National Rice Development Strategy

Country : Malaysia
Date: 31 March 2014
Presented at: CORRA-GRiSP National Rice Development Strategy Workshop SE Asia, Malaysia, 6-7 May 2014
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Introduction: Current status rice sector

Describe relative importance of rice the country's economy, and current status. One can think about acreage under rice, average yield, production; typical rice ecologies (irrigated, rainfed etc), importance for national food security and/or export; rice import status.

Rice is an important commodity and has been a staple food of the Malaysian community. Unlike other commodities, rice is a strategic crop in terms of food security, poverty eradication and other social and political concerns. Irrigated lowland rice is apparently the most important rice ecosystem in Malaysia. The total physical lowland rice area in Malaysia is 385,683 ha and total planted area of 688,207 ha (DOA 2013). About 76 % of the planted area are in peninsular Malaysia, 18 % in Sarawak and 6 % in Sabah. Irrigated rice constitute 87% of rice cultivated area and are mainly concentrated to eight granary areas (Muda, Kemubu, North West Selangor, Kemasin-Semarak, Kerian-Sungai Manik, Pulau Pinang, Ketara and Seberang Perak) and many mini granary areas which are provided with extensive irrigation and drainage facilities. Currently the eight granaries are practicing double cropping which covers 52% of the total physical lowland rice area. The expansion of four new paddy granaries in Kota Belud (Sabah), Batang Lupar (Sarawak), Rompin and Pekan (Pahang) covering 19,000 ha isin progress.

The national average productivity is 3.8 t/ha whereas average yield in the granary areas is around 4.7 t/ha. The irrigated rice areas consistently contributed more than 85 % of the national production while the granaries contribute 66 % of the total national rice production. In 2013, the country's rice production amounted to 2,626,881 t of paddy (approximately 1,693,852 t of white rice) and achieved 71.4% self-sufficiency level (SSL) in rice (DOA 2013). The remaining rice requirement is imported from neighboring countries especially Thailand and Vietnam. The target SSL in rice often varies with a minimum level as low as 65%. In the National Agro - food Policy 2011- 2020 (NAP), the SSL in rice is targeted to more than 70% and should be reviewed from time to time, considering food security, global market price and the relative cost of importing scenarios (MOA, 2011). Generally, the target is more than 65%, taking into account food security and the need to meet the requirements and obligations of the AFTA and WTO and other national economic considerations.

As defined by FAO (2006), there are four main aspects in the food security, namely availability, accessibility, utilization, and stability. On food security, one of the priorities is to ensure the supply of rice is sufficient for the people. During the 10th Malaysia Plan (2011-2015), Malaysia aims to maintain rice stockpile at 292,000 metric tons or sustained consumption for 45 days. The government will endeavor to increase the productivity of existing granary and non-granary areas through the upgrade of infrastructures and expect local production of rice to fulfill a 70% level of self-sufficiency.

The current rice import policy supports the nation's self-sufficiency policy in that the import volume depends on the production of local rice. To fully meet the rice requirement of the country, Padiberas Nasional Bhd, BERNAS (a private entity given the sole right to import rice to Malaysia) imports about 30% to 40% of Malaysia's domestic rice demand annually. To protect the local rice farmers, BERNAS' import volume merely covers the shortfalls of demand after ensuring the local rice production finds its way to the market. BERNAS also imports special rice varieties that cannot be produced locally like basmati and fragrant rice to cater to the various types of culinary tastes of our multi-racial society. Rice imports by Malaysia in 2013-14 increases to around 1.1 million tons, up about 5% from an estimated 1.05 million tons of rice imports in 2012-13.

Main challenges and opportunities

Describe the main challenges facing the rice sector. Think about national food security, import or exports, climate change, resource scarcity, urban migration, land tenure systems that need overhauling, R&D capacity, status of extension services, capacity issues, etc.

Efforts to improve rice production in Malaysia are very challenging. Raising food prices, uncertainty of climatic condition, overpopulation and limited resources are the key issues and challenges facing rice production and food security in Malaysia. Malaysia's SSL for rice at present is only about 71% and the balance of her requirement is imported. Relying on importation for rice is very risky due to the fact that the amount of traded rice in the world market is relatively small, amounting to only about 7% of world production. Any mishap or calamity in the Malaysian traditional exporting countries, either due to drought, flood, or pest and disease outbreak, may reduce their production or thus limit their export volume. As demonstrated during the 2008 rice crisis, within a few months, rice prices shoot up from around US$300/t to about US$1000/t. However, even after the crisis ended, the rice price never went back to its pre-crisis price but remained at about US$600/t that might indicate the ending era of cheap rice in the world market.

There will also increasing demand over the foreseeable future and rice production and supplies will have to continue to grow to meet the demand. Maintaining the SSL at about 70%, as stipulated by the government is a huge

motivational challenge. This challenge is further compounded by an increasing population size (2.5% growth per annum) and by decreasing amounts of suitable agricultural land. Land available for agriculture is becoming limited due to competition for industrialization, urbanization and expansion of residential areas so that the need arises to maximize land productivity. Fatimah *et al*. (2011) reveal that the reduction in paddy area is expected due to the conversion of the paddy area to other agricultural and non-agricultural activities. Therefore, the original SSL target is difficult to be maintained together with the increasing demand from a growing population. Without choice, the national production of rice to accommodate 71.4% SSL need and will have to come from less land.

Irrigation water use accounts for 80% of the total water consumption (Facon, 1999). The remaining 20% is used for domestic, industrial, recreation and hydro power generation purposes. However, the water demand from domestic and industrial sectors will increase exponentially in the future and these sectors are always given high priority compared to other sectors, including agricultural. This may result in reduced water allocation for paddy cultivation. Therefore, it is of urgent need to increase water productivity so as to sustain sufficient water for paddy cultivation.

Due to global warming, the weather conditions are getting more erratic and extreme. During the past decade, incidents of floods and droughts were also getting more frequent. The severity of flooding in some regions has reached unprecedented magnitudes. Both flood and drought pose serious challenges in sustaining land productivity. Floods destroy standing crops while droughts inhibit planting due to insufficient irrigation water. Global warming also has significant effect on rice production where rice yield dropped by 1 percent with every degree increase in nighttime temperatures. In order to meet the increasing rice demand and with the unfavorable environments, major changes in rice growing is needed. New technologies in plant breeding and crop management must come together to make any significant advances and help facing these challenges. Rice has to be grown with less water with the development of drought tolerant varieties, the aerobic rice and improvement of hill rice production system.

Pests and diseases may pose great challenge for crop cultivation in the future. Excessive and indiscriminate use of chemicals for the control of pests and diseases may result in the emergence of new strains of pests and diseases that are resistant to chemical applications. The potential risk of major outbreak of pests and diseases which may result in wiping out substantial areas of the standing crop cannot be ruled out at any point of time. If this were to happen then he land productivity will be severely affected.

The latest technology practices for paddy cultivation e.g. precision farming technique is readily available. However, precision farming is still not widespread in the granary areas due to the reluctance of farmers in adopting this new technology. Agriculture extension service has to be intensified to promote such technology to the farmers so as to increase water and land productivity.

Rural-urban migration has also contributed to declining rural agricultural activities due to declining farm labor. It is within this context that rice cultivation should be developed into less labor-intensive activities, providing good return from investment.

Development plans and goals of rice sector

Describe any national plan, strategy, goals related to development of the rice sector. What are the main pillars, cornerstones, themes, sub-components of the plan/strategy. Are there any quantitative goals, such as rice self sufficiency or production of X tones by year Z, export of X tones of rice by year Z, etc? Maybe even more detailed like increase national average yield from X to Y tons/ha by year Z. Are there any environmental goals? Who are the main executing agencies of the development strategy, who is the lead agency?

The Ministry of Agriculture & Agro-Based Industry Malaysia is responsible to spearhead the transformation process within the agriculture sector via a planned, integrated and holistic approach towards realization of the National Agro-food Policy 2011-2020 (NAP). The government has outlined a number of approaches and efforts in improving the productivity and stability of food production to ensure food production is guaranteed. In the 10th Malaysia Plan, the government emphasizes strategic approach to food security, which aims to ensure the sustainability of the food supply, food accessibility and affordable food prices to the public. The National Agro-food Policy (NAP) which replaced the Third National Agricultural Policy (NAP3) aims to increase food production in the country to meet the growing demand and high value agricultural development which is an increase in the contribution of the rice production to national income and agriculture entrepreneurship development. The main focus of this policy is to increase the production and productivity to ensure food supply, exploration of high-value agriculture, strengthening supply chain, the implementation of sustainable agricultural practices and human capital development and more participation by the private sector and effective government support (MOA, 2011). The local rice production should be increased to ensure sufficient supply as only 7% of total world rice production is traded. The stability of supply, growing demand and the small quantity of rice being traded in the international market tend to cause volatility in prices of rice.

The per capita consumption of rice in the country is around 79.6 kg which indicates that Malaysia has to produce around 2.3 mil t of white rice during the current year. In 2020, at the growth rate of 2% per annum, the population of Malaysia is projected at

32.37 million people. Assuming the consumption rate to remain unchanged, then the white rice requirements during the year amounted to 2,577 mil tons. If the 95% SSL target is to be achieved then productivity must be increased to 6.12 t/ha. On the other hand, if SSL target of 72% is maintained, the average national yield of rice for the country should reach 4.64 t/ha instead of 3.8 t/ha at present. To ensure the stability and continuity of national rice production, the government initiates the rice subsidy policy as a mechanism to promoting and increasing production. This intervention suit to fulfil three main objectives, namely:

- To ensure food security
- To improve farm productivity and farmers income
- To ensure the consumers get the staple food at an affordable price

The government has introduced several new forms of subsidies and incentives to boost the country staple food production. Rice sector was identified as one of the National Key Economic Areas (NKEA) under the Economic Transformation Programmes. NKEA agriculture will focus on the sub-sector that has great potential growth to drive Malaysia to participate in global markets which focuses on strategic sub-sector to ensure the country's sufficient food supply. Three out of 16 EPPs identified, will involve the rice sector namely EPP 9 (cultivation of fragrant rice varieties in idle land and non-major granaries), EPP 10 (cultivation of rice in Muda granary) and EPP 11 (rice cultivation in the other granaries (including KADA, Kemasin Semerak IADA and KETARA).

The government will maintain buffer stocks of rice at 292,000 tons to meet the food requirement for 45 days. Stockpile management mechanism will be improved to ensure more strategic management and cost-effective. Simultaneously, long-term contractual agreements for importing rice with matching agreement of oil palm and oil are signed. The government will also ensure that production yield could be increased by upgrading the existing infrastructure to improve the productivity in the granary and non-granary areas.

Implications or strategies for national rice R&D

Is there a rice R&D plan? If so, please describe. Goals, objectives, themes, any specific targets? Who are the main executing agencies of the R&D strategy, who is the lead agency?

The Agro-food sector in Malaysia must be transformed through R&D outputs. There were seven strategic directions outlined in the National Agro-food Policy (NAP). Enhancement of R&D, innovation and use of technology is one that has been identified. As articulated by FAO, in its 10-20-70 principle, the bulk increase in rice production (70%) should be realized through R&D, innovation and policy initiatives; while the remaining 10% and 20% increases should be due to land expansion and crop

intensification, respectively. Production gaps between potential yield and actual yield currently obtained by farmers in rice production areas in Malaysia are large. The need for a consolidated and integrated research program to achieve definite targets is vital to sustain rice availability for national food security. It is important to establish a research network of smart partnerships to enhance capacity building in R&D, integration and consolidation of R&D initiatives, resulting in outcomes benefiting the nation as a whole. The R&D on rice is also geared towards improving productivity/efficiency, development of value added products, sustainability and other related R&D which will be able to keep our SSL at a comfortable level but also managed to reduce foreign exchange by reducing imports, help increase farmers income, and gradually lessen government subsidy to the industry. The urgency to re-orient and align national research efforts in the paddy and rice industries is a manifestation of the crop's importance as a staple food and part of national food security.

Currently most of the rice research is undertaken centrally by the Malaysian Agricultural Research and Development Institute (MARDI), along with other small and limited research activities conducted by universities, agencies and private organizations. The R&D conducted by MARDI follows the national research agenda formulated by policy and market considerations. MARDI, as a R&D agency related to the national agro-food industries focuses on the technology generation. However, the effectiveness of R&D in MARDI is influenced by the availability of funds and adequate expertise. At the same time, farming infrastructure must also be optimized. Selective R&D activities are undertaken by MARDI based on challenges such as increasing competitiveness, sustainability and food security, environmental sustainability, attraction of private investment and should also in line with market and customers requirements who will adopt the relevant technology and innovation. Research and development on rice could be covered under the following themes:

- Varietal development
- Pest and disease management
- Sustainable and precision crop management
- Farm mechanisation and post-harvest handling
- Adaptation and mitigation to climate change
- Development of early warning system in the management of diseases and pests
- Post harvest technologies to increase production
- Rice quality and utilisation
- Technology transfer,policy rationalisation, competitiveness and supply chain.

The major challenge for the researchers is to deliver environmentally sustainable rice technologies that will benefit farmers, leading to technology-driven farmers practicing sustainable crop production systems. Rice R&D conducted in MARDI is practically addressing issues and challenges facing the country, which includes food security, sustainability, producer/consumer welfare and other national strategic

concerns such as poverty eradication, equity participation, and international commitment for free trade etc. Since her inception, MARDI has been embarking on R&D covering the whole value chain of the rice industry that is from varietal development to policy studies. These R&D initiatives are driven primarily by the need to ensure food security and sufficient supply of rice to the whole population at a reasonable price. This is particularly important because Malaysia has always been the net importer of rice.

Due to the difficulty in the expansion of physical rice area, then the intensification of R & D activities is vital to provide a technology that can be used to stimulate and increase the country's rice production and this can be achieved through the following measures :

1) Increase the level of productivity per unit area per growing season in the irrigated areas (t / ha / season)
2) The increase in cropping intensity to 200 % or 250 % a year
3) More efficient rice production in rain-fed and marginal areas

Possible common development objectives across the region
What's really important, seed source and systems, standards of trade, variety registration and release.

Seed source and continuation of rice seed sharing through various common biotic nurseries will remain useful to many countries. It is a means of sharing and obtaining donor parents for utilization in the breeding program for resistance to biotic stresses.

Research program on identifying donor parents and sharing of advance breeding lines to abiotic stress (salinity, heat and drought tolerance) should be intensified. This is due to the fact that good agricultural land was diminishing at certain rate in most countries due to climate change, urbanization and the need to expand rice cultivation to marginal and less fertile or friendly lands.

Conclusion

Rice production in the country is still insufficient to fulfil consumption need of the people, and hence the need for rice importation from the neighboring countries to fulfill the gap. Challenges in global and domestic rice production, such as the occurrence of natural disasters and climate change are inevitable and unpredictable. The National Agro-Food Policy is aimed to increase the production and productivity to ensure food supply and food security. Since new areas for rice cultivation is limited, rice production

at the current and immediate term can only be increased through improving productivity per unit area which can be achieved through research and development, supported by infrastructure development to increase cropping intensity. For the long-term research, focus should be on the developing of rice varieties suitable for marginal lands with multiple abiotic stresses. Research and development in rice for food security should be holistic and inclusive. Hence, rice R&D and efforts to enhance food security at the national and household level deserve support from government and other related agencies.

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