

# **THE SUPPLY CHAIN OF VEGETABLES IN THE MEKONG DELTA TOWARDS GAP**

**Dr. Tran Thi Ba  
Cantho University**

## **1. INTRODUCTION**

The Mekong Delta (MD) is biggest agricultural zone of the whole country; it's famous for paddy, aquaculture and tropical fruit tree. In recent years, due to the diversification of cultivation in the Mekong delta, the farmers have been gradually switching their paddy mono-cultivation to growing short-duration crops as vegetables and annual industrial crops in order to establish themselves in a capacity to compete and increase productivity of farming products and to improve their household economic living standard. However, development of the vegetable production sector has only contributed towards serving domestic consumption.

In parallel with production growth, consumer concerns regarding the safety and quality of vegetables have been increasing day by day. There is almost a daily article in different media reporting a case of food poisoning due to high residues in vegetables. Nowadays, there are very few "safe vegetable" stores in some cities of MD such as Cantho, An Giang, My Tho, but, in practice, the turnover of these stores is still limited. Consumers want safe vegetables but they still lack confidence that the vegetable products available at present in stores are safe.

How to ensure domestic consumers feel safe when they buy vegetables, and then the export of safe vegetables from Vietnam is one of the most challenging problems in authorities in Vietnam in general and in the MD in particular to tackle. Following the forum of Agricultural Extension @ Technology" Safe vegetables Real situation and solution" on December 10, 2007 and the conference "Safe vegetable production and orientation in the year 2010" of South Vietnam provinces" on May 7, 2008, one of conclusions Beautiful Women Nuginugi Dancingsis to apply GAP (Good Agriculture Practices) in vegetable production. To achieve this, it has to be managed through supply chain management of vegetable produced in the MD. Therefore, it's necessary to:

- Understand the MD and its vegetables
- Understand the present vegetable supply chain of MD
- Analyse the weaknesses and strenghts, opportunities and challenges for vegetables of MD.
- Offer solutions to manage the vegetable supply chain of MD towards GAP.

## **2. GENERAL INFORMATION ABOUT THE MEKONG DELTA AND ITS VEGETABLES**

The MD is a flat and wide plain, situated in the southern edge of Vietnam, has 3.96 million hectares of cultivable land for nearly 18 million of Vietnam inhabitants (about 22% of the whole population of the country). Actually, the Mekong Delta represents a great potential for agriculture and aquaculture production with 2.60 million hectares (65% of the total area of the MD), supplying half the food quantity and contributing to the economic growth of the zone.

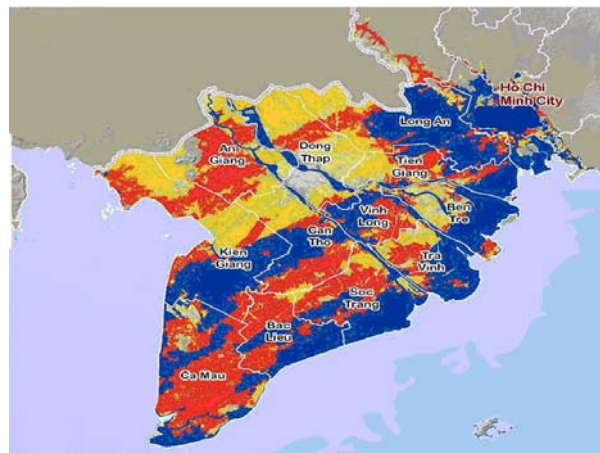
During the last 8 years, vegetable areas of the MD have rapidly increased and become more specialised. In 2007, the MD had 233,809 hectares of land for vegetable cultivation (about 20% of the total vegetable area of the country), and is the biggest vegetable growing area in Vietnam. Provinces with large area of vegetables were Tien Giang 31,994 ha, An Giang 31,052 ha, Tra Vinh 25,894 ha, Soc Trang 24,427 ha, Vinh Long 15,000 ha. Among these areas, leafy vegetable groups occupied 105,154 ha, fruit group 77,068 ha, root group 25,393 ha, and the remaining is other vegetables. The average yield of vegetable in the MD is 16.25 tons/ha, 4.7% higher than yield of provinces in Southern part. Production 3,863,097 tons, which is about 30% the total vegetable production of country, leafy vegetables are 1,775,630 tons, fruit crops 1,558,692 tons and root crops 476,445 ton (Pham Van Du *et al.*, 2008). There are two modes of production. Farmers produce, sell themselves and or produce commodities for markets. As a result of this commodity markets are concentrated in 2 zones depending on vegetable growing regimes:

- **Intensive vegetable cultivation region:** concentrate nearby cities and industrial zones. Products are mainly to supply non-agriculture people, so that the demand for vegetable diversity and level of safe product is high. Rotation of crops is very high (4-8 crops/year), farmer's knowledge on growing intensive vegetables is rather good, but they still apply excessive amounts of chemical pesticides and fertilizers.

- **Vegetable based on rice cultivation region:** this region has large area and high production, vegetable crops grow alternatively with rice in well develop rather alluvial soils, with production being reasonably stable. Rotation of crops is low (2-4 crops/year). Because of this it's easy to make plans for enlarging the vegetable production areas based on rice fields in the MD, when it becomes and industrial zone serving processing and exporting.

- Vegetable production with high technology have been initially established including growing vegetable in net houses to protect against the insects, using mobile net roof to protect against the disadvantage weather factors, and growing vegetable without soil (hydroponics technique).

The MD has means of communication on both waterways and roads are favorable for access to nearby provinces and some countries. This is also a convenience for MD to promote business and consumption of products, especially farming products.



Picture 1: Mekong Delta map

***Situation of safe vegetable production in the MD (Pham Van Du et al., 2008):***

- In 2007, the total area of safe vegetable production was 8,439 hectares (3,6% total vegetable area). Among this area, leafy vegetable group was 4,451 ha (mustard, chysanthnum, lettuce, amaranth, cresson, water spinach, cabbage, cauliflower and spices), vegetables for fruit 3,835 ha (cucumber, bitter gourd, snap bean, yardlong bean, watermelon, tomatoes, okra, squash, pumpkin), and vegetables for root 131 ha (radish, taro, yam, yam bean, ginger); the average yield is 23.05 tons/ha and production is 206,991 tons.

- Targets for 2010, are 49,426 ha, production 1,117,709 tons, 5,5 times higher than 2007; with production mainly in Tiengiang, Angiang, Soctrang, Travinh, Vinhlong and Cantho city,...

**3. PRESENT VEGETABLE SUPPLY CHAIN OF MEKONG DELTA**

Mekong delta does not only supply vegetables for provinces in the zone but also for Ho Chi Minh City (chilli, cucumber, watermelon, pumpkin, eggplant,), Ha Noi (watermelon, melon), Campuchia and China (watermelon). An Giang province is the largest vegetable production of MD, the main supply source for Campuchia, mainly green onion, cabbage, bitter gourd, cucumber, chilli, and zinger. Long An and Tien Giang supply watermelon and melon to China.

In the value chain of vegetables in the MD, farmers are partners who supply most of vegetables to other partners in supply chain, who play a very important role. Some farmer households participate in regional Cooperatives for safe vegetables, while the majority of them do the cultivation and sell products by themselves, they sell to traders, mostly selling in bulk because of its convenience compared to retailing their own product.

Traders buying vegetables in MD are medium and small scale. Most traders in the MD purchase and sell products in the zone, nearby provinces and Ho Chi Minh City. But Cooperatives have not fully played their roles in planning and allotting cultivation of certain vegetables.

Private enterprises of processed products of MD have had rather good business with increasing export of canned products of vegetables and fruits, special in Angiang city. Moreover, they know how to profitably exploit the rich sources of materials in the zone of MD in order to diversify export product lines.

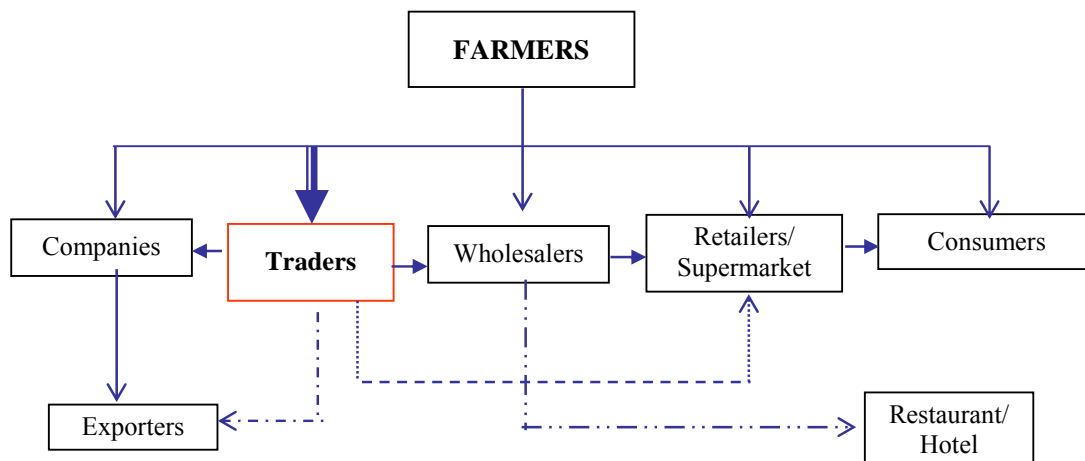


Figure 2: Supply chain of vegetables in the Mekong Delta

Farmers in intensive vegetable cultivation regions of big cities or provinces know well the requirements for planting safe vegetables. But in order to apply strictly these requirement, they must be very confident of the outlets because they have to pay costs and investment (net house, fertilizer etc.). While there's not many purchasers, shops that sell safe vegetables for product consumption (like in Ho Chi Minh city) or large scale exports (Da Lat) and that is why safe vegetables are still produced with small volumes , mainly for the demand of supermarkets in the city (Metro, Coopmart, Citimart) or specialised shops.

Farmer households in MD now are planting vegetables for green leafy vegetable and spices (coriander, mustard, basil, lettuce, water spinach,) on reserved lands, while vegetables for fruits (watermelon, cucumber, bittergourd, pumpkin, gourd, tomato, eggplant, chilli, etc) are alternatated with paddy (2 paddy 1 vegetable). Each year, farmers plant alternatively on the same area 2 to 5 kinds of vegetables (seasons/crops), with a rotation of about 1 month (for green leafy vegetables), and sometimes 2-3 months (for roots, fruits). Winter-Spring (November-February) is the main season of vegetable and Autumn-Winter (September- November) is the most disadvantage season.

**3.1 Planting process:** Each kind of vegetable shall undergo a different planting process in respect of method, caring and harvesting time etc... But, a general culture technique process as below:

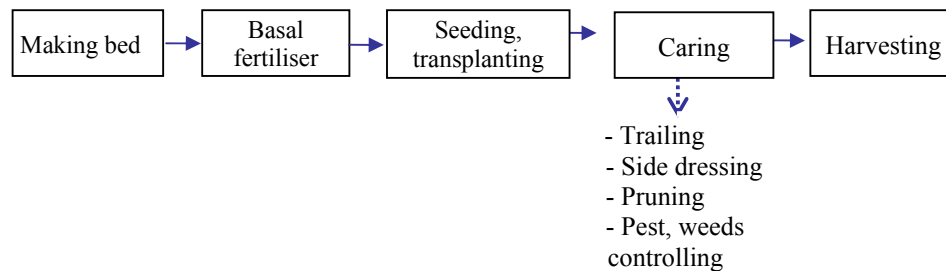


Figure 3: Culture technique process of vegetables in the Mekong Delta

**3.2 Harvesting process:** Each kind of vegetable requires a proper harvesting process, depends on how the product shall be consumed (sell in kg or in bulk) and consumers (farmers or traders), it looks rather simple.

Picking/pulling up → Early processing → Grading → Packing → storing/preserving

Leafy vegetables pulled up shall be put into basket to carry over to early process. Early process consists of: at the field, cut root, put away young leaves, re-arrange (per kind of vegetables), clean, tie in bundles. For tomatoes and cucumbers, put into basket, do a selection again then packing. After early process, vegetables suffer big loss about 20% (leave roots and old leaves away); as for vegetables for fruits (cucumber, beans) loss is about 5%.

In short, main difficulties of vegetable production are big loss in post harvest, while prices are not stable, prices shall be dictated by traders when in season “products abundant” and changing weather cause difficulties for farmers in their harvesting time.

**3.3 Consumption:** Bulk sale is popular in business transaction of farmers in MD. Farmers come to traders and notify them the amount of vegetables of the day. If traders agree farmers harvest and put the crop into baskets or plastic bag. This bulk sale is a way farmers like most because all their products are sold at one time, no matter what the quality of products is.

**3.4 Customers and relationship:** Main customers of farmers are traders, mainly they have long relationship, professional, prestigious “prices could be agreed upon”. In addition, farmers also sell to strange traders with a deposit. The problem farmers don’t like when dealing with strange traders is that they usually “press the prices” when market price is changing, even in cases of advance agreement (verbal). A small amount of vegetables have been sold by farmers to retailers or farmers also retail their vegetables themselves to consumers but prices are not high.

Beside traders, there are also regional Cooperatives that buy safe vegetables and farmers mainly sell vegetables to supermarkets (Metro, Co-opmart, Vinatex.). Due to small orders from supermarkets and farmers often grow a lot of vegetables, this sometimes leads to a situation that supply exceeds demand. So a big quantity of safe vegetables are often sold in retail markets at lower prices.

**3.5 Trademark, label:** Until now, there are no safe vegetable labels for farmers or cooperatives in the MD and vegetables sold to supermarket, carry the trademark of supermarket (as Metro). This creates difficulties for farmers growing safe vegetables in MD as they want to have their own certified label in order to control product prices, run better advertisements and obtain consumers trust. Farmers do not directly export vegetables and only small quantities of vegetables through small channels are handled by traders to neighboring countries like Campuchia and China.

**3.6 Contract and payment:** There are two types: Verbal contract with familiar traders (based on prestige) and written contract with strange traders (certified agreement or deposit). Traders pay farmers on time as agreed within 5 – 6 days after sale or pay when the harvest is completed. Cooperatives pay farmers within half of a month or 1 month later, but Cooperatives also give an advance as required by farmers.

**3.7 Fees and incomes:** Fees for hiring manual workers in planting stage is very high (difficult terrain to use equipment), at least investment for one season on area of about 1000 m<sup>2</sup>/season (2 months) is 2,5 million dong. Average income for vegetables about 2.5-5.0 million dong/1000 m<sup>2</sup>.

#### 4. ANALYSIS OF WEAKNESSES, AND STRENGTHS, OPPORTUNITIES AND CHALLENGES FOR VEGETABLES OF MEKONG DELTA

##### 4.1 Weaknesses and strenghts

Core problems	Strenghts	Weaknesses
Materials	<ul style="list-style-type: none"> <li>- There are many seed companies, various and abundant vegetable species suitable with soil and weather of each zone.</li> <li>- There are many kinds of plant protection chemicals coming from different companies.</li> <li>- There are many bio-pesticides and bio-fertilizers coming response safe clean vegetables.</li> </ul>	<ul style="list-style-type: none"> <li>- Sense of farmers not high because some of them still buy floating species outside or propagating seeds themselves from hybrid seeds.</li> <li>- Various pesticides with different sources of marketing services that is uncontrollable, causing difficulties for farmers in choosing what to buy, as they like to buy the cheap ones, disregarding damages for themselves and for consumers.</li> <li>- In the process of cultivation, some pests difficult to cure also cause bad quality and not safe products.</li> </ul>
Soil and weather	<ul style="list-style-type: none"> <li>- The weather in MD is moderate, not much of storm, warm around the year, stable with two seasons that is good condition to develop tropical vegetables.</li> <li>- The MD zone planning policies on vegetable cultivation have created new development in the future.</li> </ul>	<ul style="list-style-type: none"> <li>- Most of plans and development programs for fruits, but vegetables are not many.</li> <li>- The fast growth of industrialization programs in Can Tho and other cities in recent few years has somewhat influenced to land capital, agricultural land prices and farming environment.</li> </ul>
Quality of product	<ul style="list-style-type: none"> <li>- High quality vegetables can be produced naturally in open field in dry season as watermelon and melons, that are required high sugar content.</li> </ul>	<ul style="list-style-type: none"> <li>- The cultivation of vegetables is until now still at random, lack of centralization that is difficult to administer and control the quantity, output and quality as well.</li> <li>- Safe vegetables have not been certified of quality, so there is no trademark. A weak point for circulation into big supermarkets and for export.</li> </ul>
Post harvest process	<ul style="list-style-type: none"> <li>- The model of cooperatives have been rather well organized with grouping of early processing points, transportation by trucks that help to reduce loss in the post harvest.</li> </ul>	<ul style="list-style-type: none"> <li>- Except a number of big enterprises and supermarkets that have their own facilities for early processing, storage and preservation, most partners in the value chain don't have basic facilities for early processing, packing, preserving, or if they do, these facilities shall not be big, not</li> </ul>

		<p>hygienic, specially due to poor processing technology and techniques that lead to poor categories.</p> <ul style="list-style-type: none"> <li>- Poor hauling and packing techniques cause high loss through each stage of supply chain.</li> <li>- Shortage of source of capable and experienced staff for management.</li> </ul>
Prices	<ul style="list-style-type: none"> <li>- For certain product lines for export, prices are high, more income and value for vegetables in general.</li> <li>- Payment for safe vegetables by supermarkets is higher than outside.</li> </ul>	<ul style="list-style-type: none"> <li>- Exported vegetables have been influenced by raising fuel prices, transport fees higher. That lead to cost price higher than that of the zone (Thailand and China)</li> <li>- Prices in local markets not stable, especially in rainy and flood seasons when traders are those who confuse the markets.</li> <li>- The cooperatives of safe vegetables has not operated effectively, no guarantee of outlet for products, a number of safe vegetables have to be sold in market at price of normal vegetables, that's a loss for farmers.</li> </ul>
Relationship in the value chain	<ul style="list-style-type: none"> <li>- The coordination of 4-model has been applied. This relationship is being build on legal basis with credit obligation, Followbooks (Cooperatives, farmers), some already have written contracts.</li> <li>- The role of concerning agencies (the Department of Agriculture &amp; Rural development, Commerce Department., Sofri and University of Can Tho).</li> </ul>	<ul style="list-style-type: none"> <li>- The government still supports farmers through Agriculture Extension Center: technical training, financial support for building demonstration model... Priority policies stimulate other partners of the supply chain not much and not strong enough.</li> <li>- Lack of cooperation of partners in the supply chain, specially the role of "consumers" – an important element to determine acceptable product quality – is still weak.</li> <li>- The functional agencies have not yet developed their effective operation, lack of a synchronous management.</li> <li>- Lack of participation of press agencies in promoting the use of safe vegetables and publicizing the products, building trademark and supporting with feedback information to partners of the supply chain.</li> </ul>

## 4.2 Opportunities and challenges

Core problems	Opportunities	Challenges
Market demand	<ul style="list-style-type: none"> <li>- Market demand for vegetables is increasing in respect of quantity and quality of products, not only local markets (restaurant, hotel, super market and refectory) but also foreign markets (Japan, Taiwan, Hong Kong and Singapore).</li> <li>- Mekong Delta river, became a famous biological travel zone with many rivers, along with floating markets and the presence of supermarket network, it will be big opportunities for vegetables.</li> </ul>	<ul style="list-style-type: none"> <li>- As consumption demand of vegetables is high quantity and quality in the country and abroad, there's also a requirement for improvement of farming productivity and high quality of vegetables.</li> </ul>
Products/ Competition	<ul style="list-style-type: none"> <li>- The product of vegetables in MD is easily transported to Ho Chi Minh city or Ha Noi capital.</li> <li>- The product of vegetables in MD is hardly competing as fruits (imported from Thaila and, Trung Quốc)</li> </ul>	<ul style="list-style-type: none"> <li>- Some of product of vegetables (tomatoes, cabbage, cauliflower, lettuce,...) of MD are competing for vegetables of Dalat due to low yield, quality and income of farmers.</li> </ul>

## 5. SOME SOLUTIONS TO MANAGE VEGETABLE SUPPLY CHAIN OF MEKONG DELTA TOWARDS GAP

Market demands		<ul style="list-style-type: none"> <li>- big amount</li> <li>- competition price</li> </ul>		<ul style="list-style-type: none"> <li>- high quality, safety food</li> <li>→ towards GAP implementation</li> </ul>	
Chain actors	Main difficulties	Causes	Solutions	Who solves?	How to solve?
<b>I. Farm input</b>					
<b>1. seeds and seedling management</b>	<ul style="list-style-type: none"> <li>- don't gain initiative in seeds</li> <li>- High seed cost</li> <li>- seeds and seedling management are not good</li> </ul>	<ul style="list-style-type: none"> <li>- imported seeds</li> <li>- government management is not absolute</li> <li>- lack of interests in seeds, seedling researchers, micro-organism productions</li> </ul>	<ul style="list-style-type: none"> <li>- to strengthen the management of seeds and seedlings, agro-chemical</li> <li>- to strengthen the seeds and seedlings research, and deeply research on bio-pesticides</li> </ul>	<ul style="list-style-type: none"> <li>- government, uthorities</li> <li>. company</li> <li>. institute,</li> </ul>	<ul style="list-style-type: none"> <li>- manage seeds and chemical pesticides closely</li> <li>- invest more facilities on research</li> <li>- train farmers GAP</li> </ul>
<b>2. fertilizer and pesticide management</b>	<ul style="list-style-type: none"> <li>- overused fertilizers and pesticides</li> <li>- the price of fertilizers and pesticides are high</li> </ul>				
<b>3. capital</b>	lack of capital	crop demands aren't met timely	planting by contract	banks and companies	invest ahead for growers
<b>4. ago-extension</b>	lack of vegetable extension staff		enhancing the knowledge of extension staff	- institute	train & transfer technologies to staff
<b>5. information</b>	passive in finding market information	lack of market information role	improve the knowledge on market information	<ul style="list-style-type: none"> <li>- companies</li> <li>- co-operative farmers</li> </ul>	train market information
<b>II. Growers</b>					
<b>1. farm size</b>	<ul style="list-style-type: none"> <li>- still at random</li> <li>- problems: irrigation &amp; transportation</li> <li>- the quantity &amp; quality are not stable</li> </ul>	<ul style="list-style-type: none"> <li>- don't organize</li> <li>- can't invest the irrigational works</li> <li>- high investment</li> </ul>	improving the size production	<ul style="list-style-type: none"> <li>- government., institute</li> <li>- companies</li> <li>- growers</li> </ul>	<ul style="list-style-type: none"> <li>- forming material zone: to invest the irrigation system, transportation, and electricity</li> <li>- Co-operative farmers</li> </ul>
<b>2. cultivation techniques</b>	<ul style="list-style-type: none"> <li>- almost doing by hand</li> <li>- lack of vegetable on offseason</li> <li>- lack of bio-tech applications</li> <li>- the quantity &amp; quality don't meet the need of market</li> </ul>	<ul style="list-style-type: none"> <li>- almost farmers use traditional experiences &amp; technologies</li> <li>- lack of bio-tech investment</li> <li>- overused foliar fertilizers and regulators</li> </ul>	<ul style="list-style-type: none"> <li>- improve and apply modern cultivation techniques: apply high-tech, bio-tech</li> <li>- changing the farmer's thinking, working ways</li> </ul>	<ul style="list-style-type: none"> <li>- growers</li> <li>- companies</li> <li>- institute</li> <li>- extension staff</li> </ul>	<ul style="list-style-type: none"> <li>- celebrate trainings &amp; workshops about how to cultivate safe vegetable to farmers</li> <li>- invest high tech and bio-tech facilities and equipments</li> </ul>

cont...

Chain actors	Main constraints	Causes	Solutions	Who solves?	How to solve?
<b>III. post harvest technology</b>					
<i>1. processing</i>	<ul style="list-style-type: none"> <li>- serious losses in post-harvest &amp; reduce the quality quickly</li> <li>- simple processing</li> <li>- no packing &amp; preservation</li> </ul>	<ul style="list-style-type: none"> <li>- don't notice the forms, designs in post-harvest</li> <li>- high cost</li> </ul>	<ul style="list-style-type: none"> <li>- post-harvest technology</li> <li>- the value &amp; fair competition of products</li> </ul>	<ul style="list-style-type: none"> <li>- growers</li> <li>- companies</li> <li>- scientists: Institute</li> </ul>	invest the preliminary processing place, simple package & preservation
<i>2. packing</i>					
<i>3. preserving</i>					
<b>IV. market</b>					
<i>1. trademark</i>	no trademark	the belief of consumers is not created	<ul style="list-style-type: none"> <li>- update knowledge in marketing</li> <li>- manage the quality control systems</li> </ul>	<ul style="list-style-type: none"> <li>- growers</li> <li>- company</li> <li>- government</li> </ul>	<ul style="list-style-type: none"> <li>- register the trademark</li> <li>- sign contracts</li> <li>- follow the GAP</li> <li>- cultivate vegetable in the large size production</li> <li>- invest high technology</li> <li>- training farmers</li> </ul>
<i>2. marketing</i>	less customers & consumers known	lack of marketing			
<i>3. domestic market</i>	<ul style="list-style-type: none"> <li>- the quantity &amp; quality are not stable</li> <li>- lack of controlling output quality</li> <li>- less information of market</li> </ul>	<ul style="list-style-type: none"> <li>- farmer growing by themselves</li> <li>- using traditional experiences and production</li> </ul>			
<i>4. exporting</i>	- the contracts are often broken down and lost prestige				

## 6. CONCLUSION

Managing thorough supply chain of vegetable in the Mekong Delta towards GAP is solution to manage quality and rise the quality of vegetable, each actor of the production and supply chain has responsibility himself to product quality. This is the highest competent solution help to go seeking origin of vegetable.

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