

**THE ROLE OF AGRICULTURAL EXTENSION AND
INSTITUTIONAL CAPACITY IN SUPPORTING INCREASED
PROGRAM OF RICE CORN
AND SOYBEAN PRODUCTION IN SUKABUMI –
INDONESIA**

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Abstract

The role of agricultural extension is to help farmers form a healthy opinion and make a good decision by communicating and providing information needed by farmers. The purpose of this study is to analyze the role of agricultural extension and its institutional capacity at the district level in the dissemination of technological innovations. Describing determinants that affect the role of agricultural extension and institutional capacity at the district level, and analyzing the effect of agricultural extension and institutional capacity to support increased production of rice, corn and soybeans. This study used a survey design on 115 agricultural extension respondents. The data collection was conducted on May to November 2016. Data processing used descriptive technique and simple regression. Based on the result, it concluded that the role of agricultural extension is in a quite good and balanced category so that farmers could adopt relatively quickly innovation. Availability of potential resource becomes indicator requiring special attention to support extension institutional capacity in Sukabumi because it is in a low category. Determinants that affect the role of agricultural extension and institutional capacity in implementing the tasks, functions and dissemination of technological innovation are the support of facilities and infrastructure and program incentives. The role of agricultural extension, determinants and institutional capacity of district level extension have a strong influence in supporting the success of the program, especially the increase in rice production.

Keywords:

The Role of Extension;
Institution;
Capacity.

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1. Introduction

Extension has a very strategic position in the development of agriculture, because it has duties and functions to organize non-formal education for main actors. Thus, the extension institutional system must be built and developed in an effort to help the main actors in creating a conducive climate of education/learning, so that in the end, they are able to help themselves to improve the welfare of the family (Department of Agriculture, 2007). According to Tedjokoesoemo (1996), the success of linking agricultural production system with agribusiness chain is largely determined by the success of the motivation efforts to farmer groups – fishermen to develop into groups of certain agricultural commodity business or combinations thereof. This development is only possible by the wider business opportunity that can be created through the development of a professional agricultural extension institutional network.

Quite a lot of experts talked about the role that should be run by an extension. Mosher (1997), for example, states that the role of agricultural extension is as; (1) teacher, (2) analyzer, (3) advisory, (4) organizer, (5) the developer of change needs, (6) driver of change, and (7) stabilizer of the farming community relations. Kartasapoetra (1994) mentions the role of extension is very important to establish a modern agriculture, that is community-based agricultural development. The most important role of agricultural extension is a motivator, dynamist, facilitator and consultant for farmers (Tjitrajanoto 2003; Subejo 2009), and able to respond to new challenges emerging from the new situation perceived by farmers to solidify the adoption and prevent termination of adoption (Lippitt *et al.* 1958; Rogers 2003; Slamet 2003).

The role of agricultural extension is to help farmers form a healthy opinion and make a good decision by communicating and providing information needed by farmers. Besides, agricultural extension also plays role to help farmers increase their farming (Van den Ban and Hawkins 1999). The extension is a spearhead that has direct contact with farmers. The position as the spearhead describes agricultural extension has a lot of abilities to support a variety of tasks and functions in advancing farmers. This is mainly due to the problem faced by agricultural extension in field, not only a question of farming, but also question of cultural, social, knowledge and confidence of the farming community. Therefore, agricultural extension is required to use a diverse approach in helping to resolve the farmers' problems.

Agricultural extension has a strategic role in delivering the novelty of specific technology and knowledge to farmers. These roles can be as an educator, disseminator, facilitator and evaluator (Mardikanto, 2009), while elements within the institution, as stated by Esman (1986), can be used as a parameter for assessing the capacity of an institution: 1. The leadership, which refers to a group of people who are actively involved in the formulation of doctrine and program of the institution and direct operations and relations with the environment. 2. The specification of values, goals, and operational methods that underlie members' social action. 3. The existence of the program, referring to certain actions relating to the exercise of the functions and services which are the output of the institution. and 4. The existence of those resources, ie input of finance, physics, human, technologicity and illumination of the institution.

Both variable roles of agricultural extension and institutional capacity which refer to the two sources become conceptual references in this study used to test empirically the degree of influence on efforts to support the increased production of rice, corn and soybeans as a government program that is currently being aggressively implemented. Meanwhile, the determinants of the role of agricultural extension and institutional capacity of agricultural extension at the district level are measured through facilities and infrastructure, program incentives and working procedures.

Based on the description, then to determine the extent of the role of agricultural extension at the district level in supporting and succeeding program of increased production of rice, corn and soybeans, this study is conducted. The purpose of this study is to analyze the role of agricultural extension and institutional capacity at the district level in the dissemination of technological innovations. Describing determinants that affect the role of agricultural extension and institutional capacity at the district level, and analyzing the effect of agricultural extension and institutional capacity in supporting increased production of rice, corn and soybeans.

2. Research Method

The study was conducted in Sukabumi, West Java on May to November 2016. This study is a quantitative study with survey method. Population in this study is the agricultural extensions in the field in Sukabumi who run self-sufficiency programs to increase production of rice, corn and soybeans. The population number based on data of Counseling Agency for Agriculture, Fisheries and Forestry of Sukabumi is 115 people consisting of civil servants Agricultural Extension and Contracted Extension. In connection with enabling retrieval of data to the whole population, the sample in this study used census technique, ie. whole population becomes sample.

Instrument in this study is a questionnaire that contains a statement list. Variable of agricultural extension role (X_1) is measured using four indicators, they are: educator (X_{11}), disseminator (X_{12}), facilitator (X_{13}), and evaluator (X_{14}). Variable of determinants (X_2) is measured using three indicators, they are facilities and infrastructure (X_{21}), program incentive (X_{22}), and working procedure (X_{23}). Variable of institutional capacity (X_3) is measured using four indicators, they are: leadership (X_{31}), values and objectives (X_{32}), program (X_{33}), and resource (X_{34}). Variable of program success (Y_1) is measured using two indicators, they are behavioural change (Y_{11}) and increased production (Y_{12}). The study instrument has passed the validity and reliability test with *alpha cronbach* score of 0.889. Data analysis technique used is Simple Regression. Simple Linear Regression Equation Model is: $Y = a + bX$

3. Results and Analysis

3.1 Role of Agricultural Extension in Dissemination of Technological Innovation

Agricultural extension has played an important role in increasing agricultural production in Indonesia. Travelling of the agricultural extension development always has dynamic ups and downs and twists and turns in accordance with the times and plays an important role in agricultural development, which is part of the national development and the process of transformation from traditional agriculture into resilient agriculture that is capable of utilizing resources optimally, capable of making adjustments in the pattern and structure of its production to changes in attitudes, behavior, knowledge and skills of farmers and their families as a result of the learning process.

Today, there are many who have the impression that the extension only as a supplement of an agricultural program. In fact, the agricultural program is a farmer-owned and run by the

farming communities themselves. Therefore, a good education is the education that meets the needs even exceed the expectations of the parties given with extension (farmers and their families). The implementation of agricultural extension will work properly if there is a shared understanding between extension workers and farmers and the parties concerned. Agricultural extension implemented jointly by the provincial and district/city government must clearly have harmony and objective similarity among the the governance structures so as to resolve all the problems faced by farmers over the years.

The results of the data analysis of respondents show that all four agricultural extension role in disseminating government programs to farmers are in the moderate category. More associated with the data analysis of respondents to the role of agricultural extension as shown in Table 1.

Table 1. Role of Agriculture Extension

No	Description	Modus	Category
1	Educator	3.0	Moderate
2	Disseminator	3.0	Moderate
3	Facilitator	3.0	Moderate
4	Evaluator	3.0	Moderate

Remark: 1.0: Very Low; 2.0: Low, 3.0: Moderate, 4.0: High

Table 1 explains that the four agricultural extension roles in informing, educating, guiding farmers and evaluating the achievements of the program are in balanced category since those four roles are in moderate category. It proves that agricultural extension in Sukabumi has sufficient capacity both in dividing the tasks and functions so that all roles of agricultural extension can be played pretty well. Under these conditions, the program of increased production of rice, corn and soybeans in Sukabumi can be well-realized.

It is also revealed by Sundari et al (2015) which identifies the role of agricultural extension that is able to increase farming production by running tasks, functions and roles well, especially the role as reformer agents in disseminating technological innovations developed by research institutions. The condition is also strengthened by the interview to survey respondents, that they are required to be able to do a variety of activities at the same time so farmers are able to be independently and successfully in farming, infrequently they also have to be a marketer of products to farmers, in other words, they work from guiding, giving examples and helping farmers from upstream to downstream.

Zubaidi et al (2011) also reveals that farmer assessment to the role of agricultural extension (facilitators, disseminator and motivator) affect the success of farmers in farming and changes in the farmers' mindset. Based on this, agricultural extension has a quite crucial role in the development of farmers, farmings and government bridges in delivering the program to farmers. Therefore, agricultural extension should always be given refresh of training annually, according to the capacity and site-specific in order to information, insights and skills upgraded, so that in the guidance and assistance to farmers and safeguarding of government programs to increase the production of rice, corn and soybeans can be better in order to target of food self-sufficiency can be achieved.

3.2 Institutional Capacity of Agricultural Extension

Generally, extension institutions in Indonesia have undergone some changes since Pelita I until now. First, on 1970-1990, in which institutionally, extension was part of the Mass Guidance program that was responsible for the increase of basic commodities to meet production targets maximum. Second, on 1991, the extension institutional was reset up, so the institutional management of agricultural extension in Mass Guidance which was originally submitted to the technical departments of agriculture scope. That period was marked by the emergence of BPP and PPL Food Plant, BPP Plantation, BPP Fisheries, BPP Animal Husbandry. PPL is monovalent. Third, on 1996-2000, extension institutions at district/city level were united in a new container with the Nomenclature of Agricultural Extension Information Center (BIPP) and at the subdistrict level, BPP was used again as a home base for Agricultural Extensions who were in charge of the district.

On the first to three institutional model, the determination and management of extension were carried out with a centralized system. Fourth, on 2001-2005, extension institutional was handed over to the local government. The decentralization of extension programs was conducted at this era. However, many areas were not ready so the extension became "suspended". Fifth, on 2006-now, revitalizing agricultural extension in which the extension institutions at the district and sub-district level were revived as outlined in Act 16 of 2006 on Extension System of Agriculture, Fisheries and Maritime, institutions in the District of Extension Executive Agency and in district of BPP. This is confirmed by the letter of the Minister of Agriculture No. 157 stating that the deconcentration of the Centre will only be given to districts/cities that has formed the Institution of Agricultural Extension.

Agricultural extension institution is one of organization containers in the department of agriculture. The main function of the agricultural extension institution is as development container and organization of agricultural human resource as well as organizing extension. Extension institutions at district level in Sukabumi is Extension Implementing Bureau of Agriculture, Fisheries and Forestry (BP3K) or in accordance with Law No. 16 of 2006, which further in accordance with the Forestry Minister Regulation No. 03/2015 on Pajale Production Increase Pedum Upsus, role of BP3K is set up as a coordinating node post of pajale production increase at district level. The result of respondent data analysis to the institutional capacity of agricultural extension at district level in Sukabumi viewed from the aspects of leadership, values and objectives, programs, and resources they have, it is known that there is one indicator related to resources, especially human resources owned by BP3K in a low condition. Furthermore, associated with the data analysis of respondents to the case as shown in Table 2.

Table 2. Institutional capacity of agricultural extension at district level

No	Description	Modus	Category
1	Leadership	3.0	Moderate
2	Values and Objectives	3.0	Moderate
3	Program	4.0	High
4	Resources	2.0	Low

Remark: 1.0: Very Low 2.0: Low, 3.0: Moderate, 4.0: High

Based on Table 2, the indicator of leadership, values and objectives to be achieved from BP3K capacity in Sukabumi is in moderate category. This means the leadership and the value of the institution's objective have been suitable with the conditions expected by agricultural extension and other stakeholders in increasing the production of rice, corn and soybeans. Meanwhile, the indicator of the program is in high category, it indicates that the continuity of BP3K program in Sukabumi in accordance with the demand expected by farmers. However, the particular concern is the lack of human resources. This is because the indication of nearly 70% of agricultural extension in Sukabumi status is contracted workers so that the improvement of education, both formal and non-formal is stagnant. Therefore, education and training should be a priority to improve the extension institutional capacity at district level in Sukabumi to be much better.

3.3 Determinants Affecting the Role of Agricultural Extension and Institutional Capacity at District Level

The role of agricultural extension and institutional capacity at district level often becomes basis for error in case of failure of the government program. This study is based to facilities and infrastructure owned, program incentive and working procedures as the determinants affecting the role of extension and institutions to disseminate and promote the production of rice, corn and soybeans in Sukabumi. Furthermore, the results of the analysis that has been processed from a respondent's answers are listed in Table 3 and Table 4.

Table 3. Determinants affecting the role of agricultural extension

Description	Parameter	Score	α	Remark
R square	R^2	0.137	0.001	There is linear relationship
Influence of Facilities and Infrastructure		0.168	0.038	Have influence
Influence of Program Incentive		0.225	0.031	Have influence
Influence of Working procedure		0.102	0.265	Does not have influence

Based on the results in Table 3, from three determinants that affect the role of agricultural extension, only one indicator that does not affect, that is the working procedures. Meanwhile, for the facilities and infrastructure as well as program incentive have an influence on the role of agricultural extension in performing their duties. Observations and interviews with some respondents also strengthen the results of this study, they are limited facilities and infrastructure, especially operational motor vehicle often becomes obstacles in carrying out their duties because not all agricultural extension gain operational vehicles, especially for contracted agricultural extension. As for employment incentives, although there is still deemed too small so it is not adequate for the working operational and activities for a month, and it was often late in payment for the cost of the program incentive comes from the budget of the central government (Ministry of Agriculture) while activity incentive of the Local Government is only in form of help. Therefore, it should be the government's main concern for the welfare of agricultural extension in advance so the performance and its role in disseminating technological innovation is not impeded.

Table 4. Determinants that affect the extension institutional capacity at district level

Description	Parameter	Score	α	Remark
R square	R^2	0.068	0.049	There is linear relationship
Influence of Facilities and Infrastructure		0.219	0.038	Have influence
Influence of Program Incentive		0.048	0.655	Does not have influence
Influence of Working procedure		0.069	0.470	Does not have influence

As for the determinants that affect the extension institution at the district level, the results of the analysis only explain indicator of facilities and infrastructure that have influence on program support of increased production of rice, corn and soybeans. Indicators of program incentive and working procedures have no influence in the matter. This contrasts with the study result by Salaman et al. (2010) in which institution of sub-district (BP3K) is much influenced by the presence of a strong working procedures as well as agricultural extension capability whereas facilities and infrastructure only as a supporting. The result of this study proves despite facilities and infrastructure are only a supporting, those are also deciding factor that can increase the capacity of the extension agency. Therefore, the fulfillment of administrative requirement standard, equipment and others are important to encourage increased extension institutional capacity at district level, especially in supporting government programs.

3.4 Role Influence of Agricultural Extension and Institutional Capacity in Supporting Success on Increased Production Program of Rice, Corn and Soybeans.

Extension institutional capacity in producing and delivering innovation will determine the sustainability of agricultural development in general, from two technical aspects of production related to crop, fertilization, pest control and disease until harvest; technological aspects related to the application of technology packages in increased production to improving post-harvest; ecological aspects related to the environmental impact of the application of technology; and social aspects related to the function and interconnectivity of institution of main actor and entrepreneurial actor in the social system of local and supra-local (Uphoff 1986; Uphoff and Esmann 1988; Kusdarjito 2012; Jamil 2012).

Under conditions of food self-sufficiency in Indonesia is very vulnerable, marked by increasing food imports such as corn, soybean, meat and rice, then innovation to increase food production is a must, in which the paradigmatic baseline and institutional strength in agricultural extension in general, play an important role in it (Sumardjo 2012; Salman 2012). Through agricultural extension role, then information, innovation and technology of the government should be disseminated properly to the farmers so that programs can be managed and towards increased production.

Jamil and Hamdan (2013), Extension institution with extension roles that interact directly with the main actors and entrepreneurial actors of food crops and horticulture, plantation, animal husbandry, fisheries and forestry is BP3K which the operational units at district level (Law No. 20/2006) can connect the learning needs of group of farmer, breeder, fishermen, fish farmer, and forest farmer with a source of innovation from central and local government and the agribusiness company programs.

Results of analysis using simple regression about how much influence of the role of agricultural extension and institutional capacity to support the success of the program to improve the production of rice, corn and soybean, it is known that the role of agricultural extension, determinants and institutional capacity correlated fairly closely to the success of the program to improve the production of rice, corn and soybeans. So does the influence of each variable to the success of the program. This means that the role of agricultural extension, determinants and institutional capacity has a significant role in the success of the program, even though the effect of each variable is different. This contrasts with the study result by Sucihatiningsih and Waridin (2010), that the institutional capacity and the performance of agricultural extension is relatively small in supporting the implementation of innovation in soybean and rice commodity, this is because the agricultural extension is considered to have become accustomed provide extension materials about it and consider extension institution as it should plan, implement and evaluate the activity of extension and support it through funding and completion of facilities and infrastructure.

The fact in Sukabumi proves that the role of agricultural extension and institutional capacity is very dominant in giving a good influence on the adoption of innovations conducted by the beneficiaries of the program farmer. Knowledge and attitudes of farmers are already better than the initial conditions before innovations adopted, seen from the way

which previously still use conventional pattern and now use legowo row pattern as a suggestion innovative. Despite the evidence of increased production has not been clearly defined as many things that lead to the production of rice, corn and soybeans in Sukabumi can be increased, but the forecast looked, especially for rice production has good potential to increase. Therefore, further research with variables that are not examined in this study is needed.

4. Conclusion

Four roles of agricultural extension (Educator, Facilitator, Disseminator and Evaluator) in informing, educating, guiding farmers and evaluating the achievements of the program are in quite good and balanced category so that farmers can adopt innovations relatively quickly. Availability of potential resources is an indicator which needs special attention to support extension institutional capacity in Sukabumi because it is in a low category. Determinants that affect the role of agricultural extension and institutional capacity in implementing the tasks, functions and dissemination of technological innovation are the support of facilities and infrastructure and their program incentives. The role of agricultural extension, determinants and institutional capacity of extension at district level has a strong influence in supporting the success of the program, especially the increase in rice production.

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