils or in soil of intercropping cycle of 1-2 seasons water melon in 2-3 years or using cucurbit rootstock are recommended for better cropping of water melon.
- Seedlings: directly sown to field or in propagated trays or grafted to cucurbit rootstock
- Planting: As in case of sowing in trays or grafting to cucurbit rootstock
- Post sowing cares: watering, fertilizer applying (2 times), vine adjustment (20 days after planting), branch pruning, hand pollination, early fruit selecting, straw basin making (for better shape and nice appearance of fruit)
- Harvesting: 60-70 days after sowing, depending on varieties. Water melon should not be irrigated at 4-5 days before harvesting in order to secure better quality and shelf life as well as ease for transportation

Each water melon grower normally cultivate an average area of 0.5-1.5 ha, rented from other farmers who usually grow only two rice seasons per year, lacking of experience or not affording for water melon cultivation. Conversely, experienced growers are those who do not have land or those who have land, but cultivated water melon for years so that high risk of loss due to pests and diseases. They always search for new soils for better water melon cropping with a rental rate of 7-8 millions VND per hectare (equal to 3 tones of rice or of water melon).

It had been found that different varieties of water melon had been growing in Long An. However, growers prefer to long shaped water melon like Hac My Nhan, Tieu Long,. due to high yielding, good quality and easy marketing as well. Different companies provide seeds as well as culture technique for particular variety to growers, however, seeds are still expensive to growers (140-150 thousands VND/ 0.1ha)

Most of water melon growers got financial problem for cultivation as they were land renters who could not receive any support from banks for low rate of interest. These growers absolutely asked agro-chemical shops for fertilizers and other chemicals in way of latte payment with interest rate of 2% per month which were very much higher than that from banks. Most of growers complained about high prices of fertilizers and chemicals as compared to cheap price of their products.

Another problem of water melon growers is of cultural practices. Most of growers were not sure for good cropping by their own experiences, but depending on luck rather than their techniques applied. Some growers were still in delimita of solving problems of pests and diseases, adverse weather conditions which lead to low yield and even loss due to lacking of experience on cultural practices of water melon. Successful growers were those who got experience by working on water melon for so many years that they knew the merits of cultivating water melon in new soils which always resulted in high yielding of even more than 25 tones/ha.

Most of daily works in water melon fields such as irrigating, fertilizer applying, hand pollination and even chemical spraying are often practiced by growers. Other works in cuminant phase of cultivation like soil preparation, seed sowing or planting, harvesting and fruit carrying to gathering places are normally employed by labours due to problem of time of growers.

Each grower normally has dealings with 2-3 wholesalers for selling water melon more easily as better price could be secured due to competition for buying fruits of those wholesalers. Trading contract is usually not initiated by grower but wholesaler who deposits advance money at pre-harvesting period of about 50 days after sowing and the rest money is paid to grower at the day of harvesting fruits. However, price of water melon is depend on market price at harvest time. Wholesalers usually come to gathering places for classifying and transporting water melon to their packing houses. Most of growers are satisfied with stably current price of water melon except low price in early months of 2005 due to problems of exporting to China. In general, the relationships and trading way of water melon are found convenient to growers and local wholesalers as well except fruit grading.

Classification and average price of water melon in Long An

Classification	Average weight	Fruit appearance	Proportion (%)	Price (VND/kg)
Class 1	>1,5 kg	Nice smooth skin without injury	60-75%	2,500-3,000
Class 2	1,0-1,2 kg	Smooth skin with or	30-35%	1,500-2,000

		without small injuries		
Class 3	< 1,0 kg	Any if edible	5%	<1,000

Classifications of water melon are often set up personally by different wholesalers. However, most of wholesalers grade class 1 fruits of more than 1.5 kg per fruit, and class 2 of 1-1.5kg. Class 1 fruits normally proportionate to 60-75% production, even 80 % class 1 fruits could be reached due to properly taking cares and young fruit pruning to water melon of farmers. Class 3 fruit is of 5% production.

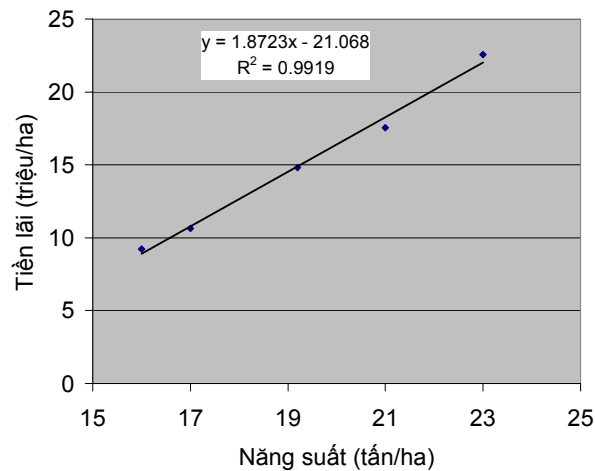
Water melon yield also varies from field to field of 15-25 tones/ha. The higher yield the growers obtain the more benefit the growers secure as expenditure of cultivation is almost constant. Growers were satisfied with interest of 2-3 millions VND/0.1ha of water melon. However, it has been latter found that actual interest was of 1-2 millions VND/0.1 ha, depending on yield. The difference between these values is that growers did not count on their own works in fields.

Economic analyses of water melon cultivation in Long An (per 1000 m²)

STT	Details	Cost (VND)
1	Land rent	800.000
2	Soil preparation	252.000
3	Seed	131.400
4	Plastic cover	356.000
5	Organic manure	91.600
6	Fertilizer	269.000
7	Pesticide	150.000
8	Fungicide	180.000
9	Petro oil, electricity	84.000
10	Herbicide	36.000
11	Family worker	540.000
12	Labour	410.000
13	Bank interest (If any)	84.000
14	Expense for field construction	-50.000
15	Total expenditure	3,334.000
16	Yield (kg/ 0.1 ha)	1.924
17	Average cost for 1 kg fruit	1.733
18	Average price of 1 kg fruit	2.340
19	Total income (VND)	4.502.160
20	Net income	1.168.160

These mentioned values were of 15 professional growers of water melon.

The above table indicates that growing cost for 1 kg water melon is of about 1.700 VND, growers could get an interest of 1.1 million VND/0.1 ha if production of water melon could be reached of 19 tones/ ha. Accordingly, constant growing cost is of about 3.0-3.5 million VND/0.1 ha, growers could secure an interest of 2.3-2.5 millions VND/ 0.1ha if yield could be obtained at 25 tones/ha. So, it is easily seen that benefit of water melon cultivation is very much depend on yield of particular field, not depend on expenditure of production which was found almost stable during the course of time. However, water melon yield is also very much depend on grower' experience, weather, pests and diseases, even luck of growers as well.



Quan hệ giữa năng suất và tiền lãi khi trồng dưa hấu

5.2. Collectors

In the recent value chain of water melon, collectors as well as small wholesalers often buy water melon from those growers who have small cultivated area, with an average of 3-5 tones per day to provide to other traders in nearby provinces. These collectors and wholesalers usually work on low quality fruits with cheap price, accordingly, fruit grading is also found more relaxed than that of other big wholesalers. These collectors and wholesalers also come to water melon fields to buy fruits and pay cash to growers thereafter harvesting. These collectors and wholesalers are those who can afford for only as small quantity as 10 tone fruits/day to provide to a limited number of customers. However, such collectors and small wholesalers have been noted only in small number in Long An. Due to scarcity of water melon in markets in the heavily rainy months from July to December, the business of these collectors and small wholesalers are normally stopped as they could not compete with bigger wholesalers because of their financial problems for which small wholesalers normally trade in cash only with customers, not like the so called latter payment done by other wholesalers with customers.

5.3. Local packing houses

Like those in other fruit crops, local packing houses as well as local wholesalers play important roles in different channels of distribution water melon to both domestic and exotic markets. They are local inhabitants who got good experience for years doing business on water melon and other melon as well. They are very professional in differentiating fruits of current water melon varieties as well as in anticipating internal quality of particular fruit such as maturity, sweetness, flesh colour by its appearance without any cut of the fruit. They often deal mainly with water melon, however, other melon such as are also seasonally traded as demands from markets with a limited quantity.

Scope of activities of particular local packing house was found different from that of others; depend on working capital, experience as well as number of customers of each local small wholesaler. Normally, such working capital also varies from 50 millions up to 3 billions VND. Local packing houses could earn an annual interest of 100 millions up to 10 billions VND if they have a working capital of 500 millions VND.

At least 2-3 labours had been working daily for each small wholesaler. Those labours are close relatives of such wholesaler who may hire 3-5 labours more for occasional working in culminant phases of water melon seasons. The works of the so called seasonal labours were to search for water melon fields in fruit seasons, to estimate yield and then production of particular field and to deposit advance money to grower as well. These seasonal labours also take responsibilities for fruit grading, weight, transporting to packing house for selling at once or distributing to markets far and near. At harvest, small wholesaler also charter 5-10 workers more to shift fruits from field to trucks or other transportation means. Small wholesalers normally purchase 2-3 tones fruit/ day, bigger wholesalers could daily trade 5-10 tones, especially in culminant fruit seasons, they could work on 20-25 tones water melon in a day.

Water melon fruits provided for wholesalers of Long An are from districts of Tan Tru, Thu Thua, Tam Vu, Duc Hue, Duc Hoa, Vinh Hung and Moc Hoa. Most of wholesalers buy fruits directly from growers at fields, They sometime require fruits from collectors or small wholesalers but not often with small quantity. Farmer personally harvest fruits, however, fruit grading is often performed by farmer and workers of wholesaler at water melon field. Wholesalers only purchase fruits of class 1 and 2 and farmers have to retail class 3 fruits to local markets or to supply to other local retailers. Those graded fruits are then transported by wholesaler to packing house, such fruits subsequently are reclassified, depend on requirements of customers.

The so called reclassified water melon are then distributed to customers, normally in other provinces like Ho Chi Minh city, Ha Noi, Da Lat, Vung tau, Nha Trang, Binh Duong. These customers are usually other wholesalers, but rarely retailers. Most of customers come to providing wholesalers to receive fruits, however, some customers are also supplied fruits at shops by providing wholesalers due to convenience of transportation means.

Water melon fruits are packed in plastic bag of 25-30 kg or in bamboo made racket of 35-50 kg for customers in Ho Chi Minh city or in south east provinces and in carton box of 50-100 kg for those customers in Ha Noi or in China. Supper water melon fruits of more than 2 kg weight, smooth thick skin, nice appearance without any scratch are carefully selected for markets in Ha Noi or in China. Each wholesaler could distribute 2-15 tones fruit at a time of trading during months of August to March.

There is about 1-3 % water melon loss, mainly broken due to improper handling during transportation from fields to packing houses. The daily loss could be 4-6% at packing house due to problems of breakage and fruit rot. As a consequence, wholesaler must bear a total loss of 5-8% which is originally caused by notorious practice of farmers such as watering right at harvest day or a day before. Farmers seem to have good yield and subsequently high interest by irrigating and even fertilizer applying to water melon at full maturity of fruit, which lead to heavy loss during harvest and transportation as well. Such incomplied practices of farmers lead to a mistrust of wholesaler to those farmers and the rest as well.

Wholesalers normally deposit advance money of 10-30 % estimated production of particular water melon field, however, the sum of such advance money could be varied, depending on negotiation between farmer and wholesaler. The rest money is obviously paid to farmers on the day of harvesting, based on actual production and market price of water melon on such a day. Conversely, wholesalers often trade on way of latter payment for customers. Wholesalers receive a sum of money less than 50% monetary value of the so called first batch of water melon, the rest money is paid to wholesaler in the second one only. So, customer always makes a credit of 50-100% value of each batch of water melon from wholesaler.

Having years of running business on water melon, wholesalers agreed that there is an increasing demand for water melon in recently years as more and more customers place an order for water melon fruits, accordingly, production of water melon in Long An is also yearly increasing by which wholesalers' business are somewhat advantageous. In addition, price of water melon is almost stable as compared to that of other fruits. However, wholesalers are also aware of disadvantages somehow arising to impede their business. The most prominent problem is of their working capitals as wholesalers run business on way of latter payment for customers for which wholesalers must get loan with high rate of interest from somewhere rather than from banks if wholesalers expand business. Wholesalers sometime get loan from banks with a limited sum of money, not enough for expanding business as they do not have legal documents required by banks. Sixty per cent interviewed wholesalers could not timely have relevant information regarding to price as well as market requirements of water melon so that they could not at once decide a certain price for farmers. Loss or gain of business is very much depended on market prediction of wholesalers, sometime they lose and sometime the farmers bear. However, wholesalers would like a fair profit to both farmer and wholesaler. It was found that market price did not seriously affect to customers' business due to endowment of latter payment of wholesalers.

Wholesalers would like supports from banks whose formality should be more relaxed and encouraged than those of banks at present to wholesalers to expand business by loan of low interest rate. Some wholesalers would also like to develop certain trade mark for their business more enlargement but they still did not know somehow. Most of wholesalers did not know how to get market information from internet; they mostly have such precious information from close customers by daily phones. However, wholesalers could somewhat predict market price by estimating supplied water melon from cultivated area and its requirement in markets.

5.4. Wholesalers in other provinces

Distributing wholesalers are those who permanently trade water melon in different gathering markets in Ho Chi Minh city, Ha Noi and in provinces of Central and North of country. They personally came to Long An to place an order for water melon fruit for 1-2 times, thereafter fruits were transported to distributing wholesalers by local wholesalers because a close relationship had been made during course of time. The local and distributing wholesalers often contact each other for ordering the fruit and price negotiating as well. Distributing wholesalers as well as inter provincial customers always work in such a way of latter payment endowed by local wholesalers. Not like those in other fruit crops, such distributing wholesalers do business mainly on water melon, sometime on cantaloupe, honey dew when required by customers.

Distributing wholesalers in main cities normally work at night, starting at 8-9 pm due to far transportation of water melon from local wholesalers to gathering markets. Subsequently, shipping and receiving of water melon are undertaken with supervision of wholesaler and truck driver who is representative of local wholesaler. Water melon fruits are then reclassified and packed by wholesalers' workers for different customers in such city or in other places. It had been found that there is a difference in fruit grading between distributing wholesalers and local wholesalers. Distributing wholesalers often grade fruits into 3-4 classes instead of 2 classes of local wholesalers. Fruits of class 1 from local wholesalers are usually reclassified into supper class and class 1 for easier trading with more interest. The so called supper class of water melon are those which are very nice in appearance, weight of more than 3kg, normally provided to supper markets. Some distributing wholesalers also grade the class 2 fruits of local wholesalers

into 2 classes, however, most of distributing wholesalers do not as there is not difference between such 2 classes of water melon.

Customers of distributing wholesalers are those who retail water melon in city. Some of these customers personally receive water melon fruits of 50-200kg at a time at wholesalers due to convenience of their transportation means by which they could purchase some more other fruits from shops nearby. These retailers usually pay money immediately after receiving fruits. However, water melon fruits are normally transported by wholesalers to those retailers permanently dealing fruits in city markets or in supper markets and way of latter payment is often endowed. Besides, consumers who require for large quantity of water melon for certain purpose such as parties could personally purchase fruits from wholesalers, but occasionally or in small number of such consumers.

It had been found that there was no written contract on trading between wholesalers and retailers and customers as well. Their trading activities like those for price of water melon, classification, quantity and ways of payment were normally discussed on phone or by direct verbalization

Distributing wholesalers in cities also have financial problem, especially on Lunar New Year holidays as they have daily to reimburse a big sum of money for considerable quantity of water melon to local wholesalers. Moreover, the money shortage of wholesalers on these holidays could be due to late return of customers. For running business on such holidays, wholesalers must get monetary supports from somebody instead of banks with a rate of interest as high as 5-10% per month or higher if daily loan. Wholesalers could secure a great benefit on New Year holidays if they could sell all stored water melon fruits in good price otherwise wholesalers could bear a big debt to certain holders.

Another problem of wholesalers is of space of their shops. Most of wholesalers often work in so limited area of their own shops that they have to rent some more shops nearby for fruit grading and packing as well. Some wholesalers have to distribute immediately all fruits received during night time. The space of shop is mainly for fruit classification and packing, less space is for fruit displaying.

It is easily seen that wholesaler' business is somewhat stable, having less difficulties as compared to that of other members in value chain of water melon. On traditional holidays of the country like new-year festivals and Noel, however, wholesalers also face problem of working capital and risk of loss, arising due to certain reasons during running business on water melon. Some wholesalers even closed shops as their business had been down, which had also influenced to local wholesalers due to problem of reimbursement.

5.5. Retailers/ supper markets

Water melon fruits are normally distributed by a source of retailers to various consumers in a variety of places like food stores, vegetable shops, grocery stores, shops in roadside, or even at gates of factories. Water melon fruits are also transported in various means of transportation such as tricycle, small truck to crowds or even passing places, living areas, schools in order to retail more profitably. With a limited sum of working capital of average 3-10 millions VND, retailer personally take water melon at gathering markets of 100-200kg at a time, 2-3 days interval. Some get lesser quantity of water melon, but along with other fruits from gathering markets to retail for different consumers. Wholesalers sometime transport fruits to certain retailers as required by

phones. In retailing shops of high quality fruits, water melon is usually placed in such a position not much attractive to consumers as compared to other fruits, especially those imported. On the other hand, in shops at roadside, water melon fruits are well displayed in large quantity, along with other fruits but small quantity. Water melon is naturally preferred by a variety of consumers like students, pupils, workers and others due to its good quality and reasonable price as compared to that of other fruits. Retailers obviously play important roles in distributing and marketing water melon fruits directly to consumers. Most of retailers are satisfied with their business as water melon naturally is long shelf life of about 6-7 days without loss if proper cares are taken. Moreover, retailing price of water melon is somewhat stable as quality of water melon remains good for 3-4 days in good storage condition after harvesting.

5.6. Customers/ Consumers

Normally, consumers could not anticipate internal quality of certain water melon fruit purchased. They usually make strokes to the fruit by action of fingers as a routine when buying to check the maturity of water melon rather than internal quality with uncertainty. Most of retailers could not appraise quality of water melon through fruit appearance. In value chain of water melon, wholesalers and farmers are those who could anticipate exactly internal quality as well as maturity of particular fruit through its appearance and by strokes to fruit skin. Fruit quality of long shaped water melon varieties is almost stable as compared to that of round shaped varieties whose quality could vary, depending on cultural practices of farmers. Fruit size and price are the main priorities for consumer to buy the fruit. About 76 % consumers would like to purchase fruits as well as flowers in retailing shops in markets and in living area or in roadside rather than supper markets due to problems of time and transportation. The rest questioned consumers would like fruits in both local and supper markets., according to them, supper markets always provide reliable products in term of quality and variety to consumers with higher price.

About 22% interviewed consumers often buy fruits like apple, grape dragon fruit, mango, king orange, mandarin, pomelo, water melon banana, papaya,.. of which water melon is of 19% total quantity of all fruits required. Consumers usually purchase fruits 1-2 times in a week with an average of 1-2 water melon fruits (2-4kg) at a time. Sixty two per cent consumers would like small water melon of 2-3 kg/fruit, thirty four per cent would like fruit of 3-4 kg, the rest would like fruit of less than 1.5kg as these small fruits have acceptably internal quality although appearances of these fruits are not attractive for which they but are often sold in low price as compared to that of other classes of water melon. On New Year holidays, most of consumers prefer for large round shaped water melon of more than 4-5 kg with nice smooth and dark green or yellowish skin for displaying. External criteria of displaying water melon like nice appearance, large size, freshness are usually very much concerned by buyers rather than internal quality of fruit. The first internal character of water melon preferred by consumers normal is flesh colour, followed by seedlessness and sweetness of fruit. The excellent water melon fruits are those having redish or yellowish flesh colour depending on varieties, seedlessness or less number of seeds, sweetness, moderate juice. Most of consumers do not concern much about safe fruits when buying water melon, according to them, vegetables could contain certain residues rather than water melon as thick skin of water melon is usually removed before consuming. Such neglectfully notorious idea of consumers should be criticized from food safe concern point of view. It is easily seen that so much dangerous chemicals had been used to control pests and diseases in even a day before harvest. Such indecomposable chemicals remain for a long time in fruit which could adversely affect to human health. Farmers should comply with all cultural

practices of which bio and easily decomposable chemicals should be applied for water melon at right concentration and at right time which could lead to free residue. About 65% of consumers stored fruits in refrigerator for 2-8 days, however, water melon is normally not cool stored due to its long shelf life. It requires a mild cool before eating for feeling pleased of its freshness. Most of consumers would like fresh fruits and flowers of high quality, they prefer for long shaped water melon (Hac My Nhan variety as an example) with no or less number of seeds. Most of consumers would also like a variety of melon in markets like cantaloupe and honey dew beside water melon due to diversity of consumer' tastes. These melon are presently sold in markets, however, consumers buy a small quantity for tasting purpose only due to high price of those melon of 4-5 times higher than that of water melon. Consumers are satisfied with market price of water melon in recent years, however, they strongly complain about unacceptably high price of water melon on New Year holidays so that only 2-3 water melon fruits are brought home for displaying in ancestor' altar along with other fruits rather than large quantity of cheaper water melon being consumed on these holidays.

5.7. Input suppliers

Water melon growers have normally to buy in cash chemicals and fertilizers from local agro-chemical shops. These suppliers also grant some growers a credit to harvest time of water melon with high rate of interest as compared to that of early payment. They also consult growers certain methods of pest and disease control or cultural practices by which could attract growers to purchase more chemicals or fertilizers. However, these consultants are sometime not up to the mark for proper cultivation point of view. Growers on the other hand are much influenced by costly advertised, or even non certified chemicals/fertilizers provided by these suppliers, which lead to certain problems such as non safe water melon fruits and low interest to growers.

Table 2: Fresh water melon price of different members of water melon value chain (from growers in Long An to retailers in Ho Chi Minh city)

Members of value chain	Selling price (VND/kg)				
	Class 1	Increasing rate (%)	Class 2	Increasing rate (%)	Class 3
Grower	2500-3500	100	1600-2000	100	800-1000
Small wholesaler /collector	3000-4000	117	2000-2500	125	-
Local packing house	3500-4500	134	2200-2800	139	-
Wholesaler	3800-4800	145	2500-3200	158	-
Retailer	5000-5500	179	3000-4000	194	1000-1500

It had been found that there was a considerable increasing in price of water melon, approximately 1.8 –2 times higher from growers to consumers in Ho Chi Minh city. Price of water melon could vary mainly due to transportation cost, physical loss of water melon, quantity sold of each member of the chain. The highest difference in price was recorded between packer and wholesaler in far places (34-39%), followed by those between retailer to consumer (34-36%) and those of smalll wholesalers/collectors and wholesalers (17-25%). The least difference was those between wholesalers and retailers (10-18%). Class 3 fruits were normally sold in local markets so that the price is not different from field to local market.

5.8. Role of other organizations

Water melon industry of Long An have not yet received much virtual supports from national or foreign organizations as compared to that in other fruit crops. However, local authority played an important role in encouraging farmers to grow water melon as an inter-cropping crop in rice field for better benefit. Certain supports in term of training courses and manuals for growers had been periodically received from Service of Agriculture and Rural Development as well as Agriculture Extension Center of Long An. Besides, advanced techniques such as agro-plastic cover, cultural practices had been recommended to growers by different organizations like Can tho University, Ho Chi Minh University of Horticulture and Forestry.

Seed companies as well as agro chemical companies had carried out training courses, field workshops for growers on cultural practices and methods of pest and disease management for better cropping. However, price of water melon seeds and chemicals/fertilizers are so expensive, especially in culminent phase of epidemic that benefit of cultivation is consequently reduced to some extents. Some companies like GINO, An Dien provided newly seedless varieties to growers for trial. They also advised growers proper cultural practices and made contract for buying all products of such new varieties of water melon. However, this kind of trial was still limited to some professional growers only.

Growers also get financial supports from Banks of Agriculture and Rural Development with low rate of interest (1% per month), however, formality of banks are not relaxed to growers. An example of notorious formality is of limited sum of loan (2-3 millions/ 0.1ha) with all legal documents required as security. Moreover, such problematic formality of banks sometime lead to uselessness of such a loan for investment of growers due to short growing term of water melon. Due to such formality, most professional growers who do not have required documents get loan from somewhere with high rate of interest rather than from banks, leading to high growing cost off water melon. The same situation also happens to local packing houses and wholesalers.

VI. Constraints/opportunities

Essential challenge is of high expenditure of cultivation which could adversely affect to the competitiveness of water melon in markets, especially in exotic markets. Such high expenditure of cultivation could be due to high cost of water melon seeds, chemicals and fertilizers as well. Due to habit of individual cultivation, most of farmers purchase fertilizers and other agro materials in high price from local retailing shops, however, price of farmers' products is very much depend on market price and is mostly decided by collectors or wholesalers who often pay low price to growers. As a nature of water melon, fruits are uniformly mature at harvest so that fruits should be collected at fully maturity otherwise loss could be resulted from problem of fruit breakage, however, income of growers is adversely affected if price of water melon is down on such a harvesting day.

Members of value chain like growers, collectors, local packing houses and wholesalers as well are virtually important in distributing water melon from growers to consumers. However, infrastructure and facilities required for post harvest treatment and packaging in those shops were not properly equipped in order to provide safe water melon fruits to markets and also to create good working areas and better environments nearby as well. For examples, water melon fruits transported from growers to retailers were normally embedded by rice straw and were packed in bamboo made rackets, exceptional case

was of those fruits packed in carton boxes for Chinese markets, however, design of such boxes should be in consideration.

It had been found that there was no unified standard of water melon grading between members of value chain so that each member had certain criteria for fruit classification which could vary, depending on season or fruit supply to markets. Such criteria is more relaxed when fruits are highly demanded from markets due to competitiveness between wholesalers of which growers could earn more profit as they could easily sell their fruits with good price and vice versa.

Due to lack of relevant information regarding to price of water melon and requirements at particular time of year from both domestic and exotic markets, most of growers could not plan proper season of cultivating for better marketing. As a consequence, growers altogether grew water melon in so large area instead of rice that fruit supply to markets was much more than requirement of markets, which could lead to low income or even loss to growers due to quantity crisis of water melon in markets, especially in winter-spring season.

Heavy rains and other adverse weather conditions could also influence to water melon cultivation of growers. They could not grow water melon properly in the months from July to November as there are risks of loss due to heavy rains along with serious pests and diseases in such period. Epidemic of pest and diseases is more serious in water melon already cultivated fields as compared to new soils which growers prefer for better cropping.

The considerable difference in price of water melon between those of growers and consumers are mainly due to high cost of transportation and high interest payment of different members of water melon value chain to somewhere rather than banks. Such difference could be reduced to some extents if all members could fully receive financial supports from banks.

Trade mark advertisement of Long An water melon has not yet been appropriately considered. Members of the chain usually do business on water melon in a routine way that they do not care much about trade mark or logo for their own water melon or for that of province. It should be taken into consideration that trade mark, logo as well as improved packaging of Long An water melon should be as soon developed and advertised and even properly protected as possible for easy future trading, comparable to those water melon from nearby countries, especially those from Thailand, and otherwise.

Scope for water melon exporting of Viet Nam could be greatly expanded to foreign markets. Advantages of Long An water melon such as low growing cost as compared to that of the world, excellent quality and long she life could enhance exporting easily to differently exotic markets.

Seedless water melon varieties, cantaloupe and melon should be under cultivation in larger area in order to expand markets which could lead to good income for growers and other services in Long An as well due to great demand for those melon in both domestic and foreign markets. However, growers should be carefully trained on cultural practices and pest and disease management for better cropping of such melon.

VII. Conclusions and recommendations:

7.1. Conclusions:

In general, water melon cultivation and marketing in Long An is relatively stable. Members of value chain could earn a good benefit as water melon is adaptive short term crop of 60 days so that production could be managed for certain requirement of markets

Growers of Long An are very much experienced on cultivation for high productivity with good quality water melon, leading to low growing cost which could induce more and more clients to consume water melon fruits. Weather and soil conditions of Long An are almost suitable for water melon growing in different seasons, providing a large quantity to markets. Gathering markets had been autonomously established nearby cultivating area, which could attract more customers and wholesalers from different places of the country to come for trading fruits.

Better benefit of water melon cultivation as compared to that of rice had been encouraging farmers to study cultural practices of water melon, and many of them had become pros in growing of water melon as a cash crop in rice fields. Technical supports had been received from local authorities, agriculture extension centers, universities, and seed companies. Financial supports from banks had been gradually endowed to some extents to growers, collectors and other members of value chain for better business and latter better family income.

Water melon markets had been found stable except some cases in early months of the year 2005 due to problematic formalities of import of Chinese authority. Price of water melon is almost stable as compared to that of other fruits as water melon could be cultivated year around.

However, members of value chain also face certain problems and constraints during running business on water melon. The most prominent constraint is the shortage of working capital for cultivating purpose as well as expanding business for which these members have to get loan with high rate of interest from somewhere rather than banks, leading to high producing cost of water melon fruit.

Weather fluctuation sometime causes a big problem for growers, especially for the inexperienced farmers who could face a high risk of loss entirely water melon crop due to improper handling of pests and diseases and other problems arising due to adverse climate change.

There was no certain uniform standard for water melon fruit grading among members of value chain. Each wholesaler individually set up his own standard so that fruits could be subsequently reclassified in other wholesalers, leading to problems of time consuming and labouring. Moreover, the so called individual standards could cause problem of price making due to unsatisfactoriness of grading among members of the chain.

These members of water melon value chain has not yet cooperatively worked together for better business, they sometime vied for certain individual purpose. Trading relationships among them had been setting up for a particular time, based on non-written but spoken contracts by which price was decided by market requirements.

Although water melon of Long An has uniformly excellent quality, however, market price of these water melon could be reduced due to problem of packaging, which is unsatisfied by customers. Growers could not receive relevant information regarding to monthly market requirements and water melon price by which growers could make a plan of cultivated area in proper seasons for better income.

7.2. Recommendations

Based on these problems and constraints being analyzed, growers and other members of water melon value chain virtually need supports from different organizations to determine a plan of particularly cultivated area and business investment more appropriately in order to provide enough quality water melon as required by markets so that all members could secure a good income from water melon industry. Supports from local and foreign organizations for development of water melon industry should be in term of the followings:

- Provincial authorities of Long An should have considerations more appropriately on water melon as potentially cash crop for poor farmers gradually to become the wealthy. These considerations should be of actually supporting programmes for profitably sustainable development of water melon.
- Technical supports on cultural practices of water melon as well as musk melons should be continued for all farmers. Training courses and field workshops should be more regularly undertaken so that inexperienced farmers could inquire knowledge from the professional growers. Personnel of such training courses should update and subsequently transfer advanced cultural practices of different new melon to growers.
- Appropriate authorities of Long An should establish and then promulgate an unified standard of grading encouragingly or even compulsory to all members of water melon value chain so that trading works could be more convenient as fruits could not be reclassified at different places, leading to probably low producing cost of water melon.
- Formalities of government banks as well as those of local authorities should be so relaxed that members of water melon value chain could timely get enough money required for their business. These financial supports from banks could lead to low producing cost of water melon due to low interest rate of such loan.
- Provincial authorities should have suitable policy to encourage or to support growers and other members of the chain working cooperatively for better production and better trading as well in order to provide excellent water melon as required by markets. Such cooperation could bring conveniences to all members in term of reduced competitiveness among wholesalers, easy getting of financial supports from banks, acceptable price of agro-chemicals/fertilizers due to larger quantity required, easy transfer of cultural practices as compared to that of individual production.
- Government of Long An should have studies on water melon requirements of domestic and foreign markets in future in order to help members of value chain have proper production and trading plan which could decrease the large quantity crisis with low price of water melon and vice versa.
- Agriculture organizations and Services of national resources and environment should have land use strategies as water melon could not give good crop in its old soil so that land structuring for water melon should be in term of unutilized cycle of 2 years. Farmers should be encouraged to comply with such land structuring for water melon otherwise problem of pests and diseases could arise more seriously not only in old soils but also in new soils nearby due to successively water melon cultivation in the same soil of certain farmers.

Metro company should carry out necessary training courses for members of water melon value chain on the following aspects:

- Advanced cultural practices for producing safely quality water melon, criteria of clean safe fruits for growers, especially the professionals.
- Criteria of each water melon class of suitably unified standard being established and promulgated for growers and wholesalers/ collectors/ retailers for easy trading.
- Knowledge of running business, account management, payment and marketing for participants if cooperative of growers and buyers had been set up in order to enhance their capacities of business management, marketing for better trading of water melon fruits.
- Collectors and wholesalers should be supported in term of loan with low interest rate or of facilities in order to upgrade infrastructures, houses of packing and grading and further to enhance post harvest mechanization of water melon.

Suggestions to financial supporters:

Financial supports to provincial growers, wholesalers in order to establish a system of producing and marketing perfectly, satisfied to GAP standards to strengthen competitiveness of Long An water melon in different markets.

Technical supports to growers in term of free manuals or pictures of advanced cultural practices or of sponsored working tours to developed countries in order to encourage growers producing high quality water melon fruits.

- Supports to businessman to introduce water melon products to foreign markets by different ways like agricultural fairs, logo and trade mark development for wholesalers/ enterprises.

Suggestions to other related organizations: Local authorities, associations and unions should support members of value chain in term of orienting, managing and regulating of water melon production in a year so that price fluctuation could be reduced to some extents. Government organizations should also assist these members for working cooperatively in order to strengthen competitiveness of water melon industry.

IX. Appendices

Appendix-1 List of interviewees

Working group of farmers					
Sn	Name	Address			
1	Nguyen Van Het	Vinh Cong, Chau Thanh			
2	Le Van Phai	Vinh Cong, Chau Thanh			
3	Dang Van Tai	Vinh Cong, Chau Thanh			
4	Le Thanh Son	Vinh Cong, Chau Thanh			
5	Dinh Tuan Kiet	Vinh Cong, Chau Thanh			
6	Tran Thanh Hai	Vinh Cong, Chau Thanh			
7	Pham Thị Be	Vinh Cong, Chau Thanh			
8	Le Van An	Vinh Cong, Chau Thanh			
9	Nguyen Quang Huy	Vinh Cong, Chau Thanh			
10	Truong Van Phong	Vinh Cong, Chau Thanh			
11	Nguyen Hoang Hai	Binh Hiep, Moc Hoa			
12	Nguyen Huu Duc	Binh Tan, Moc Hoa			
13	Nguyen Van Xuan	Binh Tan, Moc Hoa			
14	Duong Tan Loc	Binh Tan, Moc Hoa			
15	Phan Van Ba	Binh Hiep, Moc Hoa			
16	Huynh Van Be	Binh Hiep, Moc Hoa			
17	Do Van Tinh	Binh Tan, Moc Hoa			
18	Pham Hong Phuc	Binh Hiep, Moc Hoa			
19	Nguyen Thị Huong	Binh Hiep, Moc Hoa			
20	Le Thị Mai	Binh Hiep, Moc Hoa			
21	Pham Thị Le Hang	Binh Tan, Moc Hoa			
Interviewees					
Participant	Name	Address			
Government official					
	Phan Thanh Tung	Director, Agriculture Extension Center of Long An			
Agro chemical supplier	Nguyen Thị Dieu	Binh Hiep commune, Moc Hoa district			
Collector	Phan Van Be Tu	Binh Thanh commune, Thu Thua district			
Packing house	Phan Van Tuan	Binh Thanh commune, Thu Thua district			
	Le Van Muoi	Binh Thanh commune, Thu Thua district			
	Võ Van Ba	Thu Thua town, Thu Thua district			
	Nguyen Van Ngon	Binh Thanh commune, Thu Thua district			
	Phan Van Bao	Binh Thanh commune, Thu Thua district			
	Le Van Be	Binh Thanh commune, Thu Thua district			
	Le Thị Hoa	Binh Hiep commune, Moc Hoa district			
Wholesaler	Tran Thị Ngọc Hoa	Agro product market, Thu Duc district, HCM city			
	Nguyen Van Hoang	Agro product market, Thu Duc district, HCM city			
Retailer	Tran Thị Cuc	Ben Thanh market, District 1, HCM city			
	Pham Thị Lan	An Dong market, HCM city			
Consumer	Truong Thị Yen	48, Street 3-2, Commune 12, District 10, HCM city			
	Le Thị Thu Ha	158, Pasteur Street, District 3, HCM city			

Appendix- 2 References

- Web site of Long An province. www.longan.gov.vn. Accessed on 24/03/2005.
- Nguyen Man 2001. Experience and lessons extracted from exporting and importing fresh produce and processed fruits in South Viet Nam. Paper presented in “Thuong mai hoa trai cay nhiet Doi lan 2” tai Can Tho ngay 29/04/2001.
- Nien giam thong ke tinh Long An nam 2005
- Doan Thị My Hanh. 2004. Application of “demand – supply theory” for selecting correct solutions to develop fruit industry in MRD. Dissertation in Economy HCMC University of Economy.
- Hayley Boriss 2006. Commodity Profile: Melons. Agricultural Marketing Research Center, University of California
- Nguyen Mai Oanh 2005. Analysis of fruit and vegetable August 2005. Office of Information Technology Center in HCMC.
- _____ The U.S. and World Situation: Melons. USDA Foreign Agricultural Service, Horticultural & Tropical Products Division.
- TTXVN. Domestic commodity market on 9/Jun/2005. www.agroviet.go.vn
- Lang Son Department of Commercial and Tourist. Announcement of water melon export to China. Lang Son web site on 04 Apr. 2005. www.langson.gov.vn

