

The role of technological transfer to strengthen food security in the ASEAN region

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Abstract

This paper reviews the importance of technological change, present problems and constraints in technology transfer, and the strategy to increase transfer of technology in improving food security of ASEAN region.

Introduction

Almost all of the ASEAN member countries have been trying to increase production of staple food and feed grains, as efforts to achieve self-sufficiency to strengthen food security in the country concerned. Programs have been launched in country like Indonesia, Thailand, the Philippine and Vietnam to expand rice production not only to meet the people's demand for this staple food but in the case of Vietnam it is also intended for export, as a source of income for this country. Extensification as one possibility to increase capability to produce more rice, seemingly has been hindered by the fact that land area is limited, and arable land has been converted into non-agricultural purposes such as industrial area, residential area and many others. Therefore, in order to keep abreast with the constant increasing demand, intensification is one of the most promising programs that can be explored further. Improvement and construction of new irrigation facilities, intensifying cropping systems, the use of high yielding varieties (HYV) are among the most popular programs which are being carried-out in ASEAN as an integral part of the intensification programs.

Multiple cropping utilizing the wet season optimally by increasing the number of planting from one to two or even three times a year, has been made possible by HYV's which are normally having short maturity period, providing the fertilizers and water supply are adequate. It should be pointed-out, however, multiple cropping creating new problems and difficulties in postharvest such as harvesting, threshing, drying, milling and storage, that made grain

deterioration commonly occurred if proper post-harvest technology is not conducted in due time. High yielding varieties have characteristics which may cause problems, such as shatters easily, non-uniform maturity stage, and sometimes having more chalky kernels than the traditional variety. Therefore, aside from its high productivity, HYV has some weaknesses primarily in the post-production systems, which have to be tackled properly, otherwise the energy spent to increase production will be wasted.

Some references indicated that aside from technological problems there have been constraints that prevent post-production industry from increasing its efficiency, and these constraints apparently come from the food systems itself. Therefore in order to find the best solution to that existing problems the broad system frameworks which starts from production, processing up to the consumption should be analyzed critically. It is generally known that food systems functions as facilitator to the flow of food products from the point of production up to the point of consumption, and it is supported by various components that inter-relates one to another. The movements of products from one stage to another should be done in the most efficient way in terms of economic cost, with the minimum qualitative and quantitative losses, and maximum outputs that can give maximum benefits to consumers.

The ability to minimize losses, and increasing the roles and functions in maintaining the continuous supply of food with minimum loss, for sure will increase efficiency of the food systems, improving its performance, and at the same time will increase the availability of food for consumption. In this respects, all supporting elements whether it be infrastructure, financial supports, research and education, as well as the government policy will play a crucial role in determining the efficiency of the systems. The government as facilitators, private sectors as the executioners and research institutions as a source of new invention and technology should cooperate closely in order to increase post-production efficiency as described earlier. Government through their policies guidelines, enactment of favorable laws may provide a conducive environment that make activities in each stage in the systems can be carried-out in a way that can ensure the accomplishments of the objectives such as self-sufficiency or strengthening food security in the country. In addition socio-cultural, climatic and political

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dimensions should also be taken into consideration in the operation of the food systems.

The importance of technological change

Grain production like most of agricultural commodities, is very much influenced by uncontrollable factors such as weather and climatic conditions, natural calamities, pest and diseases any many others. Efforts have been focused on how to minimize those natural factors through, among others technological development, improvement of plant varieties, control of pests and diseases. It is quite obvious that grain production increase which has been experienced by some ASEAN member countries is an outcome of long and tedious works. The process is started with improvement in cropping system, the use of high yielding varieties, post-harvest technology development, pricing policy for inputs and outputs, marketing and distributions, and all are carried-out integratively to get the most optimal ways to increase grain production. After the grain production increases, as a consequence it may increase the surplus stock, and followed by the decline of the price of this commodity in the market. On the other hand consumers tend to choose better quality rice to meet their taste and there are more choices in the market.

The problems emerge as the demand for grain keeps increasing at relatively high pace due to increasing income and population growth, whereas the rate of growth for production may not keep up with such a fast moving consumers demand. On the other hand there has been an indication that grain production has reached its levelling-off stage, fatiqueness in the farming sectors due to several reasons, and there has been no technological breakthrough in production, coupled with land conversion to non-agricultural purposes, the incidence of pest and diseases outbreaks and many others that hindered the grain production.

Encountering such a situation new strategy has to be sought, among others by intensifying utilization of post-harvest technology available which have been lying idly in the university laboratories, research stations or at the government research and development centers. In the last ten years various post-harvest technology have been developed, such as paddy threshing machine by using a simple motorized pedal thresher suitable for small farmer. simple one-pass mechanical dryer or flat-bed-type mechanical dryers and many others which basically provide new technology to reduce the qualitative and quantitative losses that may occur after post-production.

In addition to improvement on hardwares, progress has been made on the development of softwares in various aspects such as storage management aiming at increasing efficiency in maintaining grain quality during storage.

Application of decision support system encompassing all of the pest management issues faced by BULOG, including cost-benefit considerations, and a suite of generic training tools to teach pest management concepts and techniques, as well as diagnostic skills, and a set of simple keys for training field staff in pest identification. All are incorporated in a system comprised of several modules which have been developed by ACIAR in collaboration with BULOG, can be used as an example on how improvement in transferring knowledge and understanding through interactive training with more effective communication can lead to application of more effective storage procedures, reducing weight and qualitative losses and pesticides usage.

Problems and constraints in technology transfer

It is quite common in developing countries that introduction of new technology cannot reach the target beneficiaries, which actually need technological change to improve the existing conditions. Such a transfer cannot be performed smoothly due to various reasons.

Lack of price incentive

In most ASEAN countries government play a key role in influencing the price of grain in the market. Some countries have set-up a support price to guarantee that farmers can sell their product at reasonable level, which means they can get reasonable income to maintain production. However, it seems likely that quality is not key determinant in setting the price level. A higher price is not always linked with premium quality, therefore such a policy in fact discourage farmers to use improved technology.

Lack of marketing information

It is common practice that farmers rely on intermediaries to market their products, and information concerning price of various commodities is hardly received by the farmers. As a result farmers tend to receive whatever price offered by the intermediary, which sometimes disregard the quality of products delivered by farmers. Such a practice hinders farmers from making progress in improving their technology to produce a better quality products.

Socio-economic factors

Farmers in most of ASEAN countries have relatively small hectareage, and in Indonesia land area per farmer is less than one hectare, therefore it is hardly meet the economic of scale, which place them as subsistence farmers. Low productivity and high production costs has constructed to low financial return, that force farmer to sell their product immediately after harvest. The need for cash and their inability to market their product have discouraged them from

utilizing new technology which actually may increase the value added of their products. In such a situation technology transfer obviously may not be performed as it is expected.

Lack of education and knowledge

Most of farmers are not well educated and have limited knowledge in farming management, therefore it is obvious that their reception towards new technology is not always positive. In the contrary, introduction of technology frequently perceived as a threat to their job opportunity. The adoption of labor-saving equipment such as mechanical dryers, fully mechanized processing unit would displace labor. This situation has made the improved technology become unpopular and resulting resistant from the farmers, and furthermore it may discourage them to receive any technological change. Inadequate knowledge in basic operation of post-harvest equipment, may bring about wrong perception about the technology.

Lack of support from extension specialist

Development of various technology is seemingly not properly disseminated to target beneficiaries due to lack of extension workers' support. Inadequate and inefficient delivery of extension services for technology transfer and information, has caused a major constraints in the adoption of new technology. Lack of awareness and technical knowledge concerning new postharvest technology has discourage private sector to upgrade and modernize their operation in rice processing, drying or storage.

Strategy to increase transfer of technology

The population increase and a better income have a strong impact on the consumption which brings about problems to the government in ensuring the availability of food to fulfill such a demand. As indicated earlier there have been some limitations to increase production due to various reasons, and therefore improvement in technology or technological breakthrough could be one of the solution to the problems.

Recognizing the difficulties in disseminating information and technological transfer to the end users, new strategy seems to be needed to accelerate the adoption of various technology and to encourage farmers to optimally utilize the technology. The strategy should at least cover the followings:

Government assurance to provide a better price for premium quality

Price differential for a better quality product would give a strong incentive to farmer to improve the quality of their products. Utilization of technology on processing of agricultural products normally needs additional inputs such

as more energy which directly increase the production cost. However, additional costs can be off-set by higher price received as a results of a better quality products. With price guarantee based on quality standard will assure farmers to get a higher value added, which in turn increase their income. Such a strategy will encourage farmers to adopt a better technology.

A better linkages between research and extension

Research works in various fields to support production increase and quality maintenance have been carried out in universities and research institutions. With a strong linkages between research and extension to actually implement the research outputs into action programs will certainly ensure the smooth conduct of technological transfer to increase production to strengthen food security.

Education and training as a part of human resource development program

Lack of knowledge and education which are commonly found among farmers, extension workers and store managers should be minimized through an intensive training and implementation of education programs. A special package of training program can be developed based on the actual problems encountered in the fields and should cover various aspects, which integrated into a comprehensive training program. As an example on the implementation of decision support system developed under BULOG-ACIAR projects, a package of training using computer assisted learning programs has also been developed. This package consists of three components started with a suite of simple interactive keys for training field staff in identification of pests species, and followed by a 'Teach' an interactive tutorial system on a range of essential pest management concepts and techniques and a module which aims to train users in the logical processes used by experts in diagnosing the problems encounter in the field. A complete and simple materials of the training program will encourage trainers to learn more and increase their understanding on the substances tough in the training program. Improvement in field staffs' knowledge will certainly increase the perception of new technology which in turn increase the pace of technology transfer.

Provision of financial support

One aspect constraining the adoption of technology is lack of capital to acquire equipment. Inability of farmers to purchase improved machineries to increase production simply due to lack of capital. Therefore provision of special credit lines or other forms of financial supports will have positive impact on the adoption of technology.

Summary and conclusions

In most ASEAN member countries government still play an

important role in ensuring food security at national and household levels. To increase the food security status those government rely on domestic productions, and therefore efforts have been geared towards the attainment of domestic food production increase, among others through improvement in technology, particularly postharvest technology.

It is generally known that various technologies developed can be used to increase food production to strengthen food security, however, the adoption and implementation of such technologies have been minimal and faced many problems. In addition transfer of technology cannot be performed maximally due to various reasons, among others: lack of price incentive, lack of knowledge, and lack of capital which brings about low reception and discourage farmers from utilizing the technology. The major constraints at the consumption side are demand for low quality products is still high due to inadequate supply and inability of government to enforce food quality standards. Therefore strategy to increase adoption and implementation of technology should be set-out, as an overall strategy to increase food production. Such strategy should cover the government assurance to provide incentive for a better quality product, financial support, strong linkages between research and extension and human resource development through comprehensive training.

It is concluded that using such strategy transfer of technology to target beneficiary and adoption of the technology can be improved and at the same time be speed-up, meaning the implementation of a better technology to increase food production can be carried-out intensively and be accelerated at a higher rate, as a part of the overall strategy to increase food production to strengthen food security.

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