Can Tho University Journal of Science
website: sj.ctu.edu.vn

ASSESSMENT OF AGRI-PRODUCT VALUE CHAINS IN THE MEKONG DELTA: PROBLEMS AND SOLUTIONS

Vo Thi Thanh Loc
Mekong Delta Development Research Institute, Can Tho University, Vietnam

ARTICLE INFO

Received date: 24/07/2015
Accepted date: 19/02/2016

KEYWORDS

Agri-product, policy and value chain

ABSTRACT

This paper investigated production and distribution of agri-product value chains in the Mekong Delta of Vietnam. The analysis was driven by key questions relating to 1) problems of agri-product chains, 2) solutions for upgrading agri-product chains in general and 3) key messages and solutions for each value chain of four main products in the Mekong Delta towards sustainable development. The study methodology included the value chain approach of Kaplinsky and Morris (2001), the ValueLinks method of GTZ (2007); Marking value chains work better for the poor (M4P, 2008) and participation of 1,759 chain actors and stakeholders. The conclusions indicated that there were many difficulties and challenges in agri-product value chains in the Mekong Delta including (i) inefficient production from many stages in the chains, (ii) high production cost, (iii) lack of vertical and horizontal linkages in production and distribution; and (iv) low product quality that need to be solved in order to meet market demands. Many solutions were proposed for upgrading agri-product value chains in general and for six main products in particular in terms of market information, value chain approach, techniques, linkage development and policies.

Cited as: Loc, V.T.T., 2016. Assessment of agri-product value chains in the Mekong Delta: Problems and solutions. Can Tho University Journal of Science. Vol 2: 100-111.

1 INTRODUCTION

The Mekong Delta (MD) is one of seven key economic regions of Vietnam with natural area of 39.713 km^2 (accounting for 12% of the country), and 21.1% of national population. The MD includes 13 provinces and Can Tho city (CT). The MD's economy is mainly based on agriculture and fisheries. Indeed, the four key sectors in the MD include rice, pangasius, shrimp and fruits. Specifically, areas for paddy were approximately 4.25 million hectares (accounting for 54.3% of the country) with 24.9 million tons of paddy annually (representing 56.3% of the national volume). Rice export value reached US$ 2.96 billion in 2014 (# 6.38 million tons of rice, of which 91.2% from the MD), rice is exported to 45 countries and territories in the world. Similarly, areas for pangasius of the MD in 2014 were 5,500 ha (93.2% of the nation, down 1.1% compared to 2013) with 1,116,000 tones of live fishes (90.3% of the country, up by 31.3% compared to 2013), and export turnover reached US$1.77 billion (of which the US market, the EU and Asian accounting for 50.6%); pangasius is exported to 149 different markets in the world. Regarding the region's shrimp culture, areas for shrimp were about 537,000 ha (accounting for 89.4% of the nation, of which tiger prawn accounting for 89.4%) with the total volume of 248,000 tons (72.3% of nationwide, including tiger prawn 45.9%); both shrimp area and volume were down 4% and 3% compared to 2013, respectively;

shrimp export turnover reached US$ 3.95 billion in 2014, three major shrimp export markets were the US, EU and Japan (accounting for 62.6% of total export value); shrimp is exported to 92 countries and territories of the world. Particularly, fruit area in the MD was about 295,000 ha in 2014 (accounting for 36.5% of the nation) with the volume of 3.8 million tons of fruits (50% of the nation) (SOFRI, 2014). There is about 185,000 hectares of fruit specialties in the MD (accounting for 64.6% of the specialty fruit area of the Southern region) with 13 kinds of fruits in the "Top 50 specialty fruits of Vietnam" including dragon fruit, mango, rambutan, durian, apples, grapefruit, longan, banana, pineapple, orange, custard, sapoche (sapodilla) and tangerines. Export turnover of Vietnam's vegetable and fruits reached US$ 1.04 billion to more than 76 countries in 2013 (VFA, VASEP and Vinafruit, 2013).

In addition, some main vegetable value chains, including chili and onion, are existing in Dong Thap (DT), Soc Trang (ST) and Tien Giang (TG) where have the largest cultivated area in the MD. Chili was popular in DT and TG with 3,566 ha in 2013 (accounting for 60% of chili area and volume of the MD); China is a main market of chili (more than 80% of chili volume). Similarly, Onion is cultivated in Soc Trang (ST) province with total area of 7.059 ha (accounting for 88.2 % of total onion area in Vietnam and 99% of onion area in the MD) and volume of 108.486 tons, of which 69% of chili volume were exported to China and Indonesia.

Although the MD is the mainstay of agricultural commodities in general, seafood and rice-fruit sector in particular, production and distribution of these commodities are still unstable and unsustainable due to imbalance of market demand and supply. Especially, business linkages between farmers and companies are still weak because of lack of production capacity and logistics, limited management at all levels, lack of investment in research and development (R&D), lack of market information and forecasting, lack of advanced processing technology to produce value-added products, ... All of these reasons have made production efficiency become low, low competitiveness and limited value added products. Therefore, assessment of agri-product value chains aims to find out problems and propose solutions for stable and sustainable development of agricultural products is very necessary.

2 RESEARCH METHODOLOGY

Approach methodology

The study applied the value chain approach of Kaplinsky and Morris (2001), the ValueLinks method of GTZ (2007), Marking value chains work better for the poor (M4P, 2008) along with participation of 1,759 chain actors and stakeholders from six main industries (rice, pangasius, shrimp, mango, chili and onion) in the MD.

Research frame

Objectives	Research Methodology	Sample size	Research sites
1. Market analysis	- Secondary data collection - Primary data collection from companies		
2. Value chain analysis of six products	- Primary data collection from chain actors and stakeholders:		
	Rice		
	Pangasius	564	AG, KG, LA & ST*
	Shrimp	318	AG, DT, BT & CT
	Mango	181	CM, ST & BT
	Chili	423	DT & TG
	Onion	219	DT & TG
		54	ST
3. Solutions for upgrading the value chains	Based on Market analysis, Value chain analysis of six products, and SWOT analysis.	1,759	

Data collection

Several complementary approaches were used for this work. These included:

Field surveys and interviews by structured questionnaires with representatives of chain actors (suppliers, farmers, traders, millers, companies, wholesalers, retailers and users) according to chain-link method.

Interviews with local facilitators and experts by unstructured questionnaire;

Case studies of selected supply chains involving companies and farmer groups;

Review of related literature/documentation including policies

Workshops for stakeholders of six agri-product chains

Sample size and sites

For rice: 564 observations and 10 groups of of chain actors and facilitators in An Giang, Kien Giang, Long An and Soc Trang where account for 51% of rice area and 52% of rice volume in the MD (2013-2014)

For pangasius: 318 observations of chain actors and facilitators in An Giang, Dong Thap, Ben Tre and Can Tho where account for 82.3% of pangasius area in the MD (2013-2014)

For shrimp: 181 observations of chain actors and facilitators in Ca Mau, Soc Trang and Ben Tre where account for 62.6% of shrimp area in the MD (2013)

For mango: 423 observations of chain actors and facilitators in Dong Thap and Tien Giang where account for 44.1% of mango area in the MD (2013-2014)

For chili: 219 observations of chain actors and facilitators in Dong Thap and Tien Giang where account for 60% of chili area in the MD (2013-2014)

For onion: 54 observations of chain actors and facilitators in Soc Trang where accounts for 99% of onion area in the MD (2013)

3 STATUS-QUO OF PRODUCTION AND DISTRIBUTION OF AGRI VALUE CHAINS

1.1 Key problems in agri-product value chains

Generally, the results of basic researches regarding value chain analyses of fish, shrimp, rice, pangasius, mango and vegetables (onion and chili) show that the major problems in production and distribution of these products are frequently in crisis situation of both surplus and deficit due to imbalance of market supply and demand that leads to low efficiency and competitiveness of product chains, passive and unsustainable production. There are many reasons for this situation:

(1) The first actor in the chain (farmer): Most of individual farmers are in small-scale production (>90%). They lack of market information and knowledge about quality as well as responsibility for the final product. In addition, it is difficult for them to access to credit. They also face the following difficulties: lack of effective horizontal linkage for large-scale production, lack of business linkage to reduce product costs, weak power of input purchase as well as product selling, lack of logistics for preliminary-processing and storage to ensure quality and increase product added value. As a result, farmers get generally low income, profit and high risk compared with other actors in the chain.

(2) The final actor in the chain (company within the country): Companies lack horizontal linkages for supporting mutual logistics and information; lack cluster production and distribution to meet market demand (in both quality and quantity), weak capacity and logistics in vertical integration, passive business due to lack of market research, backward technology, difficult to access credit as well as limited capital to invest in R & D.

(3) The intermediary actors of the chain (collectors/traders): The main problems of these actors are lack of knowledge and responsibility in ensuring product quality, limited logistics (cool store, track, warehouse, etc…,)

All above chain actors and facilitators (local managers at all levels) lack market knowledge and knowledge of value chain approach toward sustainable development of agricultural products (the knowledge aims to change the mindset in the direction and implementation of production and distribution by market needs).

Macro policies from the government: There is still lack of macro-regulatory policies from the government and province to support in long-term development and sustainability based on forecast of market supply and demand. Issued policies in the last five years were lack of checks and impact assessment to policy effectiveness in order to change or improve better policies. The policies benefit only a few actors in the chain, particularly company (not farmer). Investments from the government have not focused on the product chains but in different aspects of many industries.

In short, the basic cause related to unsustainable agri-chains for a long time is the lack of market demand and supply forecasting (including supply forecasting of countries producing the same products) and lack of national policies and regulations for production to meet market needs. Forecast of

market demand should contain product quantity and quality. Especially, It is very important to forecast product volume for the next time (by quarter, 6 months or by year). This forecasts are main bases for productive re-planning to meet market demands and agricultural development towards stability and sustainability.

3.1 Solutions for upgrading agri-product value chains

Following solutions base on analyses of market and value chains of six agricultural products in the Mekong Delta. Specific primary data is mentioned in Part 2.

3.1.1 Macro level

The government should assign a department to be responsible for developing database as well as forecast patterns of market supply and demand for national main agri-products in general and for the MD in particular such as fish, shrimp, rice and fruits.

The government needs to issue policies for management and regulation of seed production based on market demand forecast in terms of quantity and quality.

The government needs to issue policies for productive re-planning at the provinces under supply and demand forecasts for each product annually, including cluster production (case of a few provinces have the same product).

The governments needs to improve "4-house policy" to support and strengthen linkages (horizontal and vertical) by market demand (by value chain approach), particularly agri-business linkage between farmer and company. For rice, the government should pay attention to the food companies and Vietnam Food Association members (VFA) in linkage development (only private companies conduct linkages with farmer so far). To develop good linkages, the companies need to be supported loans for investing in their technological systems by specific product chains.

It needs to have a policy on legal assistance to help farmer make contract and solve conflicts between farmer and company.

The government needs to develop policies regarding cluster and regional production to meet the market demand. Particularly, policy for cluster management of production and distribution process.

3.1.2 Provincial level

The province should assign a team in Department of Trade and Industry to be responsible for developing database as well as forecast patterns of market supply and demand for provincial main agri-products. For regional or cluster products, the province should connect with the government's forecast (macro level) and other provinces.

The province needs to develop incentive policies in order to attract and encourage new investments by specific product value chain, aiming to increase the number of agri-business models between farmer and company.

The province should support the legality of the contract between farmer and company.

The province should absolutely participate in seed management along with policies of macro level by market requirements as well as plant variety management of provincial products.

It needs to update the market knowledge and the value chain approach for all local managers at all levels and for all actors in the value chain of the province.

3.1.3 Micro level

Leaders of the district/village should enhance knowledge of market information and value chain approach to manage agricultural development based on market demand.

Local leaders participate in consulting farmers who are responsible for quality and quantity of the final product.

Farmer needs to be aware of safe production (production under GAP), avoids plant development freely that leads imbalance of market supply and demand, develops large-scale production with the same technical process and quality by horizontal linkages, connects companies (vertical integration) for product distribution stably and sustainably.

3.2 Explanation of proposed solutions

Balance of market supply and demand for any agri-product is "necessary and sufficient" conditions for a stable and sustainable development. Indeed, farmer's production habit is based on what they have instead of what the market needs. The reasons are lack of market research as well as of supply and demand forecast for products in both quantity and quality. This means that the production of chain actors must follow market requirements; this is main content of sustainable agriculture develop-

ment under the value chain approach. This approach helps agricultural products can distribute in high competitive environment, especially when the free trade agreements in general, Trans-Pacific Strategic Economic Partnership Agreement (TPP) in particular taking effects in the coming years. Thus, production according to market needs and cost reduction is essential to protect domestic commodity producers.

Results of value chain analysis of pangasius, shrimp, rice, fruits (mango and dragon) and some vegetables (chili and onion) in the Mekong Delta showed that these products are presently in situation of "many but less". That means they are oversupply in term of volume but lack of number of quality products for export on the one hand. Vietnam's agri-products are low quality that can not penetrate in markets with high technical barriers such as EU, the US and Japan. On the other hand, oversupply in production leads to low price of the products. For instance, the crisis of pangasius overproduction and shortage occurs every year cyclically due to lack of demand forecast in order to plan suitable production in terms of quantity and quality, especially in production of fingerlings. Similarly, fruit and vegetable industries are belonging to China market (70-80% according to each kind of products) with low product quality and price as well as instable demand; while different foreign markets with high technical barriers are demanding high quality products and large volume that the agri-products of Vietnam can not meet presently.

Particularly, rice industry is facing many difficulties due to low quality, price and foreign market demand. Indeed, the results of rice value chain of the MD in general, Tai Nguyen rice and ST5 rice of Soc Trang province in particular point out that overproduction of rice leads to low price in both domestic and export market. In addition, there is presently 1.4 million rice households with 4.3 million hectares in the Mekong Delta but about 10% of rice area (approximately 20% of total rice volume) linked by companies under "large field" model that can meet the market needs. Furthermore, market share of Vietnam's rice export is declining due to (i) appearance of new competitors from Asian countries, (ii) higher yield of rice from import countries, and (iii) a large volume of stored rice from export countries selling.

As a result, the imbalance of market supply and demand causes enormous damages to agriculture development because:

There is a tremendous waste of natural resources, human resources, material and financial resources for production without/less profit (or profit focuses mainly on commercial agents, not farmers),

It increases cost added of agri-product chains that lead to low incomes and difficult livelihoods of chain actors, especially farmers. The words "production by market demand" is only a speech because there is now not any agricultural sector developed sustainably by market demand in terms of quantity and quality.

Therefore, forecasts of market supply and demand for agricultural products are main bases to plan suitable production, meet the market requirements in quantity and quality of the products.

4 SOLUTIONS FOR UPGRADING FOUR MAIN VALUE CHAINS IN THE MD

4.1 Rice value chain in the MD

4.1.1 Key messages

In 2013, total rice area of 4.3 million hectares with 24.9 million tones of paddy; export volume of rice from the MD 6.61 million tones with total value of US$ 2.7 billion.

Many agents in the rice value chain that lead low price and less profit to the farmer

Farmer with small scale production, high input price, low selling price, lack of market knowledge and information

Collector with limited capital and logistics that make low rice quality

Company with backward technology, limited capital and logistics, lack of material regions of rice linked with farmer

Priority of rice policies from the government to export company benefits than rice farmer

High competition with new entrance rice companies abroad

4.1.2 Solutions for upgrading rice value chain

Innovation and policy development

There are 3 conditions for developing a good policy: The policy (1) must base on related fundamental research and reviewed reference of similar policy models of the world, (2) receive feedback/comments from researchers, experts and national related departments, and (3) implement the policy, evaluate and amend the policy in order to improve better or develop new policy based on

results of steps (1) and (2). In addition, for the long-term policy, the forecasting along with basic researches is very important for policy adjustment. Particularly, for sustainable development of rice value chain, a set of following policies are suggested.

Develop market information systems and forecasting (national and regional level): this task is very important because demand forecast will help planning and regulation of supply stability annually.

Develop macro policies for managing agri-input companies to ensure quality of materials by specific conditions (such as quality and stable price for a long time). It should have mechanism of entrance and leave for the rice industry because competition between companies will benefit quality products and low cost.

Market policies and export: (1) In order to balance national interest to exploit advantages of rice production and export as well as to ensure economic efficiency to farmers and stable food prices for urban areas and food consumers, the re-application of flexible export tax on rice instead of quota tool is more feasible and better effectiveness. (2) At present, there are many companies without factories operating along the chain that lead to being not responsible for finished products; so companies involved rice export must have specific conditions in terms of facilities, warehouse, capital,…in order to manage input and output for export; this will bring long-term stability to the rice chain (3) The policy should support all actors in rice value chain instead of only company or commercial actors that aims fair distribution of benefits among actors, (4) Re-organization of distribution channels aims to buy rice at right price to producers regulated by state policy. Moreover, production cost of paddy from farmer should be adequate calculations before setting paddy floor price; also it is necessary to set rice floor price at polishing stage before marketing.

Development of cooperation policies in product chains: It needs to develop macro policies to encourage export companies to build factory systems including drying, milling, and polishing as well as developing large field of rice for export. The companies need to be loans with low interest or 0% interest for the first 3 years in business to develop vertical linkage with farmer. Companies need a huge capital to implement this linkage.

Re-investment policy for rice farmer: It is necessary to receive one dollar per one ton of exported rice from companies to re-invest for rice farmers. Some alternatives for distributing this fund are proposed as follows:

(1) through the Agricultural Bank for making loan to farmer with interest free or low interest rate based on the area of rice production. Re-investment funds are raised each year in accordance with the export volume and loans making will be extended.

(2) investment in silo construction to the companies aims to buy paddy timely, keep paddy quality, and can sell paddy at off-season with higher price.

(3) investment in combined systems at “large field” sites to develop vertical and horizontal linkages

Option (1) is very good to re-produce for rice farmers in short term, this leads to reduction of interest cost of 18% in total rice production cost (loan interest for input purchase and bank loan interest). In the long term, alternatives (2) and (3) will bring benefits to the rice value chain sustainability.

Adjustment of food security policy: Through basic research of rice value chain in the Mekong Delta, rice commercial volume reaches approximately 7.74 million tons per year, not including rice volume of 600 thousand tons imported unofficially from Cambodia and Thailand annually. Supply of rice in the Mekong Delta will be much higher in the coming years (2015 - 2020) for the following reasons:

(1) If retention of 3.8 million hectares of rice cultivation and volume reached 40 million tons per year (according to the food security policy of the Government to the year 2020), while particularly in 2013 rice production in Viet Nam was more than 40 million tons.

(2) Mechanization and milling technology are increasing that will reduce rate of post-harvest losses to 5-6% in the year 2020 (this ratio is now 20% including paddy loss on field (9.8%) and loss of rice after milling and distribution (9.83%).

(3) High intensive production creates more productivity growth

(4) Consumption of rice per person tends to decrease both in the domestic and worldwide

(5) The market share of rice export is declining due to new competitors from Asian countries where are planning for food security strategy including rice production and export.

All above reasons create much rice supply that lead to low price, which makes not stability and sustainability of rice industry.

Policy on food safety: It needs to research domestic and export markets to ensure the accuracy and effectiveness of market requirements on quality and safety of rice, especially in production stage, drying and storage. In addition. Food safety dose not depend on rice but other delicious food.

The provincial policy for rice: It needs to focus on development and support implementation of horizontal and vertical links in the rice chain; improve the capacity of chain actors; improve the quantity and quality of agricultural extension staff; increase knowledge of the value chain approach to all local managers, chain actors and facilitators. Local government should establish agricultural joint-stock companies to combine production, processing and export with high responsibility and benefits all the chain actors in the long-term.

Environmental Policy: To avoid rice anti-dumping in the future, use of natural resources, environment pollution as well as improvement of public accountability, cost of used water and environmental pollution needs to be charged along with control and sanctions; the policies need to be adjusted and fixed timely for development goal.

The strategy of cost reduction

In production stage: The production cost of rice may reduce when there is (1) horizontal linkages of farmer who contract input suppliers (buy a large volume, low cost, high quality with discount on the purchase (at least 5% at present) along with preferential policies of input suppliers regarding amortization; (2) contracts with input companies to reduce interest cost of input supplier and bank loan; (3) good management of production techniques: wide application of the program "3 down, 3 up," and the "1 must, 5 or 6 reduce". These programs significantly create reduction of the amount of seed and input materials per hectare. Finally, it needs to have an agreement for sale contract in order to reduce the costs of circulation and transaction as well as increase selling price.

In distribution stage: It needs to strengthen vertical linkage between producer and company to be shorten market channel in the chain; this reduces intermediary actors and costs. In addition, reduction of marketing and circulation costs by increase in the horizontal linkages (cooperatives, farmer club or cooperative groups) leads to higher profit of chain actors. Farmer should produce rice in large-scale model to have competitive price of rice. It needs to consider investment in upgrading Can Tho port, expand the harbor to meet direct export of commodities of the Mekong Delta as shrimp, fish, fruits and rice at the port of Can Tho instead of Sai Gon's. This will reduce much cost of circulation.

Strategy for quality improvement

Results of consumer research show that each province outside the MD is using local varieties to serve consumer needs of the province. For the rice shortage, the province buys rice from Mekong Delta, rice is focused mainly on some varieties as Tai Nguyen rice, Taiwan, Mong Chim, and Thai Thom. So rice production should be upgraded by following aspects:

Planning and enhancing national seed programs to serve the export target by research of market demand of export markets as well as forecast of rice quantity.

Developing local seed programs to serve the needs of domestic consumption.

Applying international and national quality programs along the rice chain as VietGAP and GlobalGAP for export rice.

In short, it is necessary to research two set of rice varieties: seed for export rice is managed by macro level (the government) and a set of rice varieties for domestic consumption is managed by provinces. Other issues related to rice quality should be combined with technology investment strategy presented as below.

Strategy of technology investment

To manage rice supply chain effectively, increase rice value added in the value chain, reduce post-harvest losses and improve rice quality, following solutions are essential and important:

Strengthening post-harvest technology: including combined harvester, dryer, storage and processing technology to ensure rice quality; enhancing vertical and horizontal linkages in use of technology, reduce costs, reduce losses and keep rice quality.

Investment in milling technology by companies at provinces: development of vertical linkage product by investing in factory systems locally to purchase paddy, drying, processing, storage and export.

Development of silo for rice storage regionally managed by rice companies in order to keep the

value of the rice, quality assurance, national food security, price stability to meet export demand and domestic consumption.

4.2 Pangasius value chain in the MD

4.2.1 Key messages

In 2013, total pangasius culture area of 5,556 ha with volume of 849,990 tones and export value of US$ 1.53 billion from the MD.

Farmer: lack of capital to invest in large scale, high risk from pangasius diseases and market fluctuation, unstable input price and pangasius price; uncontrolled input quality (fingerlings and feed).

Collector: lack of capital to buy pangasius of farmer, high competition to company and other traders, unstable selling price.

Company: high interest cost from the banks, high competition to other companies, unstable market price of pangasius, unstable pangasius supply, low quality of pangasius.

Import market: decrease in pangasius demand, high technical barrier, increase in exchange rate towards high value of US dollar that leads to reduce rice contracts.

4.2.2 Solutions for upgrading pangasius value chain

(1) Input stage: It is necessary to produce high quality fingerlings of pangasius as well as to manage in the way of planned production according to market requirements in term of quantity.

(2) Production stage: Producer must follow advanced technical process from provincial extension centers and companies with market quality standards, especially for export market.

(3) Processing stage: The company needs

To inform and train farmers on market requirements of pangasius products in terms of fish size, color, quality, ...

To support farmers on culture techniques, fingerlings, feed as well as buying their pangasius.

To research and develop value-added products and develop new markets for pangasius.

To ensure pangasius quality during processing and storage.

To develop domestic market for both pangasius and Basa fish.

To invest in large-scale of pangasius culture from individual farmers to ensure the quantity and quality of pangasius products.

(4) Local governments at all levels need to:

Forecast market demand for production planning accordingly linked with national level.

Plan pangasius culture with high quality by market requirements including culture from both company and farm level.

Support culture techniques to ensure safety of food hygiene and pangasius quality.

Manage and control fingerlings by market demand.

4.3 Shrimp value chain in the MD

4.3.1 Key messages

In 2013, total shrimp culture area of 588,000 ha with volume of 380,000 tones and export value of US$ 2.48 billion from the MD.

Use of chemicals to treat shrimp diseases from farmer and use of seaweed and small shrimp to inject into shrimp materials from collectors leading to low quality of shrimp.

Uncontroll of shrimp seed from hatcheries in terms of quality and quantity except support of six NAFIVED departments on testing shrimp seed quality and finished shrimp before export.

Not sufficient capital, logistics and technical knowledge to help the farmers guarantee shrimp quality from wholesale buyers/collectors; and residuals inside shrimp injected by collectors.

In linkage with farmer, no assurance of shrimp quality from companies due to use of low feed quality and veterinary drugs of the farmer.

High technical barriers to international business while lack of facilities to test from Vietnam.

4.3.2 Solutions for upgrading shrimp value chain

Planning shrimp material zones (large scale) by companies based on market forecast.

Planning zones for fingerling production with high quality by standards and volume based on market forecast.

Developing vertical and horizontal linkages for large scale with the same technical process and quality of shrimp from local governments and companies.

Developing and adjusting macro policies to shrimp sustainable development timely and reasonably.

Implementing deregulation with responsibilities for each stakeholder as below:

State: Development of suitable mechanism and policies for shrimp sustainable development such as centered planning for fingerling and shrimp culture, contract making, quality management "from farm to table" by market demand

Input suppliers: improvement of knowledge for quality assurance and contracts with large volume supply to farmers

Producer: improvement of quality management by market standards for shrimp, especially use of chemicals

Traders/collectors: improvement of knowledge for quality assurance and market standards, especially injection of seaweed and small shrimp.

Processor: shrimp quality assurance and linking producers by contracts

Supporter/facilitator: support of market information, business linkage, shrimp control of collectors, regional and national conferences for making decisions regarding planning, forecasting, policy changes for shrimp chain upgrading in time.

4.4 Mango value chain in the MD

4.4.1 Key messages

In 2013, the MD's mango area of 41,800 ha with total volume of 417,268 tones, in which Cat Chu mango accounting for 59.1%, Hoa Loc mango 23.2% and others 17.7%.

Global mango export values increased 12% per annum 2005-2012. Significant opportunities exist, particularly in China under the ASEAN-China FTA.

Mango production alleviates poverty. Average annual net income per household VND 105 million (≈ US$4900): much higher than rice production.

Current markets predominantly domestic and informal Chinese border trade: volatile and lower prices, except for niche Cat Hoa Loc variety.

Fragmented, smallholder production with few farmer organisations and weak linkages to export and processing companies. Difficult to transfer technology, relay market information, certify production, increase productivity.

Potential to establish business support facility to catalyse investment and support to producers by exporters, processors and service providers

4.4.2 Solutions for upgrading mango value chain

For chain stages

In production stage: It needs to establish and develop more cooperatives (Cs) and cooperative groups (CGs) by company linkage; mango production needs to have GAP standards with use of paper bag; development of more off-season models meet market demand. Farmers need to follow contract items to increase the prestige and responsibility for their mango that lead to higher added value for mango product.

In the collection stage: It is necessary to organize collector to follow market requirements from wholesaler and company. Company and wholesaler need to participate in management and collaboration of their collectors in order to have a stable supply source with high quality and risk reduction.

In the processing and export: The company needs to invest in raw material sources of mango production by market standards in terms of quantity and quality.

For provinces where are popular of mango production:

Dong Thap and Tien Giang needs to have

A discussion of linkage support, exchange, mango supply and distribution between DT and Tien Giang (the two provinces with the largest area of mango in the Mekong Delta) to plan and produce mango by market demand. On the one hand, My Xuong cooperatives in Dong Thap and Hoa Loc cooperative in Tien Giang need to exchange experience in the production and distribution, especially issues of techniques and company linkage. Both of the Cs need to have contracts with the same price for similar kinds of mango, on the other hand.

Development of Cat Chu mango instead of Hoa Loc mango because export market is interested in Cat Chu mango with low price and high quality.

Professional team to forecast market demand for key products of the province (including regional link) in general and the mango production for suitable production planning in particular.

"1 Day" training class on market knowledge and value chain approach for local managers involved in agriculture at all levels and all mango chain actors.

Investment in agri-product development by value chain approach (farmer-company linkage).

In addition,

The province should update market information of mango every 6 months to all chain actors to adjust support policies and regulatory policy in management, production and distribution. This is also the basis for annual production planning by market demand.

The province should call for investment in manufacturing "paper bag" for mango protection to reduce the cost of production instead of import it from Taiwan.

For the government:

There should be a policy of "credit package" for processing and export company at the harvest time to pay farmer in cash (about US$50 billion per company).

It needs to develop more practical policies for regional links based on forecasting market demand and production planning. In addition, it is necessary to strengthen the role of Vietnam Vegetable Association (VinaFruits), Customs and the research institutes in forecasting market demand; the role of the provinces in the regional link to suitable planning of production.

All above things are agri-product problems and solutions that need the State and local governments at all levels to concern for sustainable development of agri-product chains by value chain approach.

Summary of strategies for upgrading four-product value chains

	Rice	**Pangasius**	**Shrimp**	**Mango**
Strategy for cost reduction	- Develop horizontal linkages in production stage - Develop vertical linkages in distribution stage	- Invest large-scale of pangasius culture from individual farmers - Develop vertical linkages	- Develop vertical and horizontal linkages for large scale	- Establish and develop more horizontal and vertical linkages
Strategy for quality improvement	- Plan and enhance national seed programs for export - Develop local seed programs for domestic needs - Apply international and national quality standards	- Produce high quality fingerlings - Follow advanced technical process - Train farmers on market requirements of pangasius products	- Plan shrimp material and fingerling zones - Improve knowledge for quality assurance by market standards from all chain actors	- Use paper bag - Organize all chain actors to follow market requirements on quality
Strategy for technological investment	- Strengthen post-harvest technology - Invest milling technology by companies at provinces - Develop silo for rice storage managed by rice companies	- Develop economies of scope for processing line to produce value-added products	- Develop economies of scope for processing line to produce value-added products	- Invest raw material sources of mango production by market standards in terms of quantity and quality - Develop processing companies for producing value-added products
Strategy for innovation and policy development	- Develop market information systems and forecasting - Develop macro policies for managing agri-input companies - Market policies and export - Development of cooperation policies - Re-investment policy for rice farmer	- Develop domestic market for both pangasius and Basa fish - Research and develop value-added products	- Develop suitable mechanism and policies timely by market forecast - support market information, business linkage, shrimp control of collectors, regional and national conferences	- Research & develop more off-season mango - Develop new policies to encourage companies to invest in material areas

5 CONCLUSION

The MD's economy is mainly based on agriculture and fisheries, is the mainstay of agricultural commodities in general, seafood and rice-fruit sector in particular. However, results of value chain analyses of six agricultural products indicate that fragmented production system by numerous small scale producers that creates challenges for developing large-scale production with high quality in order to meet the market demand. In addition, pproduction and distribution of these commodities are still unstable and unsustainable due to imbalance of market demand and supply; lack of agri-business linkages between farmers and companies; limitation of production capacity and logistics; limited management at all levels, lack of investment in research and development (R&D), lack of market information and forecasting, lack of advanced processing technology to produce value-added products. As a result, many stages in the chains are still not efficient, high production cost and low quality, low competitiveness and limited value added products.

There are four strategies for upgrading the agri-product value chains stably and sustainably including strategies for cost reduction, quality improvement, technological investment and innovation and policy development; in which many solutions are proposed: forecast of market supply and demand, training on market information and value chain approach to all chain actors and facilitators, techniques, linkage development and policies. The solutions are not only for all chain actors but for all local managers at all levels who can support "4 – house" model effectively in general and chain actors in particular.

REFERENCE

GTZ Eschborn, 2007. The ValueLinks method of GTZ. Value chain analysis of agricultural products.

Kaplinsky, C.W., Morris, L., 2001. A handbook for value chain research. The Institute of Development Studies, University of Sussex. Brighton, United Kingdom.

Khiem, N.T., Bush, S.R., Chau, N.M., Loc, V.T.T., 2010. Upgrading small-holders in the Vietnamese Pangasius value chain, final report, ODI grand number RO 334. An Giang university, Wageningen university and Can Tho University.

Loc, V.T.T., 2010. Shrimp value chain analysis in the Mekong Delta, Vietnam and qualitative comparison to Thailand. Vietnam Economic management Review, Central Institute of economic management, Part 1. 05: 74-82.

Loc, V.T.T., 2010. Shrimp value chain analysis in the Mekong Delta, Vietnam and qualitative comparison to Thailand. Vietnam Economic management Review, Central Institute of economic management, Part 2. 05: 58-67.

Loc, V.T.T., 2013. Sustainable development of pangasius industry based on value chain linkages. Proceedings of market development and added value improvement of pangasius in the Mekong Delta, pp. 64 (in Vietnamese).

Loc, V.T.T., 2013. Solutions for agri. sustainable development in the Mekong Delta, Vietnam. Workshop proceeding of MDEC Vinh Long, pp.50 (in Vietnamese).

Loc, V.T.T., 2014. Policy Solutions for stable and sustainable development of main agri-products in the Mekong Delta by value chain approach and regional linkage. Proceeding of "The policy serves to restructure the agricultural sector" held by the Central Economic Commission, Steering Committee for the South West and Can Tho University, dated on Oct. 17, 2014, pp. 301-312 (in Vietnamese).

Loc, V.T.T., 2014. Risk and vulnerability of pangasius producers in the Mekong Delta. Science and Technology Journal of Agriculture & Rural Development, 02: 3-12 (in Vietnamese).

Loc, V.T.T., An, N.T.T., Tho, H.H., Kiet, T.H.V.T., Huong, L., Giang, L.T., 2015. Value chain analysis of chili product in Dong Thap province. Can Tho University Journal of Science. 38: 107-119 (in Vietnamese).

Loc, V.T.T., Bush, S.R., Khiem, N.T., 2010. High and low value fish chains in the Mekong Delta: challenges for livelihoods and governance in the following paginated issue of Environment, Development and Sustainability, 889 pages.

Loc, V.T.T., Khoi, L.N.D., 2011. Analyzing policy impacts to rice value chains and developing upgrading strategies of rice value chains. Can Tho University Journal of Science. 19: 110-121 (in Vietnamese).

Loc, V.T.T., Son, N.P., 2009. Distribution of benefit and cost in pangasius value chain in the Mekong Delta, Vietnam Economic management Review, Central Institute of economic management, 26: 32-42.

Loc, V.T.T., Son, N.P., 2011. Rice value chain analysis in the Mekong Delta in 2009. Science and Technology Journal of Agriculture & Rural Development, MARD, 09: 3-10 (in Vietnamese).

Loc, V.T.T., Son, N.P., 2013. Analysis of purple onion value chain in Soc Trang province. Science and Technology Journal of Agriculture & Rural Development, MARD, 19:3-12 (in Vietnamese).

Loc, V.T.T., Son, N.P., 2013. Rice value chain in the Mekong Delta, Vietnam: solutions for rice value added improvement and sustainable development.

Center for ASIAN Study; CAS Discussion paper, 93:16 pages.

Loc, V.T.T., Son, N.P., 2013. Solutions for value chain of ST5 rice in Soc Trang province. Can Tho University Journal of Science. 27: 25-33 (in Vietnamese).

Loc, V.T.T., Son, N.P., 2014. Solutions for upgrading Artemia value chain in Vinh Chau, Soc Trang province. Science and Technology Journal of Agriculture & Rural Development, MARD, 23:18-26 (in Vietnamese).

Loc, V.T.T., Thu, T.D., Son, N.P., Tho, H.H., Thoa, N.T.K., Danh, L.H., 2014. Improvement of agriproduct quality: Solutions for Tai Nguyen rice in SocTrang province. Can Tho University Journal of Science. 35: 40-49 (in Vietnamese).

Loc, V.T.T., Vuong, D.M., Kiet, H.V., Tien, N.T., 2015. Value chain analysis of dragon product in Cho Gao, Tien Giang province. Can Tho University Journal of Science. 36: 10-22 (in Vietnamese).

Loc, V.T.T., William, S., 2014. Business engagement in smallholder agriculture: Developing the mango sector in the Mekong Delta, Vietnam. Center for ASIAN Study; CAS Discussion paper, 94: 25 pages.

M4P, 2008. Marking value chains work better for the poor: A toolbook for practitioners of value chain analysis. A publication financed by the UK department for international development (DFID).

SOFRI, 2014. Statistical data of Southern Horticultural Research Institute – Vietnam (in Vietnamese)

VASEP, 2013. Situations of fisheries culture and export of Vietnam. Fisheries Trade Magazine of Vietnam Association of Seafood Exporters and Producers, No. 24/2013. www.vasep.com.vn/

VFA, 2013. Statistical data of rice production and export of Vietnam. Vietnam Food Association, 2013. www.vietfood.org.vn/

VinaFruit, 2013. Statistical data of fruit and vegetable production and export of Vietnam. Vietnam Fruit & Vegetables Association, 2013. www.vinafruit.com/