

National Rice Development Strategy

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1- Introduction: Current status rice sector

1.1. Natural and social conditions in Vietnam

Viet Nam lies on the eastern part of the Indochinese peninsula, is a strip of land shaped like the letter “S”. China borders it to the north, Laos and Cambodia to the west, the Eastern Sea to the east and the Pacific Ocean to the east and south. Mainland area is about 331,690 km², mountains and hills cover two thirds of the mainland, areas above 500m in altitude account for 70 percent of the mainland.

Vietnam is located in the tropical and temperate zone characterized by high temperature and humidity all year round, especially in rainy season. The average temperature is about 28⁰C, the average rainfall each year in Hanoi is 1,763 mm, Hue is 2,867 and Hochiminh city is 1,910 mm, and the average air humidity is over 80%, even 90% in rainy season and in drizzly weather. These are favorable conditions for rice cultivation all year round.

Vietnam’s population is now 89.7 million people, the urban population is about 29.03 million people accounted for 32.36%, the rural population is 60.68 million people accounted for 67.64% and this is the main labor force involved in rice cultivation in Vietnam.

1.2. Role and status of rice production and trade in Vietnam

Among agricultural products, rice is absolutely indispensable to the daily life of Vietnamese. It plays the most important role in Vietnam’s food security and rural economy which generates jobs for 60% of the country’s labor force and is a source of export revenue.

Even though Vietnam's rice land has gradually declined 11% - from 4.5 million hectares in 1999 to the present 4.0 million hectares - because of industrialization and urbanization, the equivalent area in rice reached 7.9 million hectares in 2013 because of going to the growing of three crops of rice a year.

Vietnam has 7 Agro-economic zones as follows: The North Upland and Mountainous Region; The Red River Delta Region; The North Central Coast Region; The South Central Coast Region; The Central Highland Region; The South East Region; The Mekong River Delta Region. Each region has its own natural and socio-economic characteristics and set up the direction to promote the inherent advantages of the region. In aspect of rice production, Vietnam has two main granaries which is the Red River Delta in the north and Mekong River Delta in the south with corresponding cultivated area is 1.1 million hectares and 4.1 million hectares.

Rice growing seasons in Vietnam varies from the North to the South due to the long length of the country and the resulting weather differences. (i) In the South: In the irrigated areas there are three rice crops per year: "Summer-Autumn" planted in April-May and harvested in July-August ; "Autumn-Winter" planted in August-September and harvested in November-December; and "Winter-Spring" planted in November-December and harvested in February-March. In the rainfed areas there is only one rice crop per year – "Main wet season", which is planted with traditional varieties begin planting in July-August and harvesting in January-February, in this area farmers can apply the model of rice-shrimp farming; (ii) In the North The: "Winter crop" ("Chiem xuan") transplanted in February and harvested in June, the "Main season crop" ("Mua crop") transplanted in July and harvested in late October-November. In some areas of the North, the "Summer-Autumn" crop planted in April-May and harvested in July-August. Moreover, upland rice is grown in the mountainous and upland areas by ethnic minorities.

Thanks to the use of new high-yield rice varieties and improvements in agricultural technology and infrastructure, Vietnam's rice yield is increasing significantly. Average yield surged from 4.2 tons/hectare in 2000 to 5.6 tons/hectare in 2013. Rice production increased from 32.5 million tons in 2000 to 44.1 million tons in 2013.

Vietnam is known as one of the most important rice producers and exporters in the world. The country began exporting rice, and transformed itself from a rice importer to a rice exporter in 1989. Now Vietnam is the world's third largest rice exporter, after India and Thailand. Vietnam's rice exports in 2013 reached 6.67 million tons valued about US\$ 3 billion.

2- Main challenges and opportunities

2.1. Main challenges for Vietnam's rice sector

More challenges have been posed in the context of the world economic integration and climate change for the rice sector in Vietnam. The following is the analysis of the relevant fields.

National food security:

Although Vietnam is considered as one of the most important rice producers and exporters in the world, but due to differences in natural and weather conditions in regions across the country, the mountainous and ethnic minority areas are usually food shortages at between-crop period. This is the challenge that the government of Vietnam has faced and devised the appropriate policies to address the food shortages for the vulnerable-prone areas.

Besides, Vietnam also locates in the storm and flooding prone area, people in these areas are usually suffered from the natural disasters and required to supply food in the emergencies.

Rice export:

Vietnam began exporting rice since 1989, until now rice export volume reached 6.67 million tons with a value of \$ 3 billion. In the coming years, the rice export situation is more unpredictable due to rise of the rice exporting countries such as India, Myanmar, Pakistan, Cambodia ...and changes in importing conditions as well as the ability to ensure national food security of the rice import countries.

At the present, competition in the world rice market is pretty tough. Vietnam rice is mostly 25% broken rice, a low-grade rice serving rice importing markets of African countries, Indonesia, Philippines ...Currently, this type of low-grade rice is strongly competitive in the world rice market, price of 25% broken rice of India and Myanmar is lower than Vietnam's one. So, Vietnam gradually

lost some traditional rice markets, rice export turn-over tends to decrease in both quantity and value.

In addition, Vietnam has not set up completely the Vietnam rice brand, the organization of rice production and business for rice export has not been focused properly. So, the added value of rice exports is not high, million farmers and rice processing and exporting enterprises' interests have been affected.

Consequently, this is the crucial challenges posed for governmental sectors and levels to solve the problems how to enhance the Vietnam rice prestige and value in the world rice market.

Climate change

According to study and forecast of the Intergovernmental Panel on Climate Change (IPCC) and the World Bank, in Vietnam, the sea level rising 1 meter will flood about 0.3-0.5 million hectares in Red River Delta and 1.5-2.0 million hectares in Mekong Delta. In the high floods, about 90% area of Mekong Delta was flooded for 4-5 months, includes mainly rice land flooded and salt-penetrated and unproductive. The climate change increases natural disasters and decreases crop productivity. In the Asian Development Bank (ADB) point of view, if temperature raises more 1⁰C, rice output will reduce 10%. This will pose a serious threat to national food security and impact on tens of million people.

Climate change has changed living conditions of species and disappeared several species and conversely, appeared as risk of increasing "natural enemy". In the past two years, epidemics of brown plant hoppers and leaf folders in Mekong Delta has occurred more complicatedly and affected intensive cultivation and multi-crops and reduced rice productivity. In the North, the leaf folder in the winter-spring crop became epidemic. At the highest, the damaged rice area increased up to 400,000 ha, considerably impacting on productive output and expenses.

Climate change can affect the crop; change seasonal structure, regional planning, irrigational technique, pestilent insects, productivity and yield; degrade land resources; threaten biological diversification; reduce quantity and quality due to flood and drought; and further increase extinctive risk of animals and plants and disappear rare and valuable gene sources.

Resource scarcity

Rice production has a high demand for water, energy and agricultural chemicals. These resources become increasingly scarce, exhausted, expensive and even unreasonable use, these lead to low rice production efficiency and people's life are more and more difficult.

In fact, never before has the Mekong River Basin been confronted with so many challenges. There has been a mounting pressure on water and related resources and on the ecosystems of the Mekong River Basin as a result of increasing demand for natural resources for socio- economic activities, including energy and food. The Mekong River has become one of the five largest rivers in the world with most serious flow reduction. The annual average flow of the Mekong River at Chieng Sen, the gateway to the Lower Mekong Basin, has been reduced by 10% within the past 30 years. In Vientiane, Laos, the Mekong River has dried out to the point the people can walk across the river in the dry season. Meanwhile, in Thailand, the once calm Chao Phraya River inflicted huge floods of a national disaster level for months in 2011. In the Mekong River Delta of Viet Nam, salinity intrusion happened for the first time in the areas of Tan Chau and Chau Doc of An Giang Province due to the serious flow reduction in the dry season.

Urban migration:

The migration of labor to urban and industrial areas is a social problem and depends on the process of social-economic development. It cannot be denied positive role of the migration, especially in the developing countries where there is a big gap in income and living standard between rural and urban areas.

In 2009, number of migrants from the rural to the urban was 6.5 million people accounting for 7.75% of the total population, and the figure of migration will be greater in the future due to urbanization and industrialization. Most of the migrants are young and educated, so the rural remaining labor force was mostly children and the low- educated elderly.

The challenges have to be faced are lack of the young and strong laborers during sowing and harvesting periods, lack of the educated farmers that apply the scientific and technological advances in rice production. Moreover, negative social

problem could occur such as no one to take care of the elderly parents in some families.

Land tenure systems

By land Law in 2013, land is owned and administrated by the Vietnam government. Farmers are allocated the right of land use, they have the right to transfer or donation of their land use right. Farmers are allocated the rice land use right not exceeding 3 ha for a period of not exceeding 50 years.

This is an opportunity and a challenge for farmers, especially for the vulnerable and poor farmers. They can feel secure about the rice production and improvement of their family life. On the other hand, many farmers who do not have the experiences and knowledge as well as capital investment must transfer their land use right to other farmers, they become the landless farmers who have precarious life and often received the government's support.

Research and development (R&D) capacity

In recent years, R&D capacity met the requirements for rice production development, contributed to ensure national food security and increase rice exports. However, in order to ensure the sustainable rice production in the context of the world advanced scientific-technological development and climate change, R&D capacity still faces challenges as follows:

- Scientific equipments have not been fully and synchronously invested to conduct R&D tasks.
- Training of human resource is enhanced, but has not met the requirements of the current context.
- Budget for R&D capacity has not been fully invested in research organizations.
- Sources of rice gene bank are not reserved properly. So in some cases, the rice genetic materials are not available for use.
- The current rice production poses more and more challenges to cope with climate changes, such as breeding rice varieties have high quality and yield, tolerance to pests, drought, submergence, acid sulphate soil and salt.

Status of extension services

Activities of extension services recently obtained a certain achievement, helped farmers to apply the new scientific-technological advances such as introduction of new rice varieties, new rice cultural practices and integrated pest management (IPM), integrated nutrient management (INM), program of 3 reductions 3 gains (reductions of seed rate, fertilizer and pesticide use; gains of productivity, quality and profit) ...

However, activities of extension services is still presently limited such as the investment for extension services were dispersed and spread; the advanced extension methods (e.g. Farming System Research, Farmer Participatory Research ...) have not applied widely throughout the country; extension workers have not professionally trained and sufficiently allocated across the country. These are challenges need to be considered to improve the extension activities in the future.

2.2. Opportunities for Vietnam's rice sector

Vietnam has weather and soil to its advantage for growing rice. The Mekong River delta, Vietnam's major rice basket, fortified by alluvium annually, is able to most inexpensively produce rice and related products.

Vietnam's farmers are rice-growing experts, experienced and industrious.

Many major rice-growing areas, with highly-evolved, heavily-invested irrigation systems, have abundant water for irrigation. Further, these areas have convenient roads and waterways for transporting the rice.

Rice quality for export is improving thanks to a high rate of mechanization in agriculture.

Rice is regularly mass grown in a range of quality-classifications throughout the year; hence, the quantity of rice available for export is often sufficient.

Vietnam's joining the World Trade Organization (WTO) helps rice export. Vietnam will expand its market and trademarked products that will be protected and at global-scale. Investors and companies have peace of mind in their own trademark building.

International business respects Vietnam's rice and Vietnamese rice exporters; and.

Vietnam businessmen are dynamic, fair, and have a flair in approaching and developing export markets.

3. Development plans and goals of rice sector

Ministry of Agriculture and rural development (MARD) issued the decisions related to strategies and planning of the agricultural and rural development in Vietnam and the Mekong delta in the period of 2013-2020 and vision to 2030. MARD is a leading organization that assigns and controls the subordinate and relevant offices such as the Department of Crop Production, provincial Departments of Agriculture and Rural Development and R&D institutions, local governmental agencies in implementing their tasks. These are executing organizations to implement the tasks in the agricultural and rural development. The following are some of the criteria set out to implement in period of 2013-2020 and vision to 2030 to aim at achieving the proposed targets.

- Vietnam is presently the world's third largest rice exporter, after India and Thailand. In 2013, Vietnam's rice cultivated area was 7.9 million hectares, the rice yield reached 5.6 t/ha, and the total production was 44.1 million tons.

- About 130,000 hectares of paddy area will be cut off and changed for growing other food crops in 2014. Total rice farming area in 2014 is estimated to be at 7.6 million hectares, the average yield is 5.7 t/ha, and production is about 43.4 million tons of rice.

- Currently, Vietnam's rice land is about 4 million hectares; MARD will maintain stably the rice land area of 3.812 million hectares from 2020 onwards. The average yield and production of rice in 2020 will be 5.9 t/ha and about 42 million tons respectively, and in 2030 will be 6.18 t/ha and 44 million tons respectively.

- In the Mekong delta where presently contributed 50% of the total national rice production and 90% of exported rice. The Mekong delta's rice cultivated area in 2020 will be maintained at 4 million ha, with an average yield of 5.9 t/ha and the rice production of 24.5 million tons. In 2030, rice farming area will be reduced to 3.8-3.9 million hectares, yield will be increased to 6- 6.2 t/ha and the total rice production of 23-24 million tons.

- Vietnam's rice exports in 2012 hit a record 7.7 million tons. The trends of rice exports will be declined to 6.67 million tons in 2013 and gradually decreased to a stable volume of 5 million tons yearly from 2020 onwards.

4. Implications or strategies for national rice R&D

4.1. Strategy for the development of science and technology for the agriculture and rural development in the period of 2013-2020.

Ministry of Agriculture and Rural development (MARD) has set up a strategy for the development of science and technology for the agriculture and rural development in the period of 2013-2020. In aspect of crop production, the MARD's strategy has focused on the research in plant breeding accompanied by the intensive cultural practices, crop protection, soil conservation to improve productivity, product quality, and protection of the ecological environment. The following are some contents of the research strategy in crop production:

- To study plant breeding and seed production including F1 hybrids create the plant varieties that have the high yield and quality, suitable for domestic demand and exports, resistant to the main pests, tolerant to abiotic stress, coping with the climate change.

- To study synchronously the intensive cultural techniques, procedures of integrated crop management and good agricultural practices (GAP) for major crops in each ecological region. The study must be prior for the input-saving measures, increased efficiency, environmentally friendly and sustainability.

- To study procedures of integrated pest management on the basis of applying the agronomic and biological measures to reduce use of pesticides.

- To study measures of soil protection, erosion prevention, improvement, increase of fertility, increased efficiency of land use on mainly land of food crops and industrial crops.

- To collect, store and evaluate the plant resources to serve for plant breeding in the short term and long term.

- To transfer new plant varieties, procedures of GAP, procedures of the extensive and integrated crop management to production to increase productivity, product quality, efficiency of production and business.

4.2. Scientific and technological project for the national product development in period of 2014-2020.

In respect of the rice R&D, MARD has planned to approve a scientific and technological project for the national product development in period of 2014-2020. The detail contents of the rice project is presented below:

- The theme of the national product development project: ***“Rice breeding for development of Vietnam rice product with the high product quality and productivity and high commercial value”***.

+ Objectives of the project:

❖ Scientific and technological objectives:

- Breeding and developing rice varieties have duration under 110 days in the North and under 100 days in the South; yield obtains not less than 7 t/ha in the Spring season and 6 t/ha in the Wet season; good rice quality: Amylose content $\leq 22\%$, long kernel $> 7\text{mm}$ and transparent and less or not chalkiness; resistant to main rice pests such as BPH and Blast, tolerant to abiotic stress, suitable to the main rice growing areas; rice varieties must be officially recognized and protected and existed for at least 10 years after release; rice export value reaches \geq US \$ 600/ton; the rice varieties' copyright must be transferred and assigned for companies or businesses to develop widely rice production in the main rice growing areas of the country.
- Breeding and developing the aromatic rice varieties have duration under 110 days in the North and under 100 days in the South; yield obtains not less than 6.5 t/ha in the Spring season and 6 t/ha in the Wet season; good rice quality: Amylose content $\leq 22\%$, long kernel $> 7\text{mm}$ and aromatic; resistant to main rice pests such as BPH and Blast, tolerant to abiotic stress, suitable to the main rice growing areas; rice varieties must be officially recognized and protected and existed for at least 10 years after release; rice export value reaches \geq US \$ 800/ton; the rice varieties' copyright must be transferred and assigned for companies or businesses to develop widely rice production in the main rice growing areas of the country.

- To apply molecular markers in rice breeding to improve the rice quality, pest resistance, abiotic tolerance and yield stability of the most commonly used rice varieties in Vietnam.
- To improve the technical procedures of rice seed production and procedure of the GAP - advanced cultural techniques; enhance the added value, reduce the production costs, reduce the greenhouse gas emissions and ensure food safety.
- To improve and enhance the efficiency of pest management towards increasing rice production and quality and ensuring food safety.

❖ ***Economic and social objectives:***

- To help establishing commercial rice growing areas, thereby forming a link between the scientific research institutions, farmers and businesses.
- To ensure the national food security, demand the domestic rice consumption, enhance the Vietnam rice prestige and value in the world rice market.
- To contribute to increase farmer's life, eliminate hunger, and alleviate poverty, protect environment and people's health, promote the new rural construction.

+ ***Targets of the project:***

- ❖ Newly breeding and releasing 2-3 new rice varieties for each region (North and South) that have short duration (<110 days in the North, <100 days in the South), yield obtains not less than 7 t/ha in the Spring season and 6 t/ha in the Wet season; Amylose content \leq 22%, long kernel > 7mm, no chalkiness; resistant to main rice pests such as BPH and Blast, tolerant to abiotic stress. Selecting 3-4 rice varieties of the most commonly grown rice varieties for each region (North and South) that have the similar characteristics of the above newly bred and released rice varieties. Rice export value is about UD \$ 600/ton.
- ❖ Newly breeding and releasing 2-3 aromatic and specialty rice varieties for each region (North and South) that have short duration

(<110 days in the North, <100 days in the South), yield obtains not less than 7 t/ha in the Spring season and 6 t/ha in the Wet season; Amylose content 18 - \leq 22%, long kernel > 7mm, aromatic, no chalkiness; resistant to main rice pests such as BPH and Blast, tolerant to abiotic stress. Selecting 3-4 aromatic and specialty rice varieties of the most commonly grown rice varieties for each region (North and South) that have the similar characteristics of the above newly bred and released rice varieties. Rice export value is about UD \$ 800/ton.

- ❖ Improving 3-4 rice varieties have been widely grown in Vietnam by introgressing genes governed some traits such as low amylose content, pest resistance (Bph, Blast), abiotic stress (salt, surmergence, drought).
- ❖ Set up procedures of the intensive cultural techniques, the integrated crop management and the good agricultural practices (GAP) for each selected and newly bred rice variety in each region (North and South).

Agencies and organizations

+ Agencies and organizations joined in the project:

- ❖ Leading agency: Ministry of Agriculture and rural development.
- ❖ Executing agencies: Vietnamese Academy of Agricultural Sciences and its subordinate institutionals such as Cuulong Delta Rice Research Institute, Agricultural Genetics Institute, Food Crops Research Institute, National Institute for Soils and Fertilizers, Institute for Agricultural environment, Plant Protection Research Institute. Some other Vietnamese agencies such as Vietnam Institute of Agricultural Engineering and Post-harvest Technology, Vietnam Academy for water resources, Cantho University, Hanoi University of Agriculture, An Giang Plant Protection Joint Stock Company, Southern Seed Joint Stock Company, Vietnam National Seed Corporation, Thai Binh Seed Corporation, and Provincial Seed Centers of Vietnam.

- ❖ Suggested coordination agencies: International Rice Research Institute (IRRI), International Plant Nutrition Institute (IPNI), Center for Agriculture and Bioscience International (CABI), International Food Policy Research Institute (IFPRI).

5. Possible common development objectives across the region

In 2014, the rice exporting target of the major rice exporting countries such as India, Thailand, Vietnam, Pakistan and Myanmar have changed remarkably. India can be the first largest rice exporter plan to export about 10 million tons of rice, and then Thailand is of 8.5 million tons of rice, Vietnam is of 6.7 million tons of rice, Pakistan is of 3 million tons of rice and Myanmar is of 0.75-1 million ton of rice. Rice exporters will face severe competition from 2014 onwards due to reduced prices in the world's rice market. Rice farmers and enterprises can be lost their benefits.

Regional linkage in rice production and trade is presently very important and needs to be established. It will ensure the national food security and stability of rice production and trade and benefits of the rice farmers and enterprises.

Besides, rice germplasms and varieties should be exchanged among countries in the region to strengthen R&D capacity and rice production and trade.

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