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Capacity Building on Food-Crop Farming to Improve Food Production and Food Security in Central Java, Indonesia

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Abstract

This paper describes the capacity of food-crop production for improving regional food security in Central Java, Indonesia. It also identifies crops which have high and prospective economic-values. The results of the study might help in formulating a proposed model to improve food crops production in supporting food security. The case study was conducted in districts which play the important roles on agriculture (rice) production in Central Java, Indonesia. These are Klaten and Magelang districts. Data were collected from farmers and officers from agriculture-related institutions. The results show that Central Java Province has the capacity on food crop (rice) production for securing food availability, distribution, and accessibility for people in the region. It has a moderate on food security for the products, and surplus of production have distributed to other regions within the country. However, other food crops still facing shortage of supply since lack of productions. It requires a commitment from government and stakeholders for improving capacity building on agricultural development.

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Introduction

Indonesia is an archipelago country with 240 million people and the world's fourth most populous country. Agriculture supports the livelihood of millions of Indonesians. Three out of five people still live in rural areas with the main occupation on farming. Agricultural sector plays an important role in the economy in Indonesia, and shared to Gross Domestic Product (GDP) for about 15.31% in 2010 and 15.01% in 2012 (see, Table 1). In 2012, agricultural sector avails raw materials (especially for industrial or manufacturing sector) and employment for about 41.20 million or 36.52% of labour force in the country. As an agro-based country, the development of agricultural-related sectors will lead the socio-

economic progress. These are not only producing economic-commodities, but also important to the basic functioning for the human life by providing food productions. With the population growth rate of 1.7%, Indonesia will demand in a larger amount and varied food commodities. One of the main issues in Indonesian agricultural development is related to food security, and as a foundation for development of other sectors (CBS, 2006; Rachman *et al.* (2007). For the period of 2010-2012, average growth rate of agricultural sector is about 5% per year. Manufacturing sector had a highest share to GDP (23.57%), followed by agricultural sector (15.01%), and trade sector (13.65%). However, agricultural sector provides a highest share in providing employment for the people.

Table 1: Contribution to Gross Domestic Product for the Period of 2010 to 2012 (in percent)

No	Sectors	2010	2011	2012
1	Food-crops, Veterinary, Forestry, and Fisheries	15.31	14.72	15.01
2	Mines	11.16	11.93	12.47
3	Manufacturing Industry	24.79	24.28	23.57
4	Electricity, Gas, and Water Supply	0.76	0.75	0.75
5	Constructions	10.27	10.19	10.18
6	Trade, Hotel, and Restaurant	13.71	13.76	13.65
7	Transportation and Communication	6.57	6.61	6.53
8	Finance, Real Estate, and other Services	7.25	7.20	7.21
9	Services	10.17	10.55	10.64
Total		100.00	100.00	100.00

Source: CBS Indonesia, 2012

Agricultural policy in Indonesia has been primarily concerned with implementing production-based policies designed to pursue food self-sufficiency, especially rice. This goal was reached in 1984, when domestic rice production exceeded consumption. The current agricultural development policy in Indonesia has been launched in 2005, called Revitalization of Agriculture, Fisheries and Forestry. The policy is considered as one of the triple-track strategies of economic development (Suryana and Sudaryanto, 2006) and to improve people's welfare and to place strong base for economic development (Subejo, 2007). From the point of view of agricultural revitalization, food security is unarguable step to encounter problems and to achieve the policy objectives.

Sustainable food security is defined as the ability to provide adequate food for population from time to time - as such they will be able to live healthy life and can undertake their daily activities. Adequate in this sense includes quantity, quality, and accessibility to food products for all (Mustamin, 2000). According to Suryana (2008), food security has three dimensions: (a) availability of sufficient quantities of food in appropriate quality, and supplied through domestic production or imports; (b) accessibility of households and individuals to appropriate foods for a nutritious diet; and (c) affordability of individuals to consume food according to their respective socio-economic conditions, cultural backgrounds, and preferences. In the operational sense, food security entails food availability, accessibility, and stable procurement.

Table 2: Growth for Agricultural Sub-sectors in Indonesia, 2008-2011

No	Sub-sectors	2008	2009	2010	2011
1	Food-crops	6.06	4.97	1.64	1.26
2	Plantation	3.67	1.73	3.41	3.94
3	Livestock	3.52	3.45	4.27	4.49
4	Forestry	-0.03	1.82	2.41	0.65
5	Fisheries	5.07	4.16	6.01	6.72
6	Agriculture	6.01	4.63	6.20	6.46

Source: CBS Indonesia, 2012

In Indonesia, one of the problems on agricultural sector related to the stagnancy of productivity. During the First Five-Year Plan (year 1969), rice production was 2.2 ton per hectare and 30 years later became 4.5 ton. Table

2 indicated food production in Indonesia for the year 2007. While, data for rice supply and demand for the year 2005-2008 is described in Table 3. Agricultural development have reached food sufficiency might facilitate economic

growth in rural areas (Sajogyo, 2003). However, if there is no incentive system which benefited to small-scale farmers, therefore, the production system will benefited to large-scale farmers and food-traders. Another problem related to the performance of food security which should be solved appropriately.

In relation to Indonesian agriculture and food productions, Central Java Province is one of the “buffers” for agriculture productions at the national level. This province consists of 29

districts and 6 municipalities, with the total area of 3.25 million hectares (1.70% of Indonesia). One-third of the area is utilized for agricultural activities, and most of them are irrigated land which can be cropped for paddy twice in a year (CBS, 2008). Population of Central Java Province at 2008 is more than 33 million with the growth rate for about 1.5% per year (CBS, 2008). There is increasing amount and pattern of food demand, hence, food security concept need to be socialized to all stakeholders.

Table 3: Rice Supply and Demand in Indonesia, 2005-2008 (million ton)

No	Food Balance	2005	2006	2007	2008
1	Production (Paddy)	54.15	54.45	57.16	60.28
2	Production (Rice)	30.67	30.84	32.37	34.14
3	Consumption	30.59	30.00	31.50	31.70
4	Import	0.19	0.44	1.30	-
5	Ending Stock	2.04	2.32	4.49	6.93

Source: CBS Indonesia, Suryana, 2008

West, Central and East Java, the three most populous Indonesian Provinces with a combined population of over 100 million produce almost 30 million metric tons of rice annually, plus substantial other food crops. It is a remarkable statement of the basic productivity of the agricultural resource base of the island, and this is especially the case as the average land holding is about 0.3 hectares. Total rice production on the whole of the island of Java in 1965 was only 4.9 million tons, indicating more

than a six-fold increase in production. Over the same period per capita rice consumption rose from 85 to 140 kilograms per year, while the population increased 140 percent. Substantial gains in rice production on Java, Indonesia’s most productive rice-farming zone were largely offset by population and per capita consumption increases. For supplying domestic demands, Indonesia still import some agricultural products as indicated in Table 4.

Table 4: Indonesian Food Import Dependency, 2007

No	Commodities	Production (million ton)	% Import to Total Supply
1	CPO	17.40	0.00
2	Rice	32.37	4.00
3	Maize	13.30	8.10
4	Sugar	2.45	13.50
5	Beef	0.36	28.00
6	Soybean	0.59	61.80
7	Wheat	0.00	100.00

Source: MOA Indonesia, Suryana, 2008

The development of food security system basically is development with focus on harmonizing a number of related systems, i.e.

resources availability, food availability, distribution, consumption, diversification, and agribusiness (Susilowati *et al.*, 2005; 2006). One

of the main problems is that food security in Central Java Province is still need to be improved. This is because food security in one of the important aspect and issue which need to be considered. Food is a basic need which should be avails continuously, well-distributed, and can be accessed by people. On the other side, most of rural people is still facing poverty. Therefore, a study for assessing the capacity development of food crops is necessary to be conducted. Based on the previous description, research questions raised for this study are as follows: (1) what is the performance of food crop in Central Java? and (2) what are the management and strategy for increasing food product and food security in the region? In overall, this study is aimed at analyzing the performance and capacity of food crop for increasing food production and food security.

Capacity Building and Food Security

Capacity building often refers to assistance that is provided to entities, usually societies in developing countries, which have a need to develop a certain skill or competence, or for general upgrading of performance ability. UNDP define it as “the creation of an enabling environment with appropriate policy and legal frameworks, institutional development, including community participation, human resources development, and strengthening of managerial systems. The needs for capacity building are always changing. There are no ready solutions, and any programme must be appropriate for the local situation and organization. Local government, communities, and NGO are the main clients of capacity building, but central government and the private commercial sector also need support. Capacity building encompasses human resource development as an essential part of development. It is based on the concept that education and training, and focuses on a series of actions directed at helping participants to increase their knowledge, skills and understandings and to develop the attitudes needed to bring about the desired developmental change.

World Food Summit 1996 has come to a common agreement (Rome Declaration) that all countries should provide food security for all people and free the nations from hunger. The summit goal was to reduce the number of inaccessible people for food by 50 percent in

2015. The declaration has shown its strong commitment on the importance of agricultural and rural development as a key-role to achieve food security (Suryana and Sudaryanto, 2006). It is understandable that 70 percent of the world’s poor-people are living in rural area and depending on agricultural sector. This description is relevant with situation in Indonesia. About two-third of poor people were dwelling in rural and remote areas. This fact leads to a conclusion that eradication from hunger and reduction of poor people would be achieved through sustainable agricultural and rural development.

Agricultural development is an integral part of the national development. With vision, mission, and objectives of agricultural development, the development program covers food security improvement, agribusiness development, and farmers’ welfare enhancement. Food security is important to assure the availability and accessibility of food for all people. Agribusiness development is also important to achieve productive and efficient activities in producing agricultural products. Agricultural development is planned and designed to accommodate the dynamic of community problems and needs. Local government will play significant role in agricultural development as consequences of decentralization. As the facilitator of agricultural development, local government role is focused on the development of local specific commodities, managing bottom-up approach and decentralizing the creation of people’s participation instead of top-down and centralize policies (Suryana and Sudaryanto, 2006).

Indonesian Experience: Central Java

Administratively, Central Java Province consists of 29 districts and 6 municipalities with the total area of 32,548 km². Agriculture is the important sector which involved most of job employment of the people. Central Java Province is one of the main buffer areas for national food production, especially rice, corn, soybean, cassava and vegetables. This study was conducted at a number of the centre of agricultural (rice) products in Central Java. These are the districts of Klaten and Magelang. Primary and secondary data were collected through interview with farmers and key-persons, observation, documentation, and FGD with stakeholders.

Performance of Production

About 60% of selected farmers are on the age-group of 40-50 year, and most of them have a tertiary education. The number of household member is on the average of 4-5 persons. Farming especially for paddy, is the main occupation and source of family income. Some of the farmers have additional activities from small-scale traders, livestock, and other informal occupations.

In relation to production performance, elasticity coefficients for farm inputs are positive (i.e. land 0.739, labour 0.497, and seed 0.163). It implies that as larger the land size, the production will increase. Fertilizer is the significant influential variable to the food-crop production (coefficient 0.084). Farmers who utilized K fertilizers were able to have larger productions as compared to others. Farmers who utilized organic fertilizers were able to have larger productions as compared to others. Pesticide is not the significant influential variable to the food crop production (coefficient 0.018). This input did not used regularly by farmers at the study area. Estimation result shows that farmer's experience in farming did not influence significantly to the production. However, return to scale with the value of 1.15 indicated that farming is still possible to be extended. The average value of technical efficiency is 0.942, meaning that farming did not efficient. In addition, there is a possibility to increase the use of production inputs. At the individual level, the rate of technical efficiency is ranged from 0.73 to 0.99.

Developing Strategy for Food Production

It was indicated that input availability is the most important aspect for developing strategy of farming (score 0.511). It is followed by institution (score 0.209), post-harvest (score 0.128), marketing (score 0.85), and technical cultivation (score 0.67). Performance of food crop farming is closely related to inputs availability and its distribution. The strategy for input supply might covers: providing subsidy, access of private sector to involved in, and avails farm inputs at suitable time, amount, and quality.

Another aspect to be developed is agricultural and rural institutions. The proposed strategy which can be done for example: extension services, providing incentive for agricultural institution, and revitalize extension institution (centres as well as officers). Revitalizing institution for extension services will be the main priority for improving agricultural performance. The third aspect for building the agricultural performance is marketing. It might be implemented by designing partnership between farmers and traders, farmers and products' users, and providing financial assistance. Lastly, improving the technical assistance is still notified the important aspect for developing agricultural performance. The proposed strategy which can be done are: extension services, providing technical assistance for utilizing organic fertilizers and pesticide, as well as using branded seeds for obtaining higher production.

Low educational attainment as well as low capacity and less skill in production and management are among the counter-productive condition when talking about human resources in agricultural sector. Learning activities through informal education, training, and extension should be prioritized to support agricultural development in the future. Revitalization of extension workers, therefore, is a priority to accelerate agricultural development. Certain farmers may move from farming to off-farming or non-farming in rural areas if the opportunities are offered. If the number of people involved in farming reduces substantially, the units of managed land by each farmer is expected to increase. This strategy will provide benefits and incentives for farmers to improve their productivity. Farmers are also still facing difficulties in accessing high quality seeds. The high price of seeds caused by monopoly ownership has hampered this. Water access is also a very crucial issue for farmers.

Performance of Agricultural Extension for Increasing Production

Program for increasing food-crops production is one of the important decisions in agricultural development in the province. It is because food productions have strategic and economic values. Based on the study conducted in the selected area, food-crops farming were not efficient yet. One of the solutions is by improving the delivery of agricultural extension services.

Agricultural extension services in Central Java were intensively implemented since 1970s, with the support for input supply, technical as well as financial assistance. The program was implemented through national-program called Mass Guidance. It is a major program which was implemented in Indonesia to disseminate agricultural knowledge to farmers. At this scheme, farmers were instructed what to do and given incentives through the provision of cheap-credit to follow these instructions. A major contributor to the stabilization of self-sufficiency in the staple food (rice) has been the *Supra Insus* (Super Intensification) system, which was introduced in 1987 (Resosudarmo and Yamazaki in Beckmann et al, 2010). The innovative experience in Indonesia has demonstrated that self-sufficiency in rice can be achieved through a combination as such: political will, continual technological efforts, progressive rural structure, mass guidance, socioeconomic engineering, and well-coordinated program. In supporting *Bimas* to *Supra Insus*, the establishment of extension services was done through Rural Extension Centres in each sub-district. The centre was serve in delivering information concerning to agricultural innovation, especially to farmers.

Revitalizing the agricultural sector is a key component of the government's rural development strategy (World Bank, 2007). Indonesia faces a major challenge to develop an effective institutional mechanism for disseminating technology relevant for small-scale farmers. While there is less experience in new model of agricultural advisory services, there is growing evidence of significant benefits to decentralized extension systems that involve the private sector and civil society. Educational qualification levels of public extension agents are being improved. Poor linkages between agricultural research and extension has militated again ensuring focus on farmers' problem. The new extension law (Law No.16/2006) explicitly recognizes the multi-provider system for the delivery of agricultural services to increase the competitiveness of Indonesian agricultural sector and improve farmer incomes. It is aimed at: (1) reorganizing extension and farmers' institution, (2) improving number and qualification of extensions, (3) improving implementation of extension system, and (4)

establishing networks for extension services and agribusiness.

Political will is a prerequisite for the success of a food production program, and is reflected by the commitment of the (central and local) governments and community leaders. At the same time, it was recognized that learning new-technologies would give rise to the need among farmers for other farm inputs such as seed, fertilizers and pesticides, with working capital to finance them. Post-harvest and marketing skills, procedures and facilities would have to be improved. These requirements created the need to ensure close integration with infrastructural improvement, such as irrigation systems and roads in order to support rice production and improve access to markets (Anonymous, 2004). Approaches for achieving effective extension might include all or a combination of strategies based on circumstances at national and local levels. Rivera (2003) advocates important strategy recommendations to address the food security challenge. An example of good practice and lesson is decentralization of extension in Indonesia. Enacted by law in the 1990s, it shifted extension management from central to local (district) government, made extension works more agribusiness-oriented and established research-extension-farmer linkage mechanism at the local level. The goals aimed to ensure effectiveness, to be more responsive to clients and to be less-costly to the government. Staffs training and upgrading were emphasized, including partnership development between the various components.

Conclusion

Food production is not an easy matter. Success will only be attained if national and regional policies give high and proper priorities to agricultural development. There is a lot of work to do regarding policies on agricultural development, with fundamental issues such as farmer's access to main farming inputs such as land, seeds and water. The potency of food production capabilities and the huge demand for food, either from national or global consumers, has become not only a challenge, but also an opportunity for national agriculture since Indonesia have enough natural and human resources. The country definitely has an opportunity to produce enough food for the population. In the case of capacity building improvement, the release of new Extension Law

will make the delivery of agricultural services in Indonesia increase productions as well as the competitiveness of agricultural sector and improve farmer incomes.

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