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**THE REGIONAL CHARACTERISTICS OF MARKET
INFORMATION TRANSFER SYSTEM IN THE RICE
PRODUCTION IN THE MEKONG DELTA, VIETNAM**

Doctoral (Ph.D.) dissertation

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ABBREVIATIONS

MITS	Market information transfer system
GSO	General Statistic Office of Vietnam
FO	Farmer organization
VFA	Vietnam's Food Association
MI	Market information
VND	Vietnamese Dong

I. INTRODUCTION

1.1. Actuality of the research topic

After the economic resolution in 1986 Vietnamese economy changed positively; its agricultural sector achieved a great development, especially in the rice subsector. Rice has an important role in Vietnamese life and economy. According to the General Statistics Office (GSO) rice subsector is occupying 40% of gross output of the Vietnamese agriculture, 9.3 million households are planting paddy (65% of rural households) and over 70% of the national labor force are employed in the rice production (Asia Development Bank, ADB). Rice consumption in Vietnam accounts for about 60% of the daily per capita calorie intake (Rice today, 2002). According to FAO Vietnam is the 5th largest rice producer and the 2nd rice exporter in the world. Foreign currency revenue from rice export has significantly contributed to the development of the Vietnamese economy. According to GSO during the period of 2007 to 2013 Vietnam exported on average 6.265 million tons of rice with its value of 2.936 billion USD per year. The Mekong Delta is the rice granary in Vietnam. This region has contributed to 50% of the national rice output and 90% of the rice export. However, the main issue in rice sector in the Mekong Delta is rice the market problem: When there is a good harvest the rice price is low and rice farmers' profit is not high. According to a study of Tran Cong Thang, Do Lien Huong, Le Nguyet Minh in 2013 the average income of rice farmers from rice production in the Mekong Delta is very low with 535000VND/month (about 24USD/month). Therefore, the question is that how rice farmers in the Mekong Delta could sell their rice at higher prices to increase their profits and incomes.

The reality shows that the Vietnamese government and governmental agencies also have had activities and programs to provide rice market information to farmers through television, radio, newspapers, internet but a few rice farmers in the Mekong Delta have accessed to and used these information sources. On the contrary, the government has mainly supported farmers in their rice production such as new varieties, advanced technologies, pesticides, fertilizers, etc. More and more rice is produced by farmers in the Mekong Delta and so the demand of market information is higher and higher to sell a bigger amount of rice at higher prices. Farmers in the Mekong Delta have received market information from their friends, other farmers, relatives and traders who are informal sources. The quality of market information from the informal sources is often not good.

Market information system plays an important role in raising the efficiency of economic performance and the success of the marketing process that depend to a large extent on the marketing information system and on the success of each element in this system (Sultan Freihat, 2012). Some current research

has indicate that market information is an important factor that helps farmers enter the market better, sell more products at higher prices. But there are not good models of MIT in Vietnam and through this my research will propose a model of MIT that is suitable in the Vietnamese conditions, a developing country with low income and weak infrastructure.

1.2. Reasons to choose the research topic

Market information transfer system in the agriculture has already been studied in the world but it is a new topic in Vietnam. There is not research about MITS, the primary data and information about MITS in Vietnam so we do not know the strengths and the weaknesses of the current MITS, how to improve the MITS to meet the market information demands of rice farmers. Therefore, this is need to be done in my research.

Market information has an important role in the production and trade of farmer households respectively sharing market information is one of the most effective ways of improving supply chain performance (Riikka Kaipia, Helena Lakervi, 2005). Market information changes the farmers' position in the value chains and increases the selling prices of farmers because it increases farmers' bargaining power against buyers and improving the competition with traders farmers are able to sell their rice at a higher price (Daichi Shimamoto, Hiroyuki Yamada, and Martin Gummert, 2014; Marcel Fafchamps and Bart Minten, 2011). Market information expands the market and increases the sale volumes for farmers on different markets to improve their income (Robert Jensen, 2007; Jenny C. Aker, 2010; Julien Labonne and Robert S. Chase, 2009). Market information changes the behaviour of farmers. Farmers can modify the date of market or connect directly to wholesalers or larger-scale middlemen rather than smaller intermediaries, they change according to where they market their crops, they switch markets to capture better prices and identify where to deliver their products. Some farmers develop a two-way trade, bringing products back from the market to sell them in their own rural communities.

The demands of improving the market information system is imperative and significant to rice farmers in the Mekong Delta, Vietnam for the following reasons:

➤ The competitive pressure of rice farmers in the Mekong Delta is gradually growing: With the development of science and technology rice farmers in the Mekong Delta have produced more and more rice output, many rice farmers need to sell a bigger amount at the same time so they will be under the competitive pressure from other farmers in the Mekong Delta, in Vietnam and even from international farmers. They need to find the larger markets to sell more rice at higher prices.

- There are more and more intermediates between rice farmers and final customers and export companies in the Mekong Delta and these intermediates became a barrier for the market information flow in the rice value chain, even they can distort the market information to gain advantages in the bargain making a wider gap of market information between participants in the rice value chain. Therefore, we need a good model of MIT to reduce the negative impacts of intermediates in the rice value chain, help farmers access to accurate, timely and adequate market information.
- Rice farmers in the Mekong Delta have been accessing to many market information sources at the same time but their main issue is that how to effectively use the market information and to distinguish between the good and bad information. In fact, the main market information sources of rice farmers are the informal sources such as relatives, friends, and private traders (Luu Thanh Duc Hai, 2003) and nobody controls and monitors these informal sources. As a result, the quality of market information from these sources provided to rice farmers is often not good because of the exclusiveness of these sources in the management and distribution of market information in the rice value chain. Meanwhile, the formal market information sources have often been disappointing because the market information disseminated from these sources to rice farmers is slow, they are in the wrong form and they are infrequent. Besides, rice farmers in the Mekong Delta have been limited in accessing to and using market information because of their low ability; many of them can access to market information but cannot analyze and use it and maybe they don't have modern devices either to access to market information via Internet, papers, mobile phone, etc. So we think that we need to build a model of MITS that provides the best and objective market information to rice farmers so that they can be self-confident to use this market information.

1.3. Research aims

As reflected in the abovementioned, the main aims in my research are followings:

- To investigate the rice market information needs of rice farmers in the Mekong Delta.
- To identify the rice market information providers to farmers in the Mekong Delta.
- To investigate the type of market information provided to farmers in the Mekong Delta.
- To investigate the market information channels to farmers in the Mekong Delta.
- To investigate the utilization of market information by farmers in the Mekong Delta.
- To investigate the strengths and weaknesses of MITS in the Mekong Delta.
- To investigate the factor to enhance or promote the effectiveness of MITS in the Mekong Delta.

- To propose the suitable model of MITS for the Mekong Delta based on my research.

1.4. Research questions and hypotheses

➤ *The research questions:*

- What kinds of rice market information have market information providers been providing to rice farmers in the Mekong Delta?
- What kinds of rice market information channels have providers been providing to rice farmers in the Mekong Delta?
- How have farmers been using rice market information?
- What is the attitude of the farmers like related to market information transfer system?
- What are the strengths and weaknesses of MITS in the rice value chain in the Mekong Delta?
- What are the impacts of MITS on rice farmers in the rice value chain in the Mekong Delta?
- Which demographic factors of rice farmers in the Mekong Delta have been influencing their satisfaction level of MITS?
- What kind of rational, useful and pragmatic action plans can be generated for developing the recently weak situation of MITS in the rice value chain in the Mekong Delta, Vietnam?

➤ *The research hypotheses:*

My research has been carried out depending on 5 hypotheses as follows:

H1: The rice farmers are not satisfied with the recent situation of MITS in the Mekong Delta.

H2: Rice farmers in the Mekong Delta utilize both the macro and micro rice market information in MITS for their rice production and trading.

H3: The demographic characteristics of rice farmers (age, gender, educational level, FO member, rice income, size of farmer household), amount of rice market information sources and amount of rice market information channels have strong and statistically verifiable relationships with farmer's satisfaction of MITS.

H4: The government supported the MITS development via the agricultural extension system in Vietnam.

H5: An action plan and training about MITS are useful and imperative to develop the current MITS in the rice value chain in Vietnam.

1.5. Structure of the thesis

This dissertation includes 6 main parts. This introductory part presents a statement of the research problem, the objectives of the study, the research hypotheses and the research questions. Part 2 presents my topic in the context of regional sciences. Part 3 provides the literature review on Vietnamese agriculture, rice sector in Vietnam, MITS and some models of MITS in the world and in Vietnam. Part 4 contains my research methodology used in this dissertation and the results. The research methodology was a mixed method with the qualitative method by interviews and then quantitative method by questionnaires. The aims of the interview are to describe the current situation of MITS, build the questionnaire and the survey plan for the quantitative research. The aims of the questionnaire are to collect the data about MITS to answer the research questions and to test the hypotheses. Part 5 shows the new model of MITS that I propose to the rice value chain in the Mekong Delta, Vietnam. Lastly, part 6 presents conclusions, new scientific findings of the dissertation and some suggestions for the future researches.

II. MY RESEARCH TOPIC IN THE CONTEXT OF REGIONAL SCIENCES

2.1. The context of regional sciences

Regional sciences began to appear in 1954 by its father Walter Isard (1919–2010). With suggestions from Walter Isard the arguments ended in accepting the term: Regional sciences and Regional Science Association held the first meeting in Detroit in 1954 (Walter Isard, 2003). Walter Isard studied economics at Harvard University from 1939 and mathematics as well as classical economics in Chicago (Imre Lengyel). The first concept of regional sciences was exposed by him. He wrote in his book: *Introduction to Regional Science* that is “In brief, regional science as a discipline concerns the careful and patient study of social problems with regional or spatial dimensions, employing the diverse combinations of analytical and empirical research” (Walter Isard, 1975). Therefore, regional science used a mathematical and statistical analytical approach to the empirical investigation of regional phenomena and a central purpose in regional science research was to identify and analyze the problems of regions and to suggest solutions (Walter Isard and Reiner T., 1968).

Since then regional sciences have been continuously developing with new challenges, trends and new innovations along with the rise of globalisation and urbanisation. György Enyedi wrote in 2007 that “it (regional sciences) involves the mechanisms, rules and models of spatial processes studied by different disciplines transforming them into a meta-synthesis”.

Regional science has brought together researchers from a whole range of disciplines to undertake the development of theory and methods and to investigate a wide range of social, economic and environmental issues within a spatial framework context, conducting those enquiries at a multitude of spatial scales, and using data aggregated into those spatial frameworks along with using micro-data (Robert J. Stimson, 2016).

There are 3 important factors in regional sciences that are time, space (location) and actor regional science scientists took interest in. The changes of these 3 factors in globalization created new challenges in regional sciences, new themes for regional science researches and new methodologies applied in regional sciences. That is the main reason for the development of over 60-year regional sciences.

There were several topics with the diversified fields given to scientists in regional sciences and the last list of research themes in regional sciences was brought out by Mulligan G. (2014). He listed 14 topics for future research in regional sciences: Behavior and heterogeneity; environmental issues;

global urbanization; happiness; housing and land use; metropolitan sorting; neighborhood change; networks; non-metropolitan living; post-event growth and development; regional creativity; regional decline; regional specialization and diversity; resource inequality (Robert J. Stimson, 2016).

The organizations of regional sciences and training about regional sciences: Regional Science Association (RSA) held the first meeting in Detroit in 1954; it legitimized and joined the Allied Social Science Association in 1956. Then the organizations of regional science were also formed in Europe and Asia in 1960. The Regional Science Association International (RSAI) was born in 1990 and the European Regional Science Association (ERSA) was also established. Their specialization was economics and quantitative regional analyses. The first PhD program in regional science was launched by Walter Isard at the University of Pennsylvania and 180 students got their doctoral degrees (1960-1993). Nowadays many universities in the world offer the training programs about regional sciences. The first magazine of regional science was the Journal of Regional Science in 1958.

Regional scientists have pursued methodological innovation focused on explicitly improving approaches to integrate different types of data and for analyzing and modelling data that is embedded within a spatial framework in order to furnish improved understanding of urban and regional development and the behavior of institutions, firms, and households as well as individuals within the context of space economies. Regional scientists have largely applied models using aggregates to investigate human behaviour and regional issues, and they have tended to take an optimisation approach to investigate location decisions (Robert J. Stimson, 2016).

Regional scientists solved the social challenges through the application of regional science theory and methods. In addition, they tried to demonstrate the relevance of regional sciences in developing the public policies for the regional and urban development, to evaluate policy and planning interventions, and to demonstrate applications in business (Robert J. Stimson, 2016).

According to Robert J. Stimson (2016), there are 3 levels of unit in regional science research: individuals (or households); entrepreneurs (businessmen or firms); and public bodies (such as city governments and regional planning organizations). Correlatively, there are 2 kinds of data in regional science researches: Micro data and big data. However, in fact, regional scientists have often made use of micro (individual level) data in investigating economic and demographic issues such as business and industry operations, entrepreneurship, household dynamics, and income distribution. In my research, I used micro data from which 2 rice household surveys were made in the Mekong Delta: Qualitative and quantitative surveys. My data were collected by locations. I chose 2 provinces in the Mekong Delta to survey, in which a province is a representative of rice production area and a province

is representative of rice trading area. According to Robert J. Stimson (2016), regional scientists tried to generate spatially representative data to undertake such modeling, in particular to inform policy and to better understand behavioural change. Besides, I used the statistical data from the General Statistical Office of Vietnam.

We are living in a digital era in which the proliferation and spread of rapidly emerging new digital technologies are producing a massive streams of data—including data in real time and space—that are referred to as “big data” (Robert J. Stimson, 2016). Big data offered a considerable potential to enhance our understanding of the complexities of urban and regional systems; and to assist in finding solutions to suppress problems. But the big data were not used in my research.

Regional scientists used many different methods to solve the social issues in regional sciences. Because regional science is an interdisciplinary field, regional science might also benefit through borrowing research methodologies from other disciplines (Robert J. Stimson, 2016). The mixed method (the combination of the qualitative and quantitative methods) is the most common method used by many regional scientists in their regional science researches. I also used the mixed method to study MITS in the rice production in the Mekong Delta, Vietnam. This method helped me collect both qualitative and quantitative data, besides qualitative and quantitative method supplement, and it help me understand more clearly my research topic.

2.2. My research topic in the context of regional sciences

From the knowledge I gained in the PhD program about regional science at Enyedi György Doctoral School of Regional Sciences, Szent István University I can say that the topic in my PhD dissertation is fixed to regional science research because my research and regional science research have a lot in common.

Research contents: The topic in my research is about MITS in the rice production in the Mekong Delta, Vietnam. My topic belongs to the outstanding themes in regional sciences. Firstly, my topic relates to regional economic development, this is the most essential topic in regional science research. My research is about rice economy, household economy in the rural area and it, in turn, affects the economy of the Mekong Delta. Secondly, I studied the behaviour of rice farmers in the Mekong Delta in seeking, analyzing and using the market information for making their decisions in the rice production and trading. The theme of behavioural study of individuals and households is also the important topic in regional science researches. Thirdly, my topic relates to the restructure of market

information system for rice farmers in the Mekong Delta, Vietnam to help to improve itself and farmers have more chances to get market information they need.

Research methodologies: As I said above, I used the mixed method, the widespread method in regional science research to study the dissertation. This method supplied me qualitative and quantitative data as well to deeply understand MITS in rice production in the Mekong Delta, to analyse the satisfaction level of rice farmers on MITS and to define which factors influenced the satisfaction level of rice farmers of MITS in the Mekong Delta.

Research data: The database in my dissertation is micro data collected from rice household in the Mekong Delta, Vietnam. I chose the household as a research unit because rice households are in majority in the Mekong Delta, accounted for 75% of total population of the region (GSO, 2016). In addition, I also had the statistical data about my topic at national level and regional level from the General Statistic Office of Vietnam. With the database I had enough information and data to demonstrate the research hypotheses without the big data. My database in my dissertation met the requirements of database in regional science research.

Another thing is that this research in my dissertation will influence policy makers in Vietnam and this is a main purpose of regional science research. Regional science research tries to give evidences, data, models and analyses to persuade policy-makers to change so as to improve the socio-economic environment and institution in the region and therefore my research is obviously suitable for regional science research. As in other developing countries, Vietnamese farmers are increasingly disadvantageous in their society, they must confront with the uncontrolled output elements and market information is one of these elements. They have always found good market information with a low cost to increase their income and living condition. My research will determine the roles and responsibilities of the State in MITS in the rice production.

Research area: My research area is the Mekong Delta, Vietnam. This is a rice bowl of Vietnam where rice farmers really need rice market information to serve their rice production and trading. I did not study MITS in the rice production in the whole country, only in the Mekong Delta because rice market information is really meaningful for rice growers in the area. Rice market information can improve their income and the economy of the area. Additionally, there is a big disparity of rice market information between areas in Vietnam. Rice production is self-sufficient in some areas in Vietnam, rice producers in these areas maybe don't need rice market information so MITS is less meaningful for them.

III. THEORETICAL PART

3.1. Vietnam and its agriculture

3.1.1. Introduction of Vietnam

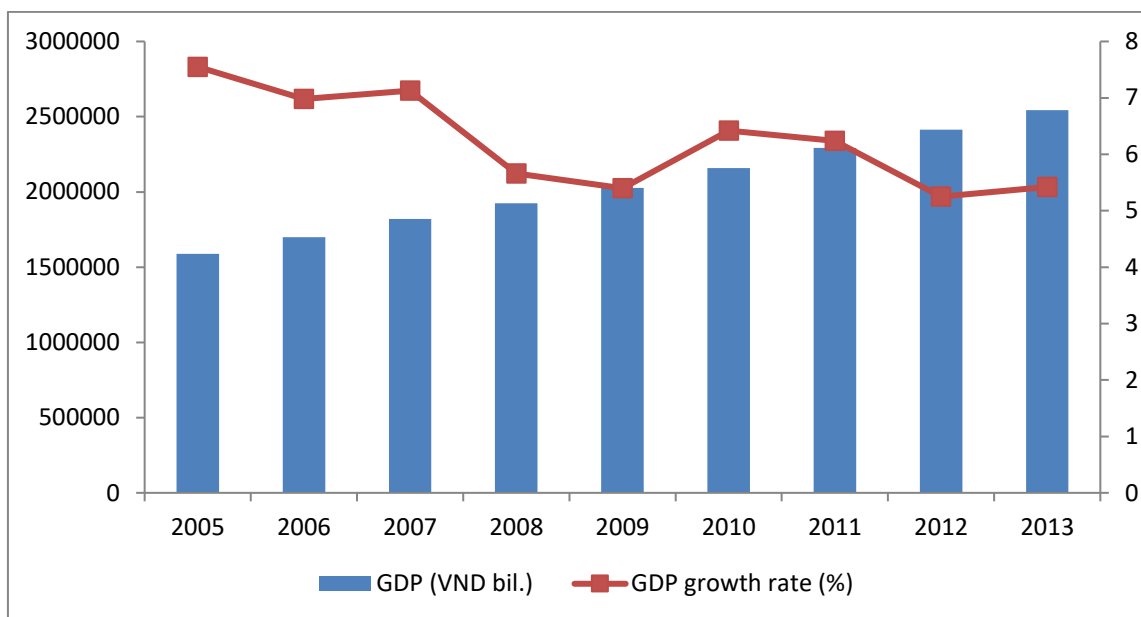
Vietnam is located on the Indochina Peninsula and on the Pacific coast. Vietnam has a 4,550km long-land border with China in the North, with Laos and Cambodia in the West and with the East Ocean. In the East. Vietnam has an area of 330,972.4 km² with its population of 85,789,573 (in 2013). Vietnam is divided into six economic regions due to their different geographic, weather, climate, demographic and economic conditions: North Mountain, Red River Delta, Northern and Coastal Central, Central Highland, Eastern South, and Mekong River Delta. However, at both ends of the country there are 2 relatively large deltas, namely Red River Delta with an area of 16.700 km² and Mekong Delta with 40.000 km².

Map 1: Geographical position of Vietnam



The status of the socio-economic development in Vietnam: Vietnamese economy gained considerable results with fast GDP growth after implementing the “Innovation” process in 1986 by turning from the central planning to market-based economy. Before the “Innovation” process the GDP growth rate was 3.7 percent per year during 1975-1986 and after the “innovation” process the economy grew at a rate of 7 percent per year in 1991-1995 and 6.5 percent per year in 1996-2000 (Nguyen Ngoc Hung, 2014).

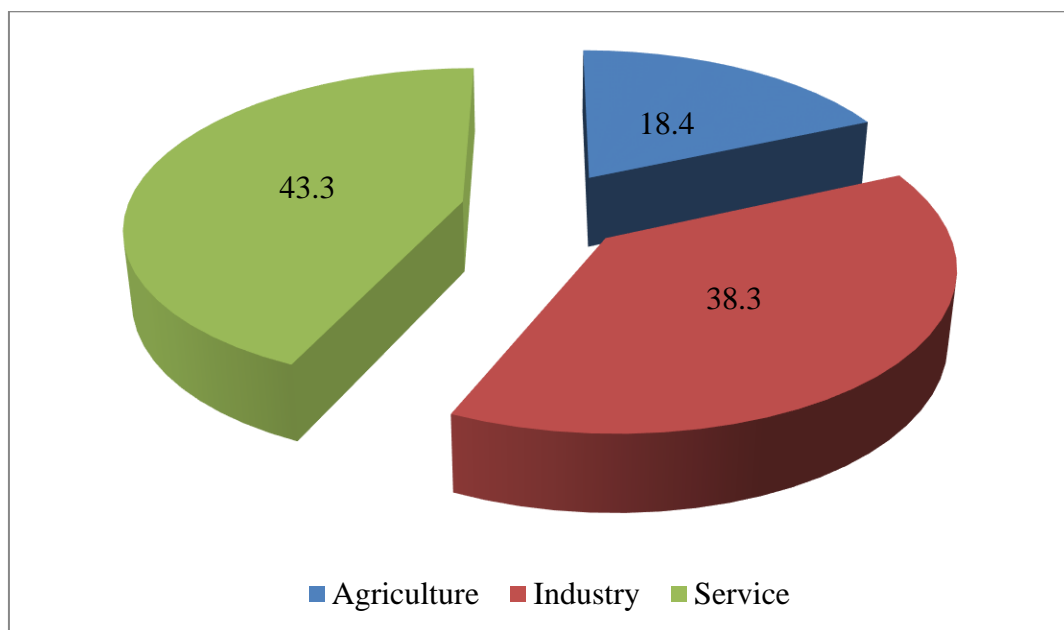
Figure 1: GDP growth and annual GDP growth rate during 2005-2013



Source: GSO, 2015

The size of the Vietnamese economy was 170 billion USD and the gross domestic product (GDP) increased by 5.98% in 2013, in which the agriculture sector contributed to the increase of GDP by 0.61%, industry sector contributed by 2.75% and service sector by 2.62% to the increase of GDP. In the structure of Vietnamese economy, agriculture sector accounted for 18.4%, industry sector occupied 38.3% and there is 43.3% in service sector (figure 2).

Figure 2: Structure of Vietnamese economy (%)



Source: GSO, 2015

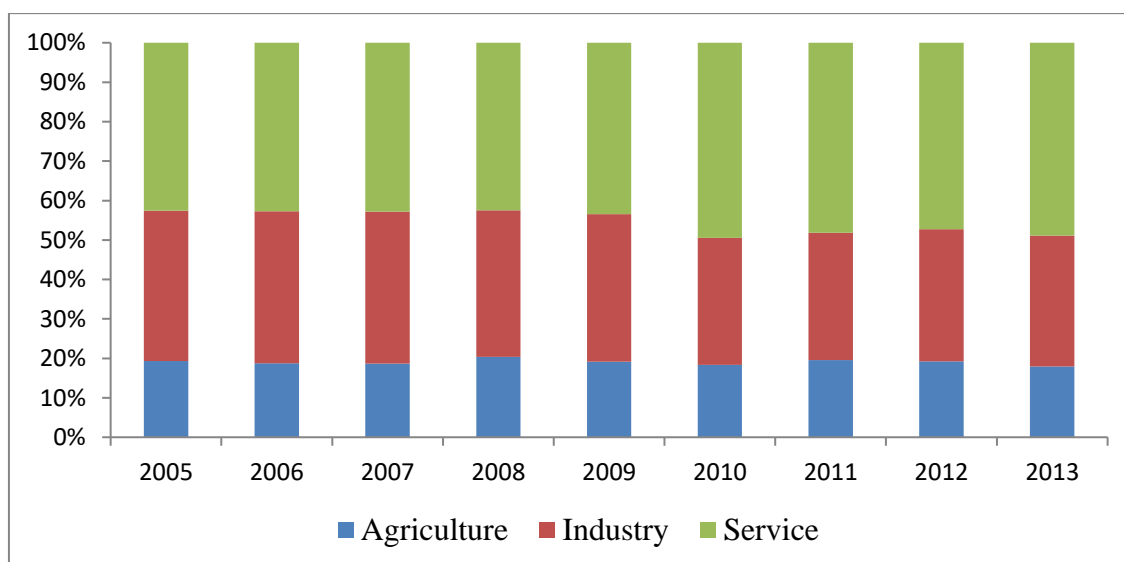
Changes in economic structure of Vietnam: Figure 3 and Table 1 show that industry and service sectors contributed remarkably to the growth of the Vietnamese economy, meanwhile the contribution of agriculture way smaller. According to Nguyen Ngoc Hung (2014) industry sector grew quickly in 1990s with the rate of more or less 10 percent per year. Services rose stably at a rate of 5-7 percent per year and agriculture expanded by less than 4 percent per year.

Table 1: GDP shares by economic sector during 2005-2013

	2005	2006	2007	2008	2009	2010	2011	2012	2013
Agriculture	19	19	19	20	19	19	20	20	18
Industry	38	39	39	37	37	38	38	39	38
Service	43	43	43	43	43	43	42	42	43

Source: GSO, 2015

Figure 3: Economic structure of Vietnam during 2005-2013



Source: GSO, 2015

Along with the high economic growth, per capita GDP was much improved. Per capita GDP increased by 122% from 795 USD per capita in 2006 to 1771 USD per capita in 2012 (table 2). And Vietnam belonged to the mid-income class in 2008.

Table 2: Per capita GDP in Vietnam during 2006-2012

Norms	Unit	2006	2008	2010	2012
Per capita GDP	Million VNĐ	12.742	18.986	24.822	36.947
Per capita GDP	USD	795	1.145	1.273	1.771

Source: GSO, 2015

3.1.2. Agriculture production and trade in Vietnam

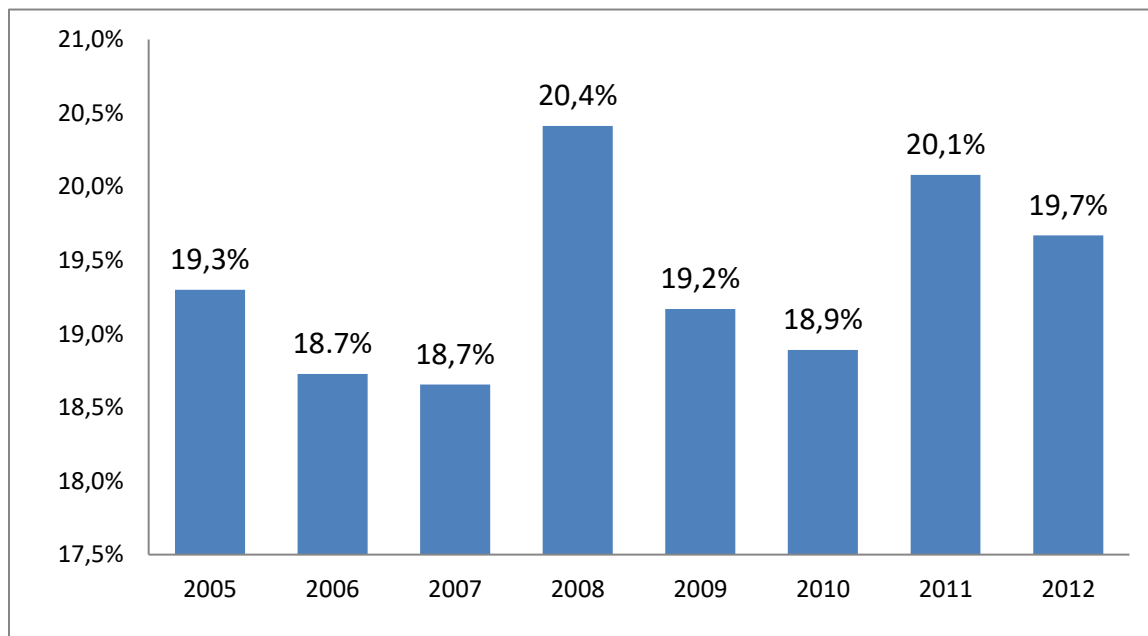
Agriculture plays an important role in Vietnamese economy and contributes by 24% to national GDP, accounting for nearly 30% of the total export value and employing over 60% of the country's population (Nguyen Quoc Viet). After 27 years of the 'Innovation' process, agriculture production showed a good growth performance. During 1985-2011, the growth rate was 5.22% per year, 5.19% during 1985–2000 and 5.27% during 2000-2011 (FAO Vietnam, 2013) and from a hungry country after the war, Vietnam is now one of the biggest food exporters in the world. Agricultural products have provided abundant food and alimentation, assured the national food security. Prices of agricultural products in Vietnam, especially food prices remain low resulting in low labor cost, which helps attract foreign investment and therefore make important contributions to the economic growth and social stability.

Table 3: Cultivated Area and Production of the Major Crops in Vietnam in 2013

Crops	Area (1000 ha)	Production (1000 ton)
Paddy	7902.5	43990.2
Corn	1172.5	5193.5
Tea	128.2	921.9
Coffee	635	1289.8
Cassava	544.1	9742.2
Sweet potato	131.5	1364.2
Soya bean	117.8	168.3
Sugar-cane	309.4	20016.2
Peanut	216.3	491.8
Tobacco	26.6	50
Rubber	955.5	948.8
Pepper	67.9	120
Cashew	310.9	277.7
Mango	85.2	678.5
Banana	126.1	1891.2

Source: GSO

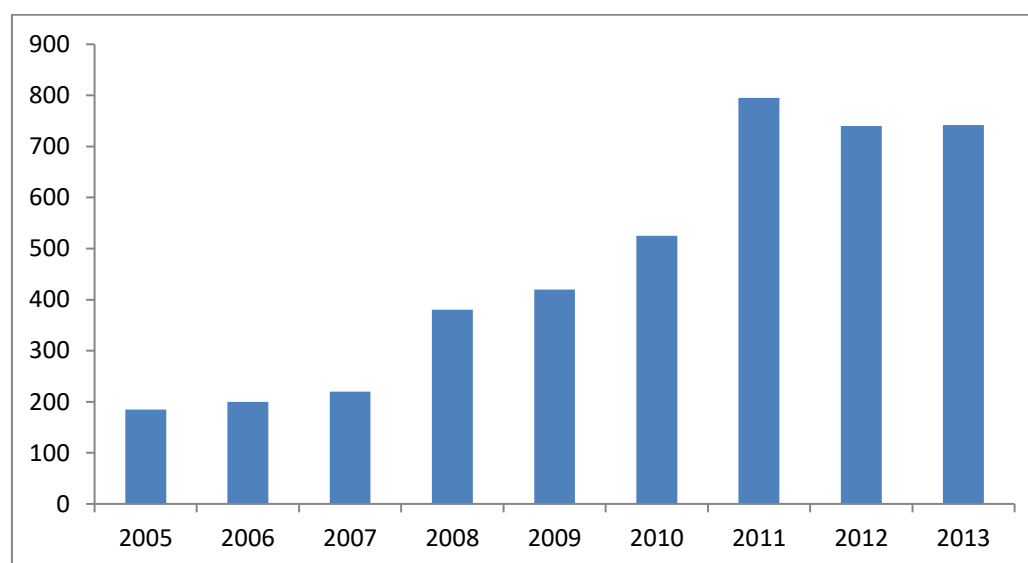
Figure 4: Percentage contribution of agriculture in GDP over the years



Source: GSO, 2014

According to the data of GSO, in 2013 GDP growth rate of agriculture sector was 2.67%, in which crop sector increased by 2.6%, livestock rose by 1.4%, forestry raised by 5.18%, and fishery increased by 3.05%. The value of agriculture is 801.200 billion VND in which: crop and livestock sector gained 602.300 billion VND; forestry reached 22.400 billion VND; fishery gained 176.500 billion VND.

Figure 5: The value of agricultural production in Vietnam from 2005-2013 (billion VND)



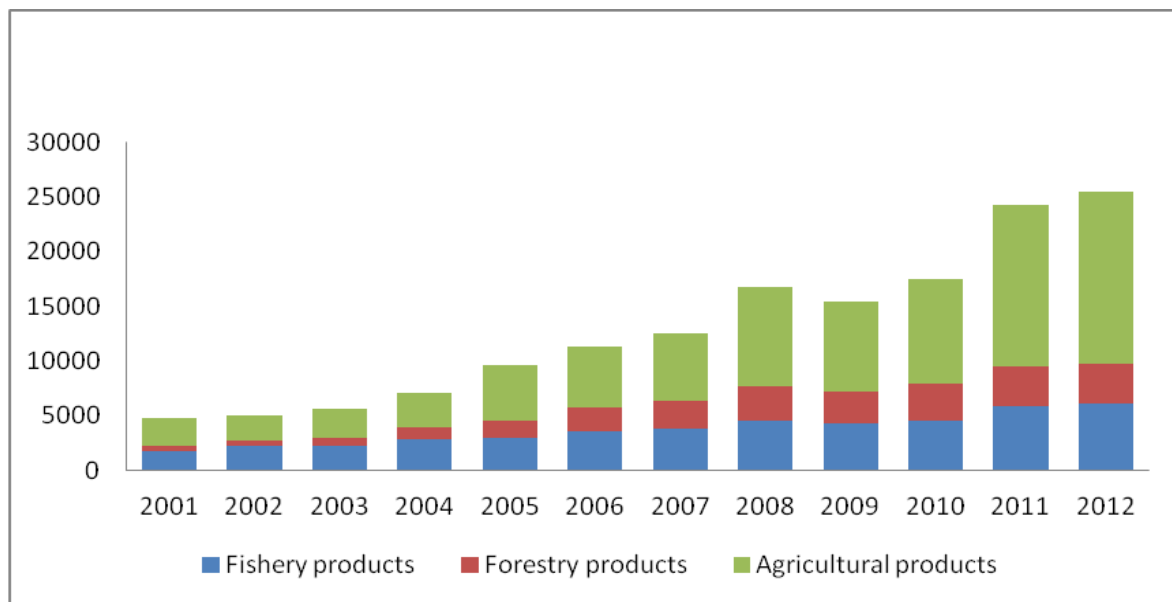
Source: GSO, 2015

Agricultural exports have increased continuously. Vietnam is now one of top world exporters in rice, rubber, coffee, pepper, cashew nuts, wood products and fisheries. Vietnam is currently the second

biggest rice exporters in the world after Thailand, and also the second largest coffee exporter following Brazil. The nation, in addition, is the biggest pepper exporter (Tran Cong Thang, 2014).

The contribution of agriculture to the total exports of Vietnam is remarkable. The export value of the agricultural sector has significantly increased since 2000, from 18.4% during 2000-2007 to 15.6% in the 5 recent years (Tran Cong Thang, 2014). In 2013, the total agricultural export value was 27.5 billion USD, in which aquaculture products account for 6.7 billion USD, forestry products is are 5.5 billion USD, rice is 3 billion USD, coffee is 2.7 billion USD and rubber is 2.5 billion USD.

Figure 6: Export value of agricultural, forestry and fishery products (2001-2012) (million USD)



Source: Tran Cong Thang, 2014

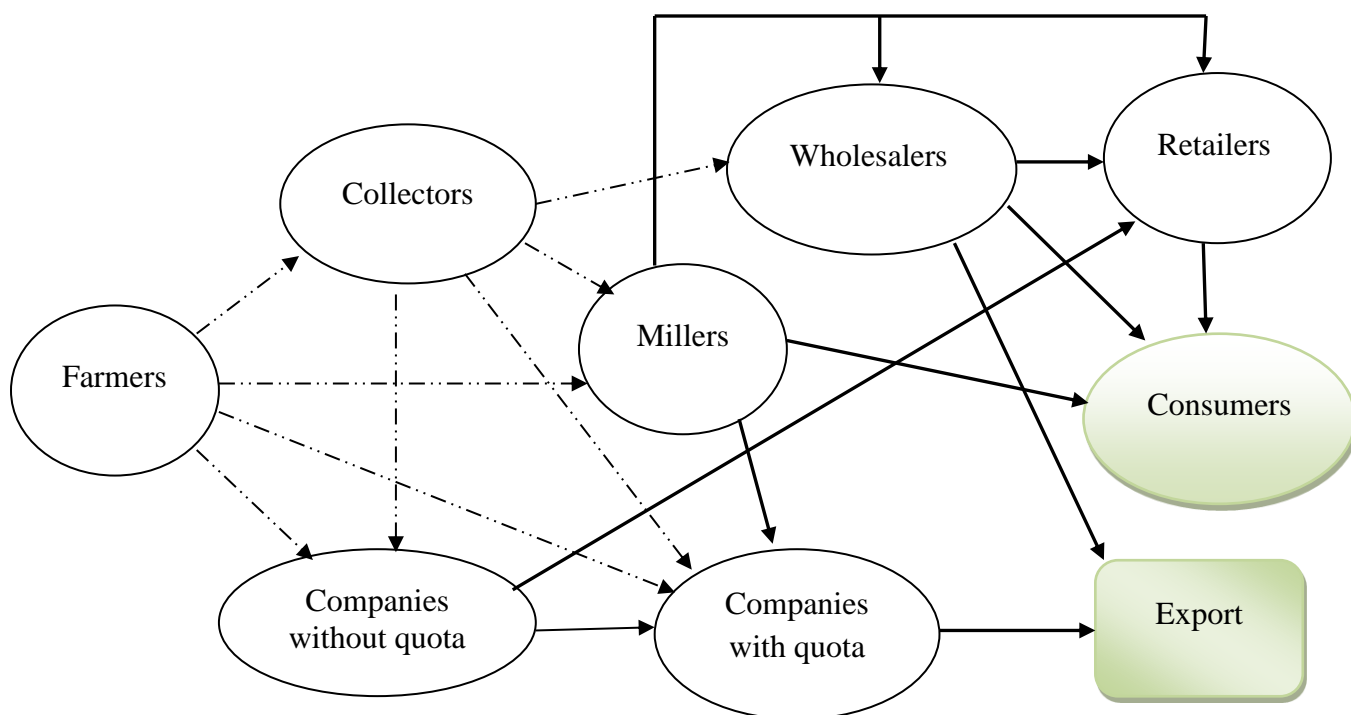
3.2. Vietnamese rice domestic market and export

➤ Domestic market

Vietnam rice industry has two main tasks: domestic trade to ensure food security and export to get foreign currency revenue for the country.

According to Pham Anh Tuan and et al the Vietnamese rice trade system is complex with a lot of the different stakeholders and links: farmers, collectors, milling facilities, wholesalers, retailers and food companies (see diagram 1).

Diagram 1: Vietnamese rice value chain



Source: Pham Anh Tuan and et al

Note: —————> Rice channels

- - - - -> Paddy channels

➤ *Rice export*

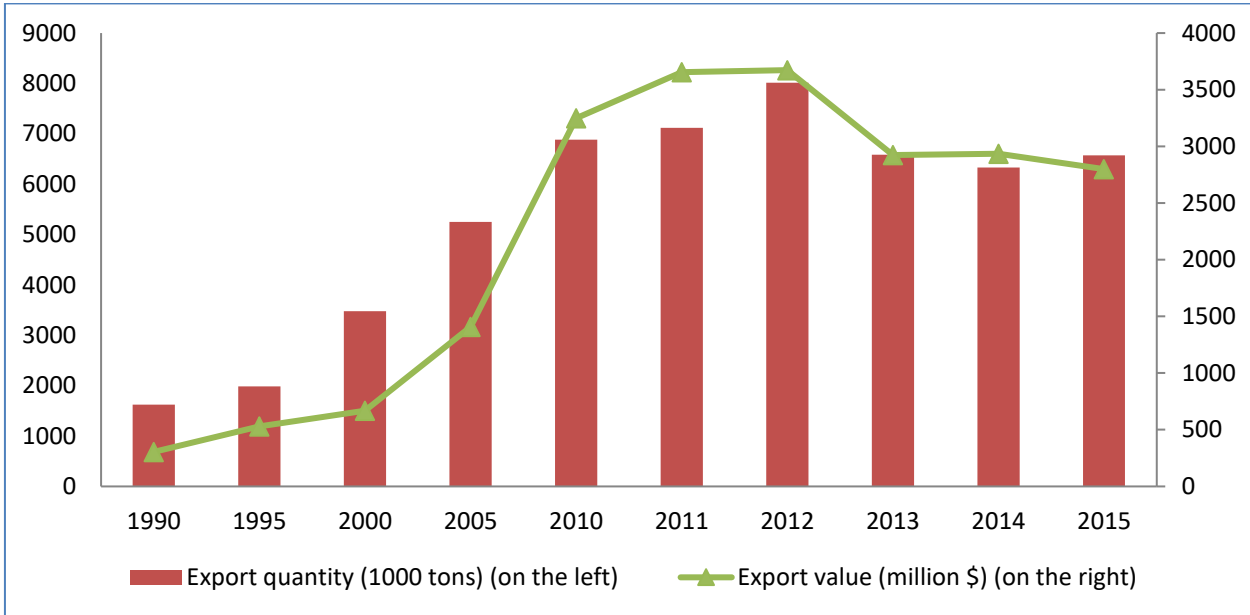
Vietnamese rice is exported under 2 pathways. Unofficial pathway (informal) is exported to several neighbor countries, especially China. And official pathway is exported by the companies that are eligible for export. These companies bought paddy or milled rice to mill and polish them before export.

In the past 20 years, Vietnamese rice export has been continuously expanded and rose to become the second largest exporter in the world (after Thailand). The greatest success of Vietnamese rice export was in 2012 with export volume of over 8 million tons, turnover of 3.67 billion US dollars.

- The volume of exported rice: the rice export volume of Vietnam was ranked the world's second largest one in terms of product availability. Rice export volume of Vietnam during the period of 1990 - 2013 had an upward trend. The amount of exported rice in 1990 reached 1.624 million tons, 3.477 million tons in 2000, over 6.8 million tons in 2010 and in 2013 rice export volume reached nearly 6.6 million tons. Accordingly, the turnover of rice export increased from \$ 304 million in 1990 to more

than \$ 3.2 billion in 2010 and in 2013 it reached \$ 2.925 billion. In 2012 Vietnam reached a record in both export volume and export value with 8.017 million tons of rice and \$ 3,673 billion, respectively (figure 7).

Figure 7: Rice export quantity and value in Vietnam in period 1990-2013



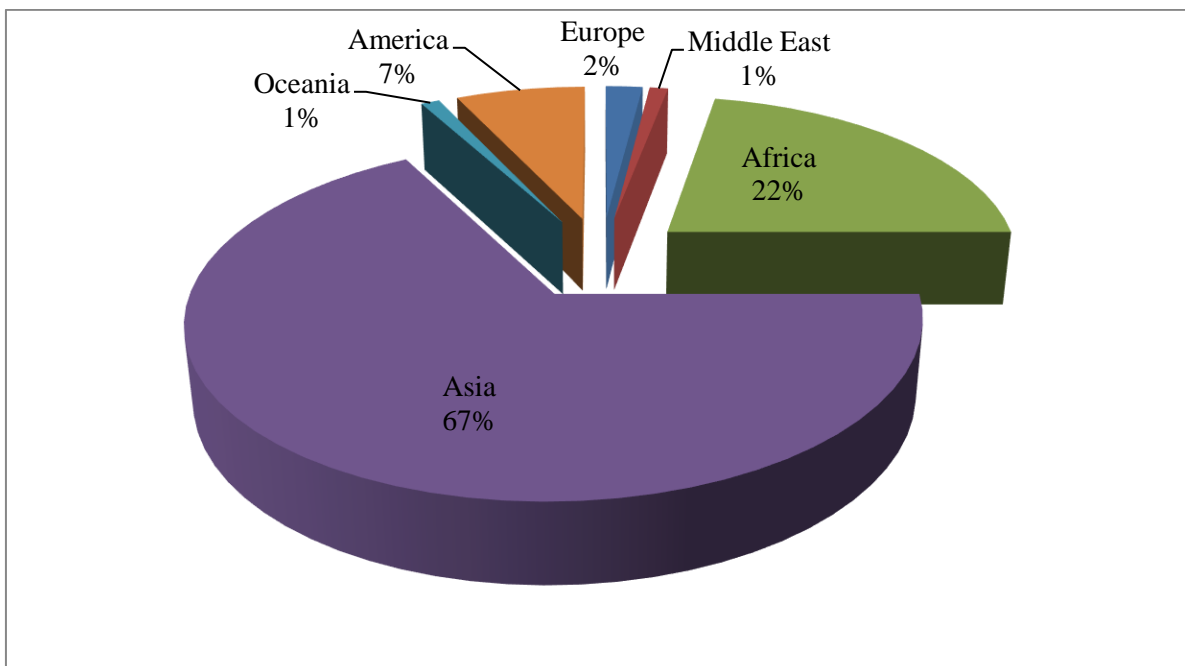
Source: GSO, 2015

- Export market: the market of Vietnamese rice export has presented in 128 countries and territories, in which 10 countries (Philippines, Cuba, Malaysia, Indonesia, Senegal, Iraq, Ivory Coast, East Timor, Singapore, Ghana) imported in large quantities and relatively stably (Tran Thi Quy, 2010).

Asia is still the main export market of Vietnamese rice with an amount of 4.609 million tons, accounting for 66.64% of a total amount of the exported rice. The second is the African market with 1.560 million tons, accounting for 22.55%; followed by the American market with a volume of 457 thousand tons, accounting for 6.60%. Europe and the Middle East account for 2.53% and 0.88% market share of Vietnamese rice export with the volume of 175 thousand tons and 61 thousand tons, respectively. The lowest market is Oceania, accounting for only 0.80% with respect to the volume of 56 thousand tons (figure 8).

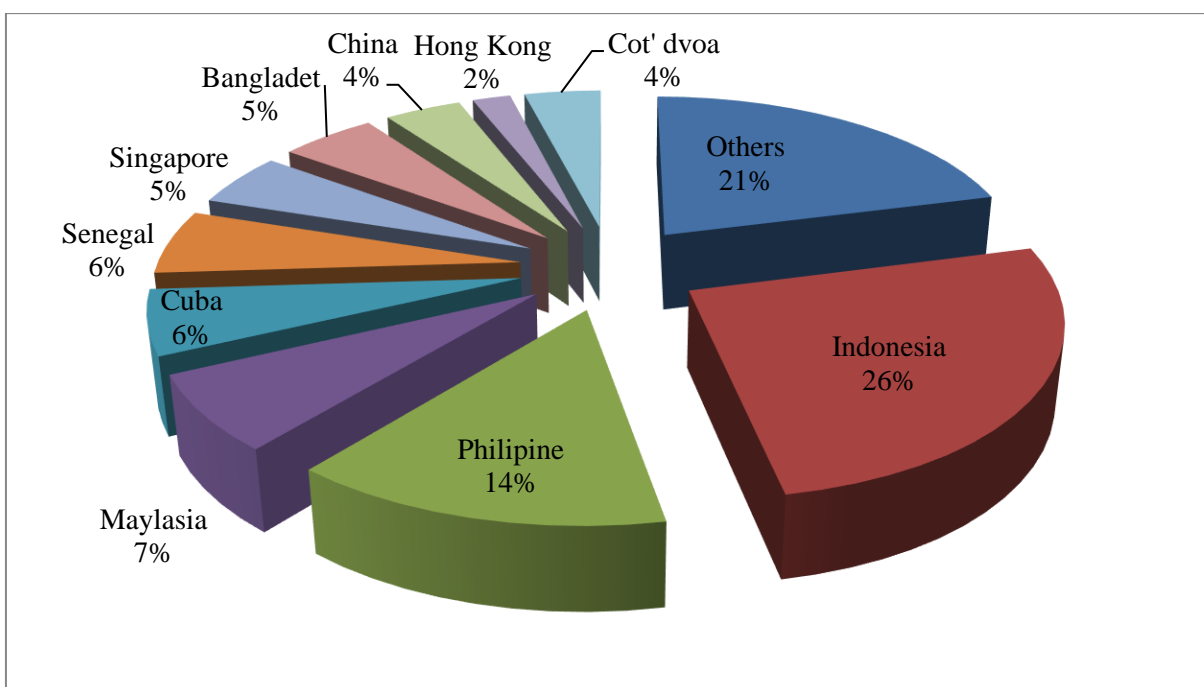
Indonesia and Philippines are two largest rice import markets of Vietnam. Indonesia is the market with the highest growth rate of 411% in amount and 443.71% in value; followed by China with the growth rate of 268.22% in amount and 325.41% in value. Notably, in recent years the export of Vietnamese rice has been expanding and developing to Africa and the Middle East. This is the suitable market with the ability of rice export of Vietnam.

Figure 8: Percentage of export rice by market in 2011



Source: GSO, 2012

Figure 9: Main markets of Vietnam rice export in 2011

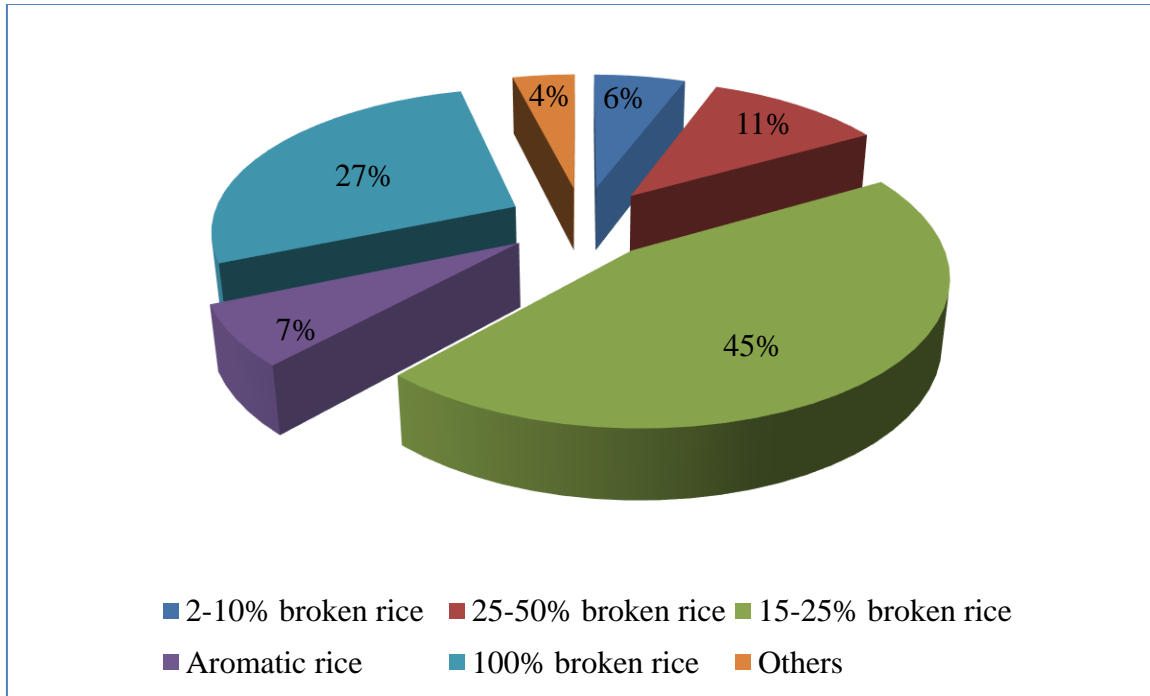


Source: GSO, 2012

- The quality and the grade of export rice: The quality of Vietnamese rice export is generally low and the main reasons are that the production systems and the quality management systems of export rice has operated ineffectively. Vietnam exports that Vietnam has, Vietnam does not focus on exporting

what the market needs. According to VFA, of the more than 7 million tons of exported rice in 2011, 15-25% broken rice ranked the first in the volume with 3.115 million tons, accounted for 45.04%; followed by 2-10% broken rice with 1.902 million tons, accounted for 27.50%; 25-50% broken rice with 765 thousand tons, accounted for 11.06%; 100% broken rice approximately 397 thousand tons, accounted for 5.74%. Meanwhile, the volume of aromatic rice and other rice handled only about 271 thousand tons, accounted for 3.90% of the total export volume of Vietnam (figure 10).

Figure 10: Vietnam rice export by kind of rice in 2011



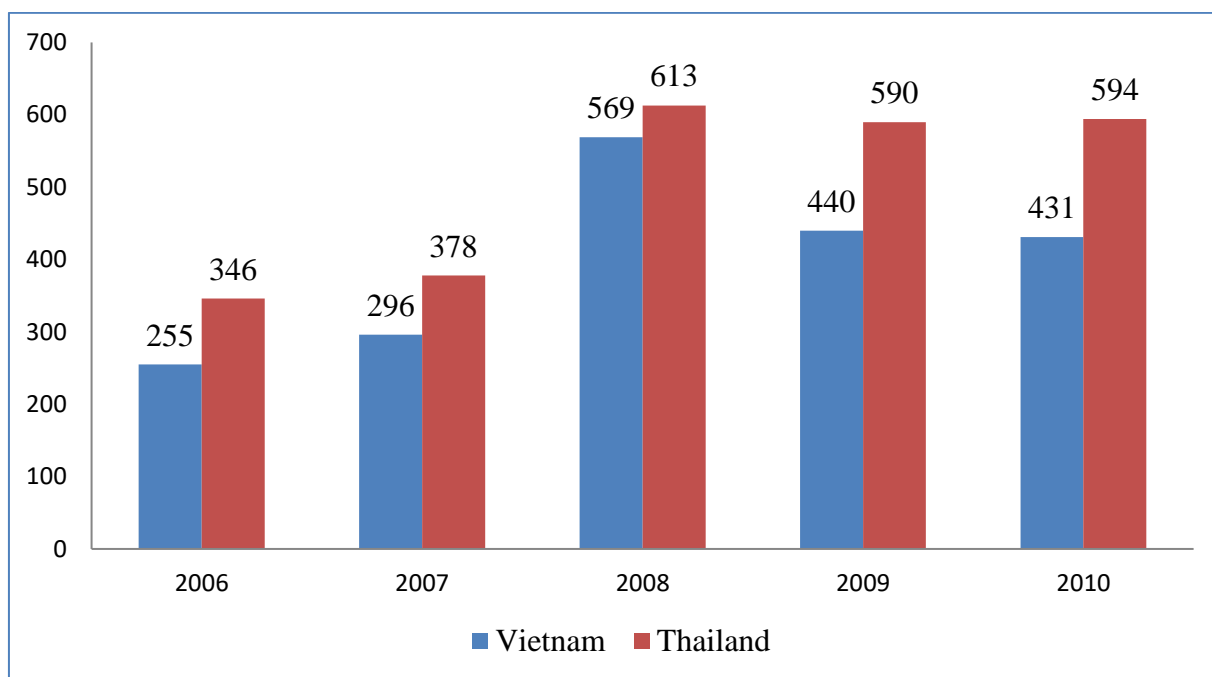
Source: VFA, 2012

- Mechanism for purchasing and processing export rice: occurring mainly in the form of "definitive purchase" between producers, processors as well as traders and does not exist in the real vertical links in rice value chain. Exporters based on the export contract price, the expected profit after deducting expenses and taxes to build the buying price of rice from the suppliers. The export rice suppliers for the exporters based on the selling price for the exporter, the expected profit after deduction of expenses and taxes to identify the purchasing price of rice from the milling plants. The milling plants based on the buying price of the export rice suppliers to define paddy price through a network of traders. Traders will buy paddy at the price based on orders from the millers. So farmers didn't join in the process of rice price decision on the market.

- The price of the rice on the market: In recent years, the price of Vietnamese rice has fluctuated irregularly. When farmers have a good crop, the rice price is low, in contrast with having poor crops,

pests and diseases, when the price of the rice rises. So farmers are disadvantaged in the rice value chain. Vietnamese rice selling prices on the world market are usually about 20% lower than average prices of the world and 30% lower than that of Thai rice (i.e 150 USD-160 USD/ton) (figure 11). This selling price not only demonstrates the weakness of Vietnamese rice on the world market, of the rice export enterprises, but also brings losses to farmers in Vietnam.

Figure 11: Average price of export Rice of Vietnam and Thailand (US\$/ton)



Source: Nguyen Van Son, 2013

- The form of rice export: In the first period of rice export, Vietnamese rice export program was mainly barter and paid Vietnamese debt. And then Vietnam used the method of direct export and through intermediates. Currently, for easy markets like Africa Vietnam is implementing the method of direct export to these markets where the no high-quality products are required that we can easily meet. As for the high-end market such as USA, Japan, etc. they require products of high quality and professional transactions. So to meet these needs Vietnam must use intermediates to export rice.

For the export contracts signed by the Government of Vietnam and foreign governments (intergovernmental contracts, G2G), the Ministry of Trade exchanged with Vietnam Food Association and then Association organized the transaction, signed contracts and delivery. These contracts are accounting for over 50% of the total export rice volume of Vietnam every year. The remaining (approximately 50% of total export rice volume) is carried out by commercial contracts that exporters themselves find and register with VFA.

- Vietnamese rice brand name: The construction and the development of Vietnamese rice brand name have not been interested in a satisfied manner. During a lot of years export rice of Vietnam usually appeared with the label of the foreign companies (foreign intermediates) and of course these companies will never develop the brand name for Vietnamese rice. Vietnam needs to develop value-added services for rice such as market activities to promote Vietnamese rice in foreign markets, enhance the quality, the competitive prices, the reputation and the good governance of supply chain.
- Some of the major rice exporter companies: Currently, traders in all economic sectors are allowed to export rice, however, there are 200 eligible enterprises throughout the country to export rice and in fact, the proportion of exported rice is concentrated in only a few state-owned enterprises (VINAFOOD 1 and VINAFOOD 2), the private sector accounts for only a small percentage (see table 4). There is a discrimination in rice export between SOEs and private enterprises.

Table 4: Some of the major rice exporters in Vietnam

Names of exporters	Percentage of export rice by volume (%)
Vinafood 2	34.4
Vinafood 1	6.3
Phu Minh limited company of production and commerce	2.6
Long An food company	2.3
Kien Giang export and import company	2.3
Vinh Long export and import company	2.1
Kien Giang agricultural trade company	1.9
Gentraco	1.9
Intimex	1.5
Ha Noi export and import company	1.4
Others	43.3

Source: VFA

Most of rice exporters are not capable of raising and establishing capital, warehouse, drying house and processing house so they should not purchase paddy or rice to keep in stocks to be ready for export, they only purchase rice from suppliers after signing the contract (Tran Tien Khai, 2010).

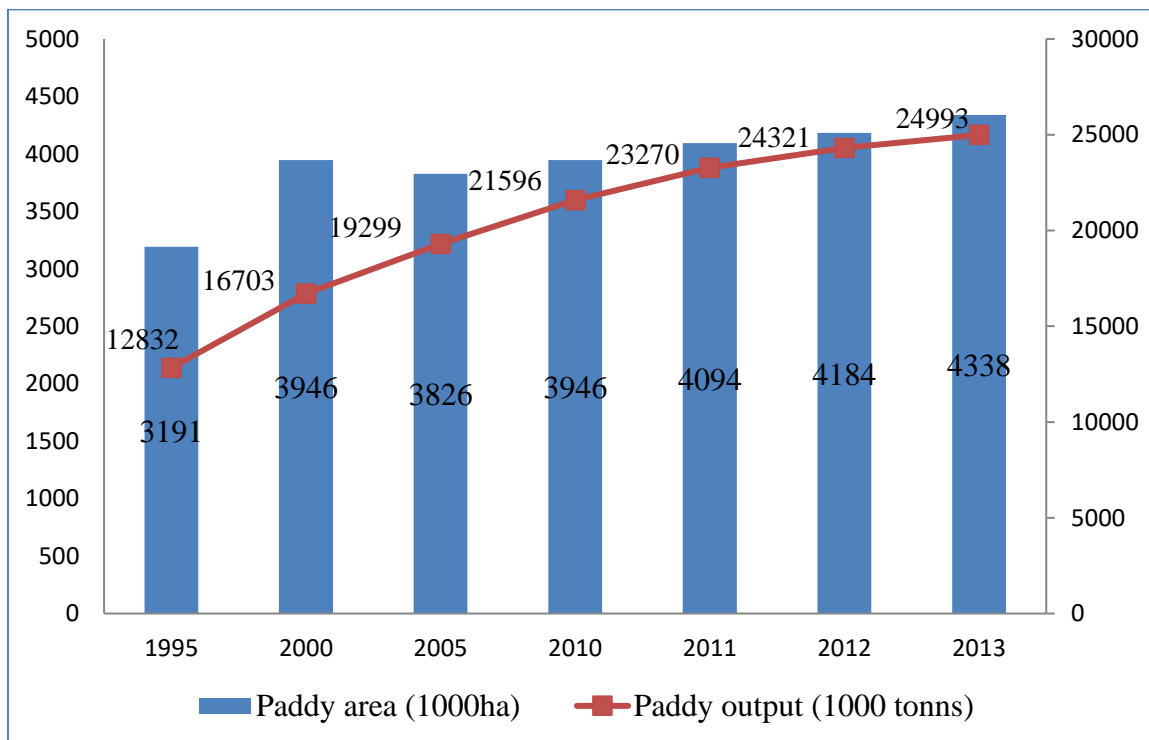
3.3. Rice production and trade in the Mekong Delta of Vietnam

3.3.1. Rice production in the Mekong Delta

The Mekong Delta has been Vietnam's rice bowl producing about 50% of the country's total rice output and providing more than 90% of the volume of Vietnamese export rice (Nguyen Lam Tu Uyen, 2011). However, rice production in the Mekong Delta is still small, an average household has 1.3 hectares of rice production, of which there are 30.6% of farmer households with an area from 0.2 to 0.5 hectares and 7.7% of households with an area less than 0.2 hectares (Tran Thi Quy, 2010).

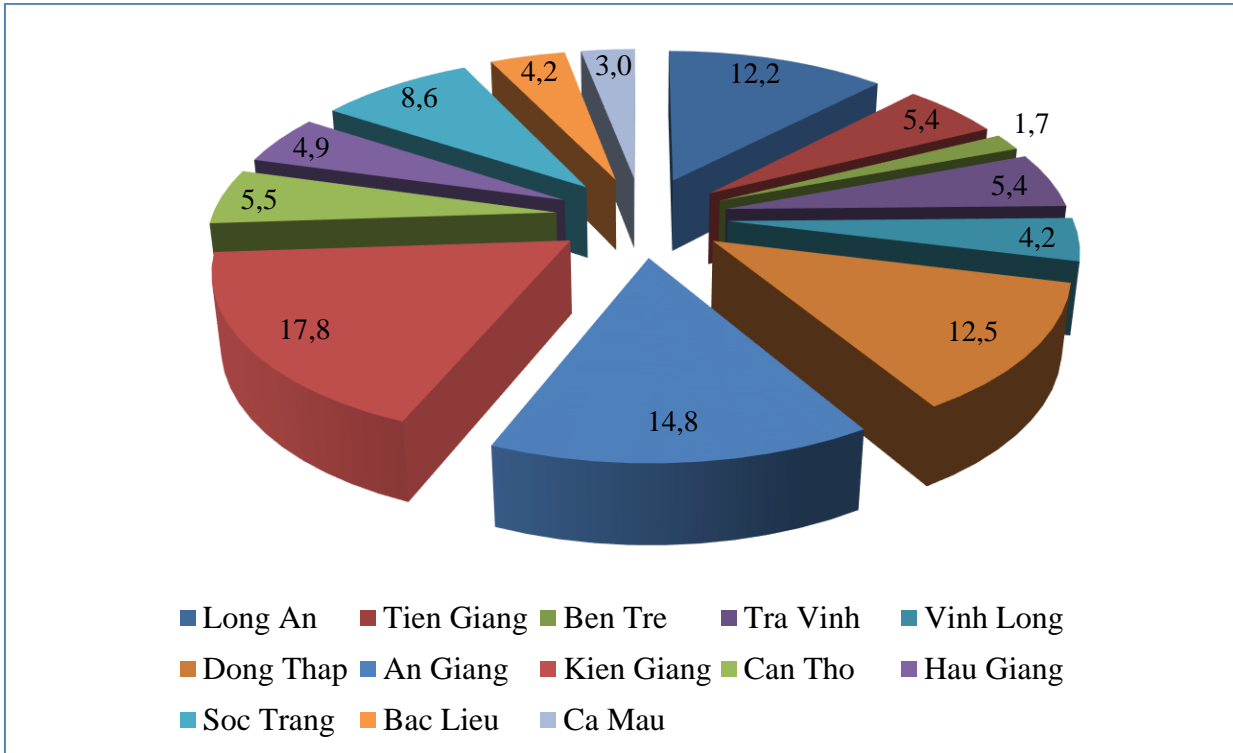
- Paddy production area: The figure 12 shows the paddy production area in the Mekong Delta has increased rapidly at an average rate of 2.0%/year over the past 20 years and currently maintained at around 4 million hectares of rice production/year. But now the area of paddy production in the Mekong Delta doesn't increase and has the potential to reduce because of the impact of sea level rise. Under the scenario of climate change if sea level rises 1 meter, Ben Tre province will lose 50% of the land, Long An will lose 49% of the land, Tien Giang (32.7%), Can Tho (24.7%) (Ho Cao Viet, 2011).

Figure 12: Paddy area and output in the Mekong Delta in the period 1995-2013



Source: GSO, 2015

Figure 13: Percentage of paddy production area by province in Mekong Delta in 2013

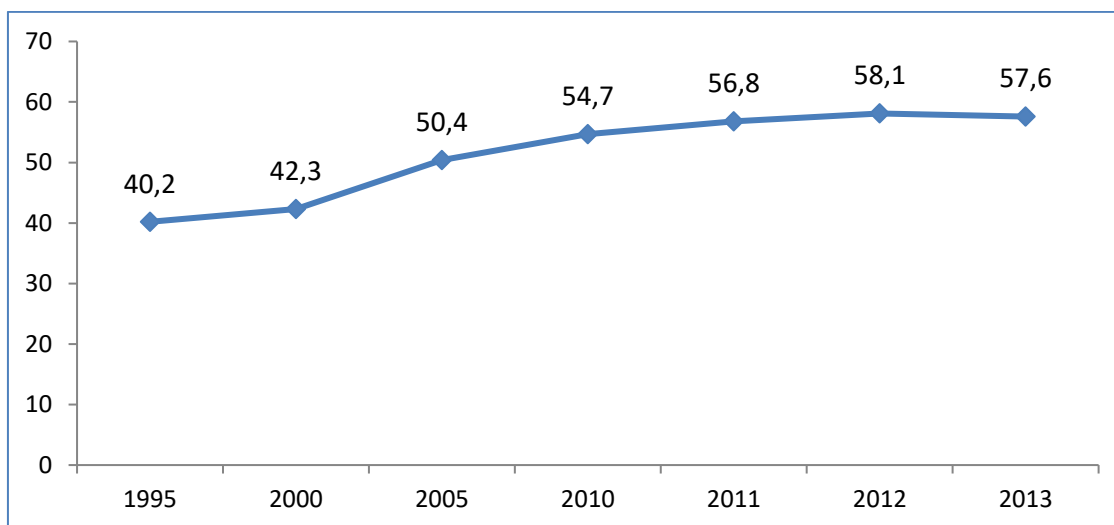


Source: GSO, 2015

The comparison of the paddy production areas between the different provinces shows that the provinces in the west of the Mekong Delta, located inland, bordering Cambodia has large area of paddy production like Tien Giang, An Giang, Dong Thap and, on contrary, the provinces in the east of Mekong Delta, bordered by East Sea, cover small area of rice cultivation due to salty soil such as Ca Mau, Ben Tre, etc (see figure 13).

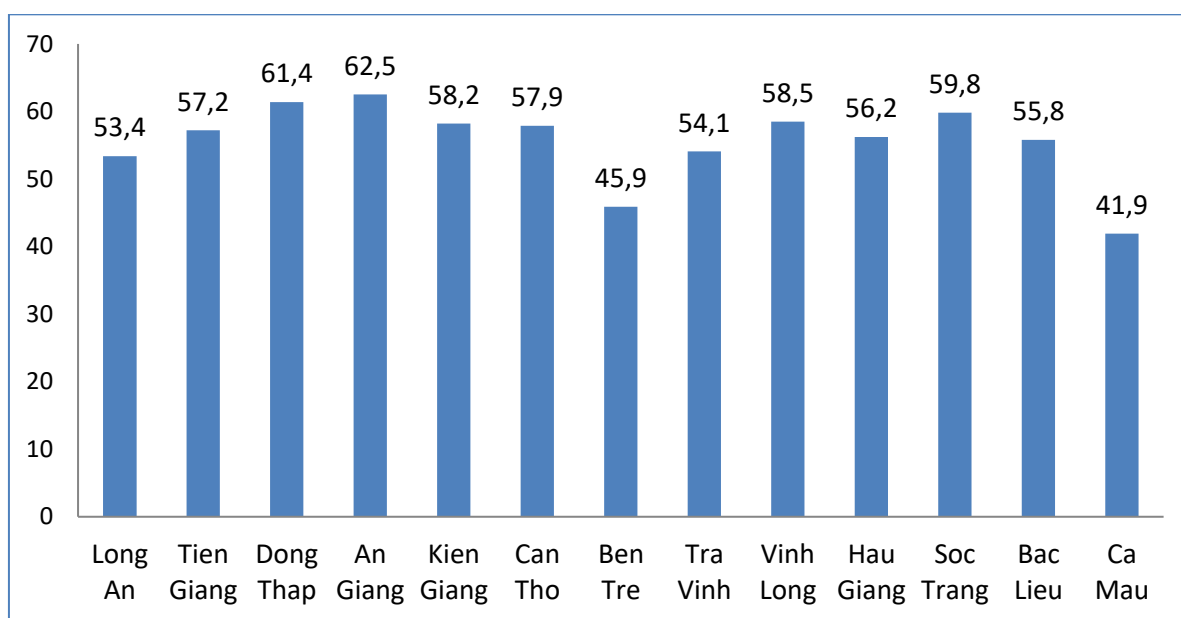
- Paddy yield: The paddy yield in the Mekong Delta has increased significantly in the last years, especially in the period from 2000 to 2010 with a growth rate of 2.93%/year. Currently, the paddy yield in the Mekong Delta reaches about 57.6 quintals/hectare and the growth rate of the paddy productivity is only 1.33%/year. The comparison of the paddy yield between provinces also shows the difference. The paddy yield of the inland provinces with less salt is higher than that of the provinces bordering the East Sea (see figure 14 and 15).

Figure 14: Paddy yield of Mekong Delta in the period 1995-2013 (quintals/ha)



Source: GSO, 2015

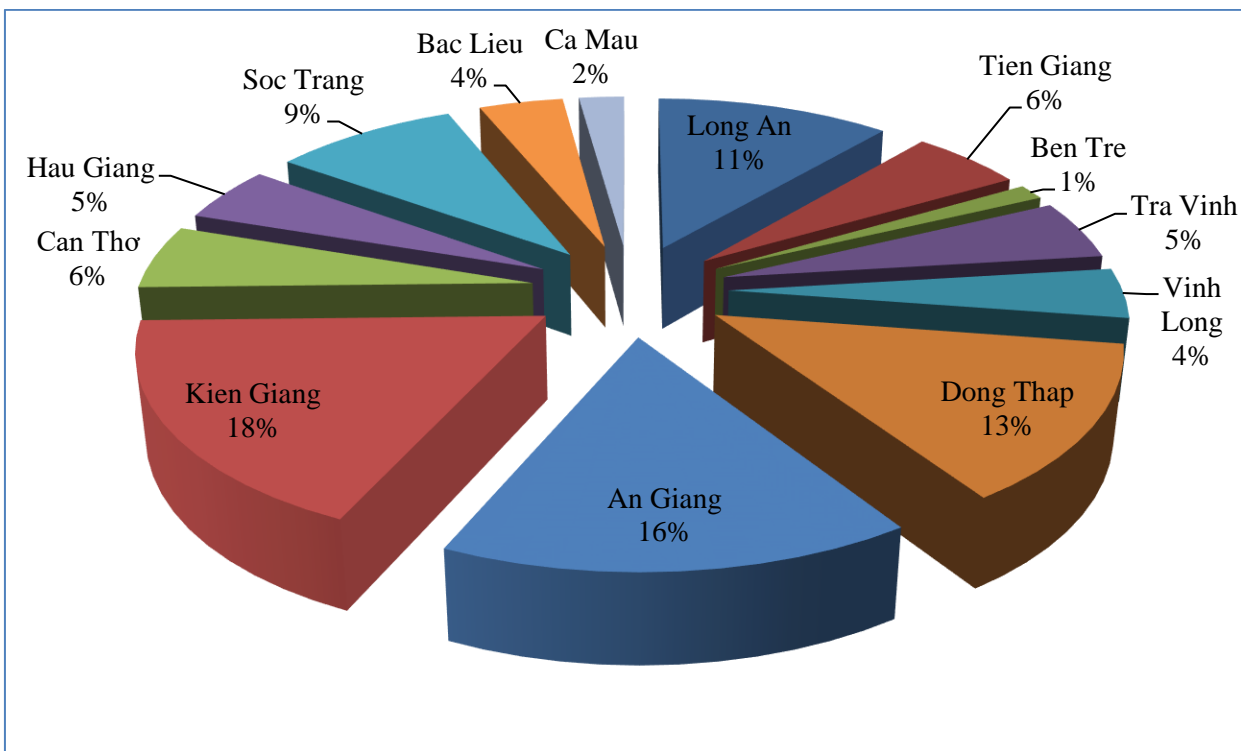
Figure 15: Paddy yield by province in Mekong Delta in 2013 (quintals/ha)



Source: GSO, 2015

- Paddy production: The paddy output of the Mekong Delta has increased continuously over the past 20 years with an average rate of 2.57%/year and the reasons for this increase are that increasing the productivity and the area of paddy production. However, the current growth rate of rice production in the region tends to decrease. Between 1995 and 2010 the growth rate of rice production was 4.6%/year and the current rate reaches 3.9%/year. The paddy production of the Mekong Delta reaches nearly 25 million tons/year. The data in graph 8 shows the differences of rice production between provinces in the Mekong Delta. The inland provinces have bigger rice production than the provinces near the sea.

Figure 16: Percentage of paddy production by province in the Mekong Delta in 2013



Source: GSO, 2015

- The structure of rice crops: There are 3 rice harvests in a year in the Mekong Delta: Spring paddy, Autumn paddy and Winter paddy.

+ *Spring paddy*: Starting in the rainy season (Apr-May) and ending at the end of the rainy season (Nov), including the long-term local varieties and adapting to deep water. Spring crop covers about 1.5 million hectares.

Table 5: Paddy production of the Mekong Delta by seasons (1,000 tons)

Year	Whole region	Spring	Autumn	Winter
1995	12,831.7	5,348.5	5,296.4	2,186.8
2000	16,702.7	8,003.7	7,004.5	1,694.5
2005	19,298.5	9,077.3	8,796.5	1,424.7
2010	21,595.6	1,027.6	9,720.6	1,599.0
2011	23,269.5	10,483.4	11,158.5	1,627.6
2012	24,320.8	10,834.2	11,677.0	1,809.6
2013	24,993.0	10,861.3	12,254.5	1,877.2

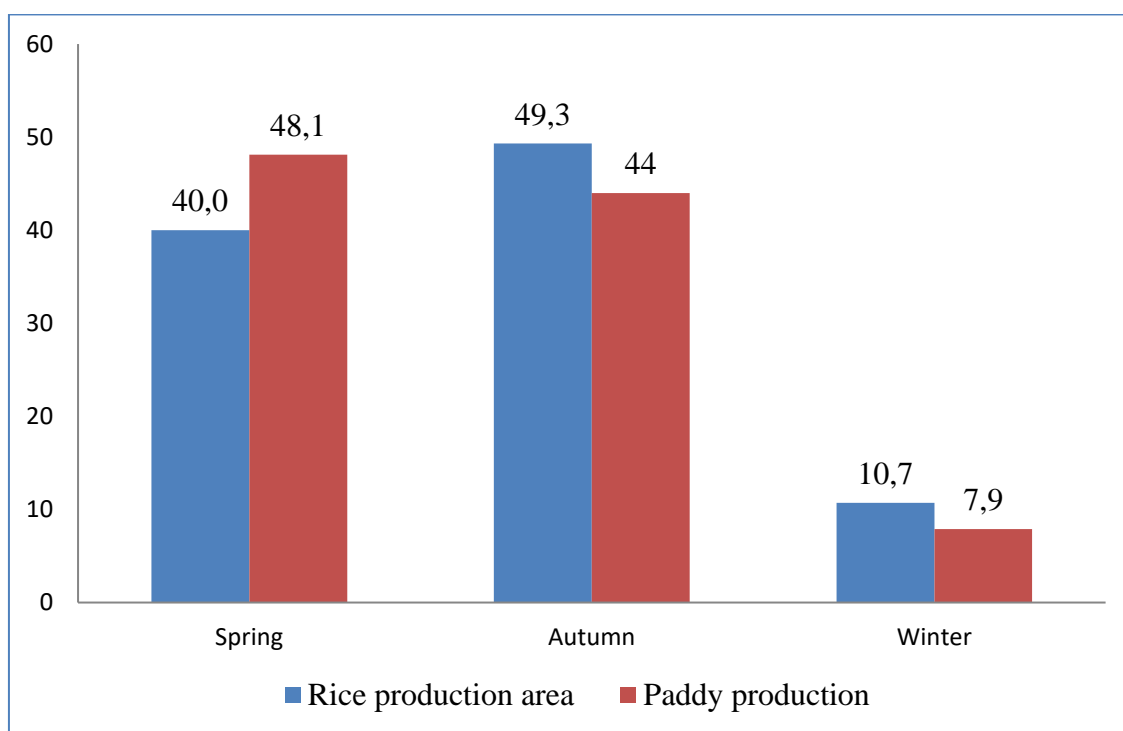
Source: GSO, 2015

+ *Winter paddy*: is a new crop with short-day varieties, the area of 70-80 thousand hectares, beginning in late rain season (Nov-Dec) and harvesting early April.

+ *Autumn paddy*: Autumn rice crop starts in April and harvests in the mid-August (due to harvesting in the rainy season and the wrong way of post-harvest handling the quality of paddy is the worst in the year) and an area of about 1.1 million hectares.

The figure 17 shows that rice production in the Mekong Delta took place mainly in two seasons: Spring and Autumn (accounting for around 90% of area and production) and Winter paddy only occurred around 10% in 2009.

Figure 17: Rice production in the Mekong Delta in 2009 by season (%)

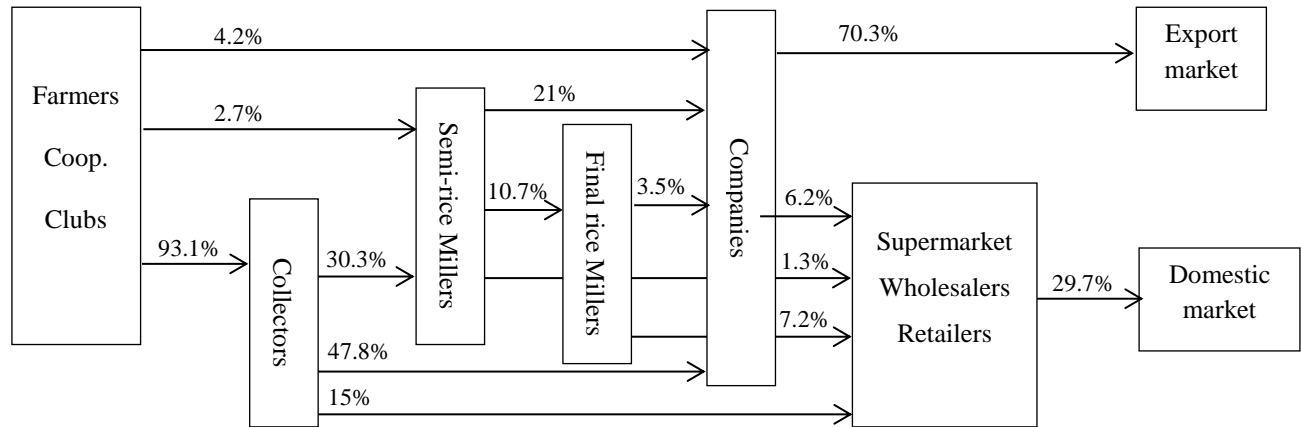


Source: Nguyen Van Son, 2013

3.3.2. Rice trade in the Mekong Delta

Rice market of the Mekong Delta: rice in the Mekong Delta has 2 main market channels: a channel for domestic market and a channel for export (diagram 2). According to William Smith (2013), annually the Mekong Delta supply of about 7.7 million tons entered the market (after deductions for seed, wastage and consumption) and of the 7.7 million tons of marketed rice, 70% was destined to export (equivalent to 90% of total national rice export), 30% to the domestic market.

Diagram 2: Rice value chain map in the Mekong Delta



Source: Vo Thi Thanh Loc and Nguyen Phu Son (2013)

For domestic market: rice in the Mekong Delta has to be transferred to many market places within the country during the year, particularly from the Mekong River Delta (surplus region) to other regions (deficit regions) (Luu Thanh Duc Hai, 2002). A study of Vo Thi Thanh Loc and Nguyen Phu Son (2013) showed that the domestic flow of rice in the Mekong Delta accounted for 29.7% of the total commercial rice of total region and in which 15%; 7.2%; 6.2% and 1.3% were distributed to three major markets: super-markets, wholesalers and retailers in provincial cities (inside and outside the Mekong Delta) by collectors; final rice millers; companies and semi-rice millers, respectively.

3.4. Market information transfer system (MITS)

3.4.1. Definition of market information

Market information is an essential factor in market information transfer system, it decides the effectiveness of the whole system. However, there is a lack of understanding of market information among participants on markets (Schulte R. B., 1992) and so in this part, we will introduce the definition of market information in order to help providers in market information transfer system collect market information in an accurate, adequate manner and meet the demand of receivers.

There are many different views about market information. Some researchers defined market information in a simple manner. Market information basically consists of data on prices and quantities (Mawazo M. Magesa, Kisangiri Michael and Jesuk Ko, 2014); Market information is data regarding supply, prices at various levels of the market system, quality available, etc. (Schulte R. B., 1992; Andrew W. Shepherd, 2011); Market information can be information on consumer needs and wants,

information on competitors, buyer requirements and forces in the market place (Lulama Ntshophe, 2011); And market information is information about prevailing market prices, commodity volumes and market conditions and also available price trend data as well as analysis for specific commodities (Andrew W. Shepherd, 2011). In addition, others have complex definitions about market information. According to Mawazo M. Magesa, Kisangiri Michael and Jesuk Ko (2014), market information include market news (information on prices, quantities, market conditions, and business contacts), market analytical reports (reports that analyze factors that cause changes in market conditions and their effects on stakeholders), and business reports (providing information that can help stakeholders identify reliable trade partners); or The World Bank (2008) defined that market information encompasses timely and accurate prices, buyer contacts, distribution channels, buyer and producer trends, import regulations, competitor profiles, grade and standards specifications, postharvest handling advice, and storage and transport recommendations.

According to Andrew W. Shepherd (2011), there are 3 kinds of market information:

- 1) *Who and where the buyers are*, how they can be contacted, what their conditions of business are, what their preferences for varieties, packaging and delivery are, etc.
- 2) *Immediate, or current, prices (and supply)*, which help farmers to decide whether to sell their crop on a particular day or wait in the hope that the price will rise, or which enable them to decide if the price offered by the local trader is a reasonable one.
- 3) *Longer-term, or historical, price data* over a number of years, which helps farmers to decide, for example, whether it would be profitable to start growing new crops, to grow existing crops out of season or to seek to produce higher quality crops.

Besides, according to Andrew W. Shepherd (2011) market information is also divided into 2 kinds:

- 1) **Current market information.** Current market information meet the immediate commercial needs of farmers and traders. Current market information help reduce risks for farmers and traders. Access to timely information on prices and quantities plays a crucial role in reducing the risk in a market transaction. Farmers with current market information can decide whether or not to harvest and they also have the option of selling at farm gate, of delivering to a local assembly market, of supplying a wholesale market directly or of selling directly to retailers or even to consumers (Andrew W. Shepherd, 2011).
- 2) **Historical market information.** Historical market information is compiled over time, often several years, and can be used for production planning, storage decisions, government planning and early

warning. Historical market information can provide valuable information for farmers. Longer-term trend data allow farmers to make decisions on which crops to grow and when to harvest, based on seasonal price trends and historical data also enable farmers and traders to make more informed decisions on storage options (Andrew W. Shepherd, 2011).

Generally, from analysis above we give a common definition of market information used in my thesis as follows: Market information is current and historical information on:

- Prices.
- Quantities.
- Market conditions.
- Customer demands.
- Distribution channels.
- Market analysis.

This definition of market information is basic and makes a center-point in my thesis.

Table 6: Characteristics of market information

Elements of market information	Description
Prices	Information on prices on different markets and different times and different traders
Quantity	Quantity demanded by different markets and different times and different traders
Market conditions	Information on characteristics of market such as size of each market in given time, competitive products, the market's growth rate, etc.
Customers demand	Demands on quality, quantity, price, packing, time to buy, etc.
Distribution channels	The path through which products travel from farmers to final customers
Market analysis	Market analysis reports about historical market and future estimations to help farmers build plans in their production and trade

Such basic market information is very useful for Vietnamese farmers because almost all smallholder farmers in Vietnam are engaged in agricultural market activities without accurate, timely, consistent and relevant market information. Interestingly, this basic market information is already available in

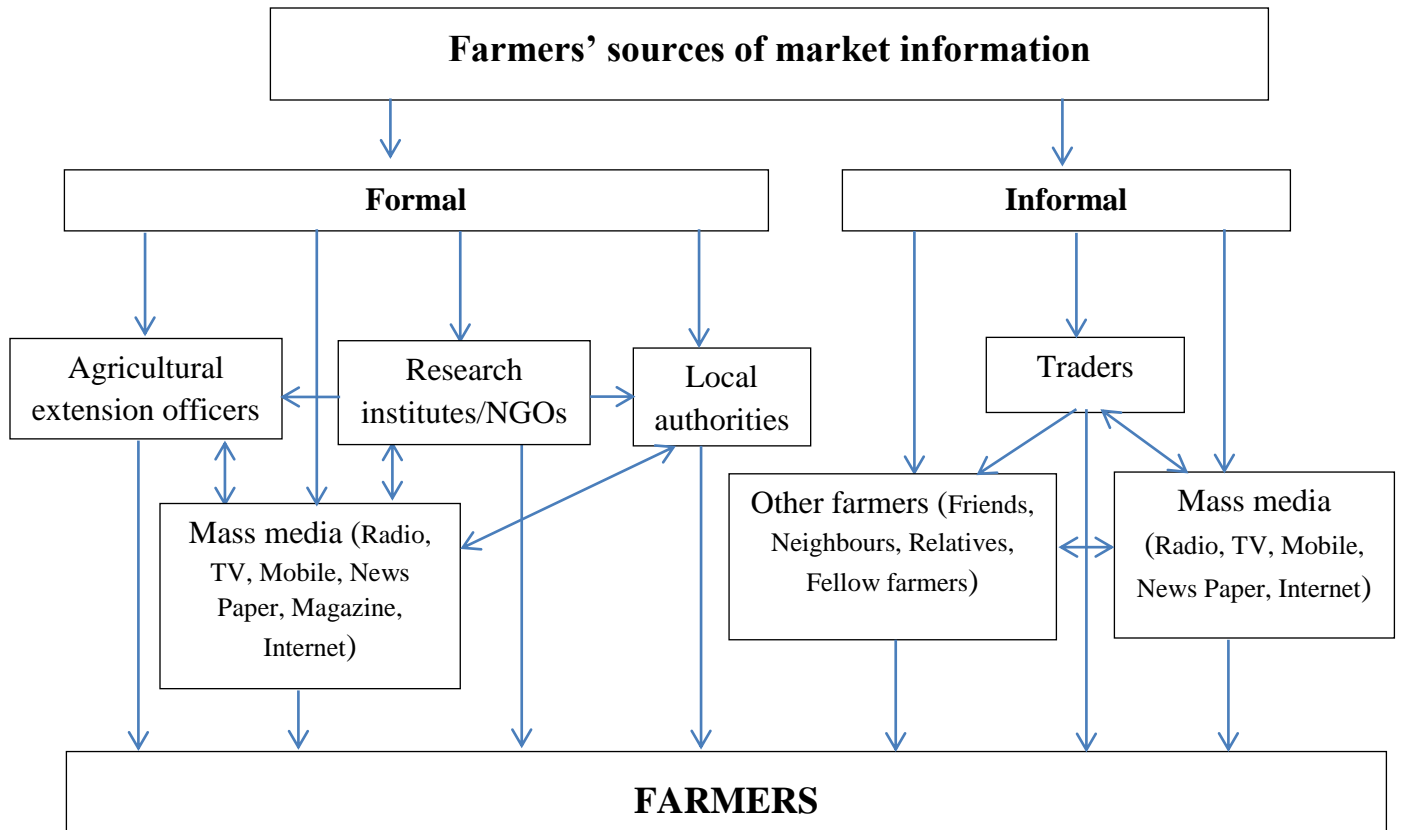
Vietnam but farmers cannot access to it because of the ineffectiveness of transfer system. Besides, some researches show that agriculture has failed to benefit rural farmers in developing countries like Vietnam because of inefficient market information (Mawazo M. Magesa, Kisangiri Michael and Jesuk Ko, 2014). Due to the lack of market information, farmers in Vietnam are failing to negotiate better on the prices of their produces with buyers and thus are paid a little. Besides, with reliable market information farmers can make informed decisions on where to sell, when to sell, who to sell to and to plan their production to get the most of the profit and to meet the market demand (Heather Kindness and Ann Gordon, 2011; Shaun Ferris and Peter Robbins, 2004).

3.4.2. Market information sources

I will introduce the market information sources in this part. This is a very important part in MITS because information sources will decide so much on the quality of information farmers will get. Information source is an institution or individual that creates or brings about a message (Starasts, A. M., 2004) and hence, there are many kinds of different sources: media, radio, TV, personal experience, books, journal and magazine articles, expert opinions, internet, extension agents, etc.

Farmers can access to market information from many different sources and in fact, farmers use multiple sources of market information to access to the market information because they have said they usually do not find any single source providing all that they need and these sources have the various reliability and accuracy (Surabhi Mittal and Mamta Mehar, 2013). These are 2 kinds of formal and informal sources of market information for farmers (Edda Tandi Lwoga and et al, 2010). The informal sources constitute face-to-face interactions with friends, relatives, other farmers, and traders or mass media when mass media get the market information from informal sources to transfer to farmers. On the other hand, formal sources refer to information that is created specifically for farmers by governmental agencies such as extension agents, local authorities or by NGOs or by mass media when media uses market information from formal sources to transfer to farmers. Farmers use a combination of these formal and informal sources to access to information simultaneously (Surabhi Mittal and Mamta Mehar, 2013).

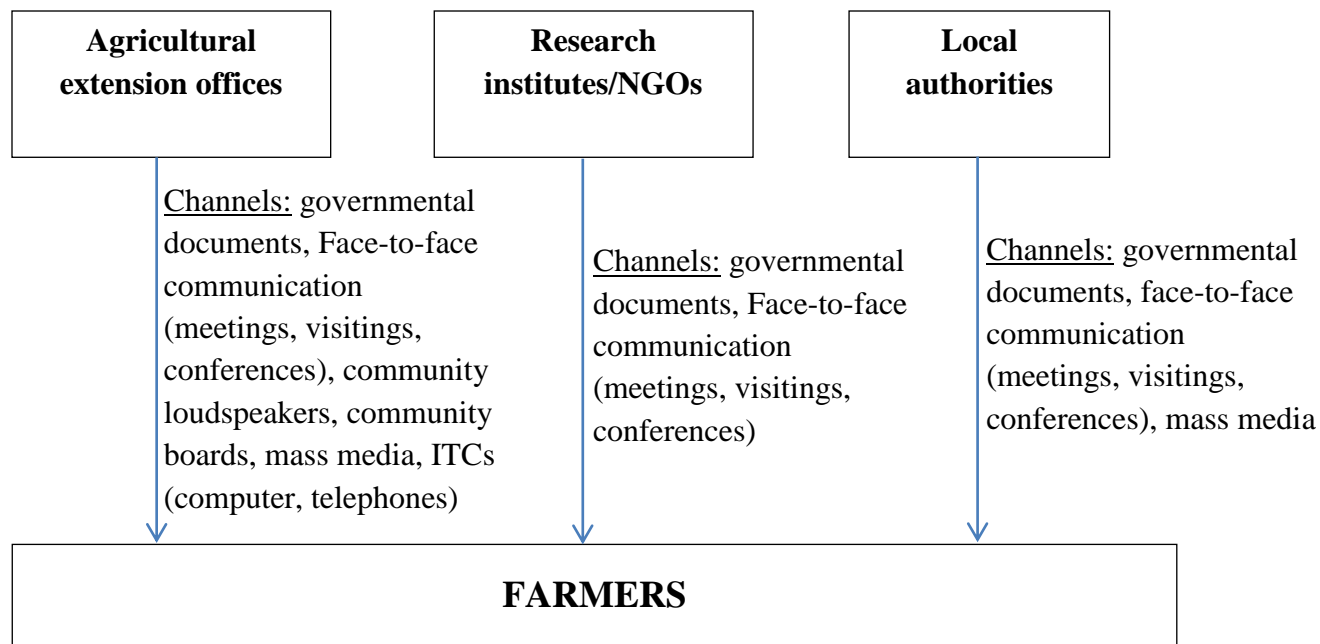
Diagram 3: Farmers' sources of market information



According to Le Van Cuong, Ngo Thi Thuan, Nguyen Hung Anh (2012), market information sources in the agricultural value chains in Vietnam are also divided into 2 sources: formal and informal ones. Farmers in Vietnam have been looking for information from these 2 sources such as television, radio, newspaper, relatives, neighbors, traders, governmental agencies, NGOs.

Formal sources of market information in Vietnam are extension agents, local authorities, research institutes/NGOs and mass media. The market information in the formal sources is created by researches in research institutes/NGOs or by collecting and analyzing the market data by extension agents. After that, the market information will be directly provided to farmers through governmental documents (reports), face-to-face communication (meetings, conferences, visitings), or via mass media by documents, videos, radio, internet, reports, etc, or to extension agents, local authorities through community loudspeakers, community boards, governmental documents (reports), face-to-face communication (meetings, conferences, visitings). But in fact, few Vietnamese farmers have accessed to these sources because the market information from these sources is not relevant for them and the availability of these sources is low and so it is difficult for farmers to access to them.

Diagram 4: The flow of the market information package¹ via formal ways to farmers



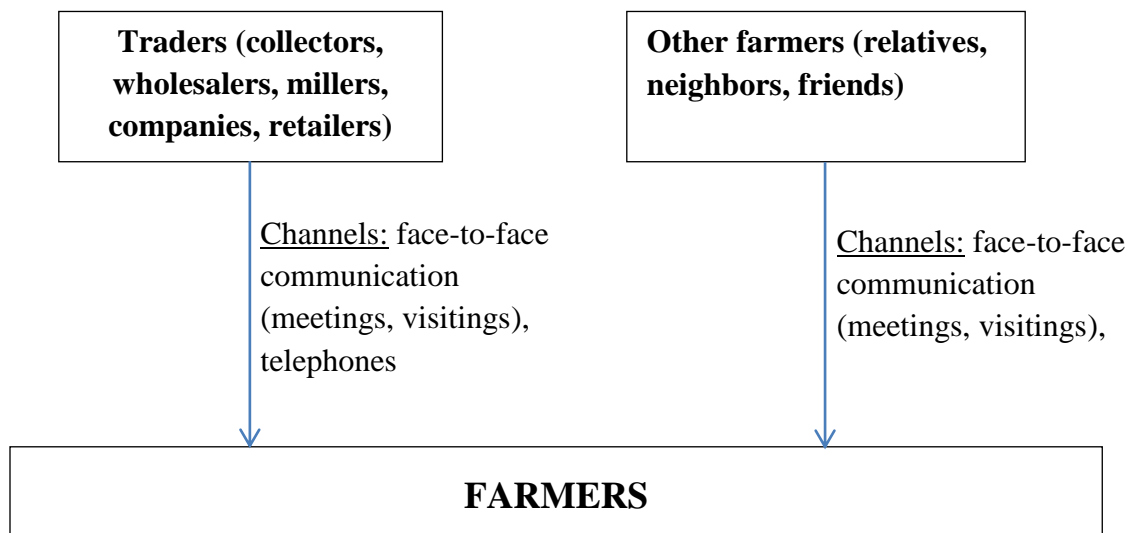
In channels farmers are accessing to market information from via formal sources, face-to-face communication that are the most profitable channels because they are easy to access at very low costs. Besides, community loudspeakers and community boards are also important channels for farmers because a big amount of farmers can access to market information from through these channels at low costs. The ability of farmers to access to market information via mass media, ITCs and governmental documents is low in Vietnam because farmers need to have knowledge and fund, the availability of these channels to farmers is low.

The content of market information from the formal sources to farmers contains all elements of market information such as prices, quality, quantities, market conditions, customer demands, distribution channels and market analysis. So we can say that the quality of the market information from formal sources is quite good for farmers.

Informal sources of market information in Vietnam are traders, farmers (relatives, neighbors, friends) and mass media. The market information from these sources is often derived from traders and transferred directly to farmers or via other farmers and mass media through email, telephone, face-to-face communication (meetings, conferences, visitings), documents, videos, radio, internet, reports, etc. Vietnamese farmers are accessing mainly to these sources.

¹ Market information package includes the market information provided to farmers through communication channels

Diagram 5: The flow of the market information package² via informal ways to farmers



Farmers are mainly accessing to market information from informal sources via face-to-face communication channel because the distance between farmers, traders and other farmers is very near, they can meet frequently. Other channels such as telephones, email are underused by farmers to get market information from informal sources.

The content of market information from informal sources is simple. It contains mainly information about prices, quality, quantities, and customer demands. Other contents in market information such as market conditions, distribution channels and market analysis often are hidden by traders to bring more profits to them.

a) Extension system as a formal source of market information:

Extension offices are the most important actors in MITS in Vietnam because they are not only a formal source of market information but also a good channel to transfer market information to a big amount of farmers at low costs. Agricultural extension system in Vietnam has appeared at grassroots level so farmers can easily access to them.

Extension is the organized exchange of information and the purposive transfer of skills (Uwe Jens Nagel, 1997) and agricultural extension plays a key role in information transfer (Surabhi Mittal and Mamta Mehar, 2013), farmers called extension department as choice number 1 in solving their problems (Iftikhar Ahmed, Muhammad Idrees and Naeem Shah, 2009).

² Market information package includes the market information provided to farmers through communication channels

Extension approach: Currently the extension programs has been implemented in a top-down manner in many places and this means that the information provision of extension agents will not solve the farmers' problems and meet their information needs. According to Daniel Tadesse (2008), to assure the need of farmers' information provision, the process of implementing extension programs should be bottom-top, based on the farmers' problem, aspirations, needs, and environment.

Extension agents are the main sources for market information among the farmers (Salleh Hassan Md. et al., 2011; Ayubu J. Churi, et al., 2012; Singh et al., 2016) because extension system has been working at grass-root level and has a close relationship the farmers (Neethi B., Sailaja A. and Soumya B., 2014 and Salleh Hassan Md., et al., 2011). Besides, extension system is also a communication channel. Information transferred from extension agents to farmers is undertaken through extension workers and broadcast media (Irfan Haider, 2014). The extension transfer is a preferable channel of farmers due to the fact that the extension channel is an interpersonal interaction and an immediate feedback. A study of Oto Jacob Okwu and Shimayohol Daudu in Nigeria (2011) shows that the majority of farmers (54.75%) considered extension channel as the most preferred channel and another study of Asogwa, B. C., Ezihe, J. A. C., and Ogebe, F.O. about market information usage among farmers in Nigeria in 2012 indicated that 62.67% of farmers got market information from extension agents.

However, there are some obstacles in market information transfer of extension system as follows:

- Firstly, the amount of extension agents as a market information source is not adequate: the availability of an extension workers in the community will lead to higher evaluations of their market information adequacy (Asogwa, B. C., Ezihe, J. A. C., and Ogebe, F.O., 2012) but in reality, the ratio of extension agents to farmers is far from adequate (Benard Ronald, Gillness F. Silayo and Kikuli Juma Abdalah, 2015) So farmers have less chances to access to extension services. David Rees et al. (2000) reckons that the extension agents are a very important source to transfer market information to farmers but they are dissatisfied with the quality and frequency of their interactions and in turn, this leads to access to non-updated and timely information to respond quickly to changes of markets.

- Secondly, small amount of farmers can access to market information from extension agents, only 47% of farmers can get information from extension agents (Surabhi Mittal and Mamta Mehar, 2013). According to Asogwa, B. C., Ezihe, J. A. C., and Ogebe, F.O. (2012); to solve this problem we need to change information transfer in extension system. It means that other methods of extension information dissemination should be used to transfer current, adequate and useful market information

to the farmers to reach a large number of the farmers and to teach them on their areas of critical needs. Of course, these methods of market information disseminated to the farmers have to ensure that farmers can understand and use market information. Or extension agents can meet some key members of the farmers' communities who can pass on the information to the other farmers.

- Thirdly, extension services frequently fail to provide adequate information to farmers due to the fact that it doesn't recognize their specific needs (Daniel Tadesse, 2008). This limitation can be due to the system of market information collection, analysis and transfer to farmers have not worked well.

- Lastly, small fund for MITS to farmers (Benard Ronald, Gillness F. Silayo and Kikuli Juma Abdalah, 2015). In India, the fund for extension activities is so low, varied from 0.03% to 9% of their total budget for various extension activities including publication of literatures in local languages, conducting training programs, organizing demonstrations, fairs, exhibitions and training (Chander M., Rathod P., 2013). This situation is also happening in Vietnam. According to Nguyen Van Bo (2012), the funding for extension was limited. In 2011, the total budget for all extension activities accounted for 20 millions USD, equally to 2USD/farming household/year.

However, in my opinion, market information transfer to farmers via extension should be developed in developing countries like Vietnam because farmers in these countries have less chances to access directly to information from different information sources, particularly the formal sources like higher Government officials, scientists, etc. (Neethi B., Sailaja A. and Soumya B., 2014).

b) Mass media as a formal source of market information:

Mass media can be printed, spoken, visual or a combination of the three (Singh et al., 2016) and it has a positive influence on the process of market information transfer to farmers. Mass media can increase quantity of information transfer and reduce information distribution costs. Mass media can give the information to farmers, even in remote places. And currently, mass media is increasingly used in agricultural communication such as in Pakistan two-thirds of farmers meet information needs through mass media (Tahir Munir Butt et al., 2008). Some advantages of mass media in market information transfer: mass media increases accessibility to the market, improves communication, identifies markets, saves time and energy, and reduces business costs (Farhad Lashgarara, Roya Mohammadi and Maryam Omid Najafabadi, 2011). Mass media has improved market transparency (World Bank, 2011).

Mass media such as radio, television, mobile phone has a huge audience because of the very low cost (Singh et al., 2016). According to a study of Surabhi Mittal and Mamta Mehar in India (2013) many

farmers have mobile phones, radio and television with ratios of 44.8%, 14.4% and 35.7%, respectively, meanwhile minority of farmers have landline phone and computer (see the table 7).

Table 7: Own ICT assets of farmers

Access to ICT assets	Percentage
Radio	14.4
Television	35.7
Landline phone	3.0
Mobile phone	44.8
Computer/Internet	2.1

Source: Surabhi Mittal and Mamta Mehar, 2013

➤ Radio:

Radio is a powerful communication tool in promoting agriculture and developing rural areas and especially where literacy rates are low (Akpomovie, Orhioghene, Benedict, 2010 and Robert Chapman et al., 2003). Radio can solve the illiteracy barrier among farmers and radio listeners don't need high education level (Maria Tamoutsidou, 2013 and Shuwa M.I., Shettima L., Makinta B.G., Kyari A., 2015). The rate of farmers owning radio is high. According to Salleh Hassan Md., et al. (2011), 84.6% of farmers in Malaysia owned a radio set. In India, radio is one of the most popular and widely used media to obtain information. There are around 110 million radio listeners in India and over 60% of them are in the rural areas (Jabir Ali, 2011).

Radio is the most popular source and channel of information for farmers (Ndaghu A.A, Yohanna. I, Simon. B.P., 2013 and Ayubu J. Churi, et al., 2012). Charles Kenny (2002) claimed that a larger number of rice farmers were receiving market information through radio broadcasts. A study of Priyangani Adikari in Sri Lanka (2014) indicates that 44.2% of farmers considered radio as the most preferable source of information. In Tanzania rural farmers heavily depend on the radio in accessing information (Mawazo M. Magesa, Kisangiri Michael and Jesuk Ko, 2014) with 83% of farmers in Tanzania listening to the radio for getting different information including agricultural market information. In Uganda, the principle sources of market information for farmers are mainly radio market news (65.1%) (Ulrich Kleih, Geoffrey Okoboi and Monika Janowki, 2004). Or in Nigeria, 3 researches show that radio is an important source of information for farmers because radio is portable, affordable and can be heard anywhere. A study of Shuwa M.I., Shettima L., Makinta B.G., Kyari A. (2015) indicates that 87% of farmers in Nigeria prefers radio as their best source of information.

Another study of Emmanuel Chukwunyem Odiaka in Nigeria in 2010 reckons that 81.2% of farmers used radio to get rice information. A research on market information usage among rice producers in Benue State, Nigeria of Asogwa B. C., O. Abu and M. A. Onkpe (2014) has indicated that main sources of market information of rice farmers in Nigeria are radio.

The most suitable time for farmers to listen programs on radio is from 7.00 to 8.00 pm (Mazher Abbas, A.D. Sheikh, Sher Muhammad and Muhammad Ashfaq, 2003). This is rest time of farmers after a working day. According to Mazher Abbas, A.D. Sheikh, Sher Muhammad and Muhammad Ashfaq (2003), but in reality, only 29.8% of farmers told that the time on radio for agricultural programs was appropriate for them.

A study of Ashish Kumar Sharma in India (2014) claims that majority of farmers (74.25%) received maximum satisfaction with the information obtained from radio, 21.5% of farmers got average satisfaction, whereas only 4.25% farmers got below average satisfaction from radio. So we can say that the quality of information from radio is quite good for farmers.

Some impacts of radio on the process of market information transfer:

- Radio can meet the information needs of farmers three times as much as the extension worker (Tahir Munir Butt et al., 2008).
- Radio can increase the selling prices of farmers' products: researches of (CTA, 2006; Jakob Svensson and David Yanagizawa, 2008) in Uganda show that farmers with market information from radio got higher farm-gate prices for their products.

Besides, there are also some obstacles in market information transfer through radio: radio programs for agricultural issues were not enough, information provided was limited (Ayubu J. Churi, et al., 2012) and broadcasting times on radio are sometimes not appropriate for most farmers (Maria Tamoutsidou, 2013).

➤ Loudspeakers:

Other important source of information in developing countries with a large number of farmer households like Vietnam is community loudspeakers because the costs for running loudspeakers is the lowest among mass media and it also brings information to a large and scattered audience simultaneously (Onumadu F.N., 2011). An example of China, according to Tian Xiujuan, to transfer information to millions of farmer households in 700,000 villages in the whole of the country the government need to use loudspeakers to undertake information broadcast in communities besides

other mass media and traditional channels. Or Addul Razaque Chhachhar et al. (2014) has said that loudspeakers have been developed widely in India to transfer information to farmers.

In addition, another advantage of loudspeakers is that using loudspeakers to transfer information to farmers doesn't influence farmers' activities (Tian Xiujuan). They can listen to information from loudspeakers everywhere and this will increase farmers' capacity to access to information.

In Vietnam, community loudspeakers are also available in almost all villages and the number of loudspeakers depends on the size of the population and territory of the village. When the loudspeakers are turned on all farmers in the village can listen to the information immediately. However, recently, along with development of mass media such as television, telephone and the Internet in rural areas, the functions of loudspeakers have gradually reduced in transferring information to farmers. We propose that extension agents should use community loudspeakers to transfer market information to farmers in Vietnam because developing loudspeakers in Vietnam only need very low costs. Due to loudspeakers in rural areas that are the available broadcast resources built at grassroots level in the past years, do not need new investments.

➤ Television:

Television is also an important source and communicating tool of information related to the agriculture sector (Akpomuvie, Orhioghene, Benedict, 2010 and Maria Tamoutsidou, 2013) and the majority of farmers own TV, for example 95.4% of population in Malaysia owned TV in 2004 (Salleh Hassan Md., et al., 2011) and in Nigeria it is 90.83% (Ani A.O. et al., 2015).

Some researches show that TV is an important source of market information for farmers. A majority of farmers (64.2%) in Sri Lanka considered television as the most important source of information (Priyangani Adikari, 2014). A study of Rupasena L.P., Bandara Rathnayake, T. Ravichandran in Sri Lanka in 2007 showed that almost of farmers saw price information on television. In contrast to it, some other researches also show that a small number of farmers used TV to get market information. A study of Hema Yadav (2012) indicates that only 0.5% of rice farmers in Assam district, India accessed to market information from television. According to Ronald Benard, Frankwell Dulle and Honesta Ngalapa (2014) in Tanzania a small number of rice farmers used television as a source of market information. A study of Asogwa B. C., O. Abu and M. A. Onkpe (2014) showed that 5.38% of farmers in Nigeria got information from TV.

Suitable time for farmers to watch agricultural programs on television: according to Mazher Abbas, A.D. Sheikh, Sher Muhammad and Muhammad Ashfaq (2003), after 8.00 PM is the best time for agricultural programs on television.

The level of farmers' satisfaction with market information from TV is high. 48.5% of farmers in India got maximum satisfaction, 45.5% got average satisfaction and only 6% farmers got below average satisfaction from TV (Ashish Kumar Sharma, 2014).

Some obstacles in market information transfer through TV: the existing time for agricultural programs on television was not appropriate for farmers (Muhammad N. Jafri, 2014 and Mazher Abbas, A.D. Sheikh, Sher Muhammad and Muhammad Ashfaq, 2003), irrelevant programs, inadequate information and language are responsible for their reduced interest in watching TV (Muhammad N. Jafri, 2014).

➤ Newspapers and magazines:

Newspapers and magazines are also sources of market information for farmers. Farmers often access to newspapers and magazines through village leaders or local authorities (Paul A. Manda, 2002) or from members in their families and neighbors (Singh et al., 2016).

In the past, newspapers played an important part in the development of agriculture (Singh et al., 2016) but the role of newspapers in market information transfer has been reducing more and more because of high cost to buy newspapers (Shuwa M.I., Shettima L., Makinta B.G., Kyari A., 2015; Asogwa B. C., O. Abu and M. A. Onkpe, 2014). According to a study of Shuwa M.I., Shettima L., Makinta B.G., Kyari A. in 2015 shows that only 4% of farmers in Nigeria considered newspapers as a preferable resource of information or according to Asogwa B. C., O. Abu and M. A. Onkpe, 2014, in Nigeria Newspapers and Magazines are used and accessed by minority of farmers to get market information. In India, a study of Hema Yadav (2012) also indicated that 0.5% of rice farmers in Assam district, India accessed market information from newspapers. In Uganda, 13.1 % of farmers used newspapers as the source of market information (Ulrich Kleih, Geoffrey Okoboi and Monika Janowki, 2004).

➤ Internet:

Internet users are increasing day by day in the world and in the era of modernization, internet is very important for agriculture development especially for the process of disseminating agricultural information (Salleh Hassan Md., et al., 2011). Farmers have also realized that Internet is useful for them to look for market information (William Mokotjo and Trywell Kalusopa, 2010). However, the internet usage in rural areas is still at a low level with a ratio of 14% in 2008 (Table 8).

Table 8: Household use of internet in rural area in Malaysia

Year	%
2005	12
2006	18
2008	14

Source: Salleh Hassan Md., et al., 2011

Currently, very few farmers have used Internet as a source and channel of information dissemination because they do not have the required skills or expertise (Megumi Muto, 2008) and it needs high costs to buy computer and pay monthly internet fee. A study of William Mokotjo and Trywell Kalusopa in Botswana (2010) indicates that only 2.51% of farmers chose computer as the most appropriate technology to disseminate information to them. Another study of Ani A.O. et al. in Nigeria (2015) also shows that computer and internet (37.50%) was the least available mass media because the relatively high cost of computer as well as internet and the technicality associated with their use may have limited their availability. And in Tanzania none of rice farmers were using internet as the source of agricultural information (Ronald Benard, Frankwell Dulle and Honesta Ngalapa, 2014).

➤ Telephone:

Mobile phones are rapidly spreading all over the world with about 76 per 100 inhabitants in 2010 and this rapid spread of mobile phones offers new possibilities for agricultural households in developing countries to overcome important barriers of distance and improve the access to information and services (Marcel Fafchamps and Bart Minten, 2011). Majority of farmers possessed mobile phones which were cheap and easy to use and they were able to make calls to extension workers and other agricultural stakeholders to get market information (Ayubu J. Churi, et al., 2012). In Nigeria, 81% of farmers owned mobile phones in 2015 (Ani A.O. et al., 2015) and 59.6% of farmers used cell phones to find rice information in 2010 (Emmanuel Chukwunyem Odiaka, 2010). Rural farmers in Tanzania heavily depend on mobile phones in accessing to information (Mawazo M. Magesa, Kisangiri Michael and Jesuk Ko, 2014) because 75.9% of farmers in Tanzania used mobile phones to get and disseminate information including agricultural market information or a study of Ronald Benard, Frankwell Dulle and Honesta Ngalapa (2014) showed that 41.2% of the rice farmers in Tanzania used cell phones as an important source of information.

However, a study of William Mokotjo and Trywell Kalusopa in Lesotho of Botswana (2010) shows an opposite result. Very few farmers used cell phones to get market information. According to William

Mokotjo and Trywell Kalusopa (2010), although cell phones can be used to provide access to agricultural markets information to strengthen the farmers' bargaining power because they have access to real-time market information alternatives but in reality, a very small number of farmers (2.01%) chose cell phones as the most appropriate technology to gain information because the cost of making calls is very high.

Some impacts of telephone:

- Telephones reduce price dispersion across markets by a minimum of 6.5% (Jenny C. Aker, 2008).
- Telephones reduce time and costs of information search (Jenny C. Aker, 2008; William Mokotjo and Trywell Kalusopa, 2010).
- Telephone can increase farmers' capacity to join in markets: According to a study of Megumi Muto and Takashi Yamano (2009) in Uganda, after the expansion of the mobile phone coverage farmers sold bananas more than 20 miles.

c) Formal and informal sources of market information:

Traders: In agricultural value chains, traders have an important role, they are an actor to bring agricultural products from farmers to final customers and are also market information providers to other participants.

In a study of S. Saikia and U. Barman (2013) in India, the results revealed that 100% of rice farmers utilized the traders as their market information source. In Tanzania, some researches show that rice farmers considered traders as an important source of market information. A study of Albert Samwel Moshi (2013) points out that 58% of rice farmers in Tanzania are accessing market information from traders and another study of Agnes Godfrey Mwakaje (2010) on sources of market information for rice farmers in Tanzania shows that 37.5% of rice farmers in Tanzania used traders as a source of market information. In Uganda, 60% of farmers considered traders the principle sources of market information (Ulrich Kleih, Geoffrey Okoboi and Monika Janowki, 2004).

Face-to-face communication: Face-to-face communication is identified with the presence of two or more individuals who have the ability to provide information for others (Bello M. and C. P. O. Obinne, 2012). And nowadays, face-to-face communication is more effective, needed and believed by the farmers than the mass media to obtain information (Salleh Hassan Md., et al., 2011). Face-to-face communication is divided into 2 kinds of formal and informal sources based on who farmers communicate with. Face-to-face communication is a formal source when farmers communicate with

extension officers, NGOs, local authorities and it is an informal source when farmers communicate with neighbors, relatives, and friends.

However, farmers mainly seek to obtain knowledge and information from informal sources rather than formal ones (Edda Tandi Lwoga, et al, 2010). A study of Saikia S. and Barman U. (2013) on 120 rice farmers in India indicated that only 6.67% of rice growers accessed market information from the extension agents and about 52.94%; 17.64% and 22.55% of rice growers accessed market information from their neighbors, family members and friends, respectively. In Zambia almost all farmers obtained information from personal experience, and informal networks (family, friends, and colleagues) to meet their information needs (Trywell Kalusopa, 2005).

According to Dinesh Das (2012), in face-to-face communication farmers in India mainly got information from friends, neighbors, relatives (34.7%) and from spouse (42.1%) (see Table9).

Table 9: Sources of agricultural information in face-to-face communication

Sources	Number	Percentage
Extension agents	-	-
Fellow farmers	10	10.5
Experienced farmers	2	2.1
Friends, Neighbors, Relatives	33	34.7
Spouse/Male	40	42.1

Source: Dinesh Das, 2012

According to Ayubu J. Churi, et al. (2012), communication and share of information from farmer to farmer has remained to be the main methods despite the low quality of information because information communication with fellow farmers is made easy through meetings in the village or on farms.

Some obstacles of face-to-face communication: it needs more time than mass media. The quality of face-to-face communication is low due to the messages through them that become greatly distorted (Bello M. and C. P. O. Obinne, 2012).

Within the face to face communication the “strongest” line is created between the farmers and other farmers who can be relatives, neighbors, friends. This is a very important source for farmers because they have a close relationship and information from these sources that is very huge and diversified. Farmers can access to many kinds of various information (Okiedo-Okojie D. U., 2015). According to Surabhi Mittal and Mamta Mehar (2013), 41% of the farmers ranked other farmers as the most

important source of information and 66% of rice farmers in Assam district, India accessed market information from fellow farmers (Hema Yadav, 2012). Another study in India in 2013 also points out that about 52.94%, 17.64% and 22.55% of rice farmers accessed market information from their neighbors, family members and friends, respectively (S. Saikia and U. Barman, 2013). In Tanzania, the majority of the rice farmers rely on their family or parents, neighbors for obtaining the information (Ronald Benard, Frankwell Dulle and Honesta Ngalapa, 2014), for example, the source of market information for rice farmers in Tanzania are fellow farmers (88.8%), relatives (56%) (Agnes Godfrey Mwakaje, 2010). A study of Christoph Spurk, et al (2013) on agricultural information of farmers in Kenya indicates that main sources of information for farmers are other farmers (78%), family (67%). In Nigeria, the main sources of market information of rice farmers are other rice producers (53.85%), friends/family (28.46%) (Asogwa B. C., O. Abu and M. A. Onkpe, 2014). In Uganda, the principle sources of market information for farmers are mainly family/friends/neighbors (72.6%) (Ulrich Kleih, Geoffrey Okoboi and Monika Janowki, 2004).

Concluded by this chapter we can establish that market information sources of rice farmers are diversified with both formal and informal sources. And the main reason for choice of information source was proximity (33.7%), assured quality (21.1%), the only available option (20.6%), timely availability (13.7%) and the main reason for not using other sources included: not available (68.4%), do not know about the source (16.2%), poor service (9.2%), and low relevance (3.0%) (Kumar D., Roy A., 2014). Quality of market information sources: the characteristics of a good information source are relevance, timeliness, accuracy, cost-effectiveness, reliability, usability, exhaustiveness and aggregation level (Dushu Tangkat Yusuf, 2011). The current studies indicate that the quality of market information sources is moderate. A study of Astewel Takele (2010) showed that 42.6% of rice farmers in Ethiopia were indicated that the information quality was adequate, 21.7% also responded both reliable and adequate, and 20.9% responded only reliable and only 2.3% was recorded as quality of information is timely.

Along with the development of information technology, farmers in Vietnam have many chances to access to many various information sources such as television, radio, newspaper, relatives, internet, neighbors, traders, governmental agencies. Similarly to the situation in other countries, Vietnamese farmers' main sources of market information are still traders and face-to-face communication with other farmers (Luu Duc Thanh Hai, 2005). For mass media, farmers' capacity to access to is very limited. A study of Luu Thanh Duc Hai (2002) indicated that, most rice farmers who reached market information from their relatives and friends, rice traders, occupied 43.5% and only few large-scale

farmers got the market information from SOEs and internet. Another study of Huynh Anh Phuong (2008) in Quang Ngai province shows that market information of farmers was derived from neighbors, village middlemen, extension workers, mass media and others. However, neighbor and village middlemen played their most important role in providing market pricing information to local farmers with over 80% of total surveyed households accessed to these sources.

Table 10: Market information sources of rice farmers in the Mekong Delta

Sources of market information	Percentage
Newspaper, radio and TV	29
Information from SOEs	2.6
From private traders or intermediaries of the channel	20.5
From relatives, friends	43.5
Other (internet)	4.4
Total	100

Source: Luu Thanh Duc Hai (2002)

Conclusion: Market information is an important factor for farmers in their production and trade activities. Currently, farmers are accessing to one or some sources of market information to meet their needs of market information. However, probability of accessing to those sources is very different for farmers. Generally, farmers prefer to access to informal sources of market information such as other farmers, traders, or from TV, radio. In addition, extension agents are also a main source for farmers.

3.5. MITS on agricultural value chains

MIT is a process of using vehicles to transfer market information from providers to receivers. The receivers will analyze and use the market information in their production and trade to get more profits. There are many researches about the impact of market information on agricultural value chains. And the findings of these researches show that MITS has positive impacts on the performance of agricultural value chains.

MITS effects on all actors in the value chains such as farmers, traders, customers, etc. However, the synthesis results of the researches indicated that MITS has the most impact on farmers because they are missing the market information more than other actors in agricultural value chains (Inter-réseaux, 2008; Gina Porter et al, 2004).

3.5.1. Farmers' need of market information

As introduced in the part 4.1 above, market information is current and historical information on prices, quantities, market conditions, customer demands, distribution channels, market analysis and so market information has an important role for all participants in the market and in order to provide appropriate and relevant information to farmers, it is necessary to identify their information needs (Dulle, F.W. and Aina, L.O, 1999). Devadason F. J. and P. Pratap Lingam (1996) have stated that information needs represent gaps in the current knowledge of the user.

Market information helps farmers make profitable decisions on when and where to market produce, what to produce and what price to expect (Food and fertilizer technology center, 1994). However, Vietnamese farmers haven't had enough market information to make the informed decisions because the weaknesses of MITS in Vietnam: the formal sources of market information in Vietnam are not running well; MITS in Vietnam is only accessing to a small amount of farmers. According to the Food and fertilizer technology center (1994), farmers who understand market trends and market opportunities have a better chance of succeeding than those who do not, they can delay for months or years to invest in a crop getting a profit and with market information farmers sell their product on markets where there is a demand for it and it also shortens market channels and cuts down on transport costs, all participants share the risks and benefits with all participants joining in market. Disadvantaged farmers such as farmers in remote areas, low-knowledge farmers, are not active to find out the market information so we think that the government should have a MITS run by a governmental agency to provide the market information to this community at very low costs or even free. Lack of access to timely and reliable market information is an entry barrier to both production and trade. Farmers with market information can transform their crop production systems to meet market demands, increase the value of their products and profit, change the schedule of their harvests at the most profitable times (Mawazo M. Magesa, Kisangiri Michael and Jesuk Ko, 2014). However, this does not happen if market information is distributed inequally. Traders without market information may accept the risks of uncertainty involved in going to market without knowledge of prices. Improved information enables traders to move produce profitably from a surplus to a deficit market, and make decisions about the viability of carrying out storage, where technically possible (Mawazo M. Magesa, Kisangiri Michael and Jesuk Ko, 2014).

Along with the rapid development of science and technology, market information systems play an important role in agricultural value chains, especially nowadays the advanced agricultural techniques help farmers produce more agricultural products to sell on the market and so the level of competition

among farmers increases more and more. The opportunity to sell products at advantageous prices for farmers is harder. A study in Tanzania by Edda Tandi Lwoga et al (2010) showed that 59.1% of the small-scale farmers interviewed needed market information. Sharing information is one of the most effective ways of improving supply chain performance (Riikka Kaipia, Helena Lakervi, 2005). According to Daniele Giovannucci and Andrew Shepherd (2009) knowledge of market information tends to reduce the risks and lower the transaction costs of participating in the market. Market information is also a necessary part of early warning systems that can identify the potential danger to farmers and also traders (Daniele Giovannucci and Andrew W. Shepherd, 2001). Effective market communication can lead to increased participation in the markets and greater stability of prices and supply/demand.

According to Ronald Benard, Frankwell Dulle and Honesta Ngalapa (2014), farmers require different types of information for daily agricultural activities. Vincent Nnamdi Ozowa (1995) has argued that information needs of farmers are diversified and variable and depending on new and complex problems farmers face every day. The level of information needs may vary between people and it depends on various factors, such as age, level of education, socio-economic status, range of information sources available, level of awareness, and ease of use of information (Andrew M. Kaniki, 2003). But in fact, According to Meitei, L.S. and Devi, T.P (2009) the majority of the rural farmers do not have access to most of the required agricultural information at the right time that slows down the agricultural development.

According to Geoffrey Chomba, et al (2002), small-scale farmers needed to have knowledge on the prevailing prices on the market for their decision-making on the choice of commodity, on transportation costs to various main markets, on the costs of production, on the understanding and use of market information to help them with decision making.

Information needs of rice farmers: Rice farmers are lacking market information. A study on 80 rice growers in Kilombero district in Tanzania by Ronald Benard, Frankwell Dulle and Honesta Ngalapa (2014) has showed that majority of the rice farmers need information on market (96.3%), followed by weather condition (95%), agricultural credit/loan (91.25), new seeds (88.7%), storage method (85%), planting methods (83.7%), diseases and pest control (80%), pesticide availability and its application (77.5%), weed control (68.75%), fertilizers use (58.75%), irrigation (56.2) and land preparation (27.5%). According to a study of Nikulsinh M. Chauhan (2012) on 100 rice households in India showed that the most concern of them is market information and it means that the rice growers gave highest emphasis on market-related information because this information could help them to a great

extent to convert their produce into more money. The market information is also very important for farmers in Vietnam, they need available market information. They are interested in where to sell their products, the prices, the quality and quantity of products, etc.

Table 11: The respondents according to their overall information needs for rice cultivation in India (n=100)

No.	Areas of information	Mean score	Rank
1	Variety	1.31	V
2	Schedule of water supply by canal	1.67	II
3	Preparation of seedlings	1.36	IV
4	Land preparation and sowing	1.22	VII
5	Fertilizer management	1.67	II
6	Weed management	0.71	XI
7	Irrigation management	1.42	III
8	Plant protection measures	1.89	I
9	Harvesting and post harvesting technology	0.88	IX
10	Market	1.89	I
11	Supportive facts	1.21	VIII

Source: Nikulsinh M. Chauhan (2012)

And in market information, the rice growers had the highest need for information on market price followed by quality parameters that affect price and time of market inflow (Nikulsinh M. Chauhan, 2012).

Table 12: The market information needs of rice growers in India

No.	Market information	Mean score	Rank
1	Market price	1.79	I
2	Quality parameters that affects price	1.72	II
3	Time of market inflow	1.67	III
4	Place of market	1.52	IV
5	Value addition	0.51	V

Source: Nikulsinh M. Chauhan (2012)

3.5.2. Farmers' information search behaviors

Information seeking behavior is purposive in nature and is an outcome of a need to satisfy some objectives and in the course of seeking, the individual may interact with people, face to face or electronically (Edda Tandi Lwoga and et al, 2010). Information seeking behavior is expressed in various forms, from reading printed materials and Internet to asking friends or colleagues (Tunde Idris Yusuf, 2012), listening to radio, watching TV, etc.

The behaviors of information seeking of farmers depend on the kind of information. According to Zarmai, J. U. et al (2014) for local information need farmers can be met by a well – organized extension system or use traditional and modern methods of communication such as television, radio, and mobile phones, while the need for global information has to be met through internet connection or through contact with private firms.

The majority of small farmers are mainly looking for word-of-mouth information from other farmers and traders and even visiting the markets or through agricultural extension officers (Mawazo M. Magesa, Kisangiri Michael and Jesuk Ko, 2014).

According to Yahaya M. K. (2002), farmers have a trend in constantly accessing to good sources of information to get the good one.

3.5.3. Market information accessibility

Farmers are the most disadvantaged participant among participating on the market. They have a poor understanding of the market, how it works and why prices fluctuate, they have little or no information on market conditions, prices and the quality of goods, they have no experience of market negotiation and little appreciation of their own capacity to influence the terms and conditions upon which they trade (IFAD, 2003). Access to market information can help farmers understand market processes more fully and to develop strategies to achieve better and more stable prices for their agricultural produce. However, such information must be location-specific, timely and accurate, dynamic, and locally available and in a language understood by all of the rural population (IFAD, 2003).

There are some studies about the market information accessibility of rice growers in some countries. Some findings from those studies indicate that majority of rice growers have accessed to the market information. The study of Asogwa B. C., O. Abu and M. A. Onkpe (2014) on 130 rice farmers in Nigeria shows that majority of farmers (69.23%) had access to market information and 30.77% of farmers had no access to market information.

Table 13: Percentage distribution of respondents by market information accessibility in Nigeria

Access to information	Frequency	Percentage
Access	90	69.23
No access	40	30.77
Total	130	100

Source: Asogwa B. C., O. Abu and M. A. Onkpe (2014)

And findings of the survey of Astewel Takele (2010) in Ethiopia also indicates that 79.2% of the rice farmer households had price information before they sale their produce to the nearby market but 20.3% of the interviewed farmers did not have access to any information.

However, another study of Francis Apori-Buabeng (2009) on the information accessibility of rice farmers indicates an opposite result. Majority of rice farmers did not have access to useful information to help them during decision-making. Almost farmers (87.9%) reckoned that they did not have professional advices to help them in decision making and they also claimed that there was no market extension service in the present system that guides them in taking production, storage and market decisions.

A study of Zarmai, J. U. et al (2014) showed that farmers are different in accessing and using the market information and this difference depends on their various personal, social, economic, or institutional factors. A the study of Gina Porter et al (2004) pointed out that access to information was likely to be different for different types of producers depending on the size of production, distance from markets and their own networks.

3.5.4. Market information utilization

To use information in the value chain, users need to have relevant data, the money, the skills, the technology, the motivation, confidence and knowledge to access, assess and apply the data, and must (Richard Heeks, 2005). Individuals must be able not only to access to that content, assess its relevance, and apply it for a specific decision, but ultimately to act upon the information (Zarmai, J. U. and et al, 2014).

The majority of rice farmers in Nigeria accessed to market information but only 34.62% of rice farmers used market information and majority of rice farmers (65.38%) did not utilize available market information. Their inability to utilize market information can be attributed partly to shortage

of technical know-how to take practical steps in utilizing the market information, and partly to shortage of finance (Asogwa, et al, 2014).

Farmers are not a homogenous group, they have different characters such as age, education, experiences, labor, and finance. Hence, in order to build a good MITS, we need to understand the specific factors that influence their market information source selection, access and use. Suresh Chandra Babu, et al (2011) listed factors that influence the use of information of farmers including their personal characteristics such as age (Carter and Batte, 1993), education (Waller et al, 1998), experience in farming (Schnitkey et al, 1992); business characteristic such as market orientation of farming (Ngathou et al, 2002), farm size (Solano et al, 2003; Alvarez and Nuthall, 2005; Llewellyn, 2007), type of farm enterprise (Carter and Batte, 1993), debt level (Tucker and Napier, 2002), ownership of farm (Ngathou et al, 2002), and geographical characteristics such as distance to market centers (Solano et al, 2003) and distance to the nearest technological adopter (Llewellyn, 2007).

A study of Asogwa B. C., O. Abu and M. A. Onkpe (2014) indicated that the level of the market information utilization of rice farmers was low to moderate. The level of market information utilization of rice farmers is high (51.11%) for other rice producers' information sources and it is low for print media (Newspaper, 20%) and very low for electronic media (television, 8.89%; internet, 6.67%; mobile phone, 4.44%, radio, 15.56%).

Table 14: Percentage distribution of respondents by level of market information utilization in Nigeria

Sources	Very low		Low		Medium		High		Very high		Total	
	N	%	N	%	N	%	N	%	N	%	N	%
Newspaper	2	4.44	9	20	4	8.89	0	0	0	0	15	33.33
Radio	3	6.67	7	15.56	6	13.33	1	2.22	0	0	17	37.78
Television	4	8.89	2	4.44	0	0	0	0	0	0	6	13.33
Friends/family	3	6.67	6	13.33	13	28.89	0	0	0	0	22	48.89
Internet	3	6.67	1	2.22	0	0	0	0	0	0	4	8.89
Mobile phones	2	4.44	2	4.44	1	2.22	0	0	0	0	5	11.11
Extension agents	5	11.11	6	13.33	7	15.56	4	8.89	0	0	22	48.89
Rice producers	2	4.44	0	3	8	17.78	23	51.11	12	26.67	45	100
Total	24	53.33	33	73.33	39	86.67	28	62.22	12	26.67	136	302

Source: Asogwa B. C., O. Abu and M. A. Onkpe (2014)

3.5.5. Impacts of MITS on farmers

a) MITS reduces information asymmetries to increase market efficiency

Participants in the value chain require the different types of market information: Prices and supplies, alternative channels, quality, means of payment and financing (Andrew W. Shepherd, 1997). In fact, participants in the value chains often have incomplete information and sometimes false information (price, quantities, quality) (Inter-réseaux, 2008). In addition, due to their location and lack of networks, farmers may have less access to market information, they are often isolated and dispersed, and in general poorly informed. Meanwhile traders have better access to information (Gina Porter et al, 2004). This difference in the access to information leads to information asymmetries, it means that the same goods are sold for widely different prices on markets merely a few kilometers apart (The World Bank, 2011).

According to many researches, providing market information will reduce asymmetry of information on the marketplace. The provision of basic market information is a service that aims to increase the efficiency of agricultural markets and contribute towards overcoming issues of market failure caused by information asymmetry (Shaun Ferris, Patrick Engoru and Elly Kaganzi, 2008; Shaun Ferris; Patrick Engoru; Elly Kaganzi, 2014). Shaun Ferris, Patrick Engoru and Elly Kaganzi (2008) claimed that there are actors who decide the prices in the market place and more equal access to market information encourages arbitrage leading to greater uniformity in prices of a given commodity within a specific supply chain or country at a given time.

Market information rises the market efficiency. Providing market information encourages transactions on the market, reduces price dispersion and the excess supply can be eliminated. A study of Robert Jensen (2007) about market information in fishing industry for 5 years from 1997 to 2001 in Southern India indicated that after the market information is provided by mobile phones, the gaps of the market information is solved, reducing price dispersion (reduced by 5 Rs/kg on average) and in addition, the study also reported that providing the market information timely increases fishermen's profits by 8% and consumer surplus by 6%.

Another study of Jenny C. Aker (2010) in Niger also showed that the market information made the market more efficient. The study of Jenny C. Aker indicated that providing the market information decreased price dispersion by 10–16% and the main reason for the decline in price dispersion was the reduction in transaction costs for traders.

A study of Hsain Ilahiane (2007) in Morocco proved that with timely providing the market information increased the market efficiency. The middlemen and poor supply chain facilities increased agricultural prices up to 60% without actually adding any value (Bibhu Santosh Behera, et al, 2015) so decreasing the number of the middlemen in agricultural value chains also helped increase the efficiency of the value chain performances. According to Hsain Ilahiane, farmers in Morocco with market information from mobile phones increasingly dealt directly with wholesalers or larger-scale intermediaries than smaller intermediaries.

b) MITS increases the selling prices of farmers

The market information is an important determinant of the selling price (Daichi Shimamoto, Hiroyuki Yamada, Martin Gummert, 2015) and MITS helps increase significantly the selling prices of farmers. According to Andrew M. Kizito, Cynthia Donovan, and John M. Staatz (2012), a farmer household that received market information received a price that is 12% higher than that received by a household that did not receive any market information. More specially, a study of Pierre Courtois and Julie Subervie (2013) in Ghana indicated that after implementing MIS program the price of agricultural products next year was higher than the previous year (year without MIS) and at the same time, farmers who had access to a mobile-based MIS received significantly higher prices for maize and groundnuts about 12.7% more for maize and 9.7% more for groundnuts than that they would have received if they had not participated in the MIS program. Daichi Shimamoto, Hiroyuki Yamada, Martin Gummert (2015) studied the market information in Cambodia and reckoned that the use of mobile phones to access to market information was associated with an increase in the selling price of farmers' rice.

Some other researches also show that providing market information increase the selling prices of farmers. Aparajita Goyal (2010) reckons that in areas where there was market price information, farmers obtain the selling prices of from 1 to 3% higher than in areas where market information was less transparent. A study of Andrew Muganga Kizito (2011) in Africa reported that a household that received market information received a price that was 16 percent higher and significantly than that which did not receive market information. A study of Shaun Ferris and Peter Robbins (2004) in Rakai district in Uganda indicated that farmers with market information had received 5–15% higher returns on their sales when they were able to negotiate on market prices, compared with farmers who simply accepted prices they were offered by traders. A study of Pieter Rutsaert, et al (2009) in Senegal also reported that after the introduction of the quality SRV rice, Senegalese consumers were willing to pay a price premium of 45 FCFA/kg.

Many other researches show that MITS has positive impacts on the selling prices of farmers in many different agricultural products. For rice, a study of Daichi Shimamoto, Hiroyuki Yamada, and Martin Gummert (2014) about the impact of improved access to market information through mobile phones usage on selling prices in rural areas in Cambodia showed that farmers who had access to market information through the use of mobile phones were more likely to sell their rice at a higher price 4.4%. For maize, a study of Jakob Svensson and David Yanagizawa (2008) in Uganda indicated that market information increases the farm-gate price of maize. The maize price of farmers who had access to regular market information was 15% higher than that of farmers who did not have the information. For bean in Tanzania, Agnes Godfrey Mwakaje (2010) reckons that there is a significant difference ($P < 1\%$) in a significantly higher price through market information access. For banana in Uganda, Megumi Muto (2008) studied about the impact of the market information through mobile phones on the market participation and showed that the market information enabled higher market participation by farmers and recognized higher prices by almost 20% by reducing the information asymmetry in the value chain. As for vegetable in Indonesia, the availability of market information could enable farmers to check on the prices they received vis-à-vis the prevailing market prices. If they received prices lower than those broadcast prices they should sell to other traders in the future and broadcast prices were also used as starting points in negotiations with traders the following day; lower prices than that broadcast were not accepted by these farmers (Andrew W. Shepherd and Alexander J.F. Schalke, 1995).

Table 15: Use of ICT, bean quantity sold and price received in Tanzania

	Did not use ICT		Used ICT	
	N	Mean	N	Mean
Quantity of beans sold (kgs)	65	3450	34	8700
Price	65	1198	34	2198

Source: Agnes Godfrey Mwakaje (2010)

An interesting study of Shaun Ferris, Patrick Engoru and Elly Kaganzi (2008) about maize in Uganda showed that the farm-gate price of maize was higher when farmers combined the usage of market information with collective storage and joining the farmer groups. It means that to increase the

efficiency of the market information farmers need to harmoniously combine the market information usage with production plans and market plans to maximize their profits.

Also, a study of Shaun Ferris; Patrick Engoru; Elly Kaganzi (2014) showed financial benefits of market information that up to 58% of farmers who used market information services achieved financial gains, with average gains of 16% above prevailing market prices for individual farmers, and 24% for farmers in groups and 56% of farmers working in groups and 30% of farmers trading as individuals were able to negotiate for better prices with a 15% higher farm-gate price using market information.

Table 16: Price gains of farmers as individuals and in groups in Uganda

	Individual farmers (%)	Farmers in groups (%)
Percentage of farmers who gained	30	56
Average percent increase gain above prevailing prices for all farmers in each category	16	24

Source: Shaun Ferris; Patrick Engoru; Elly Kaganzi (2014)

A study of Surabhi Mittal and Mamta Mehar in 2013 in India showed that with access to market information farmers were better connected to the markets and helped them to get better prices. Almost (87.2%) of the farmers felt better connected to the markets while 71.7% of the farmers had better access to the price information. These farmers used information on market demand predictions to adjust the quantity of supply they harvested and took to market during a given period. Market information influenced farmers to alter where and when they sold their crop in order to maximize revenues and, in some cases, provided market information to farmers to negotiate on better pricing terms with local traders.

Jakob Svensson and David Yanagizawa (2008) estimated the impact of a Ugandan MIS and saw that the maize farmers got profits from the broadcasts information by radio on the farm gate price and farmer business performance: a 15% increase in maize selling price and a 32% increase in the proportion of production sold.

An attention point in a study of Surabhi Mittal and Mamta Mehar (2013) is that the potential benefits of information flow have been obtained mainly by large farmers in the various states of India because small farmers, despite access to information, have not succeeded in overcoming constraints resulting from poor access to capital, poor infrastructure and lack of access to markets. Table 17 shows that

almost (91%) of the large farmers could get a better price for their commodities while only 63% of marginal farmers and 71% of small farmers could benefit from the price information.

Table 17: Benefits of mobile phones based on land size in India

Land size	Percent of farmers using mobile phone	Getting connected to market	Getting better price
Marginal (less than 1 ha)	27	72	63
Small (1-2ha)	40	91	71
Semi-medium (2-4ha)	53	91	72
Medium (4-10ha)	64	93	79
Large (more than 10ha)	68	95	91
Total	41	87	72

Source: Surabhi Mittal and Mamta Mehar (2013)

The reasons for that the market information would allow farmers to obtain a higher price are the following: i) intensifying competition between collectors; ii) generating better spatial arbitrage (some farmers could for instance sell on markets further away); and iii) increasing farmers' bargaining power (this last impact would not result in an increase in the economic surplus generated by trade, but in a change in its distribution) (Galtier F, David-Benz H, Suber vie J, Egg J, 2014).

c) MITS expands the market and increases sale volumes

Expanding the market and increase of sale volumes are also indicators of the impact of MITS (Andrew Muganga Kizito, 2011). The study of Robert Jensen (2007) showed that with the market information fishermen started selling their fish on new markets where they could get information. Jenny C. Aker (2010) also shows that when grain traders in Niger had the market information from different markets they expanded their markets.

Aparajita Goyal (2010) studied in the Indian state of Madhya Pradesh and shows that providing the market information seem to increase the sale volume of soybeans in the markets because the market information contributed more information to consumers to raise their awareness about the product and in turn this changes the bargaining behaviours of customers (George Norman, Lynne Pepall, and Dan Richards, 2008).

d) MITS improves the farmers' income

Another impact of MITS is to improve the farmers' income. David Mather, Benedito Cunguara, and Duncan Boughton (2008) reckoned that access to market information enabled farmers in Mozambique to obtain higher crop revenue by reducing transaction costs.

Julien Labonne and Robert S. Chase (2009) reckoned that the market information provided to farmers in Philippines could increase their income from 11–17 percent because market information equipped the farmers with a stronger bargaining position with traders in addition to being able to find out other markets to sell their products at higher prices.

David Mather (2012) studied on the effect of reception of market price information on the change in net crop income from all crops sold by Mozambique households in 2002 and 2005 and found that households that received market price information increased household crop income by 23 to 31 percent.

Hsain Ilahiane (2007) points out that farmers in Morocco who accessed to the market information through mobile phones could increase their average income by nearly 21 percent.

Alberto Chong; Virgilio Galdo; and Máximo Torero (2005) studied in Peru to indicate that farmers with the market information through mobile phones had 13% and 32% higher income per capita and total their revenue, respectively.

USAID (2015) concluded that the AMIS System in Cameroon increased the farmers' income by sixty-six percent.

Anabela Mabota, et al, (2003) also studied market information for agricultural market development in Mozambique and they saw that agricultural market information was important in increasing household revenues which consisted of sales volumes and prices received by sellers. The reason for increased sales volumes was that better information lead to greater allocative efficiency in production by transmitting incentives to producers to produce specific products. Higher prices received represented a redistribution of income towards producers and a movement towards more competitive prices, which also implies a reduction of dead weight loss.

e) MITS increases farmers' capacity to take part in the market

Currently, the participation of farmers in the market, especially small-scale farmers, is low for many reasons and lack of market information is a main reason. Some researches showed that providing the market information increased the farmers' capacity to join the market. According to Andrew M.

Kizito, Cynthia Donovan, and John M. Staatz (2012), farmer households are likely to participate in markets and obtain higher prices when they receive improved agricultural market information.

A study of Andrew M. Kizito (2009) in four provinces in Mozambique reported that reception of market information increased farmers' probability of market participation by 34 percent. Another study of Ekanem A Etuk (2015) also showed that the market information and farmers' probability of market participation had a positive relation. If market information increases by one unit, the probability of participation increases by 4.217 percent.

The study of Megumi Muto and Takashi Yamano (2009) in Ugandan showed that with the increase of the mobile phone and sources of the market information the proportion of the farmers who sold banana increased in communities more than 20 miles away from district centers.

f) MITS changes the farmers' position in the value chains

A clear impact of MITS is that it has changed farmers' position in agricultural value chains. When farmers lack market information they are often disadvantaged in negotiations and transactions. Market information increases farmers' bargaining power against buyers, improve competition between traders and consequently, farmers are able to sell their rice at a higher price (Daichi Shimamoto, Hiroyuki Yamada, and Martin Gummert, 2014; Marcel Fafchamps and Bart Minten, 2011).

According to The World Bank (2011), MITS increases negotiation power of farmers because they can understand pricing in multiple markets, cut out intermediaries, and sell directly to larger-scale buyers.

According to John M. Staatz, et al (2011), market information creates a more equitable distribution of bargaining power within the food system.

g) MITS reduces the risk in production and trading of farmers

Agriculture is a more risky activity due to its dependence on natural resources and weather conditions, market and its remoteness and hence, accessing and using the market information it has the potential to reduce risk in agriculture because it increases value creation and farmers can have access to better and more opportune market information on prices and demand and supply trends (Mônica Rodrigues and Adrián Rodríguez, 2013).

According to Andrew Muganga Kizito (2011), improved market information helps in reducing and managing price risks and allows market actors to make better production, market, and consumption decisions that result in efficient allocation of productive resources.

Market information helps smallholder farmers to identify new market opportunities (in space, time, and scope) and reliable trade partners, thereby improving spatial and temporal arbitrage and possibly capturing of economies of scale due to reduction in transaction costs (Andrew Muganga Kizito, 2011).

According to Mônica Rodrigues and Adrián Rodríguez (2013), the market information can decrease the costs and generate the value throughout the agricultural value chain. Cost reductions can result from both getting better prices in buying inputs and selling products.

Currently, the market risks in agriculture are very big because it has a close connection with changes in prices of outputs and inputs after farmers have engaged in production (Mônica Rodrigues and Adrián Rodríguez (2013). Due to the complexity of agricultural markets, as well as the length of agricultural production cycles, farmers' real income is very far from their returns expected at the moment they invested in production.

h) MITS changes behaviors of farmers

There are some researches on the impacts of the market information on behaviors of farmers in production and trading process. Better information may lead farmers to make better allocation of production factors. When the farmers receive clear production incentives, they can better seize market opportunities through the adjustment of production plans (Marcel Fafchamps and Bart Minten, 2011).

In production, the market information can change the production area, productivity, production and crops system of farmers (Andrew Muganga Kizito, 2011). According to a study of Aparajita Goyal (2010), providing information on the buying prices of soybeans, rice, maize and groundnuts in Madhya Pradesh of India increased the area planted under soybeans, reduced the area planted under rice, and increased the production of soybeans.

There is a positive and significant effect of access to the market information on the intensity of adoption of improved seed. According to Barnabas Kiiza, Glenn Pederson (2012), the market information increased averagely 33% of farmers who used improved seed in their production in 2006 and 29% in 2007. And Barnabas Kiiza, Glenn Pederson (2012) also reckon that using improved seed improves farmers' income because improved seed varieties will raise yields and farm revenue per acre. Table 18 indicates that adoption of improved seed varieties has a positive and significant effect on yields. The increase in average yields after adoption of improved seed is about 204.9 kg per acre (39.27%) for all the crops combined in season two of 2006 and in season one of 2007, the increase in average yields after adoption of improved seed is about 231 kg per acre (51.85%) for all crops combined. For the maize farmers alone, the average increase in gross revenue per acre after adoption

of improved seed is about 46,899.43 shillings (\$26.31), about 57.81% increase in season two of 2006 and the increase in gross revenue per acre in season one of 2007 is 35,106.12 shillings or about 41.27%.

Table 18: ATT results for the effect of adoption of improved seed on farm yields and incomes in Uganda

Outcome variable	ATT	t-value
All crops:		
2006 yield (kg/acre)	204.9	1.35
2006 yield (kg/acre)	230.8	1.55
Maize only:		
2006 gross revenue (shillings/acre)	46,899.4	1.70
2007 gross revenue (shillings/acre)	35,106.1	1.20

Source: Barnabas Kiiza, Glenn Pederson (2012)

A study of Shaun Ferris, Patrick Engoru, and Elly Kaganzi (2014) showed that farmers with the market information paid more attention to product quality such as grain moisture content and kernel quality because product quality is one of the most important criteria used by formal buyers. The more commercial farmers are seeking to harvest at the correct time, dry their crops, and clean the grain to access premium prices.

According to The World Bank (2011), farmers in Morocco changed their cropping mix and market methods due to being provided the market information. Farmers can modify the date of market, product permitting, or switch to alternate markets, transport and regulation permitting. They connected directly with wholesalers or larger-scale middlemen rather than smaller intermediaries, they changed where they marketed their crops, switching markets to capture better prices and often resorting to larger and more distant markets and they coordinated with local truckers to improve product transport and identify where to deliver their products. Some farmers developed a two-way trade, bringing products back from the market to sell in their own rural communities. A particularly important change was that they used their new market knowledge to become more market-oriented in their production, move away from producing low-value crops, and diversify into higher-value enterprises.

Prices paid to farmers are also affected by a combination of local conditions such as distance to markets, transport infrastructure, market concentration and access to relevant information on prices, supply and demand, among others and so access to reliable, timely information about crop prices and

trends that can help farmers to decide where and when to sell their products (Mônica Rodrigues and Adrián Rodríguez, 2013). With output market information, farmers are better informed about markets to sell products to prevail market prices and quantity demanded in the market. Thus, they can make informed decisions to sell products at the right price and right time and this helps reducing distress sales by farmers due to market supply fluctuations (Surabhi Mittal and Mamta Mehar, 2013).

i) MITS decreases waste

In most developing countries, information search costs form a significant part (11%) of the total cost incurred by farmers during the agricultural cycle (Surabhi Mittal and Mamta Mehar, 2013). The lack of market information increases the costs of exchange between the farmer and buyer (Oliver E. Williamson, 2002) because smallholder farmers are disadvantaged in dispersed markets that increase the transaction costs (Colin Poulton, Jonathan Kydd and Andrew Dorward, 2006). Hence, households with market information are expected to face lower transaction costs (Julius J. Okello, et al, 2014; Harsha de Silva and Dimuthu Ratnadiwakara, 2008). Providing market information through mobile phones reduced the search cost for farmers by almost 50% in Niger (Jenny C. Aker and Isaac M. Mbiti, 2010).

Another waste in trading is that products are not sold because the supply is higher than the demand. According to Robert Jensen (2007), when the market information is diffused in fishing regions in Kerala this waste is reduced by 4.8%.

A study of Surabhi Mittal and Mamta Mehar (2013) indicated that 25.8% of the farmers in India could actually quantify the benefits in terms of saving time or reducing search cost from access to market information.

MITS also can reduce logistics and transportation costs because farmers obtain the latest information with a phone call instead of making a long trip to a market and they can also coordinate with other local farmers to use one large truck rather than several smaller ones to deliver their products (The World Bank, 2011).

3.5.6. Challenges of MITS

The challenges of farmers in MITS have been studied and identified. In general, farmers are facing many obstacles in accessing and using market information.

A study of Asogwa B. C., O. Abu and M. A. Onkpe (2014) indicated that the main constraints to accessing market information of rice farmers included high cost of accessing information (74.62%),

unavailability of support facilities (57.69%), untimely receipt of information (40.77%) and unavailability of information sources readily (33.08%).

Table 19: Percentage distribution of respondents by problems of accessing market information in Nigeria

Problems	Frequency	Percentage
High cost of accessing information	97	74.62
Information sources are not readily available	43	33.08
Information received is not credible	19	14.62
Information received is irrelevant	24	18.46
Information received is not timely	53	40.77
Cultural and traditional constraints	10	7.69
Unavailability of support facilities	75	57.69
Communication barriers	23	17.69

Source: Asogwa B. C., O. Abu and M. A. Onkpe (2014)

According to the results of the study of Suresh Chandra Babu, et al (2011) in India, accessing and using information met the following obstacles: poor availability and reliability of information, lack of credit.

The study of Asogwa B. C., O. Abu and M. A. Onkpe (2014) on market information usage among rice producers in Nigeria showed that short of money, unavailability of support facilities such as poor access roads, poor transportation system, poor electric power supply, poor telecommunication and poor storage facilities as well as prevalence of natural and man-made shocks all contributed negatively to the provision of market information to farmers.

A study of Tologbonse D.; Fashola O., and M. Obadiah (2008) in Nigeria showed that major constraints farmers facing in accessing to agricultural information were lack of funds to obtain information (54.3%) and language barrier (50.5%). outdated information (36%) and presentation/poor format of information (33.9%).

A study of Aina L. O. (1990) also showed factors influencing negatively information access of farmers on the market in Africa: the low literacy level of farmers, limited numbers of radio and television sets and inadequate numbers of personnel trained in agricultural information work. Besides, a study of Suresh Chandra Babu et al. (2011) also showed that the major constraints facing farmers in accessing

information were poor availability, poor reliability, lack of awareness of information sources available among farmers and untimely provision of information, poor/unreliable information infrastructure, high illiteracy levels, low income, lack of electricity and high cost of ICTs, inadequacy of facilities/professional, incomplete or irrelevant information, lack of cooperation from fellow farmers in sharing agricultural information.

In addition, a study of Asogwa B. C., O. Abu and M. A. Onkpe (2014) in Nigeria indicated that the market information dissemination, access and utilization of farmers faced some difficulties: slow process of communication, market information processing may make outdated information; the weakness of the farmers organizations in developing countries at management; lack of marketable skills, lack of trust to the governmental agencies will hinder the effective utilization of market information; poor access roads, transportation system, electric power, telecommunication and storage facilities are contributing negatively to the provision of market information to farmers and high poverty rate and production size of farmer households also affect the effective access and utilization of the market information.

Summary: MITS has significant effects on farmers such as reducing information asymmetries to increase market efficiency, increasing the selling prices of farmers, expanding the market and increasing sale volumes, improving the farmers' income, increasing farmers' capacity to take part in the market, changing the farmers' position in the value chains, reducing the risk in production and trading of farmers, changing behaviours of farmers and decreasing waste.

Besides, MITS to farmers has some limitations such as high cost of accessing information, unavailability of support facilities, untimely receipt of information, and unavailability of information sources readily, reliability of information, lack of credit, poor electric power supply, and poor telecommunication.

3.6. The best practices of MITS

3.6.1. The KACE market information and linkage system in Kenya

KIT and IIRR (2008) also studies on improving on market information in Kenya Though a model KACE. The Kenya Agricultural Communities Exchange (KACE) is a private sector firm which aims to provide reliable and timely market information, and to link buyers and sellers of agricultural commodities. KACE began operations in 1997 to collect, update and disseminate market information on various crop and livestock products (42 commodities). KACE has developed a market information

system that is more suitable for farmers: closer, more accessible and easier for them to use. This system combines traditional face-to-face interaction with modern information and communication technologies.

Rural-based market information centers: these are information kiosks in rural markets. They provide market information to farmers and traders such as current commodity prices in different markets. There are 12 these centers in Kenya. Some of them are mini trading floors, where commodities are sold with an opening auction system every market day and some of them are the bigger centers at district headquarters where have computers with internet connections. An average of 550 farmers and traders visit the centers each month.

Mobile phone message service: a phone owner can send an SMS request to a special number, and the service automatically responds with an SMS about prices of the commodities requested. A message is giving current prices for a commodity in five markets. KACE staffs in each market gather these data every morning. KACE provides this service in partnership with Safaricom - Kenya's biggest mobile-phone provider. The service receives an average of 10,000 SMS requests a month.

Interactive voice response service: this is the voice equivalent of the SMS service. Callers can dial a special phone number (0900-552 055) and follow a simple voice-operated menu in English or Kiswahili. The service delivers a voice mail message with prices, trade information and extension messages. KACE provides this service in partnership with Interactive Media Services Ltd. About 50 callers use the service a month. This number is low, perhaps because of the cost.

Internet: KACE's website, www.kacekenya.com, has all the price information, plus a library of agricultural information and a virtual trading floor. Users can also subscribe to a system that sends out daily emails with commodity prices in markets in Kenya, Uganda and Tanzania. A subscription costs US\$ 125 a year. This service currently has 550 subscribers from Africa, Europe and the USA.

Radio: KACE's market price information is broadcasted on a national radio station by Kenya Broadcasting Corporation. The service reaches an estimated 5 million listeners a week, many of whom are farmers in rural communities.

3.6.2. The Agricultural Market Information System (AMIS)

AMIS will include a number of international and inter-governmental organizations with capacity to collect, analyze and disseminate information on a regular basis regarding the food situation and outlook, the major producing and consuming countries, as well as commercial enterprises. Currently, AMIS includes the following countries f: Argentina, Australia, Brazil, Canada, China, France,

Germany, India, Indonesia, Italy, Japan, Mexico, Russia, Saudi Arabia, South Africa, Republic of Korea, Turkey, United Kingdom, United States of America, and the European Union, Bangladesh, Philippines, Thailand, Vietnam; Egypt, Iran, Nigeria, Pakistan (FAO, IFAD, et al, 2011).

AMIS was largely developed in many developing countries to support the policies of liberalization of agricultural value chains. They were aimed at solving the problems of agricultural markets related to problems of information such as the incompleteness and asymmetry between different actors in the value chains (producers and traders in particular) (Inter-réseaux, 2008).

The AMIS includes 3 key processes (Inter-réseaux, 2008):

- *Data collection*: which kind of information do we need? Which data to collect? Who to collect? Where to collect them? At what frequency? How to collect and check their veracity?

- *Data processing*: How to centralize the data? How to classify the data, analyze, index them for optimal use? How to treat the data? Which possible transformations should they undergo? Which calculations to carry out?

- *Diffusion of information*: How to communicate the data processed? To whom? In what form? At what moment?

AMIS are systems to regularly collect information on prices of agricultural products (wholesale or retail price, price on collection, cluster and consumption markets), quantities traded, qualities of the products available on the markets, quality standards, supply and demand trends, transport conditions, etc and to diffuse these information to the public and most especially private (agricultural producers, traders, consumers). The information diffused is expected to improve market transparency and assist market actors in their decisions (Inter-réseaux, 2008).

Frequency of data collection: In general, for staple agricultural products the market information is collected every day and often in the morning and less frequently for other products (Inter-réseaux, 2008).

Diffusion of information: The diffusion of information is done in different ways, depending on the country and the systems put in place. Radio is the most used media and recognized as being the most effective one. In addition, they can diffuse the market information by print media (newspapers, bulletins or gazettes) and by Internet (Website, electronic diffusion list) and by mobile telephones (SMS) (Inter-réseaux, 2008).

Summary: There are some good MITS in the world. MITS can run well by private company such as the KACE model or by governmental agencies such as AMIS, but:

- To access market information from the KACE model farmers have to pay too much however, the market information provided by AMIS is free for farmers.
- The KACE model mainly provides information about prices, meanwhile, AMIS provides the information about prices, quantities traded, qualities of the products available on the markets, quality standards, supply and demand trends, transport conditions, etc.

3.7. Market information system to farmers in Vietnam

The aims of this part are to synthesize and analyze the researches on market information in agricultural sector in general and in rice value chain in particular in order to help me have the general picture about the situation of market information system in Vietnam. This chapter will write about all aspects of the market information system such as the demand of market information, market information sources, access and utilization of market information, etc.

Vietnam is an agricultural country with 66.9% of total population living in rural area (GSO, 2014), and so the role of information especially market information is always appreciated by farmers. In current condition, farmers in Vietnam are integrating significantly into market economy and are impacted considerably by competition and so information become more and more essential factor to decide their existence and development (Le Thi Hue, 2011). According to Mai Van Xuan and Mai Le Quyen (2011), market information has an important role in improving income and livelihood of farmers.

Some researches show that farmers in Vietnam need information because market information in Vietnam is poor, farmers lack information about production and market and their capacity to catch and use information is limited. And in fact, we have developed agricultural information to farmers. According to Le Thi Hue (2011) agricultural information has been disseminated at various times and in various forms from central level to local level in mass media but farmers still lack information. Farmers in the Mekong Delta are themselves judging market information and prices (Le Thi Hue, 2011).

3.7.1. Farmers' needs of market information

Almost all farmers' households in Vietnam are small-scale producers so they have a set of problems in market participation. In market economy, farmers often act under the conditions of unpredictability, uncertainty and risk but they are only equipped with limited knowledge and resources to respond to the quick changes of market. Farmers are often in a disadvantageous position to take part in market because a majority of them do not understand the market well, how it works, and why prices fluctuate (Huynh Anh Phuong, 2008) and they also have little or no information on market conditions and prices, moreover, they have no experience of market negotiations (H. Ade Freeman and Said S. Silim, 2001).

In agricultural information system, the biggest willing of farmers is the accession to market information and production technologies (Le Thi Hue, 2011). As for market information, farmers in Vietnam also need many kinds of market information and it is widely available. According to studies of Felsing M and Nguyen, S H (2003) and Moustier P, Nguyen TTL, Hoang BA, (2013) in market information farmers in Vietnam need information about prices, quantities, origin, and quality management, but in fact, market information provided to them is sometimes irrelevant, or lacking key aspects.

Findings of a study of Mai Van Xuan and Mai Le Quyen (2011) showed that the information need of farmers change due to production and trading stages. Over 92% of the respondents said that information about varieties, production technologies are very important and this information should be disseminated before the stage of production. Market information is also very important for farmers. Over 53% of the respondents reckoned that information about where to sell products is important for them; 55.6% are interested in payment terms, over 52% are interested in the quality and quantity of products; Especially over 88% of the respondents indicated that information about prices is very important for them. And all this information needs to be supplied before harvest.

According to the study of Le Thi Hue (2011) in the Mekong Delta, market information is a kind of information attracted so much by farmers and equipping farmers with market information is interested by governmental agencies.

3.7.2. Farmers' accessing to market information

In general, the market information need of farmers in Vietnam is satisfied only partly because the ability and capacity of farmers to access to market information are not good and their capacity to

recognize the contents and usefulness of market information is not high, although there are many sources and channels of market information for them.

According to Tiago Wandschneider and Ngo Kim Yen (2007), the capacity of farmers to access to market information is based on 3 criteria: Their understanding about market information, skills and methods to access to market information, and their applications reflected by the acquired market information.

A study of Le Van Cuong, Ngo Thi Thuan and Nguyen Hung Anh (2013) shows that the farmers' capability to access to market information in Nga Son still remains at an average level.

Table 20: Farmer's market information access in Nga Son

Criterion	Commune			Economic condition			Total
	Nga My	Ba Dinh	Nga Tan	Better-off	Average	Poor	
Understanding and Awareness	0.64	0.54	0.61	0.71	0.61	0.49	0.6
Contents of MI	0.63	0.57	0.61	0.68	0.61	0.53	0.6
Nga Son MI system	0.66	0.53	0.63	0.74	0.62	0.47	0.61
Roles of MIS's agencies and staffs	0.65	0.53	0.58	0.71	0.59	0.46	0.58
Skills and Methods	0.49	0.47	0.37	0.54	0.45	0.34	0.44
IM sourcing	0.63	0.53	0.55	0.62	0.58	0.52	0.57
Contact with MIS's staffs	0.24	0.25	0.20	0.28	0.22	0.20	0.23
Training participation	0.42	0.37	0.30	0.45	0.36	0.28	0.36
Frequent update MI	0.67	0.71	0.44	0.79	0.66	0.38	0.61
Applicability	0.52	0.54	0.42	0.66	0.50	0.33	0.49
Production planning	0.59	0.52	0.51	0.62	0.55	0.46	0.54
Inputs allocating	0.49	0.50	0.39	0.68	0.47	0.24	0.46
Sales and marketing	0.49	0.59	0.37	0.68	0.48	0.30	0.48
Average	0.55	0.51	0.46	0.63	0.51	0.38	0.50

Source: Le Van Cuong, Ngo Thi Thuan and Nguyen Hung Anh (2013)

The criteria awareness and understanding the market information 0.6 was the highest in general. In addition, the criterion of applicability also reached 0.49 on average. However, the skills and methods

reached the lowest scores among all sub-criteria which is 0.44. The methods of contacting with market information service’s staff and participating in training reach merely 0.23 and 0.36, respectively.

The capacity to access to market information is also based on many factors. Le Van Cuong, Ngo Thi Thuan and Nguyen Hung Anh (2013) reckoned that the capacity to access to market information is based on their economic conditions, poor and average households have low capacity to access to market information. It is based on the location of household, households in central area often have better capacity to access to market information than households in rural areas and remote areas. It is also based on the educational level and production level. Large-scale producers have better capacity to access to market information.

According to Vietnam World Bank (2006), farmers in Vietnam have limitations to access to market information because in Vietnam using modern information technology and media still have its limits as it needs high costs and skills to run this system. In addition, the quality of market information is low because of the lack of staffs and low- skilled staffs. In almost all cases, data and information are not updated, irrelevant to disseminate to farmers to help them make informed decisions in their production and trade activities. The other problem in transferring market information to farmers in Vietnam is that market information providers focus only on collecting data and information but they ignore the analysis and their dissemination to farmers.

A study of Mai Van Xuan and Mai Le Quyen (2011) shows that farmers’ capacity to access to market information in Quang Ngai province is low.

Table 21: Access to market information via channels (%)

Kinds of market information	No capacity or no use	Newspapers	TV	Radio	Extension officials	Traders	Others
Transportation	71.5	1.7	1	0.0	3.4	20.4	1.9
Payment terms	72.3	1.5	1.7	0.2	1.5	21.4	1.3
Products quality	69.7	1.2	9.3	0.2	6.1	11.8	1.7
Prices	23.5	1.7	10.8	3.2	6.6	53.1	0.9
Quantity	65.4	1.7	6.4	0.2	6.4	18.1	1.7

Source: Mai Van Xuan and Mai Le Quyen (2011)

Only 30% of farmers has the capacity to access to market information, meanwhile 83.7% of farmers has the capacity to access to production information. And farmers’ capacity to access to modern mass

media is very limited: Telephone: 25%; Newspaper: 15.8%; and especially Internet only 6.6%. And Mai Van Xuan and Mai Le Quyen (2011) pointed out that almost none of farmers in Quang Ngai province had the capacity to use market information. Furthermore, their capacity to access to market information is very low.

Besides, some research show that farmers' capacity to access to market information in Vietnam is high as studies of Luu Thanh Duc Hai (2005) and La Nguyen Thuy Dung and Mai Van Nam (2015) reflect it. According to the study of Luu Thanh Duc Hai (2005), for 88.7% of farmers it is easy to access to market information: Prices, quality, demands of market. There are many sources of market information but main sources are still traders, food state companies and via face-to-face channel.

Table 22: Capacity to access to market information of participants in rice value chain in the Mekong Delta

Participants	N	Rate of respondents (%)		
		Easy	Hard	Very hard
Farmers	62	88.7	9.67	1.63
Wholesalers/traders	67	79.1	19.4	1.5
Millers/polishes	53	81.1	17.0	1.9
Retailers	30	80.0	20.0	0.0

Source: Luu Thanh Duc Hai (2005)

According to a study of La Nguyen Thuy Dung and Mai Van Nam (2015), almost all farmers' capacity to access to market information ranged from average to high level and there is a significant difference amongst households associated with companies and households without companies. 88.9% of farmers households associated with companies accessed to market information from average to high level; only 10.3% of farmers households accessed to market information at a very high level. Because when farmers associate with companies, all their activities for input and output are done by companies through contracts and so this farmer group is not active to seek information. Meanwhile, farmers without association and companies have to find input and output themselves so 75.4% of farmers in this group accessed to market information at an average or high level; 17.5% of farmers in this group accessed to market information at high level. Farmer households in this group must produced and sold products themselves so they have to try their best to access to and update market information, new production technologies to gain the highest profits.

Table 23: Access to market information between households associated with companies and households without companies

Access levels	Households with companies		Households without companies	
	N	(%)	N	(%)
Very low	0	0.0	0	0.0
Low	1	0.8	9	7.1
Average	54	42.9	44	34.9
High	58	46.0	51	40.5
Very high	13	10.3	22	17.5
Total	126	100	126	100

Source: La Nguyen Thuy Dung and Mai Van Nam (2015)

3.7.3. Farmers' sources of market information

Along with the development of information technology, farmers in Vietnam have been looking for information from many various sources such as television, radio, newspaper, relatives, neighbors, traders, governmental agencies, NGOs.

Market information sources in the agricultural value chain in Vietnam are divided into 2 sources: Formal and informal ones. Accordingly, the formal sources are implemented by extension stations, market experts, newscasts and broadcasts, internets, newspapers, magazines etc...

Table 24: Sources of market information in the rice value chain in the Mekong Delta

Sources of market information	Percentage of response to different resources (%)			
	Farmers	Assemblers wholesalers	Millers Polishers	Retailers
Newspaper, radio and TV	29	7.8	24.3	4
Information from SOEs	2.6	25.5	32.7	20.8
From private traders or intermediaries of the channel	20.5	54	30.3	58.4
From relatives, friends	43.5	4	9.2	10.4
Other (internet)	4.4	8.7	3.5	6.4
Total	100	100	100	100

Source: Luu Thanh Duc Hai (2002)

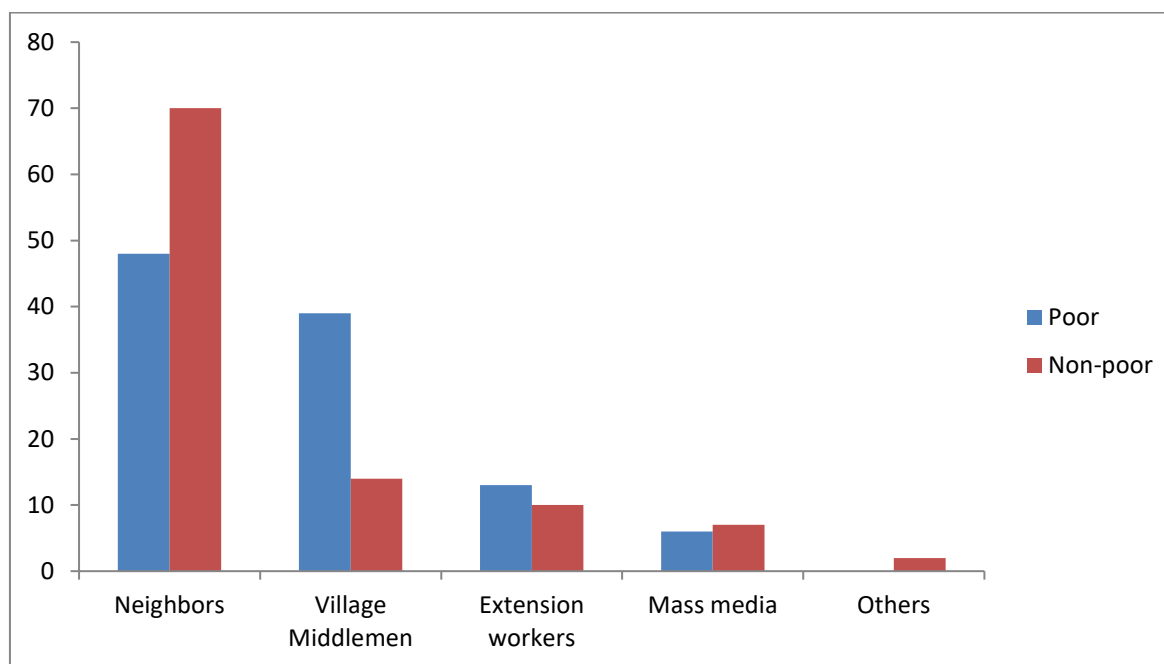
Informal sources are provided by individuals as other farmers, companies, agro-processors and non-governmental organizations (Le Van Cuong, Ngo Thi Thuan, Nguyen Hung Anh, 2012).

A study of Luu Thanh Duc Hai (2002) indicated that most rice farmers reached market information from their relatives and friends, rice traders (informal sources), occupied 43.5%. In addition, they can gain the market information from mass media such as newspaper, radio, TV. Only few large-scale farmers got the market information from SOEs and internet.

Market information source from the internet is underused in the rice value chain in the Mekong Delta. Some websites provide information about the rice market day by day. Rice traders can obtain the information on the export prices of rice, domestic prices at different major market places, business activities of the SOEs and the Vietnamese Food Association, new government policies on rice production and export, etc. but according to rice traders, market information online is general information in the whole country, not their targeted markets and this information source is not good enough to apply in practice (Luu Thanh Duc Hai, 2002).

A study of Huynh Anh Phuong (2008) in Quang Ngai province shows that market information of farmers was derived from various channels, including neighbors, village middlemen, extension workers, mass media and others. However, neighbor and village middlemen played their most important role in providing market pricing information to local farmers with over 80% of total surveyed households who accessed to these sources. The sources of extension workers and mass media had no weight because the interviewed households complained that the information from extension workers and mass media was inappropriate. Currently, the national marketing department gave the pricing information of beef on television and radio, meanwhile farmers selling bull to traders could not use that information as a basis to bargain with traders. According to local authorities, due to low finance as well as the lack of skilled personnel they found it very difficult to effectively implement and fully disseminate market information to farmers.

Figure 18: Main sources of market pricing information of different wealth groups in Hanh Phuoc commune (%)



Source: Huynh Anh Phuong (2008)

However, Huynh Anh Phuong (2008) also indicated that in fact, access to market pricing information from neighbor and village middlemen carried much risk and uncertainty to farmers, which influenced significantly their profit because maybe a farmer sells their products at low price and their neighbors might be at risk to get same situation. As for the information from village middlemen, it was not reliable or usable because village middlemen were both the traders and providers of market information and hence, they surely took any opportunities to exploit farmers to get benefit by providing farmers with market price as low level as possible. But a sad fact is that farmers did not trust much the market information from neighbors and village middlemen but they had no other option to access to better and right market information.

The study of La Nguyen Thuy Dung and Mai Van Nam (2015) pointed out that, farmers in An Giang province used many sources to look for market information to support their production and trade activities. However, they only believed in and mainly accessed to relatives and neighbors to get market information (Heidi Kaila, 2015).

Table 25: Market information sources of farmer households with and without companies in An Giang province

Market information sources	Farmers with companies		Farmers without companies	
	N	%	N	%
TV and Radio	69	54.8	51	40.5
Newspapers	8	6.3	0	0
Extension officials	15	12.1	12	9.7
Relatives, neighbors	83	65.9	89	70.6
Traders, collectors	35	27.8	67	53.2
Others	2	1.6	15	11.9

Source: La Nguyen Thuy Dung and Mai Van Nam (2015)

The accession to market information via TV is most popular with farmers. 76.5% of the respondents often accessed to prices and where to sell via TV. Some programs related to agriculture are “Rural Today” on VTV1 weekly, ‘Friends of Farmers’ on VTV1, VTV2 (Chantal Pohl Nielsen, 2002). In addition, market information sources of farmers are local associations and unions. 27% of the respondents said that they often reached market information through local associations and unions. The next is internet (23.5%), newspapers (14%) (Le Thi Hue, 2011).

Besides, market information sources of public institutions and government have also developed fast in Vietnam. Market information is used by public institutions and government for the following purposes: to make policy decisions; to monitor changes in the economy; and to assess to food security situation in the country; to supply participants in market, etc.

The Vietnamese government had some activities to supply rice market information to actors in the rice value chain such as broadcasting by national and local radio stations, publishing in newspapers, and posting on websites (The World Bank, 2011).

The Ministry of Agriculture and Rural Development applied advanced IT to build the database on the market prices of agricultural products, including rice to provide farmers and actors in the value chains through the activities of state agencies, farmers organizations, agricultural extension stations at commune and district levels via posting on the website of Ministry www.agroviet.gov.vn or www.mard.gov.vn (Nguyen Quoc Nghi). In addition, the Ministry of Agriculture and Rural Development has built an agricultural information system to support market development and agro-

products trade promotion activities since 2003. The system provided information inside and outside the country including prices of agricultural products and agricultural materials all over the country; Trade news, including official and unofficial import and export; Domestic and international market forecast and analysis; News on main agricultural commodities (rice, coffee, rubber, sugar, tea, pepper, cashew nut, wood, meat, fruit and vegetable and etc); News on production; Recommendations and guidelines on agricultural production; etc. (Tran Thi Ngan Hoa and Nguyen Hong Son).

However, facts showed that farmers in Vietnam rarely access to or use market information from public institutions because of its poor accuracy and lack of timeliness and even some actors in the value chain have not known or had ability to access market information from public institutions.

Market information sources of other actors in rice value chains in Vietnam: Wholesalers obtained market information mainly through other traders in the channel of distribution or from the SOEs. In addition to market information sources from other traders and SOEs, rice millers/polishers gained market information from newspaper, radio and TV. Interestingly, rice traders with their knowledge and experience are also their own source of market information. They know the information about rice production areas, prices between different areas to make profitable decisions on production area and time to buy rice and this results in saving time and money for them (Luu Thanh Duc Hai, 2002).

3.7.4. Vehicles to transfer market information to farmers

Vehicles to transfer market information is also an important factor in market communication. Market information providers should use simple vehicles to transfer because with these simple vehicles, market information receivers (farmers) maybe access and use information at low costs. Along with the development of information technology, market information providers and receivers have many options to choose vehicles to disseminate and receive the market information.

The main vehicles to transfer market information in the rural areas of Vietnam are as follows:

- Newspaper is a source of market information to farmers. According to Pham Quang Dieu (2006), there are some newspapers that are providing market information to farmers such as “Enterprise News”, “Sai Gon times”, “Vietnam’s Economy”, “Investment Newspaper”, “Vietnam’s Agricultural Newspaper”; “Rural Today”. However, the market information from these newspapers is not provided adequately. Besides, few farmers can access to and read newspapers every day. A study of Sonja Hähnke (2006) indicated that only 37.5% of the households read newspapers and only 27.5% read a farming journal regularly. The other difficulty in providing market information in newspapers is that

the news costs on newspapers are rather high (Hoang Thi Bao Thoa, 2013) and the sources of market information fail to transfer market information in newspapers.

Table 26: Prices of advertisement on newspapers (Unit: VND/edition)

Order	Size (cm-cm)	4 colours	Black and white
Youth Daily			
1	1 page (25.5x37)	54,000,000	38,000,000
2	1/2 page (25.5x18)	28,000,000	20,000,000
3	1/2 page (19x27)	37,000,000	24,000,000
4	1/4 page (12.5x18)	15,500,000	10,500,000
Ha Noi News			
1	1 page (38x52)	29,600,000	37,000,000
2	1/2 page (38x26)	14,800,000	18,500,000
3	1/4 page (28.5x17.5)	9,000,000	11,300,000

Source: Hoang Thi Bao Thoa (2013)

TV, radio and telecommunication play an important role in the dissemination of market information to farmers. Telecommunication, internet are developing quickly in the countryside. This process has been changing the market information system there, farmers can access to market information much faster, adequately and effectively. This makes market information system in the countryside more and more complete and perfect (Mai Van Xuan and Mai Le Quyen, 2011).

- Internet: Tại Việt Nam, Internet and digital technology applications are booming in Vietnam (Hoang Thi Bao Thoa, 2013) and more and more people considered them as a very important tool to provide and receive information. According to Hoang Thi Bao Thoa (2013), Vietnam has more than 31 million people using Internet, accounted for 35.4% of the total population and 66% of them were using Internet every day in 2012. Internet will remarkably impact on the ability of receiving information of Vietnamese people. There are some websites such as www.dost-dongnai.gov.vn; www.agroviet.gov.vn, etc. that are updating market information of agricultural products. However, according to *Pham Quang Dieu (2006)* the market information from these websites is not good for farmers in their production and trading.

- Television is a type of media used by a majority of population. They watched TV everyday. There are no other types of media that function as fast and effectively in transferring information as television (Hoang Thi Bao Thoa, 2013). However, TV programs are mainly about technology and

production experience, not much about market information (Pham Quang Dieu, 2006). In addition, like newspapers, the cost to broadcast on TV is rather expensive so enterprises and organizations did not join in providing market information via TV.

- Radio: Vietnam's radio network, the Voice of Vietnam (VOV) has 61 provincial radio stations and 528 district radio stations, including 319 FM stations, plus an estimated 5,000 public address systems at village level. In addition, the broadcast of radio and news on public loudspeakers are widely used in Vietnam. State-owned public address systems are provided free to about 5,000 remote and isolated communes in Vietnam (Felsing M and Nguyen, S H, 2003).

- Training: Training courses can also be a way to provide market information to farmers but this way it is rarely used; because of the fruitlessness and difficulties in organizing few farmers can access to market information, meanwhile the cost for the training course is high. According to Felsing, M and Nguyen, S H (2003), printed materials should accompany training sessions and could also be used for general information dissemination. Posters, booklets, leaflets and distributed newspapers were all mentioned as good information sources.

- Agricultural extension systems: the Agricultural Extension System is managed by Ministry of Agriculture and Rural Development. The official agricultural extension system consists of the Agricultural Extension Center at provincial level, which is administrated by the provincial Department of Agriculture and Rural Development (DARD), the Office of Agriculture and Rural Development at district level, and extension workers at commune level (Lan Anh Hoang, Jean-Christophe Castella and Paul Novosad, 2006). In most cases, extension workers rarely have direct contact with local farmers and 50% of farmers had never participated in an extension session (Lan Anh Hoang, Jean-Christophe Castella and Paul Novosad, 2006). Almost all agricultural extension activities focused on technical aspects instead of market information and business services (Mai Van Xuan and Mai Le Quyen, 2011).

- Farmer-to-Farmer: the Farmer-to-farmer model was considered as efficient for the transmission of information, many farmers stated they liked to interact with other farmers because the language used by other farmers was familiar and easily understandable (Felsing M and Nguyen, S H, 2003). Farmers can access to market information through their relatives, neighbors. A study of Lan Anh Hoang, Jean-Christophe Castella and Paul Novosad (2006) pointed out that kinship networks are particularly important for the accession to information. Kinship networks serve as one of the main channels of

informal communication in the community and are an important source of information for large numbers of local people.

- In addition, currently there are some other types to disseminate market information to farmers in Vietnam, namely local markets, community activity points, supermarkets, etc (Mai Van Xuan and Mai Le Quyen, 2011). Supermarkets have been developed fast in countryside because the demand and buying power of farmers have increased rapidly. Therefore the process of supermarkets development in countryside contributed to the development of market information system.

3.7.5. Market information from governmental agencies

The market information from governmental agencies is formal source managed by governmental agencies or Civilian Society Organizations such as farmer organizations, women organizations, projects, etc. and farmers can access to market information from these sources.

The sources of market information from the Ministry of Agriculture and Rural Development (MARD) is very important. Currently, there are 63 websites for agriculture for 63 Provinces in Vietnam and besides the websites of Ministry of Agriculture and Rural Development (www.agroviet.gov.vn); the Vietnam's Academy of Agricultural Sciences–VAAS (www.vaas.org.vn); the Department of Cultivation (www.cuctrongtrot.gov.vn); Plant Protection Department (www.ppd.gov.vn); the Department of Cooperatives and Rural Development (www.dcrd.gov.vn); Vietnam's Agricultural Newspaper (www.nongnghiep.vn); the National Agriculture Extension Center – NAEC (www.khuyennongvn.gov.vn) are popular sources of information (Nguyen Van Van, 2010). The Ministry of Agriculture and Rural development determined clearly that the lack of markets is becoming a very serious problem now and agricultural production has had a surplus in the domestic market; the prices of some main products have dropped sharply (Tran Thi Ngan Hoa and Nguyen Hong Son) so providing market information to farmers is a main duty. Agroviet is the name of the official website of MARD offering information in the field of agriculture, rural development and agro-product trade promotion. The objective of this website is to build a bridge between producers, traders and decision makers on the one hand and customers, investors and domestic and international donors on the other hand. The sources from the Ministry of Agriculture and Rural Development provide market information, trade news, including official and unofficial import and export, domestic and international market forecast and analysis (Tran Thi Ngan Hoa and Nguyen Hong Son).

Besides, some research show that the market information system of governmental agencies have operated ineffectively. A study of Ma. Lucila Lapar, Vu Trong Binh and Simeon Ehui (2003) indicated

that the government information network is not organized in a systematic manner with overlaps amongst and across various government agencies. Therefore governmental institutions have not been supplying the kind of information that farmers can use in their marketing activities. In addition, information is not available in a timely manner; whatever type of information eventually reaches farmers and other agents in the commodity chain is either outdated or not useful at all. Owing to the fragmentation of the marketing system in the country there exists a great variation in prices.

3.7.6. Costs of the market information service

Farmers are often disadvantaged people when they join the markets because the majority of them do not understand the market well, how it works, and why prices fluctuate (Huynh Anh Phuong, 2008) and they also have little or no information on market conditions and prices; furthermore, they have no experience in market negotiation (H. Ade Freeman and Said S. Silim, 2001). Therefore, they incur various kinds of costs in the process of searching market information, searching potential buyers, doing negotiation with traders and monitoring the agreement. These costs in turn reduce their ability as well as incentives to participate in agricultural markets, so the study about the costs of market information searching and utilization is important. Market information systems should provide market information at very low fees to farmers that they can accept.

Before making a decision about how to market a product and who to sell it to, smallholder producers must determine the price they expect to sell and receive the product at. Therefore, they search to get price information, and, of course, incur that costs. This cost is related to the time and resources used to get information about prices, possible buyers and quantities (Huynh Anh Phuong, 2008). According to Subhash Bhatnagar (2008) in most developing countries, information search costs form a significant part (11%) of the total cost incurred by farmers during the agricultural cycle, starting from the decision to the marketing of production. The costs of obtaining price information depend on the extent to which there is readily available information on market prices and also depend on the provision of information in the marketplace (Huynh Anh Phuong, 2008).

3.7.7. Infrastructure to develop market information system

Infrastructure to develop market information system in Vietnam has been developing quite quickly. Infrastructure in the countryside including roads, telecommunication, Internet and so on has improved considerably (Mai Van Xuan and Mai Le Quyen, 2011).

Roads, electricity and telecommunication are essential and important infrastructure to decide the effectiveness of agricultural production. Effective infrastructure system will help disseminate signals

of market and information to farmers, reduce production costs, bargain costs, effectively develop market systems and improve the promotion of products (Vietnam World Bank, 2006).

Infrastructure about telecommunication: A study of Heidi Kaila (2015) showed that telecommunication has developed quickly in Vietnam. 98% of households has TV in 2011 but the amount of households owning Radio reduces, 63% of households has radio in 2001 and only 18% in 2011 (TNS Media Vietnam, 2012) and few people like to listen to radio (Do Chi Nghia). Especially the amount of households owning Phones is very high. 18.6% of households has phones in 2006, 38% of households has phones in 2008 and this rate is 89.8% in 2014 (Heidi Kaila, 2015). Households owning a computer have increased fivefold from 2.4% in 2006 to 12.9% in 2014. There is also a large increase in the share of internet users. The national rate for connections has increased more than eightfold during the period of 2006 to 2012 but mainly in cities (Heidi Kaila, 2015).

Newspaper and magazine: Do Chi Nghia indicated that the amount of newspapers and magazines has a significant downtrend and the rate of readers is also as low as 3% of the population in the Red River Delta.

Table 27: Rate of 15-54 age population using/contacting mass media everyday 2010-2011 (%)

	2010	2011
TV	80.9	78.3
Newspaper	71.4	73.7
Magazine	40.4	40.5
Radio	41.2	34.9
Internet	55.3	55.5
Telephone	84.6	90.1
Outside advertisement	94.9	95.2
Advertisement at selling points	85.1	86.1
Advertisements on LCD screen	69.7	78.7
Advertisements on bus/taxi	25.6	20.3

Source: Nguyen Quang Vinh (2015)

3.7.8. The impacts of MITS on farmers

According to Le Thi Hue (2011), the majority of farmers in Can Tho considered market information such as agricultural product prices, where to sell, etc. what they received through channels such as

TV, radio, newspaper, neighbors, etc. is important for them to decide on their input and output in the agricultural production. 43.5% of farmers in Can Tho said that market information is really “very necessary” and 40.5% of them reckoned that “necessary”.

Farmers have been working hard to improve their income but in fact they can not get that goal because of the lack of market information. Market information helps improve selling price and location, change the behaviors of farmers in the production and trading to maximize their profits, reduce the risk and change agricultural products to meet the market.

- Reducing costs and improving selling prices. Information on prices helps farmers have ability to compare the prices among different traders or different market places and so farmers can negotiate with traders at higher prices. A study of Huynh Anh Phuong (2008) showed that traders cheated producers at low price so smallholder farmers with good market information can be more active to find out and negotiate with traders to realize the full value of their production. In addition, if farmers have market information they will have many chances to sell their products through formal supply chains to get higher prices. According to a study of Ma. Lucila Lapar, Vu Trong Binh and Simeon Ehui (2003), market costs of farmers will go down if they have good market information.

- Improving the productivity of farmers: Market information have positive impacts on the productivity of farms because with good market information producers can easily access to markets and they often produce in a special manner to achieve the highest productivity. This specialization will increase the total productivity of farms. A study of Tran Huu Cuong (2006) indicated that accessing to market information will increase the productivity of a farm by 2.7%: 0.61% in fruit trees, 0.83% in aquaculture and 0.27% in livestock.

- Improving farmers' income: A study of Le Van Cuong, Ngo Thi Thuan and Nguyen Hung Anh (2013) proclaimed that there is the relation between the farmer's capability to access market information and the farmer household's income. They access to market information more and more so their income is higher and higher and the opposite.

3.7.9. Some market information systems to farmers in Vietnam

a) Vegetable market information system in Hanoi city:

Cirad organization operated the project SUSPER (project for the Sustainable Development of Peri-urban Agriculture in Southeast Asia) from 2002 to 2005, funded by the French Ministry of Foreign Affairs with the following goals: Building a vegetable market information and consultation system (MICS) in Hanoi to address marketing problems faced by vegetable farmers. A MICS is a market

information system (MIS) combined with debates organized among farmers, traders, and development agents to reach common visions and strategies on marketing. The collected marketing information was disseminated among farmers and extension agents through television, newsletters, websites (including that of the Ministry of Agriculture and Rural Development) and consultation meetings (Moustier P, Nguyen TTL, Hoang BA, 2013).

Some results of MICS in Hanoi city:

- Increasing market opportunities for farmers: Farmers with market information from MICS knew that there was a period of about four months for the Hanoi region (July to October) when they could not produce temperate vegetables, such as tomatoes and cabbage and markets had to import these vegetables from China while prices increased considerably. Producers could increase their off-season production of tomatoes during the periods of shortage to get higher prices. According to Moustier P, Nguyen TTL, Hoang BA, (2013), 70% of farmers mentioned an increase in price obtained from buyers because they had information about prices.

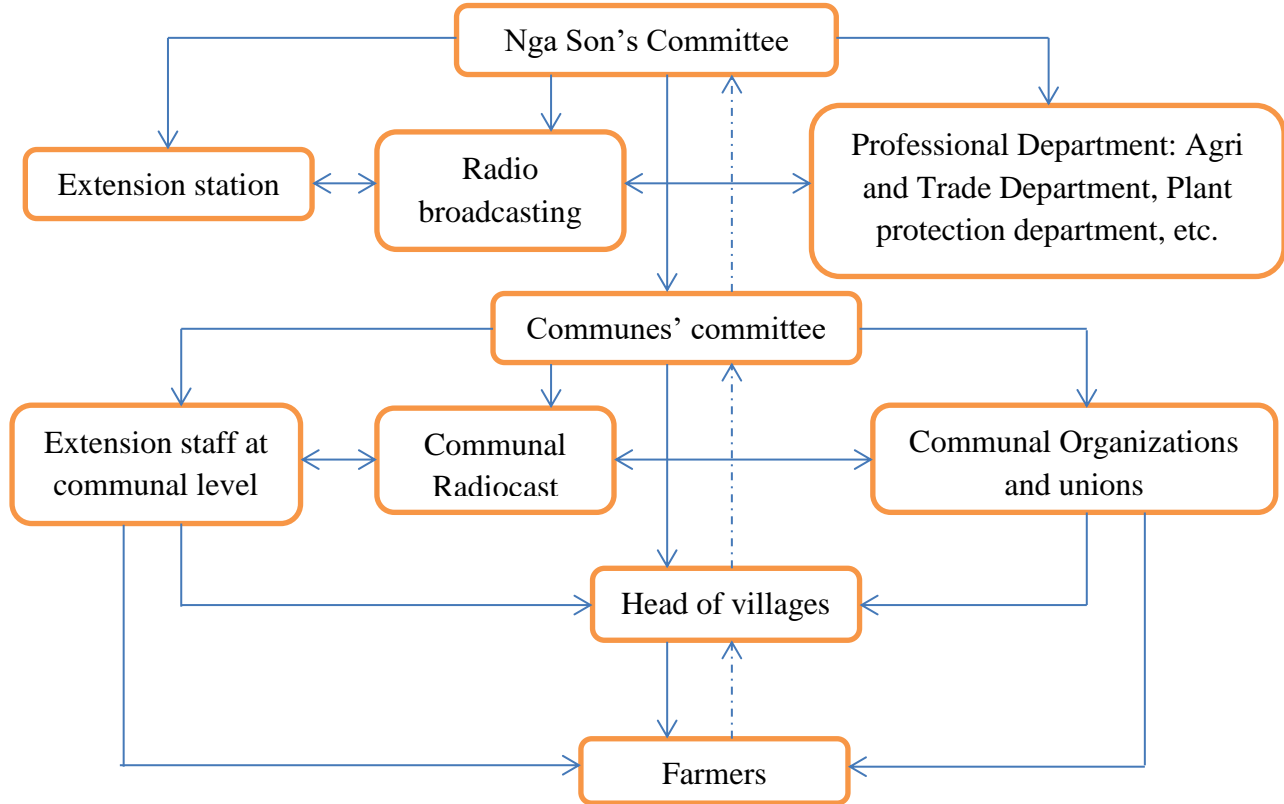
- Reducing the production costs: 65% of farmers stated that the MICS reduced the time spent in transportation as they adapted the frequency of visits of the wholesale markets to price changes (Moustier P, Nguyen TTL, Hoang BA, 2013).

- Improving the alliance between safe vegetable production and distribution enterprises (Moustier P, Nguyen TTL, Hoang BA, 2013) because in fact traders typically complained that they lacked reliable suppliers in terms of safety and diversity, while farmers who were trained to produce safe vegetables (mostly based on Integrated Pest Management) lacked customers willing to pay premium prices. So in 2008 the project supported the alliance between producers and traders to develop marketing activities (Moustier P, Nguyen TTL, Hoang BA, 2013).

b) Market information in Nga Son district, Thanh Hoa province:

Market information system in Nga Son is organized, implemented and coordinated between many agencies and departments at all levels. All activities of this service are controlled by the people's committees. These agencies and departments have close relationships with each other. They support each other in providing the farmers information regarding new technical procedures, weather forecast and diseases prevention, and especially the market information. In this system, extension plays the most important role by creating the public market information services to maximize farmer's benefits through identifying the most needed information regarding their production (Le Van Cuong, Ngo Thi Thuan and Nguyen Hung Anh, 2013).

Diagram 6: Nga Son market information system



Note: ———> Management; - - - - -> Feedback; <—> Co-ordinate relationships

Source: Le Van Cuong, Ngo Thi Thuan and Nguyen Hung Anh (2013)

The advantages of market information system in Nga Son are that there are many different sources of market information and channels, there is market information shared among farmers and good infrastructure system to disseminate market information. Besides the advantages, the farmers in Nga Son have faced some difficulties. They are always in lack of official market information from government agencies and market information services (78.89%), they perceived an inadequate local authority support and interventions in agricultural market management (40%) (Le Van Cuong, Ngo Thi Thuan and Nguyen Hung Anh, 2013).

Table 28: Advantages and disadvantages of Nga Son farmers to access market information

Categories	Communes			Total
	Nga My	Ba Dinh	Nga Tan	
Advantages				
Abundant MI on medias	76.67	63.33	23.33	54.44
MI sharing between farmers	63.33	83.33	70.00	72.22
Good rural infrastructure	96.67	10.00	23.33	43.33
Others	0	0	23.33	7.78
Disadvantages				
Difficult MI sourcing	73.33	86.67	76.67	78.89
GOV intervention and support	53.33	36.67	30.0	40.0
Dependency	80.00	50.0	86.67	72.22
Others	6.67	0	0	2.22

Source: Le Van Cuong, Ngo Thi Thuan and Nguyen Hung Anh (2013)

3.8. Agricultural extension system in Vietnam

The agricultural extension system in Vietnam is a very important entity in the market information system. Therefore, this chapter will describe the current situation of agricultural extension system to have an overall picture about agricultural extension system, its weaknesses and strengths.

The agricultural extension system in Vietnam was established and developed according to Decree No.13/NĐ-CP of the Government on Agricultural Extension dated 02/3/1993. With a 24-year history the Agricultural extension system in Vietnam has been constantly growing and it became a synchronous system from the Central to the grassroots, villages, closely linked to the agriculture, farmers and the rural areas (Ministry of Agriculture and Rural Development, 2013). Agricultural extension work largely reported by government agencies have brought significant changes in local farmers' livelihoods by increased economic efficiency of resource use through advanced technology transfers (Quy Hanh Nguyen, 2012). In addition, agricultural extension in Vietnam has contributed to rural development and poverty alleviation over the past two decades of agricultural collectivization, but it was not very effective in reducing disparities within farmer communities (Jean-Christophe Castella et al, 2006; Oxfam, 2014).

3.8.1. Situation of agricultural extension system in Vietnam

Agricultural extension has an important role in promoting the development of agricultural farmers and the rural area. Agricultural extension is a bridge to link information, sciences, advanced technique, skills and production experiences to farmers to encourage them to apply them in their production so farmers have more and more agricultural services and they will have more and more conditions to improve their agricultural production (Nguyen Huu Tho, 2015).

According to FAO: “Extension is an informal educational process directed toward the rural population. This process offers advice and information to help them solve their problems. Extension also aims to increase the efficiency of the family farm, increase production and generally increase the standard of living of the farming family. The objective of the extension is to change farmers' outlook toward their difficulties. Extension is concerned not just with physical and economic achievements but also with the development of the rural people themselves. Extension agents, therefore, discuss matters with the rural people, help them to gain a clearer insight into their problems and also to decide how to overcome these problems”.

As it was mentioned above, the Vietnam Extension System was officially established accordingly to the Decree 13/NĐ-CP of the Government in 1993 and according to the current regulations, Vietnamese agricultural extension system has the following responsibilities (Nguyen Van Bo, 2012):

- Developing policies and mechanisms of management for the extension in agriculture, forestry, fishery, rural industry;
- Developing economic-technical cost-norms for extension works; leading, organizing and guiding the transfer of advanced techniques through setting up demonstration models, disseminating information, training, providing services and international collaboration in the related fields.

a) The structure of Vietnamese agricultural extension system:

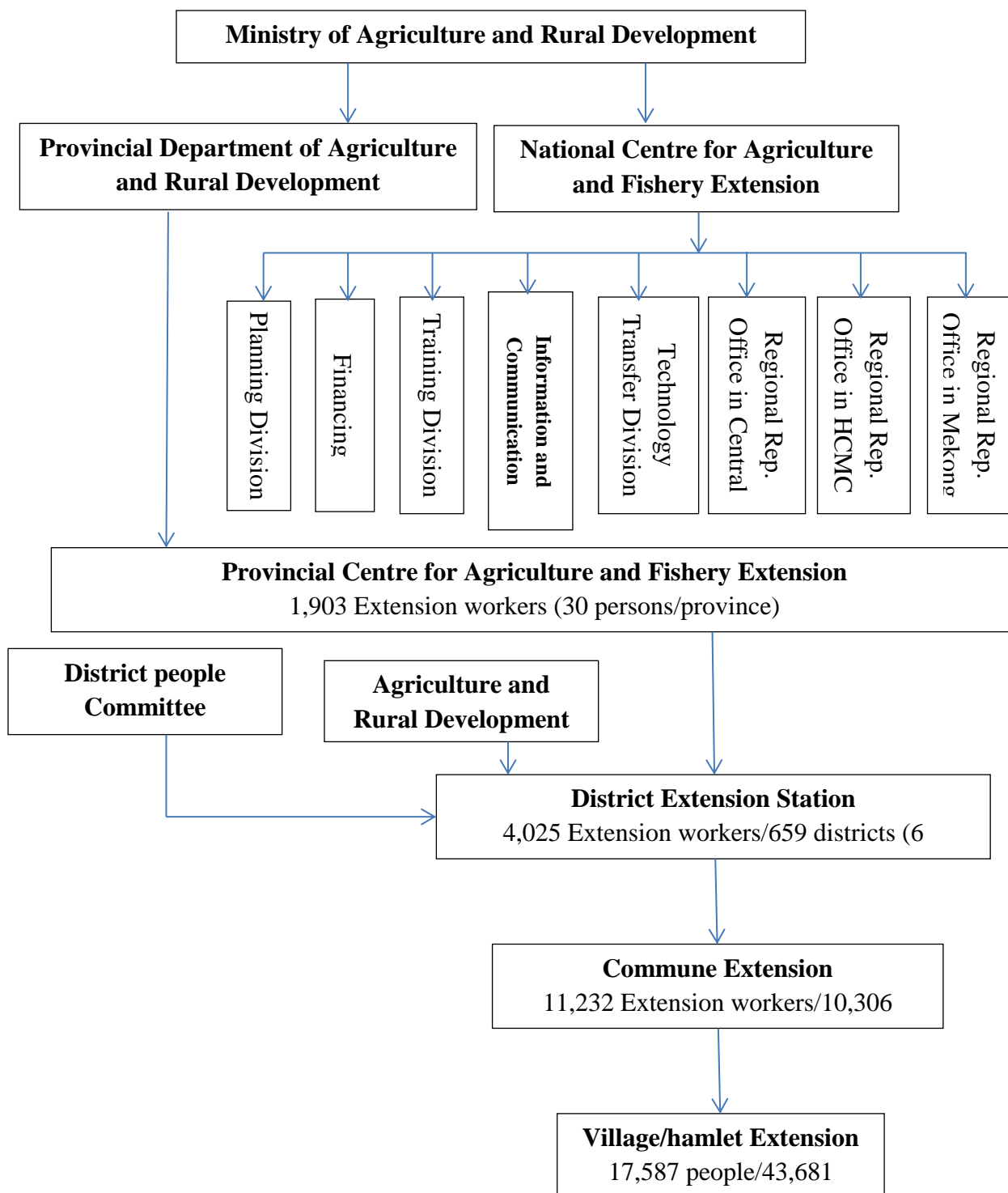
The public extension system in Vietnam is organized at 5 levels: central, provincial, district, commune and village levels (Ashok Seth, 2009).

The national agricultural extension Center is at the Central level, under the Ministry of Agriculture and Rural Development. The national agricultural extension center organizes agricultural extension activities at very large scale, inter-provincial activities, inter-regions activities and agricultural extension activities approved by Minister of Ministry of Agriculture and Rural Development.

The local agricultural extension system is divided into 4 levels: Provincial, district, commune and village levels. The local agricultural extension system has been gradually developed and completed.

The local extension has been organizing extension activities within each province, district and approved by the chairman of provincial people’s committee (Nguyen Huu Tho, 2015).

Diagram 7: Government Extension System



Source: Nguyen Van Bo (2012)

Currently, all 63 provinces in Vietnam have the provincial extension centers (Ministry of Agriculture and Rural Development, 2013) with an average 30 persons per center (Nguyen Van Bo, 2012) and there are 644 extension stations at district levels across the country (Nguyen Huu Tho, 2015). In addition, according to Nguyen Van Bo 2012, there are 11,232 extension workers at commune level with 1-2 extension workers per commune and 17,587 extension workers at village level.

b) Agricultural extension officers:

The agricultural extension officer force improved in terms of quality and quantity but it has failed to meet the demands of farmers yet. In reality the number of extension staff is low and inadequate to meet the demand with only 4 public extension workers per 10,000 farming households (Nguyen Van Bo, 2012). The total of agricultural extension officers is about 36,810 people, in which the amount of the central officers is 90 people, the provincial agricultural extension officers is 2,114 people and the average of provincial extension center has 33 officers, the total of the district agricultural extension officers is 4,347 people with an average of 7 officers per district extension station, the amount of commune agricultural extension officers is 8,780 people and there are about 21,476 extension workers at village level who are mainly working as part-time extension workers (Nguyen Huu Tho, 2015).

The quality of agricultural extension officers: In general, the quality of agricultural extension officers at district level and above has ensured professional qualification because 80% of them has bachelor degree and even higher, the rest is college degree. However, the quality of commune agricultural extension officers is still low and uneven. Only 24% of commune extension workers have BSc and College degree and 55% of village extension workers do not have professional certificate (Nguyen Huu Tho, 2015).

Table 29: Amount of agricultural extension officers at all level between 2012 and 2015 (people)

Order	Level	2012	2013	2014	2015	Quality
1	Province	2140	2160	2050	2114	> 80% bachelor and higher level
2	District	4036	4410	4298	4347	
3	Commune	8390	9743	9181	8780	24% BSc and College
4	Village	21321	22750	24638	21479	Low education
	Total	35887	39063	40167	36720	

Source: Nguyen Huu Tho (2015)

c) Budget for agricultural extension activities:

The agricultural extension budget has 2 sources: Central budget and local budget. Central budget is used for large-scale missions, inter-province activities and inter-regions activities and the Local budget is spent on the local agricultural extension activities. According to Nguyen Huu Tho (2015), the total budget (including the Central and the Local) for agricultural extension activities was 1,011.5 billion VND/year in 2015, of which the central budget was 231.9 billion VND/year and the local budget was 779.6 billion VND/year (table 30).

Table 30: Agricultural extension activity budget in the period of 2011-2015

Order	Items	2011	2012	2013	2014	2015
1	Local budget	184.7	562.4	667	717.4	779.6
	<i>Midlands and North mountain</i>	22.6	93.1	91.5	117.3	101.5
	<i>Red river delta</i>	49.3	135.3	197.9	194.4	251.7
	<i>North Central</i>	14.7	60.1	56.2	65.8	71.6
	<i>Coastal south central</i>	13.1	38.9	40.9	43.8	42.1
	<i>Central highlands</i>	11.1	33.6	32.5	30.8	37.8
	<i>South East</i>	32.4	65.1	80.9	78.2	81.6
	<i>Mekong Delta</i>	41.5	136.3	167.1	187.1	193.3
2	Central budget	222	248.6	267.2	240	231.9
	Total	406.7	811	934.2	957.4	1,011.5

Source: Nguyen Huu Tho (2015)

The agricultural extension budget depends more and more on the local budget because the central is more and more reducing the investment in the extension, so the provinces have the economic potential and focus on the extension they will invest more in the extension (Nguyen Huu Tho, 2015) and the Mekong Delta region has been investing so much in the extension (see table 31).

Table 31: Budget for government extension activities in 2011 and 2015 (billion VND)

	Total	State budget	Provincial budget
2011	407	222	185
2015	1,011.5	231.9	779.6

Source: Nguyen Van Bo (2012) and Nguyen Huu Tho (2015)

There are 2 obstacles in agricultural extension budget. (1) Funding for extension is also limited. In 2011, total budget for all extension activities accounted for only 20 million USD, or 2.5USD/farming

household/year (Nguyen Huu Tho, 2015) and (2) the unreasonable utilization of extension budget. Almost all of the extension budget was used for propaganda, training, workshops, conferences (60-65% of total budget) (Nguyen Huu Tho, 2015).

3.8.2. Activities of agricultural extension system in Vietnam

The contents of agricultural extension are much diversified because the extension depends on the demands of farmers and the extension has to meet these demands. The more developed the country is, the higher educational level, management and scientific knowledge of the farmers have and the contents of the extension are richer (Duong Xuan Lam, 2006).

The extension system in Vietnam is focusing on 4 main activities: (1) Building demonstration models of advanced techniques for transferring to farmers which concentrate on introducing new varieties, technologies (together with demonstration, extension also providing training techniques relating to the models) (Kieu Thi Thu Huong, 2014). (2) Organizing training farmers. Not all new techniques are demonstrated in the fields, therefore training is a means to transfer them quickly to farmers. Training methods are face-to-face trainings, training via TV, radio, brochures, CD, VCD, DVD, and via websites. The training of trainers (ToT) is also an effective training method to expand the number of skilled extension practitioners. Additionally, the extension system also creates opportunities for some advanced farmers to utilize advanced technologies from overseas (Nguyen Van Bo, 2012). (3) Organizing science and technology forums, festivals and exhibitions where farmers can exchange ideas directly with scientists, managers and successful farmers applying new technologies (Kieu Thi Thu Huong, 2014). And (4) The responsibility of transferring technologies and training, the extension system also takes responsibility for disseminating new policies related to agriculture, farmers, rural areas and markets. Meanwhile, extension workers receive feedback on weaknesses, constraints from the practices for proposing development of new technologies or adjusting new policies (Nguyen Van Bo, 2012).

According to Duong Xuan Lam (2006), the public agricultural extension system in Vietnam is providing information to farmers but almost all information is about seeds, fertilizers, irrigation and insects. The market information occupied only a small percentage (16.5%).

Table 32: Information is provided to farmers by extension system

Kinds of information	Percentage
Seeds	57.0
Fertilizers	47.8
Irrigation	39.5
Insects	38.3
Markets	16.5
Funds	18.3

Source: Duong Xuan Lam (2006)

3.8.3. Advantages of Vietnamese extension system

Vietnam's extension system has experienced the 24-year process of establishment and development, it has been significantly contributing to the development of the agriculture and the rural area. The Vietnamese extension system has shown the following strengths:

- Vietnamese agricultural extension system has been developing more and more, especially at the grassroots level. There are 5 levels in the Vietnamese agricultural extension system: Central, province, district, commune and village so farmers can easily access to the extension services and extension workers can also easily and frequently meet farmers.
- The extension methods are more and more suitable for the conditions of Vietnam. The bottom-up approach is used mainly in the extension methods in many places of Vietnam and so the extension services and activities have been more closely aligned with the farmers' demands by the Ministry of Agriculture and Rural Development, 2013).
- More developed sciences and technologies, many new and advanced knowledge, technologies and technics were born and therefore the Vietnamese agricultural extension system will have more chances to access to and choose advanced technics, knowledges that are suitable for Vietnam to transfer production and trading to farmers (Ministry of Agriculture and Rural Development, 2013).
- The general trend is that more and more farmers need supports from the agricultural extension system to develop their production and trading in the direction of the mass production, improving the productivity and quality of agricultural products, increasing the added value and sustainable development (Ministry of Agriculture and Rural Development, 2013).

- The Vietnamese government has been increasingly interested in agriculture in general and the extension in particular to improve the agriculture and the rural development in Vietnam. As a result, agricultural extension system will have opportunities to have good policies, projects, programs and budget from the State.

3.8.4. Some weaknesses of Vietnamese extension system

Although there are certain successes in the agricultural and rural development, Vietnam's agricultural extension system has still obstacles. According to Hoang Lan Anh, Jean-Christophe Castella and Paul Novosad (2002), Vietnam's agricultural extension system has 3 key weaknesses: (1) The level of influence and effectiveness of the extension of information is low. Only 13.7% to 18.3% of farmer households reckoned that the extension of information significantly influences their decisions. (2) The contents of information are more suitable for rich households than poor ones, more suitable for ethnic majority than ethnic minority. (3) The level of farmers' accession to the extension services has slowly improved over time. And these obstacles are caused by many following the disadvantages of the agricultural extension system:

- Fund lack to implement extension activities in an extensive manner. Currently, the average budget for agricultural extension is 2.5 USD/household/year, so low compared to the real request and especially there are 20% of the total provinces/cities in Vietnam that reduced the agricultural extension budget compared to that of the previous years (Nguyen Huu Tho, 2015).

- Human resources are lacking in both quantity and quality. The proportion of extension worker to farmer household is 1:1331 (Nguyen Thanh Binh and Tran Thi Thien Thu, 2017). Among extension workers, there are only 15% who received professional training in the field of extension, the rest have mainly shifted from other technical professions. In 2010, the number of extension staff with Master and PhD degree is 210; Undergraduate is 6,000 people, accounting for only 17.6% of total number of extension workers (Nguyen Van Bo, 2012). The extension workers specialties have not yet met the requirements for improving production to achievable levels. Most of them are specialized in crops and husbandry; other fields are lacking. At village/hamlet level, even at commune level, there is only less than one extension worker, therefore they have to carry out works related to the whole production process and many different products, including crops, livestock, fishery, forestry, irrigation, rural economy and markets. This means that a general and integrated knowledge is required for grassroots level extension, which is difficult to find (Nguyen Van Bo, 2012).

- The contents and methods of agricultural extension still have limitations. Vietnam's extension system has mainly focused on poverty reduction, few concentrated on market development for farmers. In addition, the old extension method that is a top-bottom approach has still been used in some places so extension service will not meet the demands of farmers (Nguyen Van Bo, 2012).
- Vietnam's agricultural extension system is still weak at data collection, analysis and dissemination to address rural people's need for knowledge and information (Ashok Seth, 2009).
- The association between public agricultural extension and non-public agricultural extension organizations and with the training organizations, other organizations is not close (Ministry of Agriculture and Rural Development, 2013).
- Agricultural production in Vietnam is still at small and/or medium scales and this makes the extension service meet many difficulties, and must be site-specific to meet the requirements of farmers (Nguyen Van Bo, 2012).

3.9. Farmer organizations (FOs) in Vietnam

FOs have been developing so fast in Vietnam. It helps farmers produce and trade in a better manner through collective activities. One of such activities is supporting market information to its members. This chapter will describe the current situation of FOs in Vietnam and its weaknesses, strengths.

During the innovation process, Vietnam has developed significantly in all aspects of economy and society but farmers are still poor and slow-developed, the gap between the rich and the poor, between the urban and the rural areas is bigger and bigger.

The rural population in Vietnam still occupied 70% of the total population and the agriculture contributing to GDP is 17% in 2015 (GSO, 2016), but the infrastructure in the rural is still weak, production effectiveness is low, farmers' life is backward and individuals are facing many obstacles such as small and fragmented-scale production, production costs are high lacking market information and lacking chances to effectively access to markets. Vietnam is interesting in terms of the development of farmer organizations to promote agricultural production and develop the rural areas because the country faces a new need for cooperation among small-holders in the market economy (P. Moustier et al, 2010).

3.9.1. Situation of FOs in Vietnam

According to Nguyen Thi Kim Nguyet (2002), Vietnamese government has paid more attention to the establishment of FOs in the last years to solve the difficulties in the rural development because the State itself could not meet the demands of farmers in the industrialization and modernization process because of its lack of budget and human resources. The State can use FOs to provide services to the farmers in an easier manner, in which there is a service of market information provision. In addition, when farmers work together in groups, important new skills and information are developed within their community, within their village.

Vietnamese farmers are mainly small-scale households, they are facing many difficulties in their production and trading. Their main difficulties are poor infrastructure, inadequate access to technology and agricultural extension services, poor market information, bad effects of unfavorable weather and insects and low public investment in the agricultural sector. Each farmer could not resolve these difficulties (The World Bank, 2015). This is the reason for developing FOs in Vietnam.

There are many clear definitions about FO in the world. Couturier *et al.* (2006) defined that a FO is a collective entity of farmers in a village or in a number of contiguous villages who have come together with common goals for economic benefits related to agricultural activities.

FO is defined as a formal or informal (registered or unregistered) membership-based collective action institution serving its members, who are rural dwellers that get part or all of their livelihood is from agriculture (crops, livestock, fisheries and/or other rural activities). Services provided by the FO aim to improve the livelihoods of its members, and include accession to advice, information, markets, inputs and advocacy (Florentina Williamson-Noble and Imanun Nabi Khan, 2014).

Another definition about FO that I see is that it is quite suitable for the Vietnamese context: FO is the organization of farmer households who produce and cultivate the agricultural products in a common manner and production scale, are geographically near each other and they have the mutual desire to participate in a group as a business and service oriented organization, under a structure that is appropriate to the management capacity and the desire of the participating households (Solidaridad and The Sustainable Commodity Assistance Network, 2011).

The outstanding character of FO is a voluntary, spontaneous economic form established by farmers who have interests, conditions in common and volunteer to contribute capital and labor to do business so as to assist one another in eradicating hunger and alleviating poverty and even getting rich (Chu Thi Hao, 2006).

There are many reasons for the participation of farmers in FOs such as the enhancement of production technology, the reduction of environmental pollution, improvement of productivity and quality, etc. But the main reason is still economic (accounted for 97.8%) (Dang Dinh Long et al, 2015).

Table 33: Reasons and level of farmers’ participation in FOs

Detailed reasons	Percentage (%)
Selling with higher prices	89.7
Buying input materials with lower prices	80.0
Improving the competitive capacity of products	62.2
Be ensured about markets	70.6
Be applied new techniques in the production	72.5
Enhancing the production condition	72.5
Reducing the production costs	82.5
Reducing the risk in the production	76.1
Raising the productivity and output of agricultural products	83.3
Raising agricultural products’ quality	76.9
Reducing pollution	73.6
Improving the health	67.5
Improving the relationship in the community/village	78.6
Maintaining traditional products	48.6
Seeing the participations of many other farmers	45.0
Suggestion by authority	36.1

Source: Dang Dinh Long et al (2015)

There are 3 types of FOs in Vietnam: Farmer Group, Agricultural Cooperative and Farmer Association.

- The farmer group is grass-root level group and is often recognized only by commune authorities. The farmer group is a professional organization formed on the voluntary basis of the members themselves in joining or leaving the group and for a mutual benefit. Its purpose is to collaborate, exchange experience, and help each other in production and sales of products to maximize the profit of each member (Bui Sy Tieu, 2011).

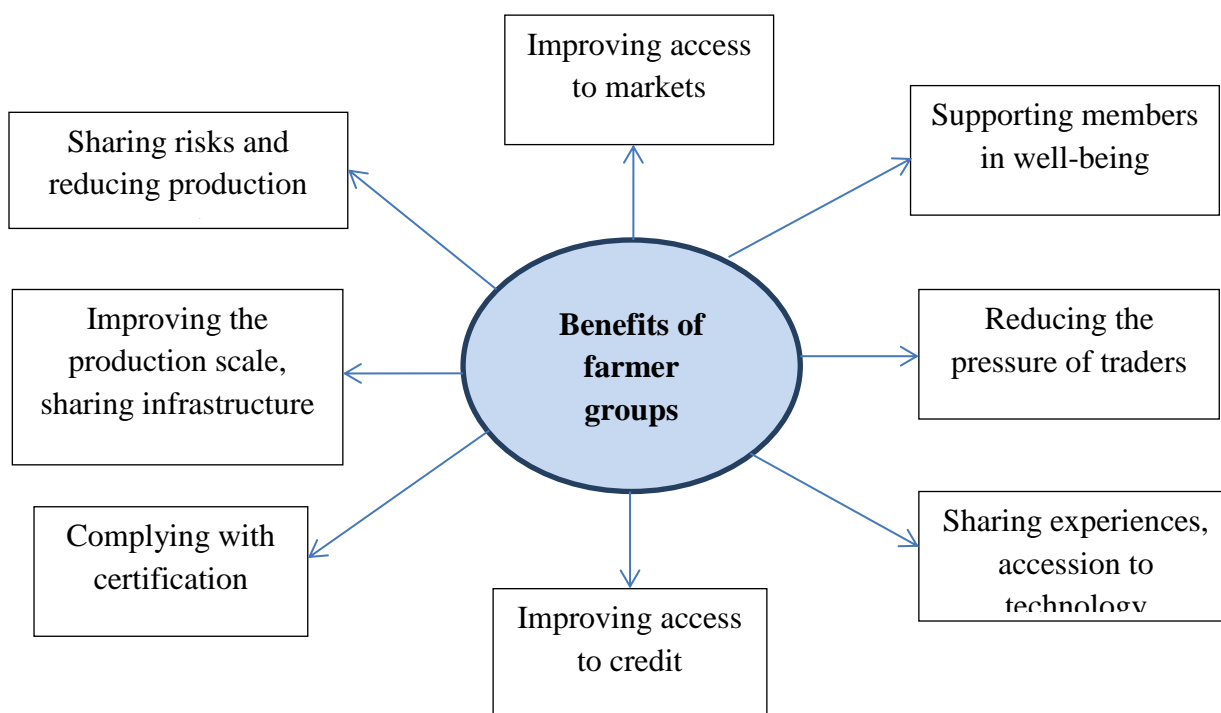
- Farmer association (FA): FA is the formal organization and is recognized by law and registered at the Ministry of Home Affairs or the Provincial Department of Home Affairs. FA is voluntary

organization of farmers who have the same purpose of gathering and uniting members, working regularly to protect the rights and interests of members, supporting one another to operate effectively and to contribute to the socio-economic development of the country.

- Agricultural cooperative (AC): formal group; recognized by law and registered at the Provincial Department of Agricultural Extension (PDA). Agricultural cooperative is a collective economic organization run by farmers, farmer households (cooperative members) who have common needs and interests, voluntarily contribute capital and labor to the establishment of the cooperative to promote the collective strength of each cooperative member, to help each other to effectively carry out agricultural production and business activities and improve the material and spiritual life, to contribute to the socio-economic development of the country (The Asia Foundation, 2012).

- According to Solidaridad and The Sustainable Commodity Assistance Network (2011), FOs have significant roles and benefits for farmers: Sharing risks and reducing production cost, improving the production scale, sharing infrastructure, improving the accession to markets, supporting members in well-being, reducing the pressure of traders, sharing experiences, the accession to technology, complying with certification, improving the accession to credit (diagram 8).

Diagram 8: Role and benefits of farmer group



Source: Solidaridad and The Sustainable Commodity Assistance Network (2011)

According to Thai Nguyen University of Agricultural and Forestry (2012), FOs have very important role to support the farmers' development: (1) FOs is the representative of its members, is the place to

get and analyze the market information to give the prediction about markets and production orientation to meet the demand of markets to gain the highest profits for its members. (2) FOs are buyers of its members and then they sell their products to markets so these activities will save transportation costs, transaction costs giving more profits to its members. (3) FOs can gather a huge amount of products from its members to gain the advantages in bargaining with traders and also in competing with other farmers (non-members) in the markets.

The number of FOs in Vietnam

Table 34: FO types and number in Vietnam

FO types	Amount	Percentage (%)
Farmer group	61571	86
Farmer cooperative	10204	14
Farmer association	N/A	N/A

FOs in Vietnam have developed very fast, especially farmer groups and farmer cooperatives.

There are 61,571 farmer groups in Vietnam, the average growth rate is 3.3%/year and the majority of farmer groups is in North Central (39%) and in the Mekong Delta (24%) (Dang Dinh Long et al, 2015). The average amount of members in each farmer groups is about 30 farmer households. The quantity of farmer groups has increased because it is suitable for the abilities and demands of farmers.

The number of agricultural cooperatives in Vietnam was 10,204 in 2014, accounting for 54.78% of total cooperatives in Vietnam and each agricultural cooperative has 700 members. Among 10,204 agricultural cooperatives there are about 800 cooperatives in the field of fishery and salt, the remaining part belongs to the fields of crops, livestock and poultry (Nguyen Thi Tan Loc and Ngo Thu Hang, 2015).

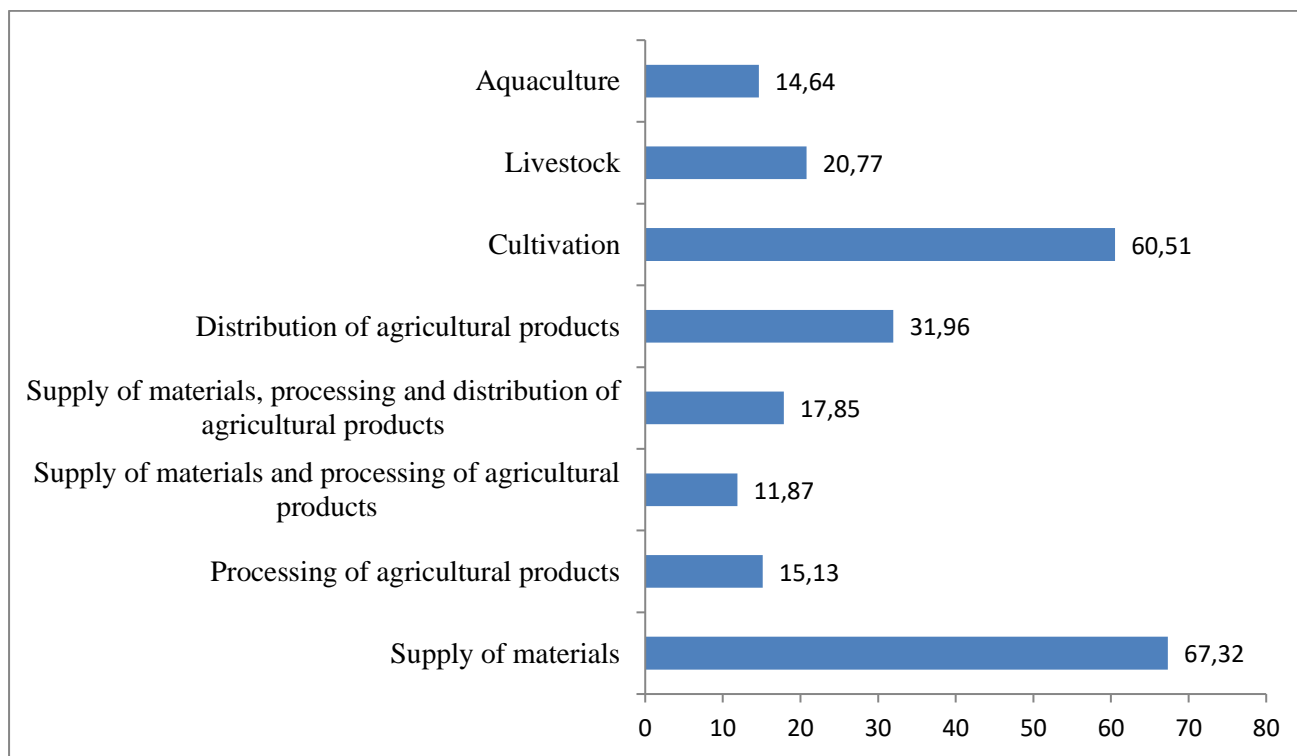
In the last some years, farmer associations have established and increased quickly in Vietnam such as Hoa vang sticky rice production and trading association, Thanh Ha litchi production and trading association, Hai Hau rice association, etc.

Operation fields of FOs:

The majority of FOs in Vietnam has been implementing input services to its members because these activities are easy to do and still ensure profits for FOs. Activities to develop markets for its members are carried out considerably by FOs because these activities are at high risk, they need a big budget

and market skill of leaders. According to Nguyen Thi Tan Loc and Ngo Thu Hang (2015), agricultural cooperative in Vietnam mainly operated in the field of supplying agricultural materials (accounting for 67.32%), they include fertilizers, pesticides, animal feeds, and veterinary medicines. Next to the rate of cooperatives operating in the field of cultivation (accounting for 60.51%), the remaining part is the rates of cooperatives operating in other fields.

Figure 19: Main operation fields of agricultural cooperatives (%)



Source: Nguyen Thi Tan Loc and Ngo Thu Hang (2015)

3.9.2. Activities of FOs

In Vietnam, FOs are intermediates among its members with inputs and outputs markets. FOs have many different activities to support their members to access to production inputs: Technical information, seeds, fertilizers, feed, pesticides, fuel, financial means; accession to output: Trading, market information, negotiation.

FOs have been implementing activities to support their members' trading such as looking for the good markets, providing market information, organizing the products jointly. FOs have an important role between its members and traders. The Hai Hau Rice Association who is the representative of rice farmers and a trading company signed an exclusive 3- year contract based on the sale of 100 tons of

flavored rice per year and specifying the price, packaging style, monthly payment and replacement conditions in case of damage or passing of the expiry date (P. Moustier et al, 2010).

FOs act as agricultural extension organizations: Currently, FOs are running extension activities such as consulting technical process, market information and trading to their members. In addition, some developed FOs share extension documents with the members. However, FOs only do these activities for their own members, not for the whole community.

3.9.3. Benefits of FOs

Reducing the farmers’ transaction costs and market risk: Individuals are often more exposed to market risk and high transaction cost than farmer groups because they lack negotiating skill, market information, negotiating power with traders because of the small output.

Increasing selling prices: Members of FOs often sell their products at higher prices because they sell them together a huge amount of products at the same time to improve bargaining power with buyers. A study of P. Moustier et al (2010) showed that the rice price of FO’s members was 43% higher than that of non-members. As a result, the profit of members will increase.

Table 35: Some financial data of surveyed rice farmers inside and outside organizations supplying supermarkets (USD)

	Outside organization	Inside organization
Farm gate prices	0.37	0.53
Production costs	0.17	0.20
Profits/kg	0.20	0.33

Source: P. Moustier et al (2010)

On the social side, FOs also have a big role in the agriculture and rural development in Vietnam. FOs contributed to poverty alleviation, job creation and to the GDP development of Vietnam (Vietnamese Government, 2012). In 2010 FOs contributed 5.22% to GDP, meanwhile the private economy sector contributed 11.54%; foreign-invested sector: 18.72%; individual sectors: 30.78%; state-owned economy: 33.74%.

3.9.4. Advantages of FOs

Some advantages of FOs in Vietnam are:

- The procedure of FOs establishment is simple and fast (W. M. G. B. Giragama; M. S. Sri Gowri Sanker and S. M. A. Samarakoon, 1999) because the State is encouraging the FOs' development to improve the rural areas.
- Many support from the State to FOs: FOs are supported by the State in training, trade promotion, market expansion; applying scientific advancements, new techniques and technology, accession to capital and development funds, participation in targeted national programs of economic – social development, supporting and giving incentives for investment to develop technical infrastructures (offices, drying grounds, warehouses, pre-processing factory, processing factory, systems of power and water, irrigation schemes, markets), policies on supporting capital and seeds when farmers are troubled by natural disasters and epidemics (Nguyen Thi Tan Loc and Ngo Thu Hang, 2015). Therefore, members of FOs have more chances to gain the State's supports through their FOs. Especially, the State also want to support farmers via their FOs because providing services to groups is more effective than to individuals, as more people can be served at the same time (Nguyen Thi Kim Nguyet, 2002).
- By working in a group, some tasks get done more easily and the work becomes lighter. Information spreads more quickly when farmers are working together in a group (Nguyen Thi Kim Nguyet, 2002).
- FOs are the compact economic organizations, suitable to the level of household's economic development in the rural areas (Bui Sy Tieu, 2011). They don't need to set up the complex management system and every farmer can join FOs to improve their production conditions and livelihood, especially for under-resourced and under-funded farmers.

3.9.5. Disadvantages of FOs

The FOs in Vietnam have been facing some difficulties:

- There are not relationships between FOs and local authorities in some places so FOs have some obstacles in their activities.
- Members' economy, knowledge, ability are not even in FOs. For the leaders of FOs it is so hard to organize the collective activities.
- Management capacity and skills of leaders of FOs are limited (Thai Nguyen University of Agriculture and Forestry, 2012). They are often so old with low educational level, they have few experience in trading and management, even if they are dedicated to their work and the profits of FOs.

28% of leaders of agricultural cooperatives in Vietnam graduated the primary school, 37% of them graduated secondary school and leaders of agricultural cooperatives with a bachelor degree are 12% (Thai Nguyen University of Agriculture and Forestry, 2012).

- Budget lack: The average budget per cooperative in Vietnam is 816 million VND, in which working capital occupied 31%. Many FOs don't have the budget to act, they could not mobilize fund from their members to run the business. Members of about 95% of cooperatives in Vietnam did not pay a fee (Thai Nguyen University of Agriculture and Forestry, 2012). FOs in Vietnam can hardly access to capital from banks and credit organizations. Only 11% of agricultural cooperatives wanted to loan accessed capital from banks. Because of capital lack, FOs could not develop their production, trading and service activities (Thai Nguyen University of Agriculture and Forestry, 2012).

- FOs have poor material facilities, low technology: There are 38% of agricultural cooperatives without any head offices in Vietnam, even this number in the Mekong Delta is 80% (Thai Nguyen University of Agriculture and Forestry, 2012). FOs have the old and backward technologies, their production depends on manual labor. These facts lead to low labor productivity, poor product quality, high production costs, low competitiveness and often do not to meet the big contracts.

- The lack of collaboration between FOs and other FOs, with other organizations and companies (Thai Nguyen University of Agriculture and Forestry, 2012): Majority of FOs doesn't have a relationship with other organizations in their production and trading.

- The products of FOs must compete with products and services abroad and other enterprises (Nguyen Thi Tan Loc and Ngo Thu Hang, 2015).

IV. EMPIRICAL PART

4.1. General methodologies of my empirical research

This part will present the methodologies and techniques used in my PhD dissertation. The methodologies include the research area, sample selection procedure, data collection and the method of data analysis. Some techniques applied are document analysis, interviews and questionnaires. With my empirical research I tried to ask the research questions of the theoretical part.

I used the mixed method approach to gather both qualitative and quantitative data in my research because the topic of my thesis is new for Vietnam, they don't have data and researches about it so to get the general picture of MITS in the rice value chain in the Mekong Delta, Vietnam I have to combine both methods. Some researches show that the qualitative method and quantitative method in the mixed method approach were two complementary methods. The qualitative method was used to guide the quantitative method and the quantitative method was performed to explain the qualitative phenomenon.

The empirical study was a process of interviews and survey in the Mekong Delta to identify and to quantify the market information flow in the rice value chain, market information sources, market information channels, the impacts of market information on rice farmers, the socio-economic characteristics of rice farmers influencing their satisfaction on MITS, etc and it included 2 stages:

Table 36: Empirical research process

Specification	Research stages	
	Stage 1 (Structural Interviews)	Stage 2 (Questionnaires)
Aim of research	Understand MITS, prepare the secondary survey	Determine market information sources and channels, measure the impacts of market information, etc
Research type	Qualitative	Quantitative
Research method	Structural Interviews	Questionnaire
Research area	An Giang	An Giang and Can Tho
Sample size	27	315
Time	21 st to 26 th October 2016	September 10 th to October 6 th 2017
Expectation outputs	Interview report, qualitative data, the questionnaire for the secondary survey	The quantitative data, the PhD dissertation

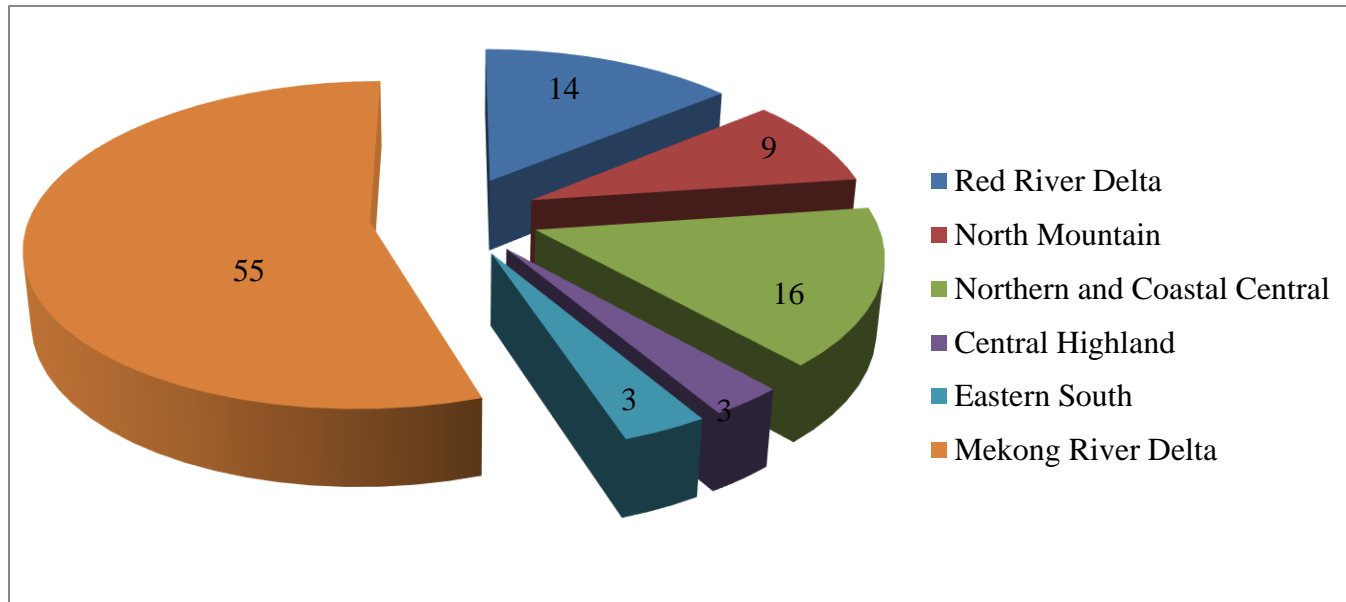
The first stage was the qualitative study by interviews and the second stage was the quantitative study by questionnaire. The third step was the evaluation of the research results and the completion of the PhD thesis.

My empirical research was implemented in two phases using mixed method approach (Table 36). The qualitative research was performed in the first stage in October 2016 and quantitative research was carried out in the second stage in September and October, 2017.

Area of my research: Can Tho and An Giang in the Mekong Delta, Vietnam.

The Mekong Delta was chosen as a research area for 3 main reasons: The Mekong Delta is a rice granary of Vietnam; The demand of rice farmers in this area about rice market information is so high; and rice trading activities in the Mekong Delta have been developed the most in Vietnam. The Mekong Delta is known as the national “rice basket,” “rice granary,” (Quy-Hanh Nguyen, 2014): According to the data of General Statistical Office of Vietnam, rice production in the Mekong Delta accounted for 56.8% of national rice production in the year of 2015, and about 90% rice surplus for export yearly comes from this delta (Nguyen Cong Thanh et al, 2013; and Nguyen, L. T. U., 2011).

Figure 20: Area of rice production in Vietnam by region in 2016 (%)



Source: GSO, 2017

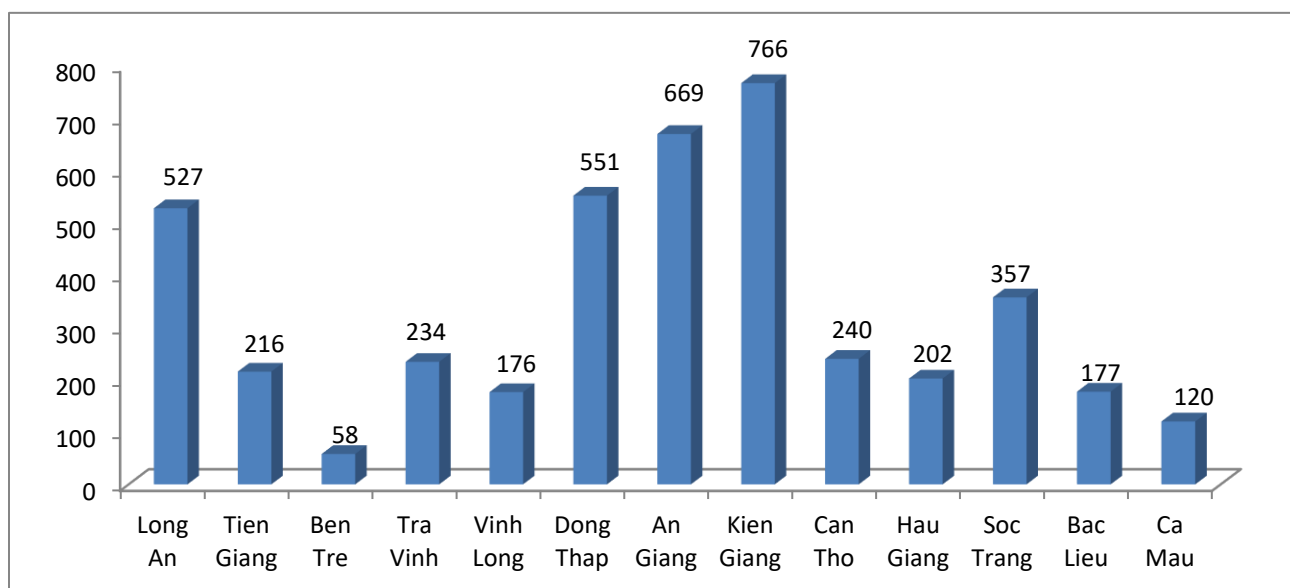
Therefore, it is said that rice production in the Mekong Delta has an important role both in the national and international food security. The market information demand of rice farmers in the Mekong Delta is high and the market information considerably influence farmers. The rice production area per farmer household in the Mekong Delta is the largest in Vietnam with about 1.1 ha/household (Meeta Punjabi

Mehta, Nguyen Minh Hien and Do Troung Lam, 2011) and therefore farmers can significantly increase their income if they have good market information. According to a study of Luu Thanh Duc Hai (2005) almost all rice farmers in the Mekong Delta were willing to access to market information to improve the effectiveness of their rice production and trading.

The Mekong Delta has an eventful trading of rice in Vietnam. According to Tran Tien Khai (2010), rice value chain in the Mekong Delta was the most commercial with many participating agents, consequently the market information system in the rice value chain in the delta is diversified for my thesis. The Mekong Delta is the southernmost region of Vietnam. It is located between 8⁰30 and 11⁰00 N and from 104⁰30 to 106⁰50 E. It is bounded by the South China Sea in the east, the Gulf of Thailand in the southwest and Cambodia in the northwest (Thi Thu Ha Nguyen et al, 2012).

The Mekong Delta comprises 12 provinces (An Giang, Ben Tre, Ca Mau, Dong Thap, Hau Giang, Kien Giang, Long An, Soc Trang, Tien Giang, Tra Vinh, and Vinh Long) and 1 central-governed city (Can Tho) with a cumulative population of 18 million (approximately 21% of the national population) in which 5 million people are active laborers in the agricultural sector (Quy-Hanh Nguyen, 2014). An Giang and Can Tho in the Mekong Delta are 2 province/city chosen to be subjects to my questionnaire survey because An Giang is a main rice producer and Can Tho is the political and economic center of the Mekong Delta where there are many rice traders and export companies.

Figure 21: Area of rice production in the Mekong Delta, Vietnam by province in 2016 (1000 ha)



Source: GSO

Can Tho is the fifth largest city in Vietnam, and the largest city in the Mekong Delta. Can Tho is located in the center of the Mekong Delta. The city shares borders with An Giang Province in the north, Dong Thap and Vinh Long Province in the east, Kien Giang Province in the west, and Hau Giang Province in the south. Can Tho has been changing to market economy from agricultural economy. The contribution of agriculture to the gross output of Can Tho is lower and lower, meanwhile the contributions of industry sector and service sector are higher and higher. An Giang is located in the Mekong Delta, in the south-west part of Vietnam, sharing a border with Cambodia to the north-west, with Dong Thap province to the east, with Can Tho city to the south. Most of An Giang is fairly flat, and it is criss-crossed by many canals and small rivers. This terrain has led to An Giang being a significant agricultural center, producing significant quantities of rice.

4.2. Methodology of interview

The process of empirical research will be implemented in 2 stages. The first stage is the qualitative research by interviews and the second stage is the quantitative research by questionnaires. I will present the methodology used at the first stage in this part.

4.2.1. The process of sample choice

I chose An Giang to interview in this first stage because An Giang is a main rice producer and rice farmers in An Giang have a high demand of market information. The sample was chosen randomly. At first, I interviewed the leader of the An Giang agricultural extension center and after the interview I thanked the help of the director. I chose 3 districts in An Giang, in which there is a district with a large area of rice production (Thoại Sơn district), a district with a medium area of rice production (Châu Phú district) and a district with a small area of rice production (Chợ Mới district) to interview farmers and agricultural extension officers at district level. At each district, I interviewed the leader of district of the agricultural extension station and 5 -7 rice farmers including both advanced and not advanced farmers. A staff of the district agricultural extension station helped me make the list of farmers and make appointments to interview them.

After finishing the face-to-face interviews in An Giang I returned to Hungary to summarize. During the summary, I realized that some information was missing so I had to make phone calls from Hungary to 4 rice farmers, 2 leaders of farmer organizations and one village leader to collect more information. These calls could not be done by viber or skype because those I wanted to interview had not used Viber and Skype and most of them did not have internet access either.

To make these phone calls I needed help from agricultural extension officers in An Giang to make the information table about phone call receivers. With help of agricultural extensions staffs, I collected information about call receivers such as their names, their phone number and their positions. Then I called them to interview and these calls were also recorded. However, there were some obstacles in the interview calls. Interviewees did not believe me despite I introduced myself to them therefore information of calls was not collected adequately. The quality of information collected from call is not as good as face-to-face interviews because there is not a long time to interview via calls and sometimes interviewees did not understand the questions.

According to Mária Bernschütz (2011), in qualitative methodology the researcher can work with a sample of small numbers, no need to use a big sample. At this first stage, I interviewed with a size of research sample of 27 people (see table 37).

- 19 rice farmers,
- 5 agricultural extension staffs,
- 2 leaders of farmer organizations and
- 1 village leader.

Table 37: Information about the research sample

	Rice farmers		Agricultural Extension staffs	Rice farmer Organizations	Village leaders	Total
Position	Farmers		Directors	Leaders	Leader	
Methods in survey	Face-to-face structural interviews	Calls	Face-to-face structural interviews	Calls	Calls	
Amount (people)	15	4	5	2	1	27
Date	20 th – 26 th October 2016	18 th January 2017	20 th – 26 th October 2016	19 th January 2017	20 th February 2017	

Source: Own survey

There are various methods to collect the primary data in the qualitative research such as personal interviews, questionnaires, calls, emails, internet, etc. However, to improve the effectiveness of survey researchers will often combine some of these methods. I used to combine the personal interviews with

phone calls at the first stage in this my research. This study used some questions as a guideline for personal interviews and calls with interviewees (no questionnaire). The data was recorded by my smartphone but some farmers were not comfortable speaking in front of the recorder.

4.2.2. Thematic structure of interviews

I was using the method of structural interview. Structured interview is known as a formal one. The questions are asked in a set/standardized order and the interviewer will not deviate from the interview schedule or probe beyond the answers received (McLeod, S. A., 2014). According to Earl Babbie (2011) the structured interview is implemented by closed-ended questions, in which case the respondent is asked to provide his or her own answer to the question. For example, the respondent may be asked: “What are the roles of market information in rice farmers’ activities?” and be provided with a space to write in the answer (or be asked to report it verbally to an interviewer). Structured interviews are easy to replicate and are fairly quick to conduct which means that many interviews can take place within a short amount of time. These questions are guide for me to get the necessary information according to research aims. There are 4 target groups (table 38) in my survey and we used a different set of structural questions for each target group. These questions are guide for me to get the necessary information according to research aims. I will put questions to each group in appendix part.

The process of data analysis has been implemented in 2 steps:

- Step 1 is coding the data: The data coding is a process, I typed the answers of interviewees from records into a word file.

- Step 2: Data analysis: After data coding I gathered the answers of interviewees according to each OGZ question and classified the same answers and different answers of interviewees in each question.

I meant that the qualitative data and information were classified and summarized by thematic dimensions which were created via my hypothesis.

Table 38: Structure of the interviews

Target groups	Main thematic panels of the structural interviews
Rice farmers	<ul style="list-style-type: none"> - Factors influencing on rice farmers. - MI sources of rice farmers and its weaknesses and strengths. - Roles of MI in rice farmers' activities. - Rice farmers' demands of MI. - MI searching and utilization of farmers. - Rice farmers' opinion about the MITS model.
Agricultural Extension staffs	<ul style="list-style-type: none"> - MITS in An Giang and its weaknesses and strengths. - Agricultural extension system in An Giang provides MI to rice farmers. - Roles of MITS in An Giang. - Impacts of MITS on rice farmers. - Policies on MITS in Vietnam and An Giang. - Roles of governmental agencies in providing MI to rice farmers. - MI searching and utilization of rice farmers. - Show MITS model and his/her opinions about this model.
Rice farmer Organizations	<ul style="list-style-type: none"> - Activities of Farmer Organizations (FO). - Roles of FO in rice farmers' activities. - Activities of FO to improve farmers' income. - Weaknesses and strengths of FO. - Opinions of FO about the MITS model and some suggestions about training. - Factors influence rice farmers' success. - How to work together between farmers, FO and Village leaders.
Village leaders	<ul style="list-style-type: none"> - Activities of village leaders. - Roles of village leaders in rice farmers' activities. - Activities of village leaders to improve rice farmers' income. - Advantages and disadvantages of village leaders. - Opinions of village leaders about the MITS model and some suggestions about training. - Factors influence rice farmers' success. - How to work together between farmers, FO and Village leaders.

4.3. Analysis of the interview

4.3.1. Roles of market information

The previous research in literature review showed that market information had an effective role in rice production and trading of farmers and this result was confirmed again in this interview in the Mekong Delta. All interviewees reckoned that there were many factors that influenced their rice production and trade and rice market information was one of these factors besides other factors such as weather, insects, technology, science, rice seed, fund and market.

According to rice farmers in the Mekong Delta they used market information in their activities such as: to determine who to sell to, when to sell and what the price was; to increase the position of farmers in bargaining against traders; to build a better rice production plan in next crop. They will know what rice varieties to grow to sell at a higher price; investing in rice production and its influences on rice yield. If they have the information that the rice price is high they will invest more in rice production so the yield and quality of rice field will increase and the opposite, they will reduce the investment in their rice fields.

“I use market information to define who I sell rice to at the highest price, when I sell it, and what the selling price is” (A farmer in Chợ Mới district).

“From the information about prices of different kinds of rice in some previous seasons, we will know the rice variety which has a good price to grow and to increase the profit. My family replaced IR50404 by OM5451 at the higher price by 200-250 VND/kg” (A farmer in Thoại Sơn district).

“During the production, if I hear the high price of rice, I invest more in rice fields to increase yield and quality, I also visit the rice fields more frequently. If I hear that the rice price reduces, I limit investment in rice fields to reduce the production costs and to reduce loss” (A farmer in Châu Phú district).

Farmer organization leaders are rice dynamic and advanced farmers have a demand to seek market information to service themselves in rice production and trading to provide other farmers and the members.

Farmer organization leaders assessed market information as very important. They used market information that they received, while other farmers determined to whom to sell, when to sell and what the price was increasing the position of farmers in bargaining against traders; building a better rice

production plan in next crop; investing in rice production to increase the rice yield. In addition, they provided market information to other farmers in their community and their organizations.

“I shared market information with the members in my organization to unite the collective price in the organization. Besides, when I meet other farmers in my commune on the road I also share market information with them to improve the rice production and trading” (Leader of rice farmer organization in Vinh Thach).

According to a village leader, market information was very important for him because he needed it to sell rice at higher prices. Village leaders were also rice producers and they needed market information like other farmers. They use market information in their rice production and trading. They need market information to develop the economy in their community by sharing market information with farmers so that many farmers can sell rice at high prices.

“I am a rice producer so I need market information like other farmers to make the decisions in rice production and trading of my family to get higher prices and profits. Besides, I am a village leader who is responsible for economic development and social stability in our village, therefore I am aware of collecting market information to transfer it to villagers to increase their income, to develop the economy of our village and to stabilize our society” (A village leader).

Agricultural extension officers said that market information was more and more important for farmers because they were lacking market information to produce and trade their products. Market information can help farmers sell more of their products at higher prices.

“In my opinion, the market information is very important for farmers. It affects remarkably farmers’ income and profits. Farmers with the good market information can easily sell their products at higher prices” (Director of An Giang Agricultural Extension Centre).

“The market information is very important for Vietnamese farmers because in fact they are lacking the good market information, they don’t know how to find it out. The market information from social media is still deficient and not good, for farmers it is also difficult to access to the information because of the budget” (Manager of Cultivation and Forestry extension division – National extension center).

4.3.2. Rice farmers’ demands of market information

Determining the market information demands of farmers is necessary because it can help me a lot to propose the MITS model to accurately meet these demands of farmers.

Rice farmers in the Mekong Delta need 2 kinds of rice market information: Macro-information and micro-information. The micro-information contains the following information: prices of each rice variety in their area that help them have an orientation to grow rice varieties at a higher selling price; the phone number and the address of traders that help farmers have many chances to call traders to check the price information and then they will decide where to sell, whom to sell at the highest price. The macro-information includes the predictions about rice markets (market trends) to help farmers adjust their production plans to fit into these market trends and information about rice export of Vietnam that helps farmers orient their market and investment in their rice production. If information about rice export of Vietnam indicates that rice export of Vietnam is advantageous, the export price of Vietnamese rice is high, rice farmers can increase investment in their rice fields to increase rice yield and quality to raise their profits the opposite.

Table 39: The farmers’ demands of rice market information in the Mekong Delta

	Market information
Micro-information	Prices of each rice variety
	Phone numbers of traders
	Address of traders
Macro-information	Prediction of rice markets
	Rice export situation of Vietnam

Source: Own survey

Because of huge roles of market information on rice production effects, the farmers’ need of market information has been increasing more and more and this leads to that Vietnam needs to improve the current ineffective MITS to meet this increasing demand of farmers.

There are more and more details and proper information for farmers, however, they have some limitations in information synthesis and analysis. In general, they need information about rice prices at different time, in different markets, addresses and phone numbers of traders so they can have many good chances to choose a good trader. Besides, advanced and large-scale farmers care information about rice export of Vietnam, rice global market to have a good orientation in rice production and trading.

“We need the detailed information to bargain with traders such as prices, traders’ addresses, and phone numbers in our community to call them to ask and compare with information from other traders. In addition, we also concern about rice export of Vietnam because it will affect

the rice prices in the domestic field. If the rice export of Vietnam is good, the rice price will increase” (Farmer in Châu Phú district).

There are differences in rice market information demands among rice farmers. Large-scale farmers and advanced farmers need both micro-information and macro-information because they can analyze and use 2 kinds of information for their rice production and marketing, meanwhile the not advanced farmers often concern only micro-information and not macro-information.

Farmer organization leaders have a very big demand about market information to serve their family and their community. Farmer organization leaders are the head persons of the families so they need market information to make decisions about their rice production and trading. They manage their farmer organization and they are responsible for collecting and sharing market information with other members to develop their organizations.

Farmer organization leaders need detailed information to seek who the good buyers are, where to sell, the selling prices, etc. They also need to have micro-information about market prediction, the rice export of Vietnam, the rice global market to build the production plan of their organization.

Village leaders said that they needed market information to serve mainly their family first. Market information can help them sell rice at the higher prices to increase the profits from rice production. Village leaders are the head persons of their families, as a result they have a huge need to seek market information.

Village leaders hold high positions in their community but in fact, they have as big amount of information as other farmers have. They also need information about rice prices, where to sell, who to sell, etc. to gain high prices.

Currently, the demand to search market information of the agricultural extension system in Vietnam is not big, especially at central and provincial levels because the supply of market information to farmers by the agricultural extension system is weak and so they don't need market information much.

Each agricultural extension level has a different demand of market information. Agricultural extension officers at district and commune levels need more market information because they often contact directly with farmers and having much market information they can consult and improve rice production and the incomes of rice farmers. Agricultural extension officers at provincial and central levels don't communicate directly with farmers so the demand of seeking market information is not high.

My survey shows that although agricultural extension staffs interviewed also knew these demands of rice farmers, market information needs to be provided to farmers. But governmental agencies in Vietnam have been providing almost very little market information to rice farmers in an effective manner because of the lack of fund for this activity. Macro-information about rice export of Vietnam has been posted via internet or broadcasting on TV not frequently and very few farmers can access to market information through these channels.

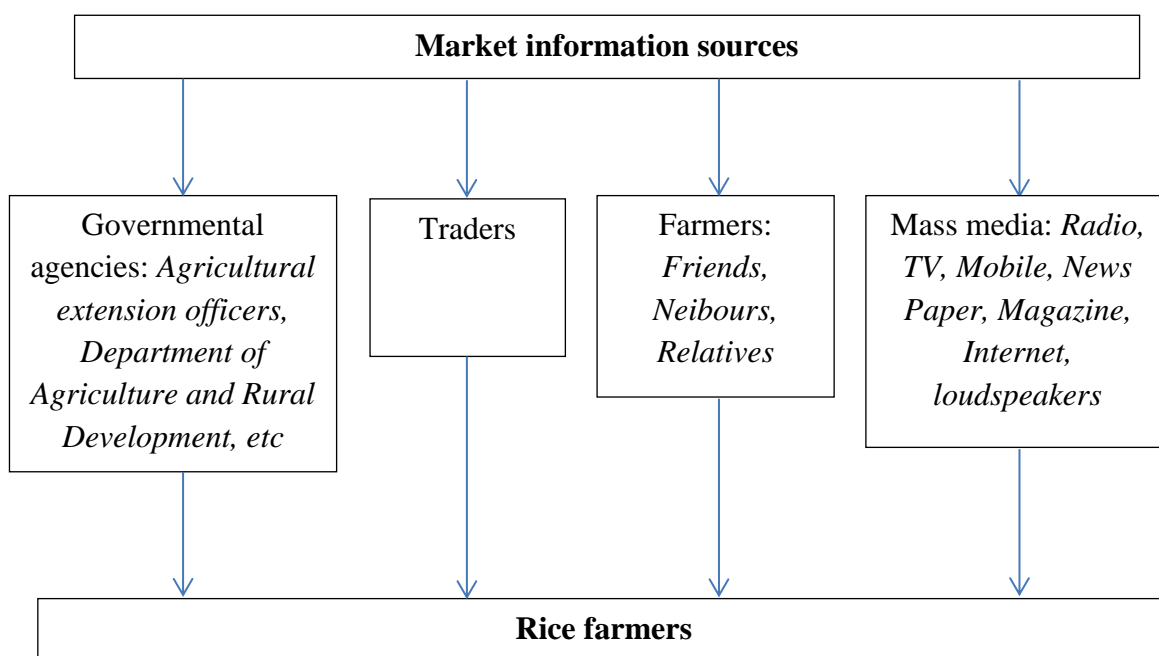
4.3.3. Sources of rice market information

Rice farmers in the Mekong Delta have been accessing to many different sources of market information simultaneously to comparing and making decisions in their rice production and marketing. However, their main sources of market information are still traders and friends because it easy for them to access to these sources and the quality is good, especially in case of market information from other farmers. The market information from other farmers was collected from many different sources and analyzed by themselves; then they shared it with other farmers and so the quality of market information is very good.

“My family have accessed to many sources of market information such as friends, TV, traders, etc. However, only market information from friends is good because we meet each other frequently and they have information from many other sources and in different areas of rice production so they analyzed and recognized the price trend in a short term. I can use market information from them to bargain with traders in a good way. The market information from traders is also important because they buy our rice, they had a big voice in bargain process with us. Market information from TV, radio, newspaper is not good because it is common information (a farmer in Thoại Sơn district).

There is an exchange information about price among farmers. The market information from farmers is the most accurate. They got market information from many different sources and is selected and analyzed. We can use this market information to bargain with traders” (Farmer in Châu Phú district).

Diagram 9: Rice market information sources of farmers in the Mekong Delta



Source: Own survey

Based on the market information needs the farmer will choose the sources of the market information. For macro-information farmers got mainly from TV (national TV) or few farmers could get from Agriculture Newspaper of Vietnam and via internet. For micro-information they directly accessed often to sources such as traders, farmers, etc.

a) Other farmers (friends, neighbors, relatives) are the most important informal sources:

Rice farmers are an intermediate source in rice market information system in An Giang. They have been collecting market information from many different sources and then analyze and share them with other farmers. Many farmers interviewed said that rice farmers are the best source because the market information was analyzed carefully, up-dated, and they don't hush up market information, they share all information they have. Farmers with farmers can easily share the market information because they are living in a village and also the channel to share market information between farmers are the face-to-face meetings.

Interestingly, in An Giang many rice farmers who are living in the same village have associated to sell their rice together. In these groups advanced farmers have the responsibility of collecting market information and then they organize a meeting with all members to discuss and unite the final price to sell. And so not advanced farmers also have a chance to access to good information from advanced farmers in the groups. Traders also want to buy rice from these groups because they can buy a big

amount of rice at the same time, enough rice for their boat and so they can save buying costs and they can buy rice from the farmer groups at a bit high price.

Disadvantages of market information from farmers are: Sometimes the quality of market information from farmers is not good because the process of collecting and sharing market information from farmers to farmers lasts for a long time, meanwhile the market change continuously, especially in harvest time. The quality of market information depends significantly on the analyzing ability of farmers. If their ability is weak, the quality is low and the opposite.

“Besides market information from traders, the market information among farmers is also very important. In the process of living in the community, farmers have frequently met to share and discuss the market information together. The market information from other farmers is the best. They will share the good and bad news as well. The good news will help farmers buy rice at a higher price. The bad news will help farmers avoid disadvantages in bargains with traders”
(Director of the extension station of Thoại Sơn district).

b) Traders as main informal sources:

Rice traders in the Mekong Delta have an important role in rice value chain because they are not only original sources of market information but also market information providers. Currently, traders are still keeping a big voice in bargaining with farmers and so they will hush up or distort market information to farmers to get more profits.

“Market information from friends is the best, meanwhile market information from traders is not good because they hush up market information or distort market information to eat profits from 2 sides (farmers who sold rice to them and their sellers (bigger traders))” (A farmer in Chợ Mới district).

Recently, to reduce the distortion of market information farmers have been referring to many different sources, to many traders to compare the prices from those sources and to choose the best price.

The advantages of market information from traders are: Market information from traders is very fast, up-dated and also accurate. And so the survey shows that 100% of farmers interviewed has been accessing to the traders as the main source. Farmers have been accessing to traders via 2 channels: Calls and face-to-face meetings.

“In my opinion, traders are still the most important sources of market information because they are rice buyers, they decide the price in rice bargain with farmers. In addition, the market

information from them is very fast and frequently up-dated” (Director of An Giang Agricultural Extension Centre).

c) Agricultural extension system in An Giang as a market information formal source:

MITS in the Agricultural extension system in An Giang:

- At district level, one staff of extension station has been responsible for collecting the rice price information and then sending it to extension center at province level before 10.00 everyday (exception of Saturday and Sunday). This staff has 2-3 acquainted rice traders' phone numbers to call the every day to get information. Interviewing these staffs I saw that in fact, they did not collect information every day, maybe every 3-4 days they made a call or they thought that rice price changed when they called traders. District extension stations didn't provide market information to farmers because they didn't have finance and capacity to do this.

“At our agricultural extension station, my mission is to collect agricultural product prices to synthesize and send them to Agricultural Extension Center of An Giang before 10.00 from Monday to Friday every week. As to rice, I have 2-3 acquainted traders and I have their phone numbers. If I need market information I will call them, I did not go to them to directly to ask market information because I don't have enough money for this activity. Agricultural Extension Centre of An Giang is paying 100.000 VND (near 5 USD)/month to me for this activity, too low, not enough for petrol if I go to meet them. After having market information, I synthesize and send them to Agricultural Extension Center of An Giang via email, we do not provide this market information to farmers because of the lack of financial resources” (extension staff of Thoại Sơn district).

- At provincial level, the extension center gets market information from all districts that they send to the centers before 10.00 every day, with the exception of Saturday and Sunday (off-days). One staff of province center of extension synthesize and send the final result to Agriculture and Rural Development Department of An Giang to post on its website (www.sonongnghiep.angiang.gov.vn). In addition, each week the extension center of An Giang publishes price information in its newspaper every Friday in amount of 1000 papers. The 1000 papers are provided to the extension stations of all districts in the province and 2-3 café stores in each district. During the survey, I saw that these papers are not handed to farmers.

“The promotion department in Agricultural Extension Center of An Giang has a mission to get market information from extension stations of all districts to synthesize and then to send it to An

Giang Department of Agriculture and Rural Development. After that, An Giang Department of Agriculture and Rural Development will post this market information on its website. In addition, on Friday the information about the prices of all days in a week are also synthesized to be publish in Agricultural Extension Paper of An Giang” (Manager of the promotion department - An Giang Agricultural Extension Centre).

Nowadays, the agricultural extension system in An Giang has been providing market information to farmers via 2 channels, namely: website <http://sonongnghiep.angiang.gov.vn/> and agricultural extension newspaper of An Giang. Everyday from Monday to Friday before 10.00 the agricultural extension system of An Giang synthesizes market information data and send them to An Giang Department of Agriculture and Rural Development to post on its website. In addition, the agricultural extension Center of An Giang publishes agricultural extension newspaper of An Giang every Friday with 1000 copies to introduce the market information of agricultural product, including rice during the whole every week.

“In An Giang, only our Centre of Agricultural Extension provides market information to farmers. We provide market information to farmers through 2 channels: Via website of An Giang Department of Agriculture and Rural Development and Agricultural Extension Paper of An Giang. Because of the financial lack, we cannot transmit market information to many farmers via many channels” (Director of An Giang Agricultural Extension Centre).

But the farmers interviewed said that none of them had accessed to these sources of market information because channels to transmit market information to farmers were not suitable to them, they could not access to newspaper and internet, and the quality of market information from these sources was not good either; market information was collected and synthesized from the whole An Giang and so it did not reflect the reality of their area.

“I did not access to market information from governmental agencies because I don’t know where to access and how to access. I sometimes met extension staff at commune level, rarely have I met extension staffs at the district level” (A farmer in Chợ Mới district).

According to the director of the agricultural extension center of An Giang they cannot provide market information to farmers via another channel because of the lack of fund and material facilities.

The budget for extension activities and for providing market information in Agricultural extension system in An Giang:

The budget for extension activities is quite low in Vietnam and also in An Giang. The budget for extension activities of An Giang Extension Center per year is about 1,000,000,000 VND (about 50,000 USD), in which 200,000,000 VND (about 10,000 USD) (accounted for 20% of total budget of extension activities) for providing market information to farmers. According to the director of An Giang Extension Center, almost of 200,000,000VND is to print the newspaper of An Giang Extension Center every Friday (Director of An Giang Agricultural Extension Centre).

At district level, each extension station has about 25,000,000 to 30,000,000 VND (about 1200-1500 USD) for extension activities in a whole year. According to the director of district extension station, this budget is not enough for extension activities and so there is not budget for providing market information to farmers. Besides, there are not enough material facilities for extension staffs at commune level, some of them don't have offices, computers and internet (Director of the extension station of Châu Phú district and Vice-director of the extension station of Chợ Mới district).

Strengths and weaknesses of the agricultural extension system in An Giang:

The strengths of agricultural extension system in An Giang are that there are agricultural extension staffs at the grassroots level and so they can easily access to farmers.

However, also there are some obstacles of the agricultural extension system in An Giang:

- Firstly, channels to disseminate market information to farmers are not diversified and suitable for farmers. Currently, there are only 2 channels: website and newspaper.
- Secondly, the quality of market information from agricultural extension system to farmers is not good. Agricultural extension system only provided information about rice prices, not other information. And even the quality of rice price information is not good because the allowance for them to collect price information (100000VND/month) is too low and so they did not collect information frequently and not enough sample.
- Lastly, the fund for agricultural extension activities in general and in particular for market information provisions is too low. This leads to that agricultural extension system in An Giang hasn't got many activities to provide market information to farmers.

Table 40: Budget for agricultural extension activities in An Giang (2015)

	Amount (VND/year)	Amount (USD/year)	%
Agricultural extension Center of An Giang			
Total budget for agricultural extension activities	1,000,000,000	50,000	100
Budget for market information activities to farmers	200,000,000	10,000	20
Agricultural extension station of Cho Moi district			
Total budget for agricultural extension activities	30,000,000	1,500	100
Budget for market information activities	0	0	0

Source: Own survey

In short, we can say that the market information provision of agricultural extension agents will not solve the farmers' problems and meet their information needs.

d) Mass media as a market information source:

Rice farmers in the Mekong Delta have been sometimes accessing to market information from mass media such as television, internet, newspaper, loudspeakers, etc. However, television is still the main source of mass media for many farmers. Very few farmers used internet, newspaper, loudspeakers to get market information and no farmers interviewed get market information from radio.

“Market information from mass media is not useful, it is too unspecific. I only concern about macro information such as information about rice export, export price, export to where, etc. If this information is good, it means that the rice price will also be good in the future and the opposite” (A farmer in Thoai Son district).

➤ Television:

Rice farmers in the Mekong Delta used TV as a main source of mass media. They watched macro-information about rice export of Vietnam on TV to make good decisions on their production and trading. They also said that there is information about rice prices on TV but these prices are retail selling prices in big cities and they couldn't use this information in their trading. There is information about rice prices on local TV such as An Giang TV, Vinh Long TV, Can Tho TV but this information is not good and they could not also use.

The advantages of market information source are that the costs to access to market information are very cheap.

Its disadvantages are that the quality of market information is not good and so they cannot use it in their production and trading. Secondly, time to broadcast on TV is not suitable for farmers because the programs about market information are broadcast in the daytime when farmers are busy to work. Finally, farmers could not follow information on TV to remember because of the fast broadcast speed.

“Farmers in An Giang can access to market information from TV. They can watch TV channels such as VTV1, VTC16, An Giang TV, Vinh Long TV, Can Tho TV” (Director of An Giang Agricultural Extension Centre).

“Farmers can access to market information from TV but its quality is not good because the market information is collected and analyzed through the very large area but not frequently. In addition, the speed of information broadcast on TV is too fast to keep a close watch and remember” (Manager of Cultivation and Forestry Extension Division – National extension center).

➤ Loudspeakers:

An Giang loudspeaker system is still in practice in the countryside. It means that there are 1-2 loudspeakers in each village to broadcast information about economy, society, and politics of Vietnam or of the local news early morning and late afternoon. Almost all the farmers interviewed said that they did not hear market information from loudspeakers but only one farmer said that he sometimes heard market information from loudspeakers at harvest time.

The advantages of loudspeakers are that the channel to transmit market information via loudspeakers is very suitable for farmers, they can easily hear information from loudspeakers even when they are busy. Secondly, a big amount of farmers can hear information simultaneously from loudspeakers without a fee.

The disadvantages of loudspeakers are that information from loudspeakers is often not good because they get market information from newspaper and then read it again via loudspeakers.

➤ Newspapers and magazines:

There are 2 newspapers in An Giang in which farmers can access to market information: Vietnam Agricultural Newspaper and Agricultural Extension Newspaper of An Giang ở An Giang. The farmers interviewed did not read Vietnam Agriculture Newspaper because they needed to have money to buy it. Agricultural Extension Newspaper is free for all readers but farmers also could not read it because the amount of newspaper is limited (1000 copies) and they could not get it.

I also saw that market information from newspaper is not good because the way to collect market information is not correct, the information is not up-dated, and the data is an average number of a large area so farmers can not apply them in the practice.

“The Agricultural extension center of An Giang is publishing An Giang Agricultural Extension Paper every Friday with 1000 copies. This amount of papers is distributed freely to Agricultural Extension Stations in all districts and some cafe shops where farmers can drink and read. There is market information in the Agricultural Extension Paper” (Director of An Giang Agricultural Extension Centre).

➤ Internet:

The number of internet users is increasing day by day in Vietnam but mainly in cities, towns. The farmer households' rate who have internet in the countryside is still rather low.

The survey showed that 2 out of 15 rice farmers are using internet to seek market information and both are advanced farmers, they have another career such as traders, teachers. Generally, very few farmers use internet as a market information source because they need to buy a computer, internet, and pay a monthly fee for internet and they need to have skills to use computer and internet but Vietnamese farmers are lacking this skills.

“I didn't use market information from newspaper and internet because I don't have money to pay” (A farmer in Thoại Sơn district).

In An Giang, farmers can get market information from the website of Agriculture and Rural Development Department of An Giang (www.sonongnghiep.angiang.gov.vn). They update the price of rice everyday, with the exception of Saturday and Sunday. Very small number of farmers get market information from this website because almost none of the farmers have internet and computers at their homes.

“Currently, An Giang Department of Agriculture and Rural Development also has a website to distribute the market information to all citizens. And An Giang Department of Agriculture and Rural Development has been collecting this market information from our Center of Agricultural Extension. However, very few farmers have accessed to the market information from this website” (Director of An Giang Agricultural Extension Centre).

➤ Telephone:

The outstanding character of Vietnam is that all farmer households have mobile phones to communicate with others. And the survey indicated that almost all the farmers interviewed used to call traders or friends to ask information about rice prices before they sell rice. One farmer called 5-6 traders to ask prices to compare.

The advantages of the telephone are that the process of market information dissemination is so fast, farmers can access to real information and the cost is not high.

➤ Radio:

None of the farmers interviewed got market information from Radio because they don't have a radio yet and there are no programs about market information on the radio.

“Nowadays, none of the farmers listen to the radio, only a few old people do it.. Besides, there aren't the programs about market information on radio” (Manager of Cultivation and Forestry Extension Division – National Extension Center).

4.3.4. Market information searching and utilization

Vietnamese farmers are active to search and use market information more and more because their knowledge and capacity increased significantly.

Almost farmers in An Giang have been being active to look for market information for their production and trading. They could search via meeting with friends, traders, governmental staffs, reading newspaper, internet, hearing TV, loudspeakers.

Almost farmers in An Giang are seeking and using market information from traders (companies) and their friends (other farmers). These sources are close to farmers, the market information is updated and channels (face-to-face meetings and calls) are quick and appropriate to farmers.

“Nowadays, besides the market information from governmental agencies, farmers in An Giang can get market information from traders and their friends. These sources are important, close with them and they can access to everyday via face-to-face meetings” (Director of An Giang Agricultural Extension Centre).

Farmers have also been using other sources such as TV, Radio, internet, newspapers, governmental agencies but not much of farmers used because they need a budget to use these sources, they are so hard to access to these sources, and they lack their capacity and skill to use these sources.

“Farmers are also accessing to market information through TV, radio, newspaper, internet and governmental agencies but with a small amount. To access to these sources, they need to have money to buy a newspaper, pay internet and they are difficult to access to governmental agencies because of far distance” (Director of An Giang Agricultural Extension Centre).

Many farmers can not use the market information they have in making decisions on rice production and trade because their ability is low. Only advanced farmers can analyze market information and use it to increase their price and profit.

Farmers used market information in building the next season plan, define the selling prices, when to sell and whom to sell. However, because of uneven level of farmers, the process of information search and utilization is so different and the effect of market information utilization is not same between farmers. The advanced farmers have more advantage than other farmers in market information searching and utilization.

“Educational level of farmers is uneven, many farmers have a low educational level and slow in thinking. They will face difficulties in collecting and using market information. These farmers often like market information from advanced farmers because the market information from advanced farmers was analyzed and filtered by advanced farmers and so they can use it directly” (Director of An Giang Agricultural Extension Centre).

Rice farmers in An Giang are using market information in their production and trading. They use price information to define who they sell and with how the price is. They use information about prices of different rice varieties to grow rice variety with a higher price for next crop. They used macro-information such as the situation of rice export of Vietnam and rice export prices to decide investment or not. Farmers interviewed said that if they hear that the situation of rice export of Vietnam is good, rice export price is high they will increase investment in rice fields because normally traders will buy rice with higher prices. On contrary, they will reduce investment to decrease production cost and risk.

“I use market information to define whom I sell rice to with the highest price, when I sell, and what the selling price is” (A farmer in Chợ Mới district).

“During production, if I hear the high price of rice, I will invest more in rice fields to increase yield and quality, I also visit the rice fields more frequently. If I hear the rice price reduce, I will limit investment on rice fields to reduce the production costs, reduce loss” (A farmer in Châu Phú district).

Farmer organization leaders have sought market information like other farmers. They got market information from other farmers, traders, TV, newspapers, governmental agencies. However, farmer organization leaders have more advantage than other farmers what they often have a good relationship with input and output companies and these companies are very good resources for them and so they can have more up-dated and proper market information than other farmers.

Farmer organization leaders use market information in their rice production and trading first. They will use it to define whom to sell, the price to gain the high profit. In addition, leaders are responsible the organization and its members for trading their products and so leaders will share market information with all members to use together.

Village leaders sought market information from traders, other farmers, newspapers, TV. And then they mainly used market information in their rice production and trading. Sharing market information with other farmers was done but by accident because it is their duty.

4.3.5. Strengths and weaknesses of MITS

Strengths of MITS: Currently, rice farmers can access to various market information sources and these sources are free or very low fee.

The weakness of MITS: Quality of market information is not good. The market information has been providing by private sector and so it is so hard to manage the quality of market information provide to farmers. Many farmers can not collect and analyze market information because of their low capacity.

“Advantages of a market information system are that there are many places where we can get market information, we are also easy to access to these sources without payment. However, the quality of market information is low, many market information is not accurate. And some poor farmers with low educational level can’t have an ability to collect and use market information”
(Farmer in Châu Phú district).

4.3.6. Impacts of market information on rice farmers

Market information has a remarkable impact on farmers. Interviewees reckoned that market information has 4 main influences on farmers: (1) Increases the selling prices of farmers; (2) Improves the farmers’ income; (3) Reduces the risks in rice production and trade; (4) Changes the farmers’ position in the value chains.

One impact of market information is to increase the selling price of farmers. According to farmers interviewed, the market information helps farmers find out buyers for their products at high prices, bargain traders at good prices and help them grow rice variety that can be sold at the market at higher prices. It means that they need to use market information harmoniously with their production and trading to maximize the profits.

The rice revenue will depend on many factors including selling prices. Income sources of rice farmers in the Mekong Delta, Vietnam remarkably depend on rice revenue and so market information will help improve farmers' income through increasing selling prices.

In addition, the market information helps farmers build effective plans of production, avoid risks as well as losses. If the market information indicates that the rice prices will increase in the future, farmers will increase investment to raise yield and quality of rice fields and the opposite; if rice price goes down they will decrease investment to reduce production price and loss.

Market information increases farmers' voice in rice value chain. Farmers said that with good market information they can bargain with traders to get higher prices, avoid disadvantages in bargaining. They said that they can sell rice at higher prices by 50-100 VND/kg compared to prices traders gave to them. Besides, during bargaining with traders if they don't agree with a trader, they can easily find other traders to sell to.

4.4. The methodology of questionnaire

The second phase was a quantitative survey with the questionnaire designed on the basis of the findings of the first phase. Quantitative research methods are research methods dealing with numbers and anything that is measurable in a systematic way of investigation of phenomena and their relationships as well as it is used to answer questions on relationships within measurable variables with an intention to explain, predict and control a phenomena (Leedy, P. D. 1993). Based on a hypothesis or theory quantitative researchers will build questionnaires or other instruments to gather quantitative database. According to Earl Babbie (2011), quantitative researchers need to present clear ideas about how at least you will begin to measure what you want to.

4.4.1. The process of sample choice

At this stage, the size of the research sample was bigger more than it was at the first stage to ensure the effectiveness of the data analysis later. 315 questionnaires with rice farmers have been conducted in the second stage altogether.

Table 41: Research area and the sample size in the questionnaire

Selection	Criteria	Sources of information	Sample selection
Provinces	Representative provinces of the Mekong Delta, Vietnam: A province is a representative of rice production and a province is a representative of rice trade	Statistical data from General Statistic Office of Vietnam	- An Giang was the top rice producer - Can Tho was the rice market center
Districts	3 districts per province, in which a district with a large area of rice production, a district with a medium area of rice production and a district with a small area of rice production	- Provincial statistics - Local authorities	- An Giang: Cho Moi district, Thoai Son district, Chau Phu district. - Can Tho: O Mon district, Phong Dien district, Thoi Lai district.
Households	- 50 rice households per district in Can Tho and 55 rice households per district in An Giang - 10% poverty household → Average rate of poverty in the Mekong Delta - 15% of research sample was member of rice farmer organizations	Local authorities	315 rice households

Thanks to the advice of the leader of Provincial Agricultural Extensions Center and the statistical data about rice production area, I chose 3 districts per province to do the questionnaire, in which there is a district with a large area of rice production, a district with medium area of rice production and a district with a small area of rice production. In An Giang, I surveyed 3 districts: Chau Phu, Thoai Son and Cho Moi. In Can Tho, those 3 districts were Thoi Lai, O Mon and Phong Dien.

I randomly chose 50 rice farmers per district in Can Tho and 55 rice farmers per district in An Giang to do questionnaires. The sample total was 315 respondents.

Household selection: The process of household selection was done under the assistance of agricultural extension officials at district level. In each district, the first step was that I gave criteria to agricultural extension officials for the selection of the households: a certain amount of rice producers, about 10% of the sample were poor rice producers. This was the average rate of poverty in the Mekong Delta, Vietnam. And it was about 15% of the sample who were joining rice farmer organizations to diversify the survey sample. Based on these criteria, agricultural extension officials listed the rice households and made the date for the questionnaire.

The main tool of my quantitative study was questionnaire to collect the data to meet the research purposes and objectives. Using the questionnaire was useful for me to gain the data and information in an effective and significant manner. My questionnaire was designed with 3 main parts and 25 questions to collect required basic information (Age, sex, education level, family size, total income, rice income, etc.), to find out the current MITS in the rice value chain in the Mekong Delta, Vietnam: Rice market information sources, rice market information channels, rice market information utilization of rice farmers, the impacts of MITS on rice farmers, advantageous and disadvantageous of MITS, etc.

I used the questionnaire to collect the quantitative data. I did 315 questionnaires and each questionnaire lasted about 45 minutes. Besides, while doing questionnaires I observed the activities of rice farmers in their rice production and trading to check their answers. For example, I got to know if they are using phones or not to gain rice market information, if they have the phone numbers of rice trader or not, etc.

4.4.2. The process of data analysis

According to Edda Tandi Lwoga (2010), in the mixed method approach data analysis will include the quantitative analysis (descriptive and inferential numeric analysis) and the qualitative analysis (description and thematic text or image analysis). In my thesis, qualitative data had been analyzed before and then the quantitative data was analyzed in order to provide support to the results of qualitative data. SPSS was used for all statistical analyses and the data is entered into SPSS. Wrong and missing data were verified with the original questionnaires.

Descriptive statistics such as frequencies, percentages, means, etc were used to present the variables. I used Cross-table analysis to test 8 hypotheses (H1, H2, H3, H4, H5, H6, H7, H8) to verify the relationships amongst variables about the socio-economic characteristics of the respondents and their satisfaction level of MITS. The existence of the relationship is tested by the Pearson Chi-square and by the significance level of the indicator (Asymp.Sig. (2-sided) is below 5%. The following

association coefficients were used in order to examine the strength of the relationship: Cramer's V, Gamma and Eta indicators. The strength of the relationship was interpreted as follows:

- 0 to 0.199: weak connection
- 0.200 to 0.399: moderately strong
- 0.400 -: strong connection.

Binary Logistic Model was performed to identify the socio-economic characteristics of rice farmers influencing the farmers' satisfaction about MITS in the Mekong Delta, Vietnam.

Model specification:

$$Y = \log [P/1-P] = \log Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \beta_8 X_8 + \mu$$

Where Y = Market information satisfaction

β = regression coefficient explaining changes caused in Y by changes in the independent variables.

Market information satisfaction = 1;

Market information dissatisfaction = 0

X1 = Age (in years) of the respondents

X2 = Gender of the respondents (0=Female; 1=Male)

X3 = Educational level (Years)

X4 = Household size (amount of people)

X5 = Member of farmer organization (0=Not member; 1=Member)

X6 = Rice income (Million VND)

X7 = Amount of market information channels

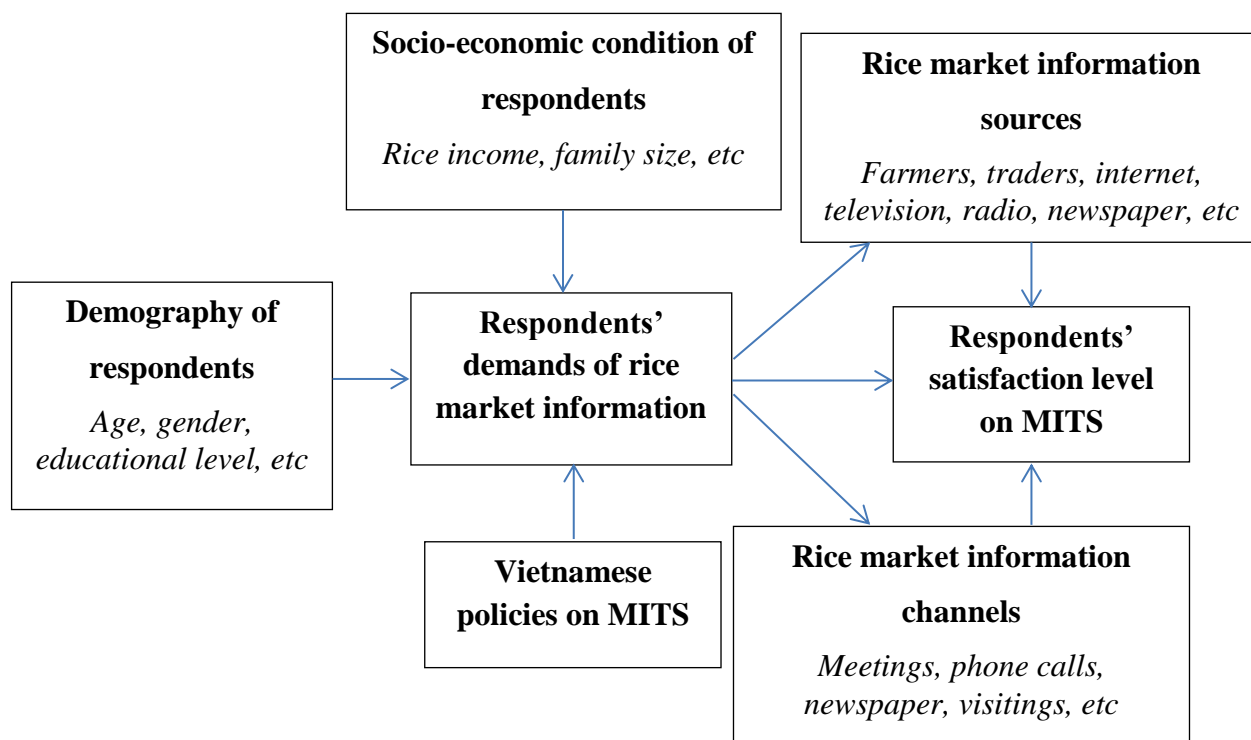
X8 = Amount of market information sources

μ = Error term

I want to explain the above mentioned function as from the findings of the qualitative research I found out that rice farmers' satisfaction level on MITS in the Mekong Delta, Vietnam depended on some main factors. Their socio-economic characteristics, their demography, and policies of the Vietnamese government on MITS significantly affect respondents' demands of rice market information. And then based on the demands of rice market information rice farmers in the Mekong Delta, Vietnam decided on the rice market information sources and channels to gain rice market information to meet their demands (see diagram 10).

However, I didn't put variables of MITS's policies in this Binary Logistic model because the Vietnamese government failed to issue any policies related to MITS.

Diagram 10: Factors influence rice farmers' satisfaction on MITS in the Mekong Delta, Vietnam



4.5. Analysis of questionnaire

This part will present the output of the data analysis and interpretation. The research results will be presented by figures, maps, tables and verbal description.

4.5.1. Socio-economic characteristics of respondents

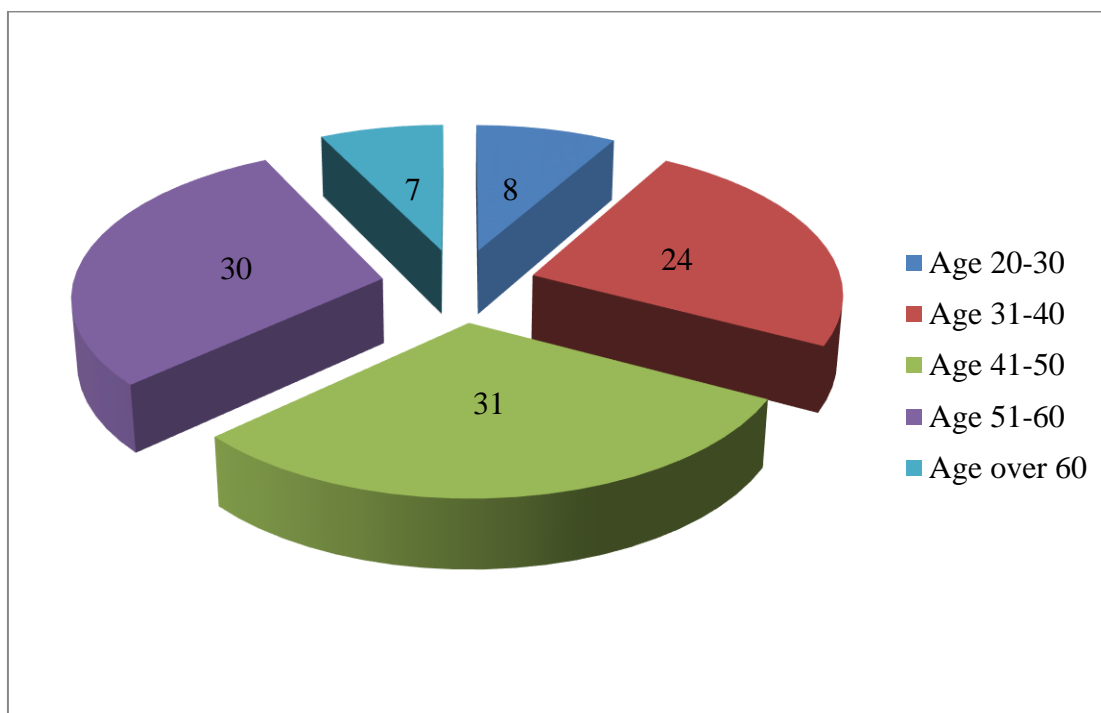
a) Demography of the respondents

Socio-economic characteristics may influence the rice farmers' participation in MITS such as their access, analysis and usage of market information. This part presents the socio-economic characteristics of the respondents.

Age: Age is a factor that can impact the rice farmers' participation in MITS. Young people are more dynamic to seek and use the market information, they have the improved knowledge and technology to easily access to the market information. The average age of the respondents was 47 years. The majority of the respondents (31%) was between the age of 41 and 50 years. The 30% of the respondents who was in the 51-60 age group, followed by 24% in the 31-40 age group. Also, the 20-30 age group accounted for 8% and the over- 60 age group represented 7% of the respondents. This

means that the respondents at this age distribution are usually family heads, they have decided mainly in accessing and using market information, in rice production and the trade of their family.

Figure 22: Percentage by age of respondents (%)



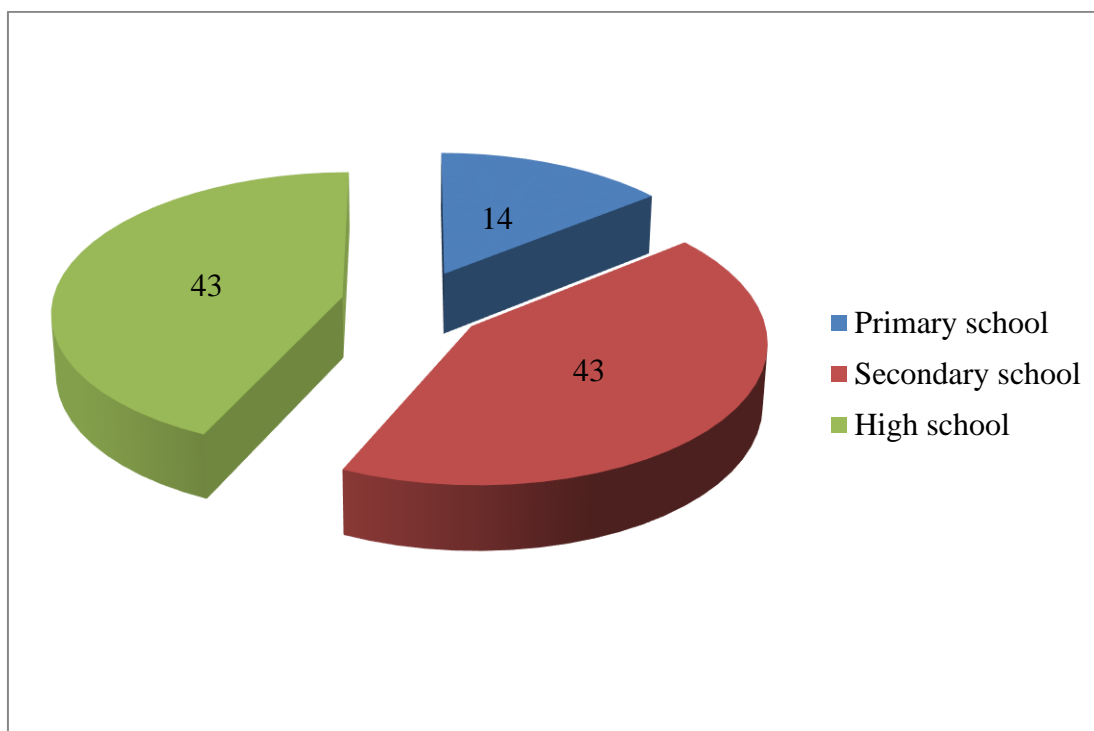
Source: Own survey, 2017

Gender: Gender can influence the decision on rice production and the trade of the family as well as their participation in MITS. Both male and female can have different knowledge, various ways of organizing knowledge, and different ways of preserving and transferring knowledge (Edda Tandi Lwoga, 2010). In a Vietnamese family, the husband has a bigger voice in all activities of the family and therefore, they will decide on the market information sources they access to, how to analyze the market information and how to use it. In the research sample, male occupies 74%, higher than female (26%). It means that almost all respondents are the household heads who had the main role in their family about the participation in MITS.

Educational level: Educational level of rice farmers will influence their market information access, analysis and usage. Educated people have advantages in the accessing, analyzing and using market information. The findings of this research show that 43% of the respondents attended high schools, 43% of the respondents were students at secondary schools and the remainder (N=45; 14%) had

attained the primary education. This infers that respondents had a basic education and consequently, they have an ability to understand and use market information. This is similar to other researches in Vietnam. The research of Jean-Christophe Castella et al. in 2006 pointed out that the household heads in Vietnam had quite a high education.

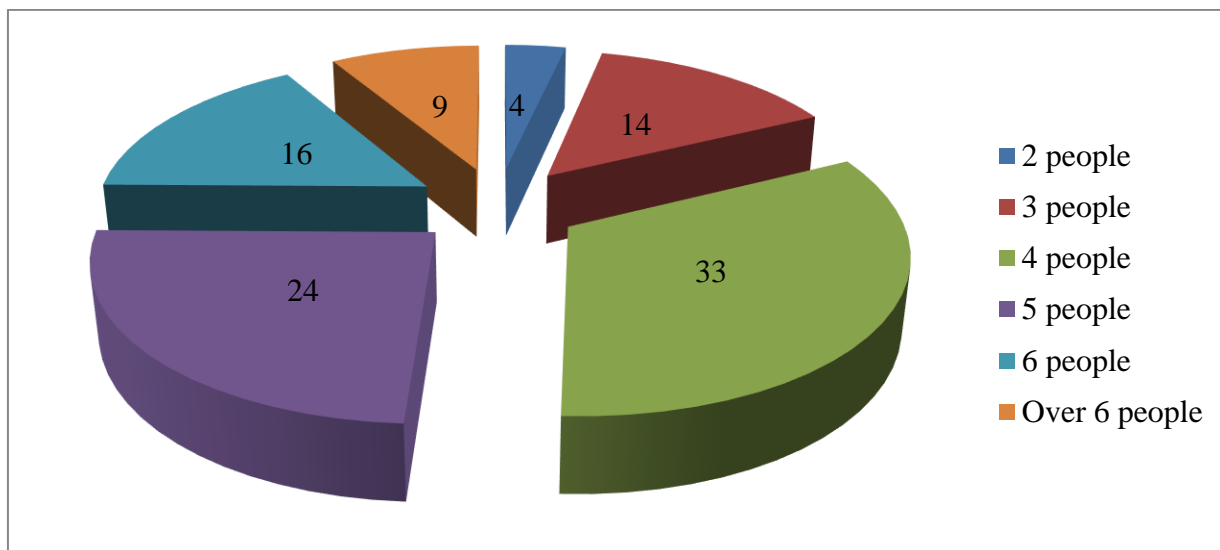
Figure 23: Education level of respondents (%)



Source: Own survey, 2017

Household size: Household size may have an impact on the effect of market information seeking. Big families have more and more opportunities to seek and get good market information because they have many relationships, many sources of market information and many channels of market information. An average size of a respondent's family in this my research is 5 people, in which 33% of the sample has a household size of 4 people, 5- people families seize 24%, 16% are 6- people family, 14% are 3- people family, over 6 -people families hold 9% and 2-people families are 4%. This indicates that the household size of rice farmers in the Mekong Delta is large enough to increase the accession to many sources and channels of market information.

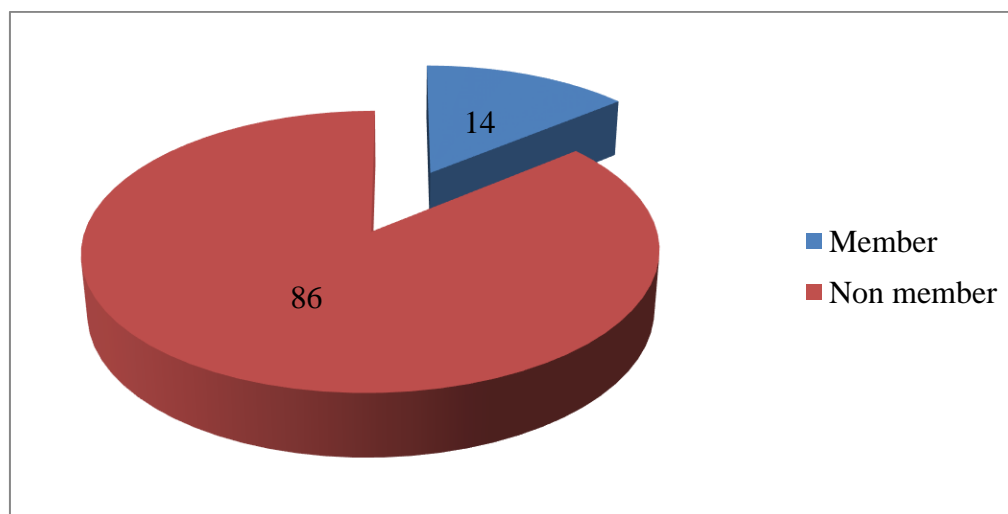
Figure 24: Percentage by household size of respondents (%)



Source: Own survey, 2017

Member of farmer organizations (FO): Joining of rice farmers to a farmer organization influences the effectiveness of their rice production and trading and also their satisfaction level on MITS. Theoretically, rice farmers who are members of farmer organizations have more and more opportunities than non-member farmer organizations to get rice market information so they have a higher satisfaction level of MITS. Figure 25 shows that only 14% of the respondents took part in the farmer organizations and 86% of the respondents were not members of the farmer organizations. The main reason for this result is that there are not many farmer organizations in Vietnam yet and therefore, they did not have chances to join even if they want to become a member of farmer organizations.

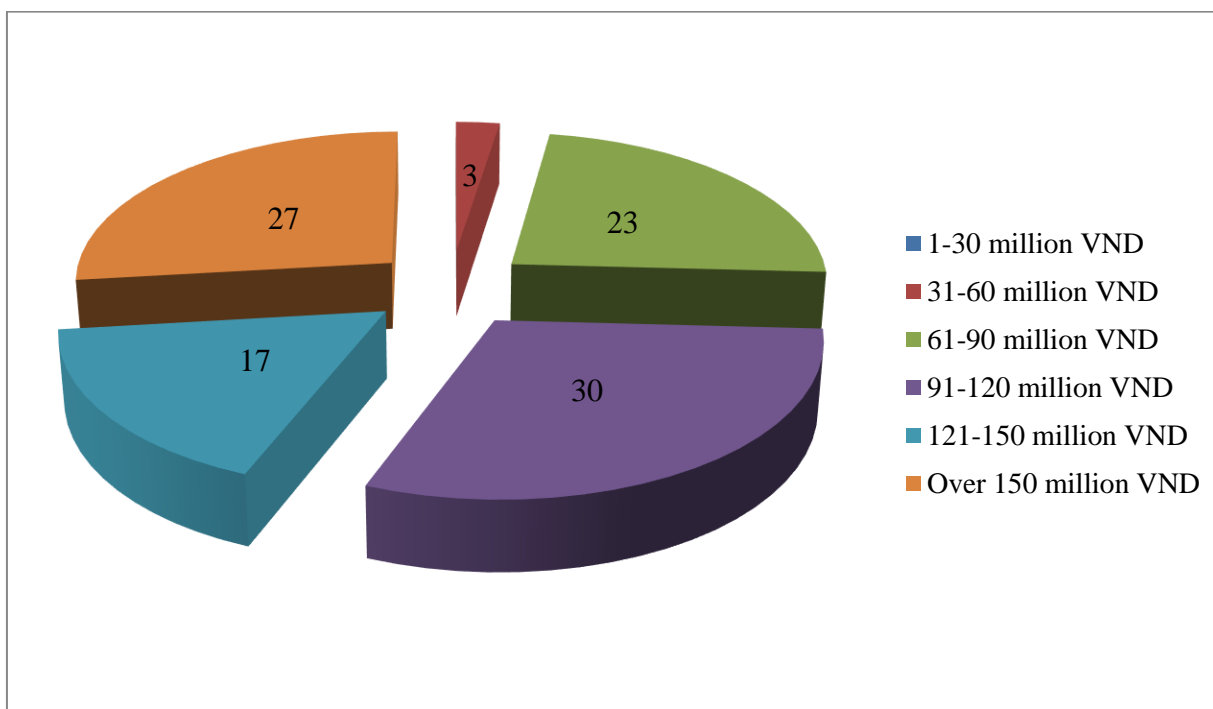
Figure 25: Member and non member of respondents in farmer organizations (%)



Source: Own survey, 2017

Annual income: The annual income of the respondents may influence the accession and the usage of market information. The high income households often have a good ability to access to the great market information, in addition they can invest in technique to easily access to and get market information as well as they also have more relationships with many sources of market information. Researchers like Ronald Benard; Frankwell Dulle and Honesta Ngalapa (2014) and Swanson (1997) also indicated that the income of farmer households affected the accession to information and farmer's information source preferences. Umerah Maxwell Ikenna (2012) pointed out that the annual income is one of the most important factors determining the utilization of agricultural information and different improved technologies. Figure 26 shows the income distribution of rice farmers in the study area. The average income of a rice farmer household in the Mekong Delta, Vietnam was 133.4 million VND/year (about 6000 USD/year). 30% of the respondents earned between 91 and 120 million VND, 27% of the respondents had an income over 150 million VND, 23% of the respondents earned from 61 to 90 million VND, 17% of the respondents earned between 121 and 150 million VND and only 3% (N=8) earned between 30 and 60 million VND (figure 26).

Figure 26: Income level of the respondents (%)

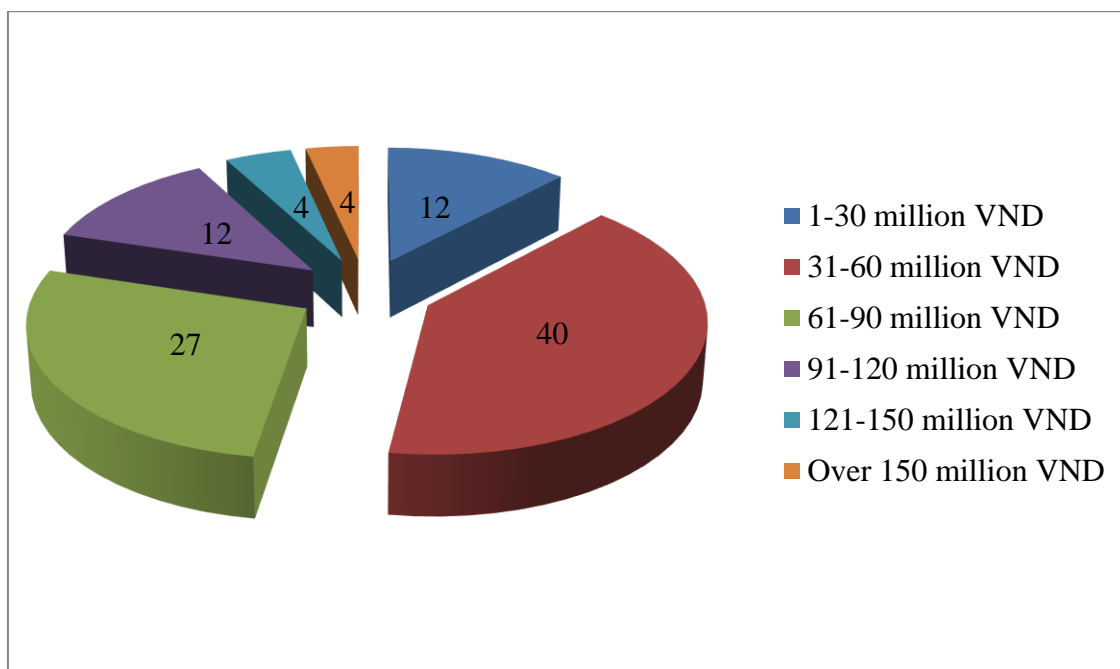


Source: Own survey, 2017

Rice income of rice producers: Rice income of rice farmers can influence their market information seeking and usage. Rice farmers with a higher rice income have the ability to search and use market information in more effective ways. The average income from rice of respondents was 70.9 million

VND/year (about 3200USD/year), seizing 53% of the total income of a rice household. It means that rice has an important role in the economy of the rice household. The majority of the respondents (N=127; 40%) had a rice income between 31 and 60 million VND, 27% of the respondents had a rice income from 61 to 90 million VND, 13% of the respondents earned from rice between 91 and 120 million VND, 12% of the respondents had an income under 30 million VND from rice, 4% of the respondents (N=14) were between 121 and 150 million VND and only 4% of the respondents (N=11) had an income over 150 million VND (figure 27).

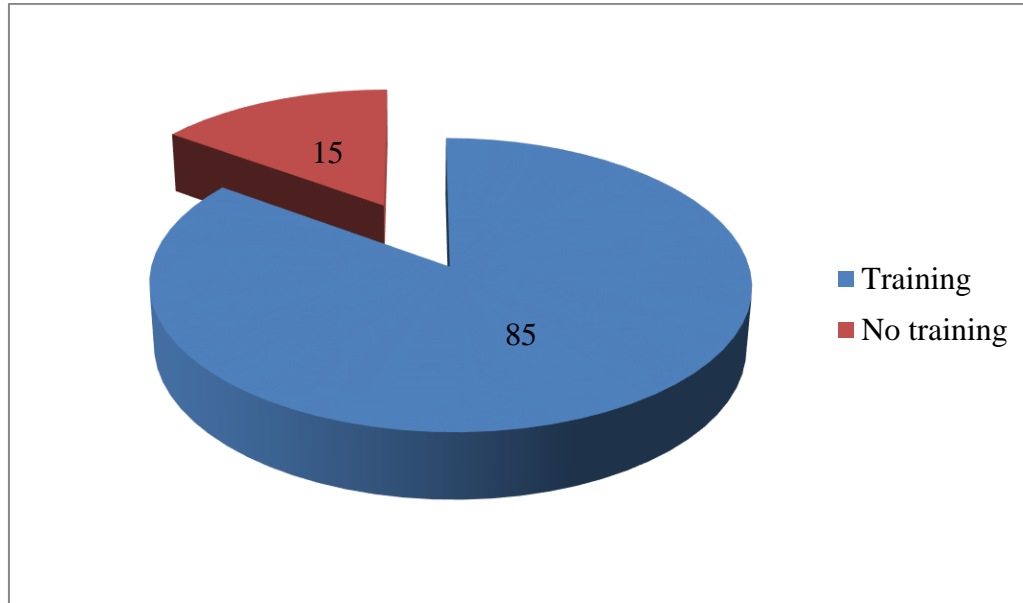
Figure 27: Rice income level of the respondents (%)



Source: Own survey, 2017

Rice training: Over the past 20 years, the Vietnamese government have promoted the rice training programs to improve the technical level of rice farmers in order to increase the rice yield and quality, to improve rice farmers' income and profits. Therefore, almost all Vietnamese rice farmers joined the rice training courses. The findings show that 85% of the respondents took part in the rice training courses and only 15% have not joined yet (figure 28). However, the finding of the qualitative survey at the first stage of my research indicated that the contents of the rice training courses were about rice technical processes and the technical process of input materials usage such as pesticides, fertilizers, etc. There were no rice training courses about market information system. This is a shortcoming in supporting rice farmers in Vietnam to develop rice markets. We need to overcome this shortcoming to ensure rice farmers to sell at high prices to increase the rice profits when rice yield and area have touched the ceiling level now.

Figure 28: Rice training participation of rice farmers (%)



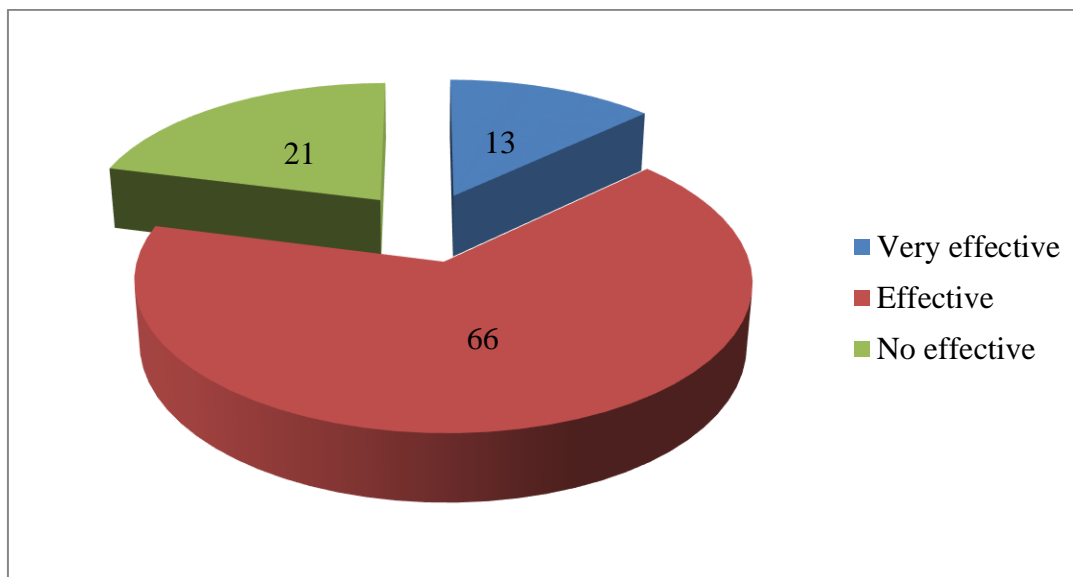
Source: Own survey, 2017

Overall, the demographic characteristics of the respondents indicated that the respondents can have enough ability and knowledge to access to, analyze and use the market information in an effective manner. They had the knowledge, experience and an economic condition to access to market information.

b) Effectiveness of rice production

MITS influences the effectiveness of rice production so we want to know how effective the rice production of rice farmers is in the Mekong Delta. The findings are presented by the figure. The data from the figure 29 show that majority of rice farmers in the Mekong Delta, Vietnam still evaluated that the rice production was effective with a percentage of 66% of the respondents but also 21% of the respondents indicated that it was not effective and higher than the very effective rice production side with a rate of 13% of the respondents. This proves that a high rate of rice farmers in the Mekong Delta under-effectively produced rice and one reason for this is the low effect of their rice trading because of a lack of rice market information that I will present below. Therefore, to maintain and develop the rice production of Vietnam in general and that of the Mekong Delta in particular the State should have policies and programs to improve the effectiveness of rice production through a model to transfer rice market information to rice farmers.

Figure 29: The effectiveness of rice production (%)



Source: Own survey, 2017

c) Some difficulties in rice farmers' rice selling

Vietnamese small-scale farmers have faced many difficulties in their rice selling and my research indicates that 100% of the respondents faced some difficulties when they were selling their rice. Table 42 shows that there were 6 main difficulties for rice farmers in the Mekong Delta, Vietnam they met when they were selling rice to traders: Low Infrastructure, low selling price, few buyers, no market information, inaccurate and inadequate market information, and they don't know where to sell. And low selling prices, inaccurate and inadequate market information and the fact that they don't know where to sell that related to MITS are the biggest difficulties for rice farmers in the Mekong Delta, Vietnam.

Table 42: Farmers' some difficulties in rice selling (%)

Difficulties	Yes	No	Rank
Low Infrastructure	19	81	5
Low selling price	97	3	1
Few buyers	54	46	4
No market information	11	89	6
Inaccurate and inadequate market information	91	9	2
Don't know where to sell	57	43	3

Source: Own survey, 2017

➤ Low infrastructure: The Mekong Delta, Vietnam is a river region and rice transportation from rice fields to boats of traders was hard and costly. According to table 42, 19% of the respondents claimed that low infrastructure was a difficulty in selling rice to traders. The rest (81%) said that the infrastructure was not a problem for them. So this is not the main difficulty for rice farmers in the Mekong Delta, Vietnam to sell their rice.

➤ Low selling prices: This is the most difficulty for rice farmers in the Mekong Delta, Vietnam during their selling process. They thought that the rice selling prices were mainly decided by traders and that is the reason for the low selling prices. There was 97% of the respondents who claimed that they had to sell their rice at low prices in many times on the pressure of rice traders and only 3% of the respondents did not agree with it. This result fits into the study of Mai Van Xuan and Mai Le Quyen (2011) on 450 farmers in Quang Ngai province, Vietnam. According to the study of Mai Van Xuan and Mai Le Quyen (2011), 54% of the farmers met the problem related to their selling prices.

➤ Few buyers (traders): Rice farmers in the Mekong Delta, Vietnam have desired that there should be more and more rice traders in their rice markets in order to increase the competition of buying rice among traders. In fact, rice farmers could only sell rice to 2-3 collectors in their commune, they could not sell rice to big traders outside commune to raise the selling prices because the big traders wanted to buy rice from collectors to reduce the rice collection time and costs, meanwhile rice farmers with a small amount of rice could not meet this demand of the big traders. Table 42 shows that the 54% of the respondent thought that there were few traders to buy their rice and so rice farmers in the Mekong Delta, Vietnam did not have many opportunities to sell their rice at a high price. The rice prices in this case will reduce considerably. Besides, also the 46% of the respondents said that there were enough traders to buy their rice because maybe they have a lot of information about traders or maybe they did not have information about rice market information so they thought that they have enough traders to sell their products to.

➤ No market information: There was a small rate of rice farmers in the Mekong Delta, Vietnam who did not get market information. Table 42 indicates that 11% of the respondents said that they did not access to rice market information and 89% of the respondents agreed that they had rice market information but the problem for them is that the rice market information was not accurate and up-dated. And this result is also so different from the result of a study of Mai Van Xuan and Mai Le Quyen (2011). The study of Mai Van Xuan and Mai Le Quyen (2011) on 450 farmers in the mountain area of Quang Ngai province, Vietnam indicated that a majority of farmers (70%) did not have market information, 82-93% of farmers did not have information about transportation, payment and contract,

and 54% of farmers did not have information about prices. The main reasons for this difference are the differences of socio-economic conditions and infrastructure between 2 study areas. The mountainous area of Quang Ngai province is such an extremely difficult area that the ability of farmers to get market information is very low.

➤ Inaccurate and inadequate market information: The quality of market information significantly influences the production effectiveness of farmers, but rice farmers in the Mekong Delta, Vietnam have accessed inaccurate and inadequate market information so it is an obstacle for them. According to table 42, 91% of the respondents believed that they accessed to inaccurate and inadequate market information. As a result, they could not use market information in the reality and there is only 9% of the respondents said that they accessed to accurate and adequate market information. This is a main difficulty of rice farmers in their rice selling and this is one of the main reasons to improve the current MITS in the rice value chain in the Mekong Delta, Vietnam.

➤ Don't know where to sell: Where to sell rice effects the rice prices and so rice farmers in the Mekong Delta, Vietnam wanted to find marketplace to sell their products at a high price. Rice farmers in the Mekong Delta, Vietnam sold rice to the local collectors in their commune and then these collectors sold rice to big traders outside the commune to fill the gap between their buying prices and their selling prices so there is not much competition among collectors because in each commune (village) there were about 1-3 rice collectors. Table 42 shows that 57% of the respondents said that they did not know where to sell their rice at a high price. This result is so similar to the result of a study of Mai Van Xuan and Mai Le Quyen (2011) in Quang Ngai province, Vietnam. According to the study of Mai Van Xuan and Mai Le Quyen (2011) 16% of 450 farmers did not have information about where to sell rice at a high price.

From these findings, the rice market information programs and policies should focus on improving the rural infrastructure, providing the information about big traders such as their address and phone numbers to rice farmers so that they can directly contact with the big traders to look for where to sell at high prices as well as increasing the competition between collectors and traders, improving the current MITS to increase the quality of market information farmers receive.

4.5.2. Rice market information transfer system (MITS)

a) The importance of MITS

Other previous researches showed that MITS had an important role for farmers in the Mekong Delta, Vietnam. A study of Le Thi Hue in 2011 on 200 farmers in Can Tho indicated that 44% of the research

sample believed that MITS was very important for them, 41% said that MITS was important. One big weakness of this research is that we cannot know which kinds of market information in MITS were important for farmers and which ones were not important for them.

This part will indicate the importance of market information to rice farmers so that we can identify the rice farmers' demands of market information in the Mekong Delta. The findings in this part help MITS provide the proper market information that the rice farmers need. Table 43 shows that the most important kind of market information was the phone number of big traders because they want to call them to ask for the price before selling rice and to extend their markets outside their commune. According to the qualitative research at the first stage, the majority of rice farmers in the Mekong Delta had only the phone number of collectors in their commune and so they did not have an ability to check the rice prices outside their commune to compare among different markets, to choose where to sell with high prices. 74% of the respondents reckoned that the phone numbers of traders were very important for them and 26% of the respondent said that it was important. The next important kind of market information is the wholesale prices, rice farmers wanted to know this kind of market information because the wholesale prices often reflect almost exactly the rice farmer's selling prices. The third position in the importance of rice market information for rice farmers in the Mekong Delta, Vietnam is the rice quality and quantity demand of the market. The information about the rice quality helps them produce high quality rice to meet this demand. Besides, the high quality rice was often sold at high prices. The information about the rice quantity demand of markets is very important because it helps rice farmers adjust their production plan to getting more profits, avoid the rice variety production that were redundant on markets and produce the rice varieties the market are demands considerably but the demand of these rice variety quantity wasn't still met. Information about rice export of Vietnam was also interested by rice farmers. 38% and 37% of the respondents reckoned that information about rice export of Vietnam was very important and important, respectively. According to the experiences of rice farmers in the Mekong Delta, Vietnam, the satiation of rice export of Vietnam significantly influenced the selling prices of rice farmers and the effectiveness of rice production. In the years of the good situation of rice export, the rice export prices were high, the rice selling prices of rice farmers were often also high, the sale of rice was very advantageous, many traders were active to look for farmers to buy the rice and the opposite, in years of the bad satiation of rice export, the rice prices reduced. Besides, other kinds of market information are concerned by rice farmers such as payment terms, retail prices, transportation, market forecasting, address of traders, etc.

Table 43: Importance of kinds of market information to rice farmers (%)

Kinds of market information	Very important	Moderately important	Not important
Retail price	12	64	24
Wholesale price	63	37	1
Rice quality	54	45	1
Transportation	5	38	57
Payment terms	36	44	21
Quantity	53	39	8
Address of traders	19	70	12
Phone number of traders	74	26	1
Market forecasting	12	46	42
Rice export	38	37	25
Global market	10	31	59

Source: Own survey, 2017

Table 44: Importance level of market information to rice farmers

Kinds of market information	Mean score	Rank
Retail price	1.9	8
Wholesale price	2.6	2
Rice quality	2.5	3
Transportation	1.5	10
Payment terms	2.1	5
Quantity	2.5	3
Address of traders	2.1	5
Phone number of traders	2.7	1
Market forecasting	1.7	9
Rice export	2.1	5
Global market	1.5	10

Note: 3 level of the importance: Very importance = 3 point; Medium = 2 point; and Non importance = 1 point.

$$\text{Mean score} = (n_1*3+n_2*2+n_3*1)/N$$

N =Size of the sample ($N=315$)

n = amount of respondents chose the given level of importance

Source: Own survey, 2017

Table 44 proves that hypothesis number 2 (H2) is rejected. Rice farmers in the Mekong Delta, Vietnam mainly used micro market information such as phone number of traders, wholesale price, rice quality, quantity, etc. in their rice production and trading, meanwhile macro market information is essentially used by large scale farmers because almost all rice farmers in Vietnam are small scale producers with a small amount of rice and they sell their rice to traders in their village, commune so they don't need macro market information. Besides, the current MITS is mainly providing information about price, but not about macro information so farmers can hardly get macro market information from MITS.

b) Market information sources

The market information source is a very important part in MITS because information sources will affect the quality of information the farmers will get. Information source is an institution or individual that creates or brings about a message (Starasts, A. M., 2004) and hence, there are many kinds of different sources: media, radio, TV, personal experience, books, journal and magazine articles, expert opinions, internet, extension agents, etc.

The findings about the rice market information sources of rice farmers in the Mekong Delta, Vietnam are presented in table 45, table 46, table 47 and table 48. Table 45 presents the descriptive statistics of amount of market information sources. Table 46 states the percentage of the respondents accessed to these market information sources. Table 47 presents the descriptive statistics by market information sources. Table 48 presents the frequency of use of market information sources.

According to table 45, each rice farmer household had on average 5 kinds of market information sources. The maximum of market information sources was 8 and the minimum was 2 kinds of market information sources. It means that rice farmers in the Mekong Delta, Vietnam had at least one opportunity to access to market information.

Table 45: Descriptive statistics of amount of market information sources

N	Minimum	Maximum	Mean
315	2	8	4.95

Source: Own survey, 2017

Table 46: Rice market information sources of rice farmers in the Mekong Delta, Vietnam

Market information sources	%	Rank
Farmers, relatives, friends	100	1
Traders	91	3
Collectors	99	2
Farmer Organizations	11	7
Newspapers	4	11
Radio	8	9
Television	64	5
Internet	10	8
Extension services	34	6
Village leaders	70	4
Other governmental agencies	6	10

Source: Own survey, 2017

Table 47: Descriptive statistics by market information sources

Market information sources	N	Minimum	Maximum	Mean	Std. Deviation
Farmers, relatives, friends	315	1	5	1.73	0.74
Traders	285	3	6	5.47	0.679
Collectors	312	3	6	5.16	0.803
Farmer Organizations	33	2	6	4.18	1.044
Newspapers	13	2	5	3	0.707
Radio	25	2	5	2.56	0.712
Television	200	1	5	2.35	0.678
Internet	31	1	5	2.39	0.715
Extension services	106	2	8	5.86	1.298
Village leaders	220	1	6	2.73	0.708
Other governmental agencies	19	3	8	6.26	1.327

Source: Own survey, 2017

Table 48: Frequency of use of market information sources

Market information sources	Daily	Weekly	Monthly	Quarterly	Yearly
Farmers, relatives, friends (N=315)	64	35	1		
Traders (N=285)		4	40	56	
Collectors (N=312)		11	50	39	
Farmer organizations (N=33)	2	42	47	9	
Newspapers (N=13)	8	85	8		
Radio (N=25)	26	70	4		
TV (N=200)	34	65	2		
Internet (N=30)	34	63	3		
Extension services (106)	1	8	29	42	21
Village leaders (N=220)	16	82	2	1	
Other governmental agencies (N=19)		5	21	42	32

Source: Own survey, 2017

Table 46 indicates that rice farmers in the Mekong Delta, Vietnam have been accessing to market information from 2 kinds of market information sources (Formal sources: Governmental agencies, newspaper, radio, television, internet, etc. and Informal source: Traders, collectors, farmers, internet, village leaders, farmer organizations, etc). And the most important source for rice farmers in the Mekong Delta, Vietnam is other farmers, followed by collectors and traders, etc.

The qualitative interview found that rice farmers in the Mekong Delta, Vietnam have been accessing to many different sources of market information simultaneously to compare and make decisions on their rice production and trade. Based on the market information needs rice farmers will choose the sources of the market information. Farmers got macro-information mainly from TV (national TV) or few farmers could get from the Agricultural Newspaper of Vietnam and Internet. For micro-information they directly accessed to sources such as traders, farmers, etc.

Farmers (friends, neighbors, relatives):

Rice farmers were an intermediate source of rice market information in rice market information system in the Mekong Delta, Vietnam. They have been collecting market information from many different sources and then analyzed and shared them with other farmers.

Table 46 indicates that 100% of the respondents accessed to market information from other farmers, relatives and friends. This proves that rice farmers were the most important sources of market information for rice farmers in the Mekong Delta, Vietnam and this finding has the same outcome in the study of Heidi Kaila in Vietnam in 2015. Rice farmers reckoned that rice market information from farmers was analyzed carefully, up-dated, and rice farmers didn't hush up market information, they shared all information they had and farmers could easily share market information because they were living in a village with a high population density.

The use of rice farmers as a market information source was quite frequent. 64% of the respondents accessed to rice farmers to get market information every day, especially in harvest time. 35% of the respondents weekly used rice farmers to gain market information and only 1% of the respondents accessed to rice farmers monthly to reach market information (Table 48).

Market information channels between rice farmers and rice farmers in the Mekong Delta, Vietnam were face-to-face meetings and phone calls.

The advantages of rice farmers in providing market information to other farmers: The good quality of rice market information, other farmers were easy to access to, the high speed of market information dissemination, no cost.

The disadvantages of rice farmers in providing market information to other farmers: Sometimes the quality of market information from farmers was not good because the process of collecting and sharing market information from farmers to farmers lasted for a long time, meanwhile the market changes continuously especially in the harvest time. The quality of market information depends significantly on farmers' ability of market information analysis. If their ability is weak, the quality is low and it will influence many farmers.

Mass media as a market information source:

Rice farmers in the Mekong Delta, Vietnam have been accessing to market information from mass media such as television, internet, newspaper, etc. However, television was the main source of market information in mass media for many farmers. Very few farmers used internet, newspaper to get market information. And they believed that the quality of market information from mass media was not good.

➤ Television:

Rice farmers in the Mekong Delta, Vietnam used televisions as a main source of rice market information in mass media. They watched televisions to gain macro-information about rice markets, rice export of Vietnam to make good decisions in their production and trading.

Table 46 shows that 64% of the respondents watched televisions to get rice market information. And Television is the most important sources of market information among Mass media.

Rice farmers' frequency of watching televisions to get rice market information in the Mekong Delta, Vietnam wasn't so high. Among 200 respondents who watched televisions to get rice market information 65% watched television to gain rice market information, 34% of them watched televisions daily to gain rice market information and 2% of them watched televisions monthly to get rice market information.

The advantages of television as a source of rice market information: Many rice farmers can watch televisions to get rice market information at the same time and at low cost.

The disadvantages of television as a source of rice market information: The quality of rice market information is not good because rice market information on television was collected and analyzed on the very large area and not frequently (*Director of An Giang Agricultural Extension Centre*). The broadcast time about rice market information on television was not suitable for rice farmers in the Mekong Delta, Vietnam because the programs about rice market information on television were broadcast at daytime when farmers were busy to work. The speed of rice market information broadcast on television was too fast for rice farmers to keep a close watch and remember (*Director of An Giang Agricultural Extension Centre*).

Another big problem of using television to provide rice market information to rice farmers is the very high cost. As in the literature review part presented the current budget to build television programs and to disseminate on television is a big number.

➤ Newspapers and magazines:

Newspaper was a source of rice market information for rice farmers in the Mekong Delta, Vietnam. Rice farmers in the Mekong Delta, Vietnam could access to rice market information from many kinds of newspapers: Vietnam's Agricultural Newspaper, Provincial Agricultural Extension Newspaper, Rural Today, Vietnam's Economy, etc. Only provincial Agricultural Extensions Newspaper is free for rice farmers, meanwhile rice farmers who want to read other newspapers need to pay. This is one of the main reasons why only few rice farmers in the Mekong Delta, Vietnam read newspapers to get rice market information.

Table 46 indicates that only 4% of the respondents read newspapers to get rice market information. This demonstrates that the rate of rice farmers in the Mekong Delta, Vietnam who read newspapers was very low. The reasons for this low rate are that the newspapers rice farmers in the Mekong Delta, Vietnam had to buy they did not read because they did not have money and also did not want to pay to buy. Provincial Agricultural Extensions Newspaper was free for all rice farmers but published in a small number of copies, consequently, only officials in communes and villages could read it, for farmers it was very hard to access to this newspaper to read.

Rice farmers' reading newspapers to get rice market information in the Mekong Delta, Vietnam was frequent. Among 13 respondents who read newspapers to get rice market information 85% read newspapers weekly to get rice market information, 8% of them read newspaper daily to gain rice market information and also 8% of them read newspaper monthly to reach rice market information.

The advantages of newspapers in providing rice market information to farmers: Many rice farmers can read newspapers to get rice market information.

The disadvantages of newspapers in providing rice market information to farmers: The low quality of rice market information because rice market information was collected and synthesized from the data on a large area, and the data were the out of date information because of the infrequent publishing, and the high costs.

➤ Internet:

Internet users are increasing day by day in Vietnam but mainly in cities, towns. The rate of farmer households who have internet in the countryside is still rather low.

Some advanced farmers in the Mekong Delta, Vietnam used Internet to get rice market information, but the number of these farmers was still few. Among 315 respondents in the survey sample the 30 respondents who used Internet to get rice market information, seized 10%. They are mainly young, under 40. They used their smart phones to access to Internet at café shops, public wifi, their homes, etc to gain rice market information. The reasons for the few rice farmers in the Mekong Delta, Vietnam using Internet to get rice market information are the high cost as well as the fact that farmers need to buy a computer/smart phones, pay for internet installation and the monthly fee of internet and they also need to have skills to use computer, internet and rice farmers in the Mekong Delta, Vietnam are lacking these skills.

Rice farmers' use of Internet to get rice market information in the Mekong Delta, Vietnam was so frequent. Among 30 respondents using Internet to get rice market information 63% used Internet

weekly to gain rice market information, 34% used Internet daily to gain rice market information and only 3% used monthly Internet to reach rice market information. The reasons for the high frequency of rice farmers' using Internet to get rice market information are the coverage of wifi in the Mekong Delta, Vietnam which was dense and in addition, more and more rice farmers had smart phones.

The advantages of Internet as rice market information source: Diversification of rice market information on Internet, many farmers can access to Internet, the high speed of market information dissemination.

The disadvantages of Internet as rice market information source: High cost and high skill of rice farmers and so this source is not suitable for the majority of farmers in Vietnam. Besides, owning computers was still quite uncommon in Vietnam in 2014 Heidi Kaila (2015).

➤ Radio:

Radio used to be a main means of communications in Vietnam but along with the development of televisions and Internet the amount of radio owners reduced considerably. Nowadays, radio owners are mainly the old people and they still have a habit of listening to radio to relax.

The amount of rice farmers listening to radio to get rice market information in the Mekong Delta, Vietnam was rather small. Table 46 shows that 8% of the respondents listened to the radio to gain rice market information.

Rice farmers listening to the radio to get rice market information in the Mekong Delta, Vietnam was frequent. Among 25 respondents who listened to the radio to get rice market information 70% listened to the radio weekly to get rice market information, 26% listened to the radio daily to gain rice market information and 4% of them listened to the radio monthly to get rice market information (table 48).

The advantages of radio as market information source: low costs, many farmers can get market information everywhere, every time.

The disadvantages of radio as market information source: The low quality of market information because the market information was collected on a large area, the period from collection to dissemination was long and so the market information was out -of .date

Traders:

Rice traders in the Mekong Delta, Vietnam have an important role in rice value chain because they are not only original sources of market information but also market information providers. Currently, traders still have a big voice in bargaining with farmers and collectors so they will hush up or distort

market information to farmers to get more profits. To reduce the distortion of market information rice farmers have been referring to many different sources, to many traders to compare and choose the best price.

Rice traders were important sources of rice market information for rice farmers in the Mekong Delta, Vietnam. Many rice farmers accessed to rice traders to get rice market information. Table 46 shows that 91% of the respondents accessed to rice traders to get rice market information.

Table 48 indicates that rice farmers in the Mekong Delta, Vietnam infrequently accessed to rice traders to get rice market information because they mainly accessed to traders in harvest time to get market information. Rice farmers said that they often reached rice traders to get rice market information before they wanted to sell their rice. Among 285 respondents who accessed to rice traders to get rice market information 56% accessed to rice traders quarterly to get rice market information, 40% accessed to rice traders monthly to get rice market information and only 4% reached rice traders weekly to gain rice market information

Farmers accessed to rice traders via 2 channels: Phone calls and face-to-face meetings.

The advantages of rice traders as rice market information: The high speed of rice market information dissemination, up-date market information, no cost and rice farmers can easily access to it.

The disadvantages of rice traders as rice market information sources: The low quality of rice market information because they purposefully distorted rice market information.

Collectors:

Rice collectors are rice buyers who directly buy rice from rice farmers and then sell rice to traders to get the price disparity. Therefore, rice collectors often got rice market information from big traders and then shared it with rice farmers. Rice collectors also distorted rice market information to create a bigger gap between their buying price and their selling price to get more profits.

Table 46 shows that the majority of rice farmers in the Mekong Delta, Vietnam accessed to rice collectors to get rice market information. There is 99% of the respondents accessed to rice collectors to gain rice market information. The reason for this high rate is that rice farmers and rice collectors lived in the same village and commune so they had a close relationship.

Table 48 states that rice farmers in the Mekong Delta, Vietnam infrequently reached rice collectors to get rice market information. Among 312 respondents who accessed to rice collectors to get rice market information 50% accessed to rice collectors monthly to gain rice market information, 39% accessed

to rice collectors quarterly to get rice market information and 11% accessed to rice collectors weekly to gain rice market information.

Farmers have been accessing to collectors via 2 channels: Phone calls and face-to-face meetings.

The advantages of rice collectors as rice market information sources: The high speed of rice market information dissemination from rice collectors, up-date market information, no cost and rice farmers could easily access to it.

The disadvantages of rice collectors as rice market information sources: The low quality of rice market information, they tried to distort rice market information.

Farmer organizations:

Couturier *et al.* (2006) defined that a farmer organization is a collective entity of farmers in a village or in a number of contiguous villages who have come together with common goals for economic benefits related to agricultural activities. They were sharing market information among the members and between members and leaders of their farmer organization.

According to Nguyen Thi Kim Nguyet (2002), the Vietnamese government has paid more attention to the establishment of farmer organizations in the last years to solve the difficulties in the rural development because the State itself could not meet the demands of farmers in the industrialization and modernization process because of its lack of budget and human resources. The State can use farmer organizations to provide services such as market information provision etc. to the farmers in the easiest manner. In addition, when farmers work together in groups, important new skills and information are developed within their community, within their village.

Table 46 shows that only 11% of the respondents gained rice market information from their rice farmer organizations. This is not an important source for rice farmers in the Mekong Delta, Vietnam to get rice market information because there are not numerous amount of farmer organizations in Vietnam. I hope that the amount of farmer organizations in Vietnam will be developed in the near future to increase the opportunities for farmers to get market information.

Rice farmers' frequency of gaining rice market information from their rice farmer organizations was not much. Among 33 respondents who got rice market information from their rice farmer organizations 47% accessed to their rice farmer organizations monthly to get rice market information, 42% reached their rice farmer organizations weekly to gain rice market information and 2% accessed to their rice farmer organizations daily to get rice market information (table 48).

Market information channels between the rice farmer organization and rice farmers in the Mekong Delta, Vietnam were phone calls and face-to-face meetings.

The advantages of farmer organizations as rice market information source: The good quality of rice market information, no cost, rice farmers could easily get to market information from their rice farmer organizations.

The disadvantages of farmer organizations as rice market information sources: No many rice farmers can access to their rice farmer organizations to get rice market information.

Agricultural extension system:

A main mission of the agricultural extension system in Vietnam is to provide market information of agricultural products including rice to farmers. The findings in the qualitative study showed that currently, the agricultural extension system in the Mekong Delta, Vietnam has been providing rice market information to rice farmers. For example, the agricultural extension system in An Giang has been providing market information to rice farmers via 2 channels, namely: website <http://sonongnghiep.angiang.gov.vn/> and agricultural extension newspaper of An Giang. Market information on the website was updated everyday from Monday to Friday after 10.00. In addition, the agricultural extension Center of An Giang published agricultural extension newspaper of An Giang every Friday in 1000 copies to introduce the market information (price information) of agricultural products, including rice during the whole week.

Table 46 indicates that 34% of the respondents accessed to the agricultural extension system to get rice market information. This proves that many rice farmers in the Mekong Delta, Vietnam did not access to the agricultural extension system to get rice market information and its reasons are that rice farmers didn't have internet access to the websites of the provincial agricultural extensions center and they did not also access to newspapers because of a small amount of copies had been published. This result is so similar to the result of a study of Mai Van Xuan and Mai Le Quyen (2011) in Quang Ngai province, Vietnam. The study of Mai Van Xuan and Mai Le Quyen (2011) indicated that almost none of the farmers accessed to agricultural extension system of Quang Ngai province to get market information.

Rice farmers' approach to the agricultural extension system was not frequent. Among 106 respondents who accessed to the agricultural extension system to get rice market information 42% approached the agricultural extension system quarterly to get rice market information, 29% accessed to the agricultural extension system monthly, 21% approached the agricultural extension system yearly to

get rice market information, 8% accessed to the agricultural extension system weekly and only 1% of them approached the agricultural extension system daily to gain rice market information. The reasons for this low frequency are the low density of agricultural extension officials, meanwhile rice farmers in the Mekong Delta, Vietnam didn't know where and when to access to agricultural extension officials.

The rice market information channels from agricultural extension system to rice farmers in the Mekong Delta, Vietnam were Internet (website), newspapers, meetings and phone calls. Internet (website) and agricultural extension newspapers were unsuitable to rice farmers. Meetings and phone calls were the preferable channels for rice farmers in the Mekong Delta, Vietnam.

- Testing H4: The government supported the MITS development via agricultural extension system in Vietnam. From table 46 and table 48 we can say that H4 was rejected because few farmers got rice market information from agricultural extension system (34% farmers), farmers' frequency to get market information from agricultural extension system was low, besides there are not policies about MITS in Vietnam, the agricultural extension system at all levels did not get enough budget, equipment to develop MITS. Therefore, to improve the participation of agricultural extension system in MITS Vietnam needs a new model of MITS with a low cost of its operation, many farmers have chances to access to agricultural extension system to get market information (many kinds of market information channels to transfer information to farmers).

The advantages of the agricultural extension system as rice market information source: The good quality of rice market information, no cost.

The disadvantages of agricultural extension system as rice market information source: Rice farmers had difficulties in accessing to the agricultural extension officials, out of date market information, the agricultural extension system lacked the budget and material facilities to provide market information to farmers. For example, the budget for agricultural extension activities of An Giang Agricultural Extensions Center per year was about 1,000,000,000 VND (about 50,000 USD), in which 200,000,000 VND (about 10,000 USD) (accounted for 20% of the total budget of agricultural extension activities) was for providing market information of agricultural products to farmers.

Village leaders:

Each village in Vietnam has a village leader who is responsible for all aspects of life such as economy, society, security, etc in his village. Village leaders are dynamic, advanced and prestigious people in

their village. Additionally, village leaders are also rice producers so they had demands of seeking and sharing rice market information with their friends, relatives and neighbors.

Table 46 indicates that 70% of the respondents got rice market information from their village leaders. The reason for this high rate is that rice farmers and their village leaders are very close to share and discuss about market information.

Table 48 shows that among 220 respondents who accessed to their village leaders to get rice market information 82% approached their village leaders weekly to get rice market information, 16% accessed to their village leaders daily to gain rice market information and 1% accessed to their village leaders quarterly to get rice market information.

The market information channels between village leaders and rice farmers in the Mekong Delta, Vietnam were phone calls and face-to-face meetings. These are the preferred channels of rice farmers.

The advantages of village leaders as rice market information source: The good quality of rice market information, no cost and it was easy for rice farmers to get into contact with them.

The disadvantages of village leaders as rice market information source: Out of date market information, sometimes inaccurate information.

Other governmental agencies:

In addition to agricultural extension system, some governmental agencies such as the Department of Agricultural and Rural Development, Farmers' Union, Women's Union also provided rice market information to rice farmers.

Table 46 shows that 6% of the respondents approached other governmental agencies to get rice market information.

Table 48 indicates that rice farmers' access to other governmental agencies to get rice market information was so infrequent. Among 19 respondents who approached other governmental agencies to get rice market information 42% accessed to other governmental agencies quarterly to get rice market information, 32% accessed to gain rice market information yearly and 5% approached other governmental agencies weekly to gain rice market information.

The market information channels between other governmental agencies and rice farmers in the Mekong Delta, Vietnam were Internet (website), face-to-face meetings, phone calls.

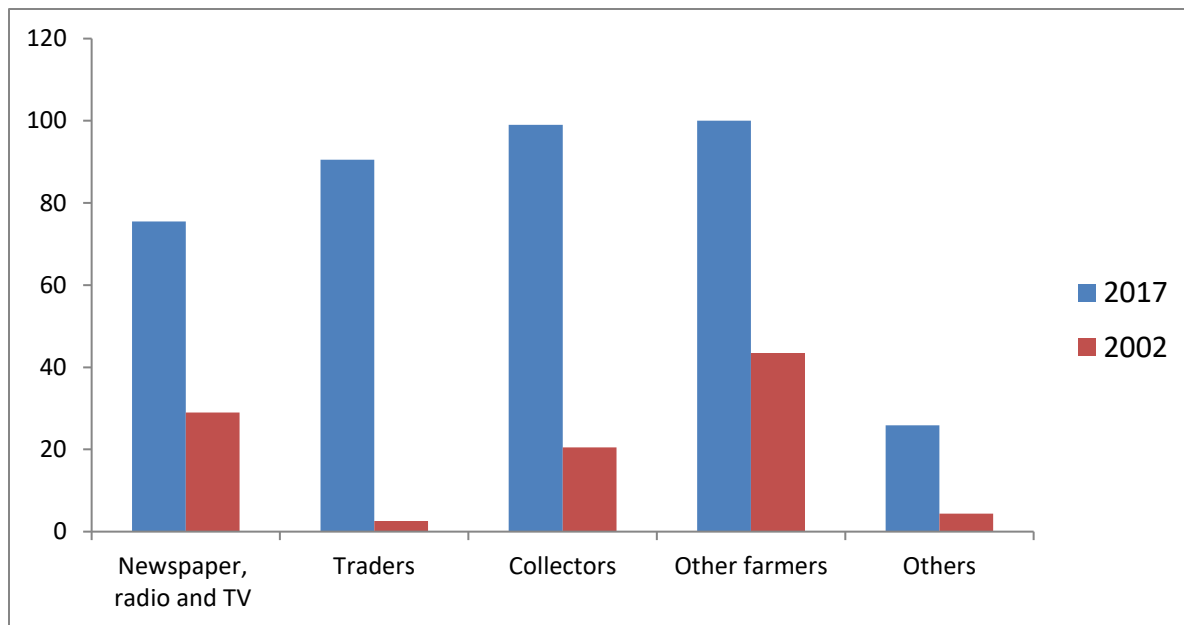
The advantages of other governmental agencies as rice market information source: The good quality of rice market information, no cost.

The disadvantages of other governmental agencies as rice market information source: Rice farmers had difficulties in accessing to other governmental agencies, out of date market information, the lack of the budget and material facilities to provide market information to farmers.

In summary, along with the development of sciences and technology rice farmers in the Mekong Delta, Vietnam had many chances to access to many sources of rice market information. The main sources of rice market information for rice farmers were other rice farmers, collectors and traders because rice farmers could easily approach these sources and without any payment. Meanwhile, other sources of rice market information such as mass media, governmental agencies, village leaders, farmer organizations were accessed by a small rate of rice farmers in the Mekong Delta, Vietnam because of its obstacles such as payment, high technology and hard accession, etc.

Comparing the findings of my research in 2017 and the findings of a research of Luu Duc Thanh Hai on 62 rice farmers in the Mekong Delta, Vietnam in 2002 to see the main sources of the rice market information of rice farmers in the Mekong Delta, Vietnam there were still other farmers and collectors but the difference between these researches is that the rate of rice farmers who accessed to rice market information sources increased significantly from 2002 to 2017 (see figure 30). For example, only 43.5% of rice farmers in the Mekong Delta, Vietnam accessed to other farmers to gain rice market information and in 2017 this rate was 100%. The rate of rice farmers accessed to rice collectors to get rice market information was 20.5% in 2002 and in 2017 this rate was 99%.

Figure 30: Rice market information sources of rice farmers in the Mekong Delta, Vietnam 2002 and 2007



Sources: Own survey, 2017 and Luu Duc Thanh Hai, 2002

c) Market information channels

The market information channel is a very important element in MITS. It influences the market information quality, the information dissemination speed, the amount of market information receivers, etc. A good channel of market information is a channel with a fast speed of information dissemination, a low cost and a big amount of users. And this part will present the kinds of market information channels that rice farmers in the Mekong Delta, Vietnam have accessed to gain the market information and the effectiveness of those channels.

The findings about market information channels of rice farmers in this study are presented in table 49, table 50, table 51 and table 52. Table 49 shows the descriptive statistics of the amount of market information channels. Table 50 shows the percentage of the respondents used these market information channels. Table 51 shows the descriptive statistics by market information channels. Table 52 presents the effectiveness of these market information channels for rice farmers in the Mekong Delta, Vietnam.

Table 49: Descriptive statistics of amount of market information channels

N	Minimum	Maximum	Mean
315	1	7	3.2

Source: Own survey, 2017

Table 50: Market information channels used by rice farmers in the Mekong Delta

Market information channels	%	Rank
Newspapers	4	7
Radio	8	6
Television	67	3
Internet, Email, web	10	5
SMS, Telephone	95	2
Meetings	100	1
Visits	4	7
Loudspeakers	37	4
Bulletin	1	9

Source: Own survey, 2017

Table 51: Descriptive statistics by market information channel

Market information channels	N	Minimum	Maximum	Mean	Std. Deviation
Newspapers	14	2	5	3.3	0.9
Radio	24	2	5	3.5	0.8
Television	210	1	5	2.6	0.8
Internet, Email, web	32	1	5	2.3	1.1
SMS, Telephone	300	1	3	1.5	0.6
Meetings	315	1	3	1.2	0.4
Visits	12	3	5	4.2	0.6
Loudspeakers	115	1	5	2.6	1.0
Bulletin	2	1	5	3.0	2.8

Source: Own survey, 2017

Table 49 shows that the rice farmers' average amount of market information channels was 3. Rice households had a maximum of 7 channels and the minimum was 1 channel. This proves that the rice farmers in the Mekong Delta, Vietnam had at least one market information channel to get market information.

Table 50 and table 52 indicate that rice farmers in the Mekong Delta, Vietnam used 9 market information channels to get market information and among them, meetings and phone were the most important channels for rice farmers. I will concretely analyse each channel as followings:

Table 52: Efficiency of market information channels (%)

Market information channels	Very effective	Effective	Medium	Less effective	No effective	Rank
Newspapers (N=14)	0	21	36	36	7	6
Radio (N=24)	0	13	38	42	8	7
Television (N=210)	9	47	40	13	1	3
Internet, Email, web (N=32)	25	41	22	6	6	4
SMS, Telephone (N=300)	51	46	3	0	0	2
Meetings (N=315)	80	19	1	0	0	1
Visits (N=12)	0	0	8	67	25	8
Loudspeakers (N=115)	13	31	38	14	4	5
Bulletin (N=2)	50	0	0	0	50	9

Source: Own survey, 2017

Face-to-face meetings:

This is the most popular channel of market information for rice farmers in the Mekong Delta, Vietnam. The 100% of the respondents who have been using face-to-face meetings to get market information were comfortable to meet to gain market information; they are living in a high population density and the meetings are 2-way exchange processes so they can analyze and use market information together at that moment and therefore the market information will be better.

Table 52 shows that the face-to-face meeting was the most effective channel of rice farmers. Among 315 respondents used face-to-face meetings to get market information 80% said that this channel was very effective and 19% believed that this channel was effective and only 1% of them reckoned that this channel is moderately effective.

Phones:

Phone is also a very good channel of market information for rice farmers in the Mekong Delta, Vietnam. The strengths of this channel are fast speed to disseminate information and no distance and time between farmers and farmers and traders. There was almost full coverage of phones, the share of household with at least one phone was 90% in 2014 in Vietnam (Heidi Kaila, 2015). The 95% of the respondents in my research used phones to access to market information.

Table 52 indicates that 153 out of 300 respondents who used phones to gain market information said that phone is a very effective channel, they occupied 51% and 139 out of 300 respondents (accounted for 46%) thought that phone was a very effective channel, only 3% of them believed that phones were a moderate channel and no one said that phone was less or not effective channel.

Television:

Television was the third important channel of market information for rice farmers in the Mekong Delta, Vietnam after face-to-face meetings and phones. There were 210 respondents of the sample (315 respondents) who watched televisions to approach market information at harvest time, accounted for 67%.

Rice farmers' watching televisions to gain market information was infrequent. The qualitative study at the first stage showed that rice farmers in the Mekong Delta, Vietnam often watched televisions to reach market information at around the rice harvest time because they needed to have market information at that time to compare the data and then make decisions on rice selling. Table 52 indicates that the television was an effective channel of market information for rice farmers in the Mekong Delta, Vietnam. 79 out of 210 respondents (occupied 47%) claimed that television was the effective channel of market information, 84 out of 210 respondents (40%) asserted that the effectiveness of television for rice farmers was moderate, 19 out of 210 respondents (occupied 9%) said that television was a very effective channel of market information for rice farmers, 27 out of 210 respondents considered television as a less effective channel of market information for rice farmers and only 1 out of 210 respondents (1%) reckoned that television was not an effective channel of market information. The qualitative study at the first stage explained why the effectiveness of television was low for rice farmers in transferring market information. The reasons are that the time of market information programs showed on television was at daytime when rice farmers were working so they could not watch these programs. The speed of market information flow on television was too fast to remember for rice farmers.

Loudspeaker:

The loudspeaker system in Vietnam significantly developed. Almost all villages in Vietnam had 2-3 loudspeakers to spread socio-economic information of the local or of the nation so almost all farmers in Vietnam have already heard socio-economic information disseminated on that loudspeaker system. The contents disseminated on loudspeakers were decided by people's committee of the communes and the rice market information was not delivered to rice farmers in every commune by the

loudspeaker system. The advantages of loudspeakers are that almost all farmers can hear information disseminated on loudspeakers even when they are working on the fields and the cost to disseminate information via loudspeakers is very low because the loudspeaker system was available.

Table 50 indicates that 37% of the respondents listened to loudspeakers to get rice market information. This infers that not everyone followed rice market information through loudspeakers and additionally many rice farmers in the Mekong Delta, Vietnam indicated that there were no programs about rice market information on the loudspeaker system (the finding of the qualitative study) to hear.

The effectiveness of loudspeakers in disseminating rice market information to rice farmers in the Mekong Delta, Vietnam was ranged from effective to moderate level. Among 115 respondents heard market information from loudspeakers, 44 respondents (38%) claimed that the loudspeaker system was the rice market information channel with the medium effectiveness for rice farmers because there was not much market information on loudspeakers and they were also hard to hear and remember any market information on loudspeakers, 36 respondents (accounted for 31%) asserted that loudspeakers were an effective channel, 15 respondents (seized 13%) thought that loudspeakers were very effective channels, 16 respondents (14%) considered loudspeakers as a less effective channel and 4 respondents (occupied 4%) believed that loudspeakers were not effective channels.

Internet:

Internet was a rice market information channel used by rice farmers in the Mekong Delta, Vietnam but the rate of rice farmers used internet to get market information was quite low. A study of Le Thi Hue (2011) in Can Tho also pointed out that Internet was not a popular channel of communication in the rural areas. Table 16 shows that 10% of the respondents used Internet to access to rice market information.

Rice farmers in the Mekong Delta, Vietnam who used Internet to get market information claimed that Internet was an effective channel of market information for rice farmers. Among 32 rice farmers who used internet to get market information, 13 respondents, accounted for 41%, reckoned that Internet was an effective channel, 8 respondents (seized 25%) said that Internet was a very effective channel, 7 respondents (22%) delivered that Internet was a medium channel, 2 and 2 respondents (occupied 6% and 6%) claimed that Internet was less of not at all effective channel, respectively. The main disadvantages of Internet for rice farmers in the Mekong Delta, Vietnam are the high cost to buy computers, internet installation, paying internet monthly fee and rice farmers with a high technical

level. The qualitative study showed that internet is not a suitable channel of rice market information to develop in the Mekong Delta, Vietnam.

Radio:

Fewer and fewer rice farmers used radio to get rice market information. This result is similar to the findings of study of Le Thi Hue (2011) in Can Tho because farmers said that the effectiveness of radio to transfer information was very low for me. Table 50 indicates that only 24 out of 315 respondents (accounted for 8%) used radio to access to rice market information and they were often old people. The reasons for the few radio listeners to get rice market information are that fewer and fewer rice farmers owned and wanted to hear radio and did not have many radio programs on rice market information.

Rice farmers in the Mekong Delta, Vietnam evaluated that the effectiveness of radio to transferring market information to farmers was so low. Among 24 respondents listening to radio to get market information, 10 (42%) believed that radio was a less effective channel of market information, 9 respondents (occupied 38%) reckoned that radio was a medium channel, 3 respondents (accounted for 13%) claimed that radio was an effective channel and 2 respondents (seized 8%) asserted that radio was not an effective channel. This means that this channel of market information (radio) is not suitable to develop in the Mekong Delta, Vietnam in the coming time.

Newspaper:

Newspaper was a rice market information channel used by very few rice farmers in the Mekong Delta, Vietnam. 14 rice farmers among 315 respondents in the Mekong Delta, Vietnam read newspapers to get rice market information, seized 4%. The findings of the qualitative study showed that there were many newspapers where there was rice market information for farmers in the Mekong Delta, Vietnam such as Rural Today, Agricultural Extension Newspaper, Vietnam's Agricultural Newspaper, etc. Agricultural Extensions Newspaper is free for farmers but very few rice farmers in the Mekong Delta could read it because the number of published copies was small. Other newspapers are not free so rice farmers didn't want to pay to buy them. Those are the reasons why few rice farmers in the Mekong Delta, Vietnam read newspapers to get market information.

The effectiveness of newspapers in transferring market information to farmers was so low. Among 14 respondents who read newspapers to get rice market information 5 respondents, occupied 36%, claimed that newspaper was a channel of rice market information with a medium effectiveness, 5 other respondents believed that newspaper was a less important channel of market information, seized 36%,

3 respondents considered newspaper as an effective channel of market information, accounted for 21% and only 1 respondent, seized 7%, asserted that newspaper wasn't an effective channel at all in providing rice market information to rice farmers. The reasons for the low effectiveness of newspapers in providing market information to rice farmers in the Mekong Delta, Vietnam are that: the amount of copies of newspapers was limited, few rice farmers could access to them, mainly officials in commune and village kept and read newspapers, and buying newspaper was costly for rice farmers in the Mekong Delta, Vietnam. The quality of rice market information was low, rice market information of newspapers was out of date, inaccurate because the information was gathered and analysed on very large areas such as the data of a whole province or even the whole nation.

Visiting:

Visiting was used by very few rice farmers in the Mekong Delta, Vietnam. Table 50 shows that among 315 respondents in the sample, 12 respondents (accounted for 4%) joined in visiting organized by governmental agencies at commune and at district level to big traders, millers (milling companies) and food companies to understand rice markets and rice market information.

The effectiveness of visiting to access to rice market information for rice farmers in the Mekong Delta, Vietnam was low. Table 52 indicates that among 12 respondents who joined in the visitings, 8 respondents (seized 67%) claimed that the visiting was a less effective channel of market information, 3 respondents (25%) asserted that visiting was not an effective channel of rice market information at all and only 1 respondent reckoned that visiting was a rice market information channel with a moderate effectiveness. No-one said that visiting was a very effective or effective channel. This proves that visiting wasn't an effective channel of rice market information and that is why few rice farmers in the Mekong Delta, Vietnam joined in visitings to get market information, besides the visiting was very costly, rice farmers must spend their time and efforts on those programs. It is very hard to develop this market information channel for rice farmers in the Mekong Delta, Vietnam.

Bulletin:

Bulletin was used by very few rice farmers in the Mekong Delta, Vietnam. Only 2 out of 315 interviewees in the research accessed to bulletin to gain rice market information, they accounted for 1% because this channel was costly and the amount of bulletin was limited. It is said that bulletin was not suitable to be developed in the Mekong Delta, Vietnam.

In summary, rice farmers in the Mekong Delta, Vietnam mainly accessed to phone and face-to-face meetings to get rice market information because it had a low cost, it was easy to access and to use

these channels. Television and loudspeakers were used by a big amount of rice farmers in the Mekong Delta, Vietnam to get market information but loudspeakers are a potential channel to develop because the loudspeaker system were available in each village with 2-3 loudspeakers and almost all farmers can hear information on loudspeakers at everywhere and every time. Other channels of rice market information such as internet, radio, newspaper, visiting, bulletin were also used by rice farmers in the Mekong Delta, Vietnam to reach market information but with a small amount because these channels had many obstacles and it is very hard to improve these channels in the Mekong Delta.

d) Rice market information utilization

Market information utilization is an important part in MITS. It considerably influences the effectiveness of a MITS. Rice farmers in the Mekong Delta, Vietnam were active to use market information more and more because their knowledge and capacity increased significantly.

Findings of the qualitative study showed that rice farmers in the Mekong Delta, Vietnam have been using market information in their production and trading. They used market information in building the next season plan, defining the selling prices, when to sell and who to sell to. They used information about prices of different rice varieties to grow a rice variety at a higher price for next crop. They used macro-information such as the situation of rice export of Vietnam and rice export prices to decide on the investment or not in their rice production.

Table 53: Rice market information usage of rice farmers in the Mekong Delta, Vietnam

Rice market information usage of rice farmers	Yes	No	Rank
Negotiating with traders	98	2	1
Deciding where to sell the products	72	28	3
Deciding when to sell	42	58	6
Deciding what to plant in the next season	45	55	5
Deciding whom to sell	66	34	4
Deciding the selling price	40	60	7
Sharing with other farmers	97	3	2

Source: Own survey, 2017

The findings of the quantitative study are presented in table 53. The data of table 53 reports that rice farmers in the Mekong Delta, Vietnam used rice market information for 7 purposes as follows: Negotiating with traders, deciding where to sell the products, deciding when to sell, deciding what to plant in the next season, deciding who to sell to, deciding the selling price and sharing with other

farmers as well as negotiating with traders, sharing with other farmers and deciding where to sell were the main purposes of market information usage of rice farmers in the Mekong Delta, Vietnam.

➤ Negotiating with traders: Table 53 indicates that the majority of rice farmers in the Mekong Delta, Vietnam used rice market information to negotiate with traders to gain the advantage in the bargain, and to avoid the price pressure to get a higher price. There is 98% of the respondents who used rice market information in negotiating with traders when selling rice. The rest of the sample (2%) didn't use rice market information to negotiate with traders because they didn't sell rice, they produced rice for their own food and livestock or they produced rice seed to sell to rice farmers, or they sold rice to food companies according to the contract signed between farmers and companies or sold to farmer organizations at a fixed price..

➤ Deciding on where to sell the products: Table 53 shows that the majority of rice farmers in the Mekong Delta, Vietnam used rice market information to decide where to sell, to sell outside or inside of their village, commune to increase the selling prices, profits from rice production. There is 72% of the respondents who used rice market information to decide where they sell their rice. Table 53 also reports that 28% of the research sample didn't use rice market information to decide where to sell. According to the qualitative study, some rice farmers in the Mekong Delta, Vietnam often sold their rice to their acquainted traders or to food companies by the contracts and some others didn't sell rice. Their rice was mainly used to feed livestock and their families.

➤ Deciding on when to sell: Rice is an agricultural product that can be preserved for a long time so rice farmers are completely initiative to decide when to sell to increase the selling prices as well as to raise rice profits. Table 53 indicates that a rate of 42% of the respondents used rice market information to decide when to sell. This also proves that the majority of rice farmers in the Mekong Delta, Vietnam (58%) didn't use rice market information to decide when to sell because they often sold rice early, after harvest to pay for input materials such as rice seed, pesticide, fertilizer or many rice farmers said that rice traders had a main role in purchasing and they also decided when they went to buy rice.

➤ Deciding on what to plant in the next season (the production plan): Rice market information affected the rice production of farmers in the Mekong Delta, Vietnam. With rice market information rice farmers realized which kinds of rice quantity the market needs and the price of each kind of rice and from that rice farmers adjusted their next season to meet these demands of rice markets to get a higher price. Table 53 shows that 45% of the respondents used rice market information to build the

rice production plan of the next season, define which rice varieties to grow to get a high profit. The majority of rice farmers in the Mekong Delta, Vietnam (55%) didn't use rice market information to build their rice production plan of the next season because the qualitative study showed that many rice farmers in the Mekong Delta, Vietnam wanted to produce according to their farming habits, they were afraid to apply new rice varieties that can affect their rice productivity and quality

➤ Deciding on whom to sell: Rice farmers in the Mekong Delta, Vietnam often wanted to sell their rice to traders who gave the highest price under quick payment terms and easy purchase conditions. Therefore, before selling rice, rice farmers in the Mekong Delta, Vietnam often checked rice market information from 2-4 traders to compare. Table 53 indicates that majority of rice farmers in the Mekong Delta, Vietnam used rice market information to decide whom to sell to. 66% of the respondents used rice market information to decide who to sell to and 34% of the respondents did not use rice market information for choosing who to sell to.

➤ Deciding on the selling price: Theoretically, sellers will more significantly decide on the selling prices than buyers but the findings of the qualitative study demonstrated that in the rice value chain in the Mekong Delta, Vietnam the rice selling prices between rice farmers and traders were mainly decided by traders, but with good market information rice farmers could still increase the selling prices by 50-100 VND/kg compared to the prices rice traders gave to rice farmers. Table 53 indicates that 40% of the respondents used rice market information to decide on the selling prices. In addition, the rest of research sample (60%) didn't use rice market information to decide on the selling prices because they believed that the selling prices were decided by traders, not by them or they sold rice to food companies with the fixed prices in the contract.

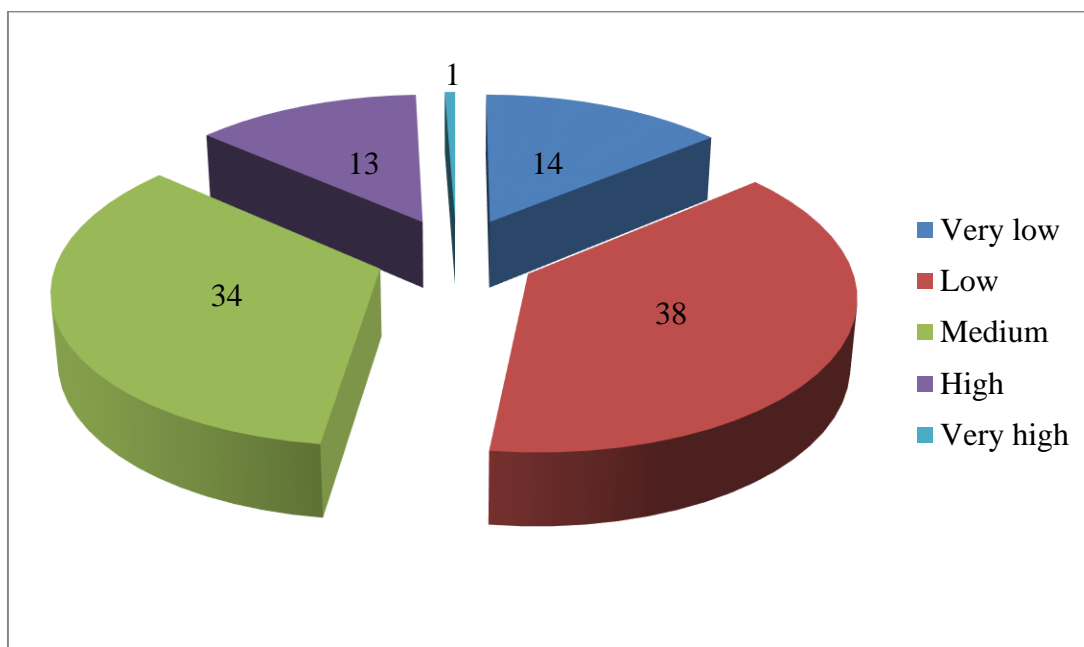
➤ Sharing with other farmers: Rice farmers in the Mekong Delta, Vietnam shared rice market information they had with their friends, relatives and neighbors to help each other to sell rice at a higher price and increase rice profits. Table 53 points out that the majority of rice farmers in the Mekong Delta, Vietnam shared rice market information with other farmers. The 97% of the respondents shared rice market information with other farmers. Only a minority of the respondents (3%) did not share rice market information with other farmers because they were disadvantageous farmers, their ability to collect and analyze rice market information was weak so they were often the final receivers of market information.

In summary, the rice market information utilization was for many purposes in rice farmers' production and trading in the Mekong Delta, Vietnam. Some rice farmers very effectively used rice market

information in their rice production and trading to increase the profit and income. In contrast, also many rice farmers had many obstacles in rice market information utilization because of their low ability, knowledge, and awareness.

e) Rice farmers' satisfaction level of MITS in the rice value chain

Figure 31: Rice farmers' satisfaction level on market information system



Source: Own survey, 2017

Farmers' satisfaction level of market information system is an important norm that reflects the gap between the farmers' needs of market information and the meeting of the market information system to those needs. The high satisfaction infers that the market information system has been running well and the opposite. The data from the figure 31 shows that rice farmers' satisfaction of market information system was not high so Hypothesis number 1 (H1) is accepted. The 38% of the respondents had a low satisfaction on MITS. 34% of the respondents indicated that they had a medium satisfaction on MITS. The rate of the respondents with a very low satisfaction of MITS in the sample was 14%. Meanwhile, 13% of the respondents had a high satisfaction level of MITS. And only 1% of the respondents were at a very high satisfaction level. There are many reasons for low farmers' satisfaction on MITS such as lack of market information sources and channels, low quality of market information, etc. and these reasons will be analyzed in the next parts of this research.

f) Testing the hypothesis number three (H3)

Before analyzing the influence of the socio-economic characteristics of the respondents on their satisfaction level on MITS I need to test whether the existence of the relationship between the

demographic characteristics of rice farmers (age, gender, educational level, FO member, rice income, size of farmer household), amount of rice market information sources and amount of rice market information channels and their satisfaction level on MITS or not by Chi-Square Test (Crosstabs) to eliminate socio-economic-characteristics that have not relationship with the satisfaction level on MITS out of Binary Logistic Model and only keep socio-economic-characteristics that have a relationship with the satisfaction level on MITS. Therefore, testing H3 means that testing 8 sub-hypotheses: H3/a, H3/b, H3/c, H3/d, H3/e, H3/f, H3/g, H3/h as followings.

Hypothesis H3/a:

H0: There is no relationship at significant level of 5% between age of rice farmers and their satisfaction level on MITS.

H1: There is a relationship at significant level of 5% between age of rice farmers and their satisfaction level on MITS.

The results of testing H3/a are presented in 2 tables: Table 54 and table 55.

Table 54: Cross table between Age and Satisfaction level of respondents on MITS

Age groups		Satisfaction level on MITS					Total
		Very low	Low	Medium	High	Very high	
20-30	Count	1	8	14	3	0	26
	% within Age group	3.8%	30.8%	53.8%	11.5%	.0%	100.0%
31-40	Count	8	26	36	7	0	77
	% within Age group	10.4%	33.8%	46.8%	9.1%	.0%	100.0%
41-50	Count	16	39	28	13	0	96
	% within Age group	16.7%	40.6%	29.2%	13.5%	.0%	100.0%
51-60	Count	14	39	22	16	2	93
	% within Age group	15.1%	41.9%	23.7%	17.2%	2.2%	100.0%
Over 60	Count	5	8	8	2	0	23
	% within Age group	21.7%	34.8%	34.8%	8.7%	.0%	100.0%

Source: Own calculation

Table 55 shows that the hypothesis H0 was rejected and the hypothesis H1 was accepted (P=0.028<0.05). We state that there is a strong relationship between age of the respondents and their

satisfaction level on MITS at significant level 5% ($p=0.28$, $\text{Eta} = 0.412$). It means that variable Age will be used in Binary Logistic Model to identify its influence on the satisfaction level of rice farmers on MITS.

Table 55: Chi-Square Tests between Age and Satisfaction level of respondents on MITS

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	218.025 ^a	180	.028
Likelihood Ratio	198.349	180	.166
Linear-by-Linear Association	1.849	1	.174
N of Valid Cases	315		
Cramer' V = 0.416 Eta = 0.412			

a. 222 cells (96.5%) have expected count less than 5. The minimum expected count is .01.

Source: Own calculation

Hypothesis H3/b:

H0: There is no relationship at significant level of 5% between gender of rice farmers and their satisfaction level on MITS.

H1: There is a relationship at significant level of 5% between gender of rice farmers and their satisfaction level on MITS.

The results of the H3/b test are showed in 2 tables: Table 56 and table 57.

Table 56: Cross table between Gender and Satisfaction level of respondents on MITS

Gender		Satisfaction level on MITS					Total
		Very low	Low	Medium	High	Very high	
Male	Count	34	84	79	34	2	233
	% within Gender	14.6%	36.1%	33.9%	14.6%	.9%	100.0%
Female	Count	10	36	29	7	0	82
	% within Gender	12.2%	43.9%	35.4%	8.5%	.0%	100.0%

Source: Own calculation

Table 57: Chi-Square Tests between Gender and Satisfaction level of respondents on MITS

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	3.681 ^a	4	.451
Likelihood Ratio	4.321	4	.364
Linear-by-Linear Association	.857	1	.355
N of Valid Cases	315		

a. 2 cells (20.0%) have expected count less than 5. The minimum expected count is .52.

Source: Own calculation

Table 57 indicates that the hypothesis H0 was accepted and the hypothesis H1 was rejected because $p=0.451 > 0.05$ and therefore there is not relationship at significant level 5% between Gender of the respondents and their satisfaction level on MITS. It means that I will not put the variable Gender into Binary Logistic Model to determine its influence on the satisfaction level of the respondents on MITS.

Hypothesis H3/c:

H0: There is no relationship at significant level of 5% between educational level of rice farmers and their satisfaction level on MITS.

H1: There is a relationship at significant level of 5% between educational level of rice farmers and their satisfaction level on MITS.

Table 58 and table 59 present the results of testing H3/c.

Table 59 tells that the hypothesis H0 was rejected and the hypothesis H1 was accepted ($p=0.000 < 0.05$) and it means that there is a weak relationship between the educational level of the respondents and their satisfaction level on MITS at significant level 5% ($p=0.000$, $\text{Eta} = 0.174$). And therefore, I will put the variable Educational level of the respondents into Binary Logistic Model to identify its impact on the satisfaction level of the respondents on MITS.

Table 58: Cross table between educational level and Satisfaction level of respondents on MITS

Education level		Satisfaction level on MITS					Total
		Very low	Low	Medium	High	Very high	
Primary school	Count	6	22	11	5	1	45
	% within Education level	13.3%	48.9%	24.4%	11.1%	2.2%	100.0%
Secondary school	Count	16	51	48	19	0	134
	% within Education level	11.9%	38.1%	35.8%	14.2%	.0%	100.0%
High school	Count	22	47	49	17	1	136
	% within Education level	16.2%	34.6%	36.0%	12.5%	.7%	100.0%

Source: Own calculation

Table 59: Chi-Square Tests between educational level and Satisfaction level of respondents on MITS

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	101.188 ^a	44	.000
Likelihood Ratio	34.492	44	.847
Linear-by-Linear Association	.041	1	.839
N of Valid Cases	315		
Cramer' V = 0.283 Eta = 0.174			

a. 40 cells (66.7%) have expected count less than 5. The minimum expected count is .01.

Source: Own calculation

Hypothesis H3/d:

H0: There is no relationship at significant level of 5% between household size of rice farmers and their satisfaction level on MITS.

H1: There is a relationship at significant level of 5% between household size of rice farmers and their satisfaction level on MITS.

Table 60 and table 61 indicate the results of testing the relationship between the household size of the respondents and their satisfaction level on MITS.

Table 60: Cross table between household size and Satisfaction level of respondents on MITS

Household size		Satisfaction level on MITS					Total
		Very low	Low	Medium	High	Very high	
2 people	Count	1	6	2	2	0	11
	% within Household size	9.1%	54.5%	18.2%	18.2%	.0%	100.0%
3 people	Count	7	16	17	4	1	45
	% within Household size	15.6%	35.6%	37.8%	8.9%	2.2%	100.0%
4 people	Count	10	37	44	13	0	104
	% within Household size	9.6%	35.6%	42.3%	12.5%	.0%	100.0%
5 people	Count	12	32	24	9	0	77
	% within Household size	15.6%	41.6%	31.2%	11.7%	.0%	100.0%
6 people	Count	7	17	15	11	1	51
	% within Household size	13.7%	33.3%	29.4%	21.6%	2.0%	100.0%
Over 6 people	Count	7	12	6	2	0	27
	% within Household size	25.9%	44.4%	22.2%	7.4%	.0%	100.0%

Source: Own calculation

Table 61: Chi-Square Tests between household size and Satisfaction level of respondents on MITS

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	20.160 ^a	20	.448
Likelihood Ratio	19.786	20	.471
Linear-by-Linear Association	.891	1	.345
N of Valid Cases	315		

a. 12 cells (40.0%) have expected count less than 5. The minimum expected count is .07.

Source: Own calculation

Table 61 shows that there is not relationship at significant level 5% between the household size of the respondents and their satisfaction level on MITS ($p=0.448>0.05$) and so the hypothesis H0 was accepted and the hypothesis H1 was rejected. It means that the variable Household size will be rejected from Binary Logistic Model to identify its influence on the satisfaction level of the respondents on MITS.

Hypothesis H3/e:

H0: There is no relationship at significant level of 5% between rice income of rice farmers and their satisfaction level on MITS.

H1: There is a relationship at significant level of 5% between rice income of rice farmers and their satisfaction level on MITS.

The results of testing H3/e are stated in 2 tables: table 62 and table 63.

Table 62: Cross table between rice income and Satisfaction level of respondents on MITS

Rice income		Satisfaction level on MITS					Total
		Very low	Low	Medium	High	Very high	
1-30 million VND	Count	8	17	8	5	0	38
	% within Rice income	21.1%	44.7%	21.1%	13.2%	.0%	100.0%
31-60 million VND	Count	27	54	38	8	0	127
	% within Rice income	21.3%	42.5%	29.9%	6.3%	.0%	100.0%
61-90 million VND	Count	6	36	36	8	0	86
	% within Rice income	7.0%	41.9%	41.9%	9.3%	.0%	100.0%
91-120 million VND	Count	2	8	17	11	1	39
	% within Rice income	5.1%	20.5%	43.6%	28.2%	2.6%	100.0%
121-150 million VND	Count	1	2	4	6	1	14
	% within Rice income	7.1%	14.3%	28.6%	42.9%	7.1%	100.0%
Over 150 million VND	Count	0	3	5	3	0	11
	% within Rice income	.0%	27.3%	45.5%	27.3%	.0%	100.0%

Source: Own calculation

Table 63 indicates that there is a strong relationship at significant level 5% between rice income of the respondents and their satisfaction level on MITS ($p=0.000$, $\text{Eta} = 0.448$). The hypothesis H_0 was rejected and the hypothesis H_1 was accepted. So I will put the variable Rice income of the respondents into Binary Logistic Model to identify its influence on the satisfaction level of the respondents on MITS.

Table 63: Chi-Square Tests between rice income and Satisfaction level of respondents on MITS

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	275.753 ^a	172	.000
Likelihood Ratio	183.982	172	.252
Linear-by-Linear Association	34.522	1	.000
N of Valid Cases	315		
Cramer' V = 0.468 Eta = 0.448			

a. 202 cells (91.8%) have expected count less than 5. The minimum expected count is .01.

Source: Own calculation

Hypothesis H3/f:

H0: There is no relationship at significant level of 5% between participation of rice farmers in FO and their satisfaction level on MITS.

H1: There is a relationship at significant level of 5% between participation of rice farmers in FO and their satisfaction level on MITS.

The results of testing H3/f are stated in 2 tables: Table 64 and table 65.

Table 64: Cross table between FO member and Satisfaction level of respondents on MITS

FO member		Satisfaction level on MITS					Total
		Very low	Low	Medium	High	Very high	
Yes	Count	6	2	14	21	1	44
	% within FO member	13.6%	4.5%	31.8%	47.7%	2.3%	100.0%
No	Count	38	118	94	20	1	271
	% within FO member	14.0%	43.5%	34.7%	7.4%	.4%	100.0%

Source: Own calculation

Table 65: Chi-Square Tests between FO member and Satisfaction level of respondents on MITS

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	64.711 ^a	4	.000
Likelihood Ratio	56.475	4	.000
Linear-by-Linear Association	32.117	1	.000
N of Valid Cases	315		
Cramer' V = 0.453 Eta = 0.320			

a. 2 cells (20.0%) have expected count less than 5. The minimum expected count is .28.

Source: Own calculation

Table 65 shows that the hypothesis H0 was rejected and the hypothesis H1 was accepted and so there is a moderately relationship between the household size of the respondents and their satisfaction level on MITS at significant level 5% ($p=0.000$, $\text{Eta} = 0.320$). It means that I will use variable household size of the respondents in Binary Logistic Model to identify its influence on the satisfaction level of the respondents on MITS.

Hypothesis H3/g:

H0: There is no relationship at significant level of 5% between amount of rice market information sources rice farmers have accessed and their satisfaction level on MITS.

H1: There is a relationship at significant level of 5% between amount of rice market information sources rice farmers have accessed and their satisfaction level on MITS.

Testing H3/g is presented in 2 tables: Table 66 and table 67.

Table 66: Cross table between source amount and Satisfaction level of respondents on MITS

Source amount		Satisfaction level on MITS					Total
		Very low	Low	Medium	High	Very high	
2	Count	0	1	1	0	0	2
	% within Source amount	.0%	50.0%	50.0%	.0%	.0%	100.0%
3	Count	1	13	15	5	0	34
	% within Source amount	2.9%	38.2%	44.1%	14.7%	.0%	100.0%
4	Count	6	41	41	5	0	93
	% within Source amount	6.5%	44.1%	44.1%	5.4%	.0%	100.0%
5	Count	11	37	31	5	0	84
	% within Source amount	13.1%	44.0%	36.9%	6.0%	.0%	100.0%
6	Count	12	16	16	14	1	59
	% within Source amount	20.3%	27.1%	27.1%	23.7%	1.7%	100.0%
7	Count	14	11	3	10	0	38
	% within Source amount	36.8%	28.9%	7.9%	26.3%	.0%	100.0%
8	Count	0	1	1	2	1	5
	% within Source amount	.0%	20.0%	20.0%	40.0%	20.0%	100.0%

Source: Own calculation

Table 67: Chi-Square Tests between source amount and Satisfaction level of respondents on MITS

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	94.391 ^a	24	.000
Likelihood Ratio	72.431	24	.000
Linear-by-Linear Association	.280	1	.597
N of Valid Cases	315		
Cramer' V = 0.274			
Eta = 0.217			

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	94.391 ^a	24	.000
Likelihood Ratio	72.431	24	.000
Linear-by-Linear Association	.280	1	.597

a. 18 cells (51.4%) have expected count less than 5. The minimum expected count is .01.

Source: Own calculation

Hypothesis H3/f:

H₀: There is no relationship at significant level of 5% between amount of rice market information channels rice farmers have used and their satisfaction level on MITS.

H₁: There is a relationship at significant level of 5% between amount of rice market information channels rice farmers have used and their satisfaction level on MITS.

Table 68 and table 69 present the results of testing H3/f.

Table 68: Cross table between channel amount and Satisfaction level of respondents on MITS

Channel amount		Satisfaction level on MITS					Total
		Very low	Low	Medium	High	Very high	
1	Count	0	0	1	0	0	1
	% within Channel amount	.0%	.0%	100.0%	.0%	.0%	100.0%
2	Count	0	34	34	8	0	76
	% within Channel amount	.0%	44.7%	44.7%	10.5%	.0%	100.0%
3	Count	8	52	57	16	1	134
	% within Channel amount	6.0%	38.8%	42.5%	11.9%	.7%	100.0%
4	Count	24	29	14	13	0	80
	% within Channel amount	30.0%	36.2%	17.5%	16.2%	.0%	100.0%
5	Count	12	5	1	4	1	23
	% within Channel amount	52.2%	21.7%	4.3%	17.4%	4.3%	100.0%
7	Count	0	0	1	0	0	1
	% within Channel amount	.0%	.0%	100.0%	.0%	.0%	100.0%

Source: Own calculation, (n=315)

Table 69: Chi-Square Tests between channel amount and Satisfaction level of respondents on MITS

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	87.067 ^a	20	.000
Likelihood Ratio	89.180	20	.000
Linear-by-Linear Association	15.136	1	.000
N of Valid Cases	315		
Cramer' V = 0.263 Eta = 0.258			

a. 16 cells (53.3%) have expected count less than 5. The minimum expected count is .01.

Source: Own calculation

Table 69 indicates that the hypothesis H0 is rejected and the hypothesis H1 is accepted (p=0.000) and there is a moderately relationship between the amount of rice market information channels and the satisfaction level of the respondents on MITS (Eta = 0.258) at a significant level 5%. It means that variable the amount of market information channels will be used in Binary Logistic Model to identify its influence on the satisfaction level of the respondents on MITS.

In sum, among 8 variables: Age, educational level, FO membership, rice income, the mount of market information channels, amount of market information sources, gender, and household size in my research, there are 6 variables: Age, educational level, FO member, rice income, the amount of market information channels, the amount of market information sources that have a relationship with the satisfaction level of the respondents of MITS at statistical significance of 5% used in Binary Logistic Model to identify its influence on the satisfaction level of the respondents of MITS and 2 variables: gender, and household size that don't have a relationship with satisfaction level of the respondents of MITS at statistical significance will be eliminated from Binary Logistic Model.

g) The influence of the socio-economic characteristics on rice farmers' satisfaction of MITS

Rice farmers' satisfaction level of MITS in the rice value chain in the Mekong Delta, Vietnam depends on many factors such as policy environment, their socio-economic characteristics and the rice market information sources as well as channels. In this research I ignored the policy environment because in fact, the Vietnamese government did not have any policies to promote the provisions of rice market

information to rice farmers. I used the socio-economic characteristics of rice farmers (age, educational level, FO membership, and rice income), the amount of rice market information sources and the amount of rice market information channels rice farmers accessed to and used to gain rice market information for Binary Logistic model to determine which factors influenced significantly the rice farmers' satisfaction of MITS.

The socio-economic characteristics of rice farmers considerably affected rice farmers' collection, analysis, and usage of rice market information, therefore it influence their satisfaction of MITS. Theoretically, age variable can positively or negatively influence rice farmers' satisfaction of MITS. Variables of educational level, FO membership, rice income can positively affect the rice farmers' satisfaction of MITS.

The amount of rice market information sources affected rice farmers' satisfaction of MITS in the rice value chain in the Mekong Delta, Vietnam. The amount of rice market information sources influences the quality of rice market information, the convenience of rice market information access, the cost of rice market information access, and amount of rice market information receivers. Theoretically, the amount of rice market information sources positively influences the rice farmers' satisfaction of MITS.

The amount of rice market information channels influenced rice farmers' satisfaction of MITS in the rice value chain in the Mekong Delta, Vietnam. The amount of rice market information channels influences the quality of rice market information, the convenience of rice market information access, the cost of rice market information access, and the amount of rice market information receivers. Theoretically, the amount of rice market information channels positively influences the rice farmers' satisfaction of MITS.

As presented in the methodology, I used Binary Logistic model to evaluate the influence of factors (the socio-economic characteristics of rice farmers, the amount of rice market information sources and the amount of rice market information channels) of rice farmers' satisfaction of MITS in the rice value chain in the Mekong Delta, Vietnam. The outputs of Binary Logistic model were presented in table 70.

Table 70 shows that the significant level of the model (Sig.) is high (0.000), the percentage correctness of the model is 86%. Therefore the model is acceptable and is used to identify factors influencing the rice farmers' satisfaction of MITS.

The data in table 70 shows that at 5% level of significance, educational level, rice income and the amount of market information channels significantly impacted rice farmers' satisfaction of MITS and

the rest of the factors (age, FO member, the amount of market information sources) didn't have significant influences on rice farmers' satisfaction of MITS.

Table 70: Socio-economic characteristics influence rice farmers' satisfaction on MITS

Variables	B	S.E.	Wald	df	Sig.
Age	.031	.021	2.095	1	.148
Educational level	.166	.081	4.226	1	.040*
Rice income	.019	.008	6.366	1	.012*
Channel amount	1.405	.309	20.623	1	.000*
Source amount	-.036	.208	.030	1	.862
FO member	.135	.614	.049	1	.825
Constant	-8.606	2.414	12.710	1	.000

N = 315
 Sig = 0.000
 -2 Log likelihood = 187.100
 Nagelkerke R Square = 0.349
 Percentage correct = 86%

* *The statistic is significant at 5% level*

Source: Own survey, 2017

- The educational level of respondents had a significant and positive influence on rice farmers' satisfaction of MITS (B = 0.166; Sig. = 0.022) at a significant level of 5%. This suggests that the higher the educational level of the respondents is the more considerable their satisfaction of MITS is. It can be inferred from this that rice farmers with a high educational level had a significant ability to seek and use market information in an effective way.

- Rice income had a significant influence on rice farmers' satisfaction of MITS (B = 0.019; Sig. = 0.012) at a significant level of 5%. This asserts that respondents with a higher rice income had a higher satisfaction of MITS than rice producers with a lower rice income. In fact, rice producers with a large area of rice production, a big output of rice and a high income from rice had often high demands of market information and they were also active to seek market information to get better information.

- The amount of market information channels also significantly and positively influenced the rice producers' satisfaction of MITS (B = 1.405; Sig. = 0.000) at a significant level of 5%. It has been inferred that rice farmers with more and more channels of market information had more and more

satisfaction of MITS. Rice farmers with many market information channels were convenient to gain market information and had many chances to access to good market information.

Variables such as age, FO membership, the amount of market information sources didn't have significant influences on rice farmers' satisfaction of MITS.

- The age of rice farmers in the Mekong Delta, Vietnam did not significantly affect their satisfaction level of MITS. As presented above, the average age of the research sample was 47 years. This age of rice farmers is mature enough to collect and use rice market information in the most effective manner.

- The FO membership of rice farmers also insignificantly influenced their satisfaction level of MITS, it means that rice farmers inside and outside of FO in the Mekong Delta, Vietnam had the fair chance to access to and use rice market information.

- The amount of rice market information sources did not affect rice farmers' satisfaction level on MITS at a significant level of 5%. This proves that the amount of rice market information sources was quite numerous and all rice farmers in the Mekong Delta, Vietnam could access to those sources if they had their economic conditions, skills and enough knowledge.

h) Impacts of MITS on rice farmers

The researching of the impacts of MITS on rice farmers in the Mekong Delta, Vietnam was implemented in both qualitative and quantitative studies. The findings of these studies showed that MITS had remarkable impacts on rice farmers in the Mekong Delta, Vietnam.

Table 71: Impacts of MITS on rice farmers in the Mekong Delta, Vietnam

Impacts of MITS on rice farmers	Yes	No	Rank
Increasing the rice income	91	9	2
Increasing the selling price	89	11	3
Improving the ability of market participation	85	15	4
Enlarging markets	58	42	7
Reducing the market risks	68	32	6
Reducing the production risks	42	58	8
Reducing the waste	24	76	9
Improving the production plan	73	27	5
Increasing the negotiation	93	7	1

Source: Own survey, 2017

Table 71 indicates that MITS had 9 impacts on rice farmers in the Mekong Delta, Vietnam: Increasing the income, increasing the selling price, improving the ability of market participation, enlarging markets, reducing the market risks, reducing the production risks, reducing the waste, improving the production plan, and increasing the negotiation, increasing the number of negotiations with traders, increasing rice income, increasing the selling price and improving the ability of market participation are the main impacts of MITS on rice farmers in the Mekong Delta, Vietnam.

➤ Increasing the selling price: One impact of market information is to increase the selling price of rice farmers in the Mekong Delta, Vietnam. The market information helps farmers find buyers at high prices, bargain traders with good prices and help them grow rice varieties that the market need to sell at higher prices. It means that they need to use market information harmoniously with their production and trading to maximize the profits. Table 71 points out that the majority of rice farmers in the Mekong Delta, Vietnam said that MITS increased the selling price of their rice. The 89% of the respondents reckoned that MITS positively influenced the selling prices of rice. The rest of the research sample (11%) claimed that MITS did not affect the selling prices of their rice because the selling prices of rice were mainly decided by traders.

➤ Increasing the rice income of rice farmers: Rice revenue of rice farmers in the Mekong Delta, Vietnam depends on many factors, including the selling prices of rice. The higher the rice prices are, the higher the rice income of rice farmers will be. As MITS analysis above raised the selling prices of rice, the rice income of rice farmers also increased. Table 71 points out that the majority of the research sample claimed that MITS improved their rice income. 91% of the respondents thought that MITS positively influenced their rice income and only 9% said that MITS did not influence their rice income.

➤ Improving the ability of market participation of rice farmers: An obstacle of small-scale rice farmers in the Mekong Delta, Vietnam is that their ability of market participation was weak, they lacked many factors to integrate in the rice markets and rice market information will help them find out the market chances to sell their rice at higher prices. Table 71 indicates that 85% of the respondents believed that MITS improved their ability of rice market participation, they were more self-confident to join in the rice markets, and they were more active to bargain with traders even with very big traders.

➤ Enlarging markets of rice farmers: Along with the increase of rice quantity the demand of enlarging rice markets of rice farmers in the Mekong Delta, Vietnam also raised. The enlargement of

rice markets helped rice farmers have chances to sell more and more rice at higher prices. Table 71 shows that the majority of the research sample believed that MITS enlarged their markets, they found out more buyers inside and outside their commune. 58% of the respondents reckoned that MITS enlarged their rice markets. The rest of the research sample (42%) asserted that MITS did not enlarge their rice markets. Through the qualitative study I saw that rice farmers in the Mekong Delta, Vietnam still maintained their old markets.

➤ Reducing the market risks: Decreasing the market risks was also an impact of MITS on rice farmers in the Mekong Delta, Vietnam. The findings of the qualitative study showed that rice farmers in the Mekong Delta, Vietnam have been combining their market experience and rice market information they had to determine when to appropriately sell rice, to avoid selling it when the rice price is increasing and to avoid keeping it when the rice price is reducing to maximize the rice profits. According to table 71, the majority of the research sample used MITS to reduce their market risks. The 68% of the respondents claimed that MITS decreased their market risks. The rest of the research sample (32%) did not think that MITS reduced their market risks. I saw that almost all of them had a weak ability to use and exploit rice market information they had in an effective manner.

➤ Reducing the production risks: Small-scale farmers in Vietnam faced many production risks, for example they overproduced therefore sometimes they could not sell all their products, or they invested so much in their production that the production cost was maybe higher than the product income, etc. MITS will help them solve these problems. With good market information rice farmers in the Mekong Delta, Vietnam produce rice varieties that markets need to meet the demands of markets, to avoid overproduction and they also reduce the investment in their rice production to reduce the production cost and loss whenever the rice prices go down. Table 71 shows that 42% of the respondents thought that MITS decreased the risks and losses in their rice production. And 58% of the respondents claimed that they did not see the influence of MITS on reducing their rice production risks.

➤ Reducing the waste: Rice farmers in the Mekong Delta, Vietnam had many wastes in their rice trading. They had to spend their efforts and time to look for rice market information, rice markets wasted in their rice transportation to sell to traders. And my qualitative study at the first stage showed that MITS reduced these wastes for rice farmers in the Mekong Delta, they decreased their time to find out rice markets, reduced the expenditure between them and traders. Table 71 indicates that 24% of the respondents reckoned that MITS lessened the waste of rice farmers in the Mekong Delta, Vietnam.

➤ Improving the production plan: The rice production plan of rice farmers in the Mekong Delta, Vietnam was based mainly on their experience of rice production and rice market information they had. With the rice production experience and rice market information, rice farmers decided which rice varieties the markets demanded to grow and therefore they could easily sell their rice at a higher price. Table 71 shows that the majority of the research sample (N=229; 73%) claimed that MITS positively influenced their rice production plan. The rest of the research sample (27%) built their rice production plan according to their habits, they grew what they liked.

➤ Increasing the number of negotiations with rice traders: Small-scale rice farmers in the Mekong Delta, Vietnam were the most disadvantageous actor in the rice value chain, their voice did not have any weight against other actors in the rice value chain. Rice traders mainly decided all aspects in the rice value chain in the Mekong Delta, Vietnam such as prices, payment terms, purchase forms, transportation, etc. MITS increased rice farmers' voice in the rice value chain. With the good market information they could bargain with traders to get higher prices, avoided disadvantages in bargaining and purchase. Rice farmers could sell their rice at higher prices by 50-100 VND/kg compared to the prices the traders gave to them. Besides, during bargaining with traders if they didn't agree with a trader, they could easily find other traders to sell to. Table 71 shows that 93% of the respondents believed that MITS improved the negotiation ability of rice farmers with rice traders. The rest of the research sample (7%) said that MITS did not improve their negotiation ability with rice traders. I saw that they had a weak ability to negotiate.

i) The advantages of MITS for rice farmers in the Mekong Delta, Vietnam

I asked rice farmers in the Mekong Delta, Vietnam that “what are the advantages of MITS for you?” and the results were presented in table 72.

Table 72: Advantageous of MITS to rice farmers

Advantageous of MITS	%	Rank
Easily access	82	1
Accurate market information	20	5
Easily understandable market information	22	4
Easily use of market information	27	3
Low cost	48	2

Source: Own survey, 2017

Table 72 shows that MITS had 5 main advantages for rice farmers in the Mekong Delta, Vietnam: Easy access, accurate market information, easy understanding of information, easy use, low cost. Easy access, low cost and easy use of market information are the biggest advantages of MITS for rice farmers in the Mekong Delta, Vietnam.

➤ Easy access to rice market information sources and channels: This is the most advantageous characteristic of MITS for rice farmers in the Mekong Delta, Vietnam. Rice producers in the Mekong Delta, Vietnam could access to rice market information everywhere, every time through some main channels such as meetings, phone calls, etc. Table 72 proclaims that 82% of the respondents reckoned that easy access to rice market information sources and channels was an advantage of MITS in the rice value chain in the Mekong Delta, Vietnam.

➤ Accurate and appropriate market information: Accurate and appropriate rice market information is an important factor, it reflects the effect of MITS on rice farmers and in fact, rice farmers in the Mekong Delta, Vietnam really wanted to access to accurate and appropriate rice market information. However, table 72 indicates that the minority of respondents said that rice market information from the current MITS in the Mekong Delta, Vietnam was accurate and appropriate, the majority of respondents did not believe that rice market information was accurate. The 20% of the respondents proclaimed that an advantage of MITS was to provide accurate and appropriate rice market information to rice producers.

➤ Easily understandable market information: A norm to evaluate a MITS can be good or not to easily understandable market information. A good MITS provides easily understandable market information to receivers and almost all receivers can understand and use that market information, even receivers with a low ability, like rice farmers in the Mekong Delta, Vietnam can also understand market information transferred from MITS. Table 72 shows that a small amount of rice producers in the Mekong Delta, Vietnam said that an advantage of MITS in the rice value chain was to provide easily understandable market information to rice farmers. The 22% of the respondents thought that the easily understandable market information provided by MITS to rice producers was its advantage.

➤ Easy use of rice market information: The findings of the qualitative study showed that rice producers in the Mekong Delta, Vietnam gained market information on rice prices so they could easily use this information. They only compared rice prices they had from different sources to make their final decisions. Meanwhile rice farmers in the Mekong Delta, Vietnam did not have complicated market information such as demands of markets about rice quantity, quality, etc. that rice farmers need

to analyze and to use. That is why rice farmers in the Mekong Delta, Vietnam said that an advantage of MITS in the rice value chain was the easy use of rice market information. Table 72 indicates that 27% of the respondents reckoned that the easy use of rice market information was an advantage of MITS in the rice value chain in the Mekong Delta, Vietnam.

➤ Low cost: Low cost was also a big advantage of MITS in the rice value chain in the Mekong Delta, Vietnam. Small-scale rice producers in the Mekong Delta, Vietnam did not access to MITS if they had to pay a high cost for that access because their income was low. Table 72 points out that 48% of the sample said that they accessed to MITS at a low cost (or no cost).

k) The disadvantages of MITS for rice farmers in the Mekong Delta, Vietnam

I also studied the disadvantages of MITS for rice producers in the rice value chain in the Mekong Delta, Vietnam and the results were presented in table 73. Table 73 shows that MITS had 6 main disadvantages for rice producers in the Mekong Delta, Vietnam: Low quality of market information, lack of market information sources, lack of market information channels, market information the lack of diversification, inconvenience to access, and lack of government participation. The low quality of market information, lack of market information sources, the lack of the diversification of market information are the most important disadvantages of MITS for rice farmers in the Mekong Delta, Vietnam.

Table 73: Disadvantageous of MITS to rice farmers

Disadvantageous of MITS	%	Rank
Low quality of market information	73	1
Lack of market information sources	52	2
Lack of market information channels	22	5
No market information diversification	31	3
Inconvenience to access	11	6
Lack of government participation	24	4

Source: Own survey, 2017

➤ Low quality of market information: The majority of the respondents thought that the quality of rice market information from the current MITS in the Mekong Delta for rice farmers was low. The 73% of the respondents asserted that a disadvantage of MITS in the rice value chain was the low quality of rice market information they gained.

➤ Lack of market information sources: This is a big problem of MITS in the rice value chain in the Mekong Delta, Vietnam. The majority of rice farmers in the Mekong Delta, Vietnam wanted to have more sources of rice market information so that they had more chances to collect and compare rice market information they got from many different sources to make their right decisions on their rice production and trading. Table 73 tells that 52% of the respondents reckoned that the lack of rice market information sources was a problem of MITS in the rice value chain in the Mekong Delta, Vietnam.

➤ Lack of market information channels: As shown in the analysis above, the main channels of rice market information channels of rice farmers in the Mekong Delta, Vietnam were meetings and phone calls. In addition, there were some different channels such as newspaper, radio, Internet, Television, loudspeakers, etc. but only a small rate of rice farmers used them to get rice market information. Therefore rice farmers in the Mekong Delta, Vietnam were willing to have many more channels of rice market information so that they can gain rice market information everywhere and every time. Table 73 indicates that 22% of the respondents reckoned that the lack of rice market information channels was a problem of MITS in the rice value chain in the Mekong Delta, Vietnam.

➤ The lack market information diversification: Through the qualitative study I saw that MITS has been providing only one kind of rice market information, rice prices to rice farmers in the Mekong Delta, Vietnam. Other kinds of rice market information were almost not provided and this is a big problem of MITS. Table 73 points out that 31% of the respondents believed that the lack of diversification of rice market information was a disadvantage of MITS in the rice value chain in the Mekong Delta, Vietnam.

➤ Inconvenience to access to market information: The qualitative study showed that there were many inconveniences for rice producers in the Mekong Delta, Vietnam to access to rice market information such as the time to disseminate rice market information was not suitable to rice farmers, the speed of rice market information dissemination was too fast to follow and remember, etc. Table 73 points out that 11% of the respondents mentioned that a disadvantageous of MITS in the rice value chain in the Mekong Delta, Vietnam was inconvenience to access to rice market information.

➤ Lack of governmental participation in MITS: Many rice farmers in the Mekong Delta, Vietnam really wanted governmental agencies to actively join in providing rice market information to rice farmers because that is a good market information source. But actually, very few governmental agencies in the Mekong Delta, Vietnam took part in providing rice market information to rice farmers

and also very few rice farmers could access to these governmental agencies to get rice market information. That is a disadvantage of MITS. Table 73 shows that 24% of the respondents indicated that the lack of governmental agencies in MITS was a disadvantage of MITS in the rice value chain in the Mekong Delta, Vietnam.

In sum, it can be seen that besides some advantages of MITS such as easily access, accurate market information, easily understandable information, easily use, low cost, MITS in the rice value chain in the Mekong Delta, Vietnam still had some disadvantageous that it need to be improved in the future.

4.5.3. Rice trainings for rice farmers

As it can be seen above the rate of rice farmers in the Mekong Delta, Vietnam who joined in rice trainings was quite high (85%), however, the contents of these training were about rice technical processes, the processes of input materials utilization such as new seeds, fertilizers, pesticides, there are not trainings about MITS. Therefore the findings for this research showed that 100% of the research sample (315 respondents) were willing to take part in the rice training courses to improve their skills in rice production and trade.

Besides, I also studied the importance level of rice training courses and what kinds of rice training courses rice farmers in the Mekong Delta, Vietnam wanted to join so that I could propose a model of MITS that was suitable to rice farmers in the Mekong Delta. The findings are presented in table 74 and table 75 below.

Table 74: The importance level of rice training courses for rice farmers

Rice training courses	Mean score	Rank
Rice technical process	4.6	3
Weed and insect control	4.9	1
Input material use	4.3	5
Post-harvest activities	2.6	6
Market information collection, analysis and use	4.4	4
Rice market activities	4.7	2

Note: 5 level of the importance: Very importance = 5 point; Importance = 4 point; Medium = 3 point; Less importance = 2 point and Non importance = 1 point.

$$Point = (n_1*5+n_2*4+n_3*3+n_4*2+n_5*1)/N$$

N =Size of the sample ($N=315$)

n = amount of respondents chose the given level of importance

Table 74 shows that trainings about weed and insect control is the most important for rice farmers in the Mekong Delta, Vietnam because they said that it is very hard to kill weed and insect on the rice fields and sometimes due to this fact they had poor harvests. The next are trainings about rice market activities and rice technical process. Trainings about rice market information collection, analysis and use is in the fourth position. The last level of rice trainings are about input material use and post-harvest activities.

Table 75: Rice training courses rice farmers desire to be trained

Rice training courses	%	Rank
Rice policies	3	6
Rice seed technical process	16	5
Rice market	57	2
Rice market information	51	3
Input material use	41	4
Rice technical process (including Weed and insect control)	60	1

Source: Own survey, 2017

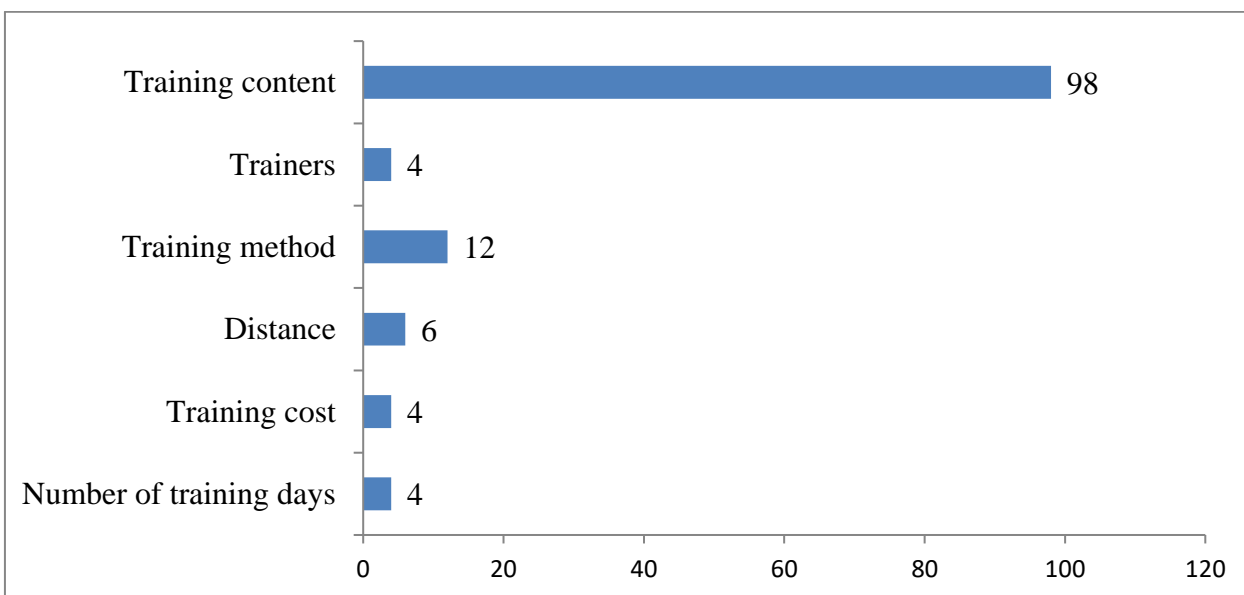
Rice farmers in the Mekong Delta, Vietnam were willing to take part in 6 rice training courses in the future: Technical processes, input materials use, market information, rice market, rice seed technical processes, and rice policies. Among these 6 training courses, 60% of the research sample wanted to join in the rice technical process to increase their rice productivity and quality, 57% wanted to take part in rice market (how to trade) to raise their rice prices and profits, 41% were willing to participate in trainings on input material utilization to use it more effectively, 51% wanted to join in the rice market information trainings to get and use rice market information in a more effective manner, 16% were willing to take part in trainings on technical processes of rice seed production and lastly, 3% wanted to participate in trainings on rice policies.

Table 74 and table 75 confirmed that H5 is accepted. It means that training about MITS for rice farmers in the Mekong Delta, Vietnam is useful and imperative to develop the current MITS of the rice value chain because farmer’s knowledge about MITS was low, they have not been trained about MITS and so they are willing to be trained about MITS to improve their trading activities.

I also studied factors influencing rice farmers’ participation in rice training courses and the findings were presented in figure 32. Figure 32 indicates that the contents of rice training courses had the

biggest influence on the decision of rice farmers' participation. 98% of the research sample said that they decided on their participation in rice trainings according to the contents of trainings. The contents of rice trainings must meet rice farmers' demands. Rice farmers in the Mekong Delta, Vietnam would like to be trained about rice market information use, rice market information collection and rice market information analysis in MITS. The next factor is the method of rice training (12%), rice farmers like combined trainings inside and outside door to improve their understanding and remembering of the training contents. The distance from their house to the training place also affected rice farmers' participation in rice trainings. 6% of the research sample said that they would not join the rice trainings located at a far distance from their house. 4% of the research sample reckoned that they decided on their participation according to who the trainer was. They preferred the trainers who were governmental officials because they had good knowledge and information. A small amount of the research sample (4%) requested that their participation in rice trainings should be free to increase the amount of participators. Rice farmers said that they would not join in training if they must to pay. Lastly, the amount of training days affected rice farmers' participation in rice trainings. 4% of the research sample asserted that the training time should be short and within 1 day.

Figure 32: Factors influencing rice farmers' participation in the rice training courses (%)

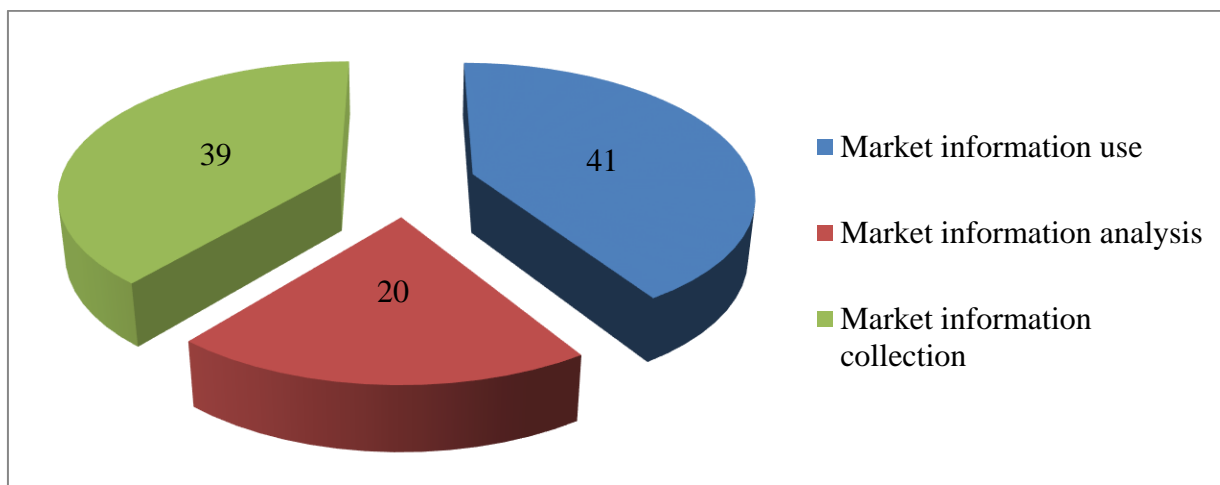


Source: Own survey, 2017

There are 3 main parts in a MITS: Market information collection, market information analysis and market information utilization. I asked rice farmers that “What is the most important part in a MITS?”. Their answers were gathered on figure 33. Figure 33 shows that the majority of rice farmers in the Mekong Delta, Vietnam claimed that rice market information utilization was the most important part in a MITS with 41% of the research sample. 39% of the research sample said that rice market

information collection was the most important part in a MITS and 20% of the research sample asserted that rice market information analysis was the most important part in a MITS. This demonstrates that a good model of MITS should focus on improving rice market information utilization of rice farmers and then on how to quickly and conveniently collect rice market information and lastly on rice market information analysis.

Figure 33: What is the most important part in MITS training courses? (%)



Source: Own survey, 2017

4.5.4. Supports of government to rice farmers

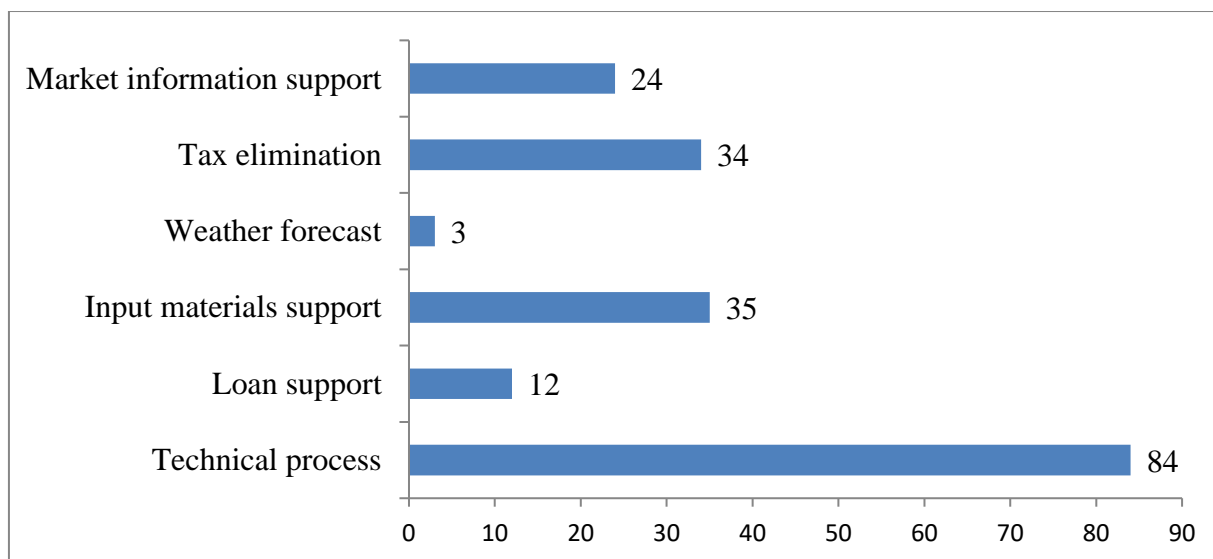
Rice production is an important subsector in the agricultural industry of Vietnam. It significantly contributed to the socio-economic development, ensured the national food security and also provided foreign currency to the Vietnamese economy by exporting. Some research showed that rice farmers' income and profits in the Mekong Delta, Vietnam were very low and to improve this the Government gave many supports to rice farmers.

Figure 34 indicates that the Vietnamese Government had 6 main supports for rice farmers in the Mekong Delta, Vietnam: Technical processes, loan, input materials (seed, pesticide, and fertilizer), weather forecast, tax elimination, and market information.

➤ **Technical processes:** This was a main support of Government for rice farmers to develop rice production, increase rice production area, improve rice quality and yield. Governmental supports about rice technical process were trainings, books, newspapers, bulletin, programs on mass media, organizing the visiting of the models, etc. Figure 34 reports that 84% of the respondents claimed that Government supported rice technical process for them.

➤ **Loan:** Government had policies on loan for farmers in general and rice farmers in particular through 2 Governmental banks: Vietnam’s Agricultural Bank and Vietnam’s Bank of Society and Policy. There were incentives in the loan policies for farmers such as low interest rate, simple procedure, long borrowing time, sometimes no mortgages on loans, etc. However, the low rate of rice farmers in the Mekong Delta, Vietnam borrowed from governmental banks. Figure 34 shows that 12% of the respondents borrowed money from banks.

Figure 34: Supports of government to rice farmers in the Mekong Delta, Vietnam



Source: Own survey, 2017

➤ **Input materials support:** the Vietnamese government had policies to support agricultural input materials such as seeds, fertilizers, and pesticides for farmers when they met natural calamity, diseases to reduce farmers’ difficulties. Figure 34 points out that 35% of the respondents reported that Government supported agricultural input materials for them.

➤ **Weather forecast:** The current programs on weather forecast to support agricultural production have been done by governmental agencies. Figure 34 indicates that 3% of the respondents mentioned that they received supports about weather forecast from Government to produce rice more effectively.

➤ **Agricultural tax elimination:** Government had many policies to eliminate agricultural taxes and nowadays farmers in Vietnam have not paid much agricultural taxes so far such as agricultural land tax, irrigation tax, agricultural market tax, etc. The Vietnamese government saw that farmers’ income was very low so it needs eliminating agricultural taxes to support agricultural production, to improve farmers’ living conditions. In addition, the amount of money received from agricultural taxes

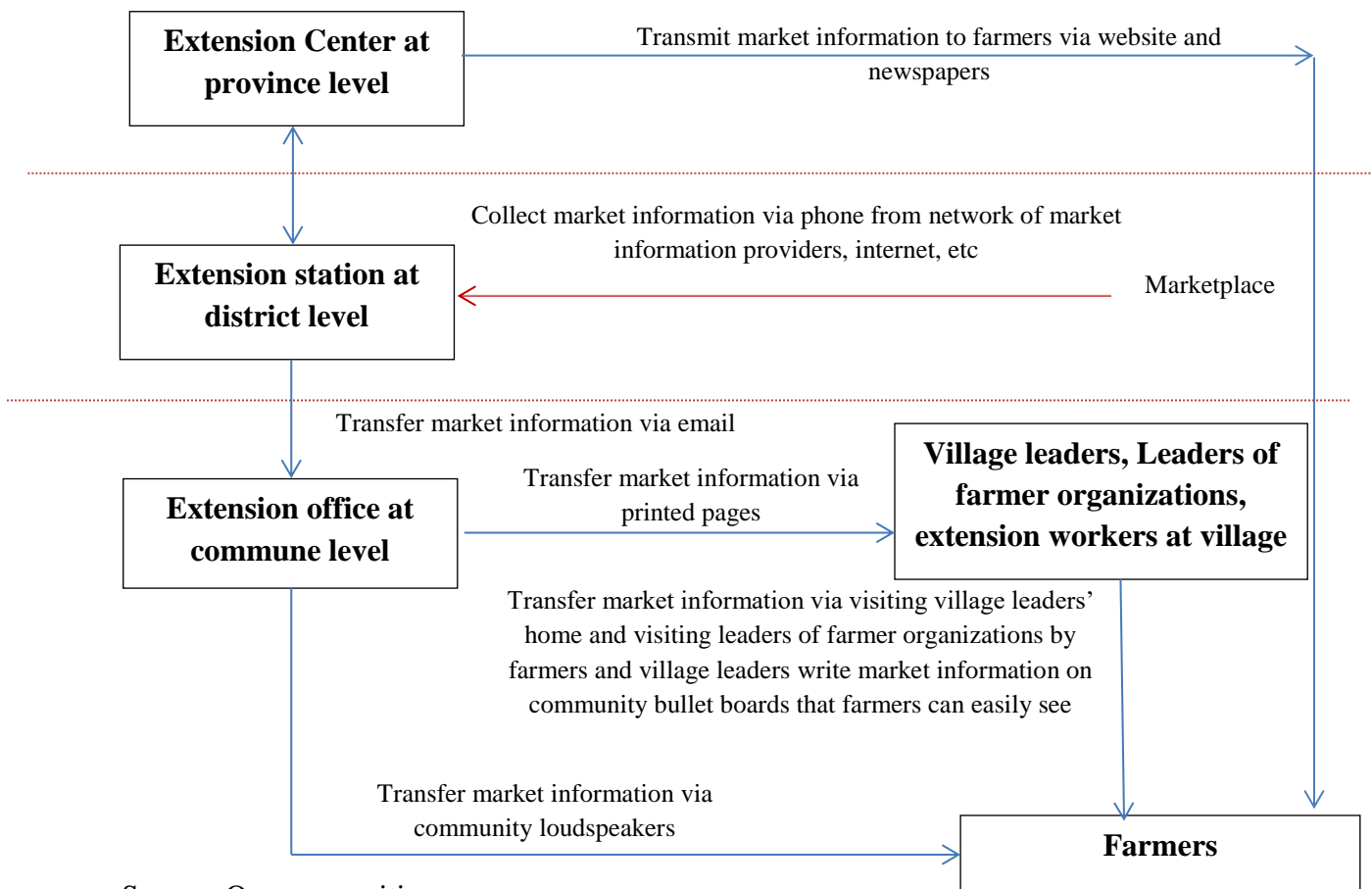
was not big, meanwhile the expenditure for staffs to collect agricultural taxes was big so agricultural taxes contributed to national budget in a small amount. This is why the Government eliminated almost all agricultural taxes in Vietnam. Figure 34 indicates that 34% of the respondents claimed that Government eliminated agricultural taxes for them.

➤ Market information support: The government had rice market information support for rice farmers in the Mekong Delta, Vietnam through many channels such as internet, newspapers, television, radio, visiting, meetings, etc. But providing rice market information by Government had many obstacles, as a result many rice farmers in the Mekong Delta, Vietnam did not access to governmental sources to get rice market information. Figure 34 shows that 24% of the respondents claimed that Government supported rice market information for them.

V. PROPOSING THE MODEL OF MITs IN THE RICE VALUE CHAIN IN THE MEKONG DELTA, VIETNAM

This part will present the model of MIT to farmers with the central entity in the model of the agricultural extension system. We have chosen agricultural extension system as the central entity in the model because the agricultural extension system has the existing 4 levels model with a big volume of extension workers who farmers can easily access to and secondly the agricultural extension system contains governmental agencies so the information transferred in the system is not distorted, ensures homogeneous information from the first point to the last one in the system. The important things are that: we need to improve the quality of input information because the agricultural extension system hasn't built the good sources of the input market information; we need to change the method to transfer information in the agricultural extension system to increase the speed of market information transfer farmers can access to and use up-to-date and adequate information. From these points of views, we propose the model of MIT towards rice farmers as shown in the following model (see Diagram 11).

Diagram 11: The model of market information transfer to farmers



Source: Own proposition

Here are 6 targeted groups who will join the model. The Provincial Agricultural Extension Center has a responsibility to gather market information from agricultural extension stations of all districts and then transfer them to farmers via their website and agricultural extension newspaper. In addition, the Provincial Agricultural Extension Center also has a duty to train those who join the model. The Agricultural Extension Stations at the district level have a responsibility to collect market information in their district and then transfer them to the Provincial Agricultural Extension Center and to agricultural extension staffs at commune level. Agricultural extension staffs at commune level have a duty to transfer market information to farmers and to village leaders and to the leaders of farmer organizations. Village leaders and leaders of farmer organizations have a responsibility to transfer market information to farmers.

There are 4 steps in the model:

- **Firstly, training of trainers:** There is a course of training of trainers that will be organized at provincial level. All those who join in the model will be trained in this course about the methods to collect, analyze and transfer the market information to farmers. The course of training will be implemented by the provincial agricultural extension centers.
- **Secondly, building the network of providers of market information for extension staffs at the district level** (network includes traders who agree to provide extension workers with market information). This step is very important because it relates closely to the quality of market information. If we choose right traders who provide proper information we will have good market information to transfer to farmers and the opposite. This step will be done by extension workers at district level. They must go directly to many markets to build the network.
- **Thirdly, collecting, analyzing and transferring market information:** To update the market information frequently and in time, every week extension workers at district level who join in the model will call each market information provider in the network to ask for market information, and then they will synthesize them to have the final data. They will e-mail market information to extension workers at commune level and provincial agricultural extension center who join in the model. Extension workers at commune level will transfer market information to village leaders and leaders of farmer organizations.

- In addition, transfer market information to farmers: There are 3 ways to transfer it to farmers:

(1) Commune extension workers will transfer market information to farmers through community loudspeakers without costs because each commune in Vietnam has a network of community loudspeakers and all citizens can hear market information via this network.

(2) Village leaders will write market information on community bullet boards and all farmers can easily see it.

(3) Farmers can be active to meet village leaders or leaders of the farmer organizations to ask market information.

Training in the model:

Training contents: According to farmers training course should train about methods to manage and supply MI, about policies, about rice production and the export of Vietnam, about demands of rice importers in the world and market prediction. This information is so hard to approach, synthesize and analyze by rice farmers.

Training time: Rice farmers need 2 courses each year to update new information and macro-information.

The conditions of successfully building the model of market information transfer:

- Establishing the farmer organizations: Almost all farmers can hardly access to and use market information so the farmer organizations where there are some advanced farmers will be a market information source and channel to share them with not advanced farmers in the organization. Many farmers can access to market information, therefore governmental agencies can not touch all of them and the farmer organization is a good solution.

“To transmit market information to farmers successfully, the important thing is building farmer organizations. Within farmer organizations, they can share information and buy their products with each other to get higher prices. Besides, many farmers have a low educational level and capacity to collect and use market information in the best way. And farmer organizations will help all their members have good information, advanced farmers will share the good market information” (Manager of Cultivation and Forestry Extension Division – National Extension Center).

- Government needs to increase the budget of the Extension System. They don't have enough money to do their main extension activities such as training, building the models, workshops, printing now. Some extension staffs at commune level don't have offices and computers.

“Currently, the budget for agricultural extension activities is not enough. Materials for agricultural extension offices are also lacking, especially at commune level. There are no computers, tables, offices for extension staffs at commune level” (Director of An Giang Agricultural Extension Centre).

“Extension staffs at district level are receiving 100.000 VND/month for collecting and synthesizing the market information and this budget is too low. To do this well, we need to increase it by about 400.000-500.000 VND/month” (Director of the Agricultural Extension Station of Thoại Sơn district).

- Need to train farmers to improve their capacity, knowledge, and awareness in seeking, using market information. There are common limitations of Vietnamese farmers.

“There are many farmers with low educational level and ability in their production and marketing so we need to improve their ability via training courses so that they can have a capacity to find out and use market information in a good manner” (Director of An Giang Agricultural Extension Centre).

Some differences between this new model of MITS and the current market information provision of agricultural extension system: There are 2 big differences:

➤ In this model, market information is collected by district (in a small market) and so the quality of market information is very good for farmers who only sell their rice in their community. Meanwhile now agricultural extension system is collecting market information from the market of the whole province (the very big market) and so the quality of market information is very low because market information is so different between each district.

➤ There are more suitable channels and sources of market information for farmers to get market information in this new model. The agricultural extension system is providing market information to farmers through internet and agricultural extension newspaper. Otherwise, besides internet and newspaper, farmers can get market information via agricultural extension officials at district and commune levels, community loudspeakers, and community bullet boards and therefore the speed of market information transfer is faster and more and more farmers can access market information.

Solutions to build this model at national level:

The extension system in each province in Vietnam is different. There are some good extension systems in some provinces and not good in other ones so this MITS needs to apply them in provinces with good extension system and then develop them in other provinces. The model will not succeed if the developing the model of MITS is not in progress at the same time. An Giang is a good province to apply this model in the practice because An Giang is a province with a rice production on a large area and the extension system is good compared to others.

“To make the model of providing market information successful to farmers via extension systems on a large scale, we should do it slowly instead of developing quickly. We should build the model as a test in some provinces and then the summary should be learnt from experience. Your choice of An Giang to test the model is absolutely right because An Giang has a quite good extension system in Vietnam and it is a large producer in the Mekong Delta so the market information to farmers in An Giang is very important” (Manager of Cultivation and Forestry Extension Division – National Extension Center).

VI. CONCLUSIONS

This part will present a brief summary of the whole dissertation to help readers quickly find out the main findings of the dissertation. Besides, I will also give some recommendations in this part.

6.1. Conclusions

MITS have an increasing big role in developing the agricultural products value chains in the world on the basis of the findings of the literature review. Many countries are applying MITS in reality to raise the transparency and to reduce inequality of market information in the value chain especially between farmers and traders. Farmers with good market information can sell more and more of their products increasing the selling prices and incomes, etc.

Rice production of Vietnam achieved the great results in the last 30 years with an increasing output. But the yield and the area of rice production in Vietnam touched the ceiling so to develop rice sector Vietnam needs improving the trading activities and bettering the current MITS is a choice.

Along with the development of sciences and technologies and rice land accumulation the rice output of a household in the Mekong Delta, Vietnam has significantly raised and in turn it puts rice farmers under a high pressure to sell more and more at the same time at a high price. So farmers need to be provided with the good market information to make their informed decisions.

My research has attempted to describe and analyze the current MITS in the rice value chain in the Mekong Delta, Vietnam to propose solutions to upgrade the current MITS. Besides the strengths of the current MITS such as low cost, fast speed of market information dissemination there are some weaknesses of MITS such as the low quality of market information, lack of channels and sources of market information, lack of participation of governmental agencies in MITS, etc.

Rice farmer's demands of rice market information in the Mekong Delta, Vietnam were high to serve their rice production and trading. Almost all farmers were willing to get more and more market information. There are 2 kinds of market information that farmers want to know: Macro and Micro market information but almost all farmers in the Mekong Delta, Vietnam want to be provided with micro market information such as price, phone number of traders, etc and some large scale farmers need Macro market information such as rice export, export prices, total of rice quantity of Vietnam, etc.

There are 2 kinds of market information sources in the rice value chain in the Mekong Delta, Vietnam: Formal and informal. Rice farmers have been approaching simultaneously many sources to meet their

demands but the informal sources such as farmers, relatives, neighbors, collectors, traders, etc are still important for rice farmers in the Mekong Delta because it is easy to access to these sources with a low cost. In addition, rice farmers need to have funds and skills to get market information from formal sources.

The main channels of market information in the current MITS in the rice value chain in the Mekong Delta that farmers are using to get market information are phone calls and face-to-face meetings because these channels are convenient with low costs. Modern channels such as internet, newspapers, television, etc. are not suitable for farmers in Vietnam because rice farmers need to have funds and skills to use them.

The quality of market information is an important factor in MITS but farmers in the rice value chain in the Mekong Delta, Vietnam have been getting a low-quality market information. The price is the main kind of market information provided to farmers from the current MITS. Besides, MITS in the rice value chain in the Mekong Delta, Vietnam is being run mainly by private traders where there is not management and supervision of the quality of market information provided to farmers.

Training farmers is a solution to develop MITS in the rice value chain in the Mekong Delta because in addition to the low capacity of rice farmers in market information collection, analysis and utilization, Vietnamese State also focused on training technical process to farmers so farmers' knowledge about MITS in Vietnam is rather low. It means that we need to hold trainings about MITS for farmers.

To design the good model of MITS for Vietnam and to improve the weaknesses of the current MITS I need to understand which factors are influencing the current MITS in the rice value chain. My research indicated that 3 factors: Educational level, rice income and amount of market information channels have significantly influenced the satisfaction of rice farmers on MITS. And we can see that among these 3 factors Vietnam can improve 2 factors, the education level and the amount of market information channels to develop MITS through training farmers to increase their educational level and designing a new model of MITS where farmers have more and more channels to get market information, meanwhile one factor, the rice income is dependent on the farmers themselves.

The demonstrated hypotheses in the research:

- **H1** confirmed that the rice farmers are not satisfied with the current situation of MITS in the Mekong Delta because of the low capacity of farmers in market information collection, analysis and utilization;

the low quality of market information as well as the lack of good channels and sources of market information.

- **H2:** Rice farmers in the Mekong Delta utilize both the macro and micro rice market information in MITS in their rice production and trading was rejected because almost all rice farmers in the Mekong Delta, Vietnam utilized micro market information in their decisions and very little scale of farmers utilized macro market information. Rice farmers in the Mekong Delta, Vietnam are small scale producers, their markets are in their village communes and so they don't need macro market information. Besides, the current MITS is mainly providing information about price, but not macro information, as a result for farmers it is very hard to get macro market information.

- **H3** was demonstrated by the Pearson Chi-square of Cross-table analysis. The results showed that there were correlations between age, educational level, FO membership, rice income, the amount of rice market information sources and the amount of rice market information channels with farmers' satisfaction of MITS at a significant level of 5%. In addition, the results also indicated that there were not relationships between genders, size of the farmer household with farmer's satisfaction of MITS.

- **H4:** The government supported the MITS development via the agricultural extension system in Vietnam, which was rejected because there are not policies about MITS in Vietnam and the agricultural extension system at all levels did not get enough budget and equipment to develop MITS, so few farmers got rice market information from the agricultural extension system.

- **H5:** A useful and imperative action plan and training about MITS to develop the current MITS of the rice value chain in Vietnam were accepted because farmers' knowledge about MITS was rather low and they are willing to be trained about MITS.

My research showed that the governmental agencies have a big role in developing MITS in the rice value chain. The participation of the governmental agencies in MITS increased the belief and confidence of rice farmers in MITS, in the rice market information they got, but because of the lack of budget the participation of the governmental agencies in MITS in Vietnam were rather limited. It is recommended that the Vietnamese State need to have policies and budget to encourage the governmental agencies such as the agricultural extension system, FOs, village leaders to join in MITS. The agricultural extension system in Vietnam has responsibility to collect and analyze market information to transfer them to farmers, village leaders and FOs who are living in the same communities with farmers to ensure the fast speed of market information dissemination with a low cost so that more and more farmers can them.

6.2. New scientific findings of my dissertation

The first new finding of the dissertation is that this research is the first comprehensive study about MITS in Vietnam about both research methodologies and contents. MITS is a new topic in Vietnam and the previous research only studied one and some aspects of MITS. I hope that this research will be the first basic for the next research about MITS in Vietnam and this dissertation will also be a good literature source for researchers who will carry out research on MITS. Besides, I think that this dissertation will serve as a valuable literature source for agricultural managers and policy makers in Vietnam so that they can see the general picture of the current MITS in Vietnam and can propose policies and programs to improve the current MITS.

The second new finding of my dissertation is that after the research I proposed a good model of a new MITS for the rice value chain in Vietnam that can solve the limitations of the current MITS. My desire in the future is that this model should be applied in reality to prove its applicability and in addition, there are many other models for other agricultural products in Vietnam proposed by my model.

The third new finding of my dissertation is that the satisfaction level of rice farmers in Vietnam was still low because of the lack of good sources of market information, the lack good channels of market information, the low quality of market information, the lack of participation of Vietnamese governmental agencies in MITS, etc.

The last new finding of my dissertation is the considerable changes of MITS in my research with MITS in the researches in the past (5-10 year ago) in Vietnam in general and in the Mekong Delta in particular. Nowadays farmers have more knowledge, skills and abilities to access to and get more and more market information than farmers in the past but the satisfaction level of the present farmers is not high because they have been producing more and more rice and a high pressure on selling more and more rice at the same time and within short time they demand more and more rice market information with more and more frequency because rice market information has been changing every day.

6.3. Some suggestions for the future research

The big role of MITS in the rice value chain was confirmed in this research so I recommend that the future researches should study MITS in other value chains of the main agricultural products in Vietnam where farmers also have a high demand of market information.

My research studied MITS in the whole value chain of rice so the findings of my research may not be the facts in the special value chains in the rice sector. The future research should focus on studying MITS in the special value chains such as rice export value chain, domestic value chains, short value chain (aromatic rice value chain) and long value chain (normal rice value chain) because there are differences in demands, sources, channels of market information in each chain.

A new model of MITS for the rice value chain in Vietnam was proposed from my research and hopefully this new model will be applied in reality to test its suitability under the Vietnamese conditions.

In summary, my research on MITS in the rice value chain in the Mekong Delta was scientifically performed and its findings showed that MITS significantly and positively influenced rice farmers in the Mekong Delta, Vietnam. In addition, it had still many obstacles to need to be solved to improve its effectiveness. Therefore, based on the findings and recommendations above I propose a new model of MITS that is suitable for conditions of the rice value chain in the Mekong Delta, Vietnam and I do hope that I will have chances to introduce this model to the Vietnamese government, managers, policy makers, actors in the rice value chain in the near future through articles, workshops, trainings, etc. to try to apply them on the fields. Hopefully, the new model of MITS for the rice value chain in the Mekong Delta, Vietnam will really solve the current obstacles of MITS helping rice farmers access to and use rice market information in an effective manner for their rice production and trade to better their rice profits and income.

SUMMARY

This is the farmers' increasing demand for adequate, accurate, relevant and timely market information in the agricultural sector to improve their production and trading, especially in the developing countries like Vietnam where there is a bigger and bigger integration into the international market and an increasing pressure on their product selling. Farmers' lack of rice market information in the Mekong Delta, Vietnam is a main reason to implement this research: the Market information transfer system (MITS) towards farmers in the rice value chain in the Mekong Delta, Vietnam. The aims of the research are to study the current MITS in the rice value chain in the Mekong Delta, Vietnam (farmers' demand of rice market information, rice market information sources, rice market information channels, rice market information utilization, the weaknesses and strengths of MITS, etc.), to evaluate farmers' satisfaction level of the current MITS in the rice value chain, to analyze factors influencing farmers' satisfaction level of MITS and to propose a new model of MITS to improve the weaknesses of the current MITS in the rice value chain in the Mekong Delta, Vietnam.

I used the mixed methodology (both qualitative and quantitative methods) in my research to interview 27 interviewees and survey 315 rice farmers in the Mekong Delta within 2 years: 2016 and 2017. The research tools I used are structured question guide and questionnaire. All analyses were run by SPSS software.

The research shows that MITS have an increasing big role in developing the rice value chains in the Mekong Delta, Vietnam. MITS helped rice farmers in the Mekong Delta increase the income as well as the selling price, improve the ability of market participation, enlarge markets, reduce the market risks, reduce the production risks, reduce the waste, improve the production plan and increase number of negotiations.

The current MITS in the rice value chain in the Mekong Delta, Vietnam is described and analyzed in the research. Almost all rice farmers need micro market information to make their informed decision in rice production and trading, meanwhile macro market information is looked for by large-scale farmers. Farmers and traders are the main sources of market information for farmers because they can easily access to it with a low cost, other sources of market information such as internet, newspaper, governmental agencies, television, farmer organization, etc. are used by a small mount of farmers because of the high costs and skills to use and access to these sources. Phone calls and face-to-face meetings are the priority channels of rice farmers because for them it is easy to use these channels,

the good effect of information exchange and the fast speed of information transfer, meanwhile modern channels such as internet, newspaper, television, bulletin, etc. are used by less farmers to get rice market information. After having rice market information rice farmers in the Mekong Delta, Vietnam use them to negotiate with traders, decide where to sell the products, decide when to sell, decide what to plant in the next season, decide whom to sell to, decide the selling price and share them with other farmers.

Rice farmers in the Mekong Delta, Vietnam have been active to access to one and more sources of rice market information to get market information that meet their demands. However, their satisfaction level of the current MITS in the rice value chain is still low due to the low capacity and economic conditions of rice farmers, the lack of good sources and channels of rice market information, the low quality of rice market information, the lack of the participation of governmental agencies in MITS, etc.

In addition, there are some new scientific findings in this research. This is the first comprehensive study about MITS in Vietnam about both research methodologies and research contents. A new model of MITS is proposed on the basis of the results of the research. Nowadays farmers have more knowledge, skills and abilities to access to and get more and more market information than farmers in the past but the satisfaction level of the present farmers is not high because they have been producing more and more rice and there is a high pressure on selling more and more rice at the same time and within short time as rice market information has been changing every day.

Some suggestions for the future research: The future research should study MITS in other value chains of the main agricultural products in Vietnam where farmers also have a high demand of market information. The future research should focus on studying MITS in the concrete value chains such as rice export value chain, domestic value chains, short value chain (aromatic rice value chain) and long value chain (normal rice value chain) because there are differences in demands, sources, channels of market information in each chain. Vietnam needs to run a project to apply the new model of MITS for the rice value chain in reality to test its suitability under the Vietnamese conditions.

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APPENDICES

1. Interview guide for farmers

Evaluate the recent situation on market information of rice farmers? Its strengths and weaknesses?

How important is market information for rice farmers?

What are the factors of rice farmers' high/medium productivity?

Why is rice farmers' productivity low?

What can help low productivity farmers produce higher level?

What are her/his ideas about the MIT model?

2. Interview guide for Agricultural extension staffs

How is MITS in An Giang? What are its weaknesses and strengths?

How is MIT in her/his office to rice farmers?

How is the importance of MITS to rice farmers?

How can MI influence on rice farmers' success?

How are the governmental policies about MI: National level, provincial level, district level and commune level?

What are roles of the government in providing MI to the farmers?

How are farmers' behaviors in seeking, using MI?

How is a budget for agricultural extension activities?

Describe the curriculum and MIT model and ask: Do you think that a training about MITS can help the recent situation of MITS in Vietnam?

How can this MITS model achieve the success in a national level?

3. Interview guide for leaders of farmer organizations

What are activities of FO and of Leader of FO?

What are advantages and disadvantages of FO?

What are roles of FO in rice farmer's work?

Which activities of FO can increase rice farmers' income?

What are factors influencing on rice farmer's success?

What are your opinions about the MIT model?

Do you think that we need a training course in the model? What do we train about? How long for a training course? Who join in the training course?

How to work together between farmers, FO and Village leaders.

4. Interview guide for village leaders

What are activities of village leaders?

What are advantages and disadvantages of village leaders?

What are roles of village leaders in rice farmer's work?

Which can activities of village leaders increase rice farmers' income?

What are factors influencing on rice farmer's success?

What are your opinions about the MIT model?

Do you think that we need a training course in the model? What do we train about? How long for a training course? Who join in the training course?

How to work together between farmers, FO and Village leaders.

5. Questionnaire

I am Pham Cong Nghiep and I am doing my doctoral dissertation. In my dissertation I am examining the accession of farmers to market information specialized in rice production and I focus on the issue that how the production and selling can be made more effective from this aspect at the level of farmers. The questionnaire is anonym and all information is handled strictly confidentially. I kindly ask you to circle the letter before the answer you have chosen. If any other information is required, you can find the necessary instruction before the relevant question. Many thanks for your co-operation.

I. DEMOGRAPHY

1. Place: 1.1. Province:

1. An Giang
2. Can Tho

1.2. District:

1. Thoai Son
2. Chau Phu
3. Cho Moi
4. Thoi Lai
5. O Mon
6. Phong Dien

2. Age:

1. 20-30
2. 31-40
3. 41-50
4. 51-60

5. Over 60:

3. Sex of the head of the household:

1. Male
2. Female

4. Educational level:

1. No school
2. Primary school
3. Secondary school
4. High school
5. Higher education
6. Other:

5. Family size:

1. 1 person
2. 2 people
3. 3 people
4. 4 people
5. 5 people
6. 6 people
7. Over 6 people:

6. Total income (VND million/year):

1. 1-30
2. 31-60
3. 61-90
4. 91-120
5. 121-150
6. Over 150:

7. Rice income (VND million/year):

1. 1-30
2. 31-60
3. 61-90
4. 91-120
5. 121-150
6. Over 150:

8. Is the household a current member of the FO?

1. Yes
2. No

9. How much are you satisfied with the efficiency of the present production?

1. I find it very effective.
2. I find it moderately effective.
3. I do not find it really effective.

II. MARKET INFORMATION

10. What are your difficulties in selling rice?

1. I have no difficulties in selling rice	1. Yes	2. No
2. I have no difficulties in selling rice but up-to-date rice production and infrastructural knowledge would be needed	1. Yes	2. No
3. Low price	1. Yes	2. No
4. No buyers/few buyers	1. Yes	2. No
5. No market information	1. Yes	2. No
6. Inaccurate, out of date and inadequate market information	1. Yes	2. No
7. Don't know where to sell	1. Yes	2. No
8. Others:	1. Yes	2. No

11. How is farmers 'satisfaction level of market information system?

1. Very low
2. Low
3. Medium
4. High
5. Very high

12. How much is the following information important to you? Please, choose from very important (1), moderately important (2), or not important at all (3)!

1. Retail price	1. Very important	2. Moderately important	3. Not important at all
2. Wholesale price	1. Very important	2. Moderately important	3. Not important at all
3. Rice quality	1. Very important	2. Moderately important	3. Not important at all
4. Transportation	1. Very important	2. Moderately important	3. Not important at all
5. Payment terms	1. Very important	2. Moderately important	3. Not important at all
6. Quantity	1. Very important	2. Moderately important	3. Not important at all
7. Address of traders	1. Very important	2. Moderately important	3. Not important at all
8. Phone number of traders	1. Very important	2. Moderately important	3. Not important at all
9. Market forecasting	1. Very important	2. Moderately important	3. Not important at all
10. Rice export	1. Very important	2. Moderately important	3. Not important at all
11. Global market	1. Very important	2. Moderately important	3. Not important at all
12. Others	1. Very important	2. Moderately important	3. Not important at all

13. What are the most trustworthy channels of information for you? Please, assess the efficiency of the following channels by circling the number of the relevant answer on a scale from 1-5 (1= very effective and trustworthy information; 2= effective; 3= medium; 4= less effective; 5 not effective at all).

	1. Very effective and trustworthy information	2. Effective	3. Medium	4. Less effective	5. Not effective at all
1. Newspapers					
2. Radio					
3. TV					
4. Internet, Email, web					
5. SMS, Telephone					
6. Meetings					
7. Visiting					
8. Loudspeakers					
9. Bulletin					
10. Fax					
11. Others					

14. How often has your family used the next sources?

Market information sources	1. Daily	2. 2 times per week	3. Weekly	4. 2 times per month	5. Monthly	6. Quarterly	7. 2 times per year	8. Yearly
1. Farmers, relatives, friends								
2. Traders								
3. Collectors								
4. Millers								
5. FOs								
6. Newspapers								
7. Radio								
8. TV								
9. Internet								
10. Extension services								
11. Village leaders								
12. NGOs								

13. Other governmental agencies								
14. Others (specify)								
.....								

15. What are the goals of market information utilization?

1. Negotiating with traders	1. Yes	2. No
2. Deciding on where to sell the products	1. Yes	2. No
3. Deciding on when to harvest	1. Yes	2. No
4. Deciding on what to plant in the next season	1. Yes	2. No
5. Deciding on who to sell	1. Yes	2. No
6. Deciding on the selling price	1. Yes	2. No
7. Sharing with other farmers	1. Yes	2. No
8. Others	1. Yes	2. No

16. What are the impacts of market information?

1. Increasing the income	1. Yes	2. No
2. Increasing the selling price	1. Yes	2. No
3. Improving the capacity of market participation	1. Yes	2. No
4. Enlarging markets	1. Yes	2. No
5. Reducing the market risks	1. Yes	2. No
6. Reducing the production risks	1. Yes	2. No
7. Reducing the waste	1. Yes	2. No
8. Improving the production plan	1. Yes	2. No
9. Increasing the number of negotiations	1. Yes	2. No
10. Others	1. Yes	2. No

17. How does the state support rice producers? What do you think of this support? Add your comment, please, if you have any.

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18. List the advantages of the present flow of information, please:

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19. List the disadvantages of the present flow of information, please:

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III. TRAINING

20. Have you ever participated in rice trainings?

- 1. Yes
- 2. No

21. If you had the chance to take part in a course for rice producers, would you sign up for the course?

- 1. Yes
- 2. No ----- Thanks for your co-operation, you are finished with the questionnaire!

22. Under what conditions would you take part in the above mentioned course (distance, daily fee, term, number of days, others)?

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23. How much do you find the following skills important during a future course? Please, choose from very important (1), important (2), medium (3); less important (4), not important at all (5) by circling the number of the relevant answer!

1. Technical process	1. Very important	2. Important	3. Medium	4. Less important	5. Not important at all
2. Weed and insect control	1. Very important	2. Important	3. Medium	4. Less important	5. Not important at all
3. How to use input materials (Pesticides, fertilizers, etc.)	1. Very important	2. Important	3. Medium	4. Less important	5. Not important at all
4. Post-harvest activities (packing, store, milling)	1. Very important	2. Important	3. Medium	4. Less important	5. Not important at all
5. How to collect, analyze and use market information	1. Very important	2. Important	3. Medium	4. Less important	5. Not important at all
6. How to trade rice	1. Very important	2. Important	3. Medium	4. Less important	5. Not important at all
7. Others (Specify).....	1. Very important	2. Important	3. Medium	4. Less important	5. Not important at all

24. Finish the following sentences, please:

1. Technical process	The most important thing when acquiring technical skills is
2. Weed and insect control	The most important thing in weed and insect control is

3. How to use input materials (Pesticides, fertilizers, etc.)	The most important thing in using input materials is
4. Post-harvest activities (packing, store, milling)	The most important thing in post-harvest activities is
5. How to collect, analyze and use market information	The most important thing in collecting, analyzing and using market information is
6. How to trade rice	The most important thing in rice trade is
7. Others (Specify)	The most important thing in others is

25. If you have to hold a supporter training course for the farmers, what will be in your focus?

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