Relationship analysis of farmers participation in agricultural extension with corn production levels in South Sulawesi

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Abstract. Extension activities cannot be separated from the participation of farmers as objects. The success of the extension can be seen from the extent to which farmers apply what they get to the farm they manage and the extent to which the production results obtained from their farming. The purpose of this study was to analyze the relationship between farmer participation in extension activities and maize production levels in South Sulawesi. This research was conducted in South Sulawesi Province, Jeneponto Regency and Gowa Regency. The data collected is primary data obtained from 40 corn farmers taken from 2 farmer groups. The data used are respondent characteristics, technology characteristics, farmer participation variables. Data analysis using descriptive analysis and Chi Square data analysis using SPSS program. Based on the results of the study, it was found that 58.1 percent of farmer characteristics had an effect on the level of corn production and there was a significant relationship between farmer participation in extension and corn production.

1. Introduction

Farmers as the main actors of development, need to have the responsibility to realize production and productivity targets to achieve self-sufficiency and sustainable self-sufficiency. The participation of farmers in agricultural development in the region is very important to support the success of agricultural development.

In Indonesia, farmer groups have an important role in the dissemination of agricultural innovations. In extension activities, agricultural extension workers use a group approach because the number of farmers is very large compared to the number of extension workers. In addition, socio-economic and socio-cultural conditions also support the use of a group approach, the approach taken by extension workers is expected to be able to encourage farmers through farmer groups to improve their abilities, both the ability to participate, have prejudice, creativity, and the ability to make decisions so that the independence of farmer groups in managing activities farming and managing the organization will always move in a better direction.

The province of South Sulawesi is the largest and most important economic locomotive in eastern Indonesia. The continuity of distribution and stability of strategic food prices are certainly not only
basic needs, but the instability of strategic food can have an impact on various aspects of people's and nation's lives. Corn production in South Sulawesi in the period 2008-2017 experienced an increasing trend with an annual increase of 66,738 tons from an average production of 1,500,486 tons per year [1] while in 2020 the average productivity was 5.24 tons/ha. [2]. The increasing demand for corn in South Sulawesi Province in the last ten years tends to increase by 574.29 tons per year from the average requirement of 12,367 tons per year [3].

The progress of farmer groups is an important thing that must receive attention, in order to spur the development of other farmer groups in their farming activities. Therefore, it is necessary to know the level of participation of members of farmer groups who are members of the existing farmer groups, in an effort to determine the extent of member participation in fully supporting their farming activities.

The participation of farmers in participating in activities in farmer groups is influenced by many factors. Several factors related to the level of participation include factors that come from the community itself, for example from the socio-economic characteristics of the farmers themselves [1].

Extension activities do not escape the participation of farmers as objects. The success of the extension can be seen from the extent to which farmers apply what they get to the farm they manage and the extent to which the production results obtained in their farming activities. Based on this, it is necessary to analyze the relationship between farmer participation in extension activities and the level of corn production in South Sulawesi.

2. Materials and Methods

This research was conducted in South Sulawesi Province, namely in Jeneponto Regency, namely in Kelara District and Gowa Regency, namely Bontorannu Regency, from January to December 2018. Based on the climate in Jeneponto and Gowa Regencies, farmers generally plant on dry land in the rainy season even until the rainy season. rain. In the dry season, farmers plant twice corn crops (February/February and April-July/August). For non-irrigated rice fields (rainfed rice fields) farmers usually plant corn after planting rice, with a rice-maize cropping pattern (April-July/August and September-December). The data collected is primary data obtained from farmers as many as 40 people taken from 2 farmer groups, namely the Canda Jaya Group in Jeneponto Regency and the Sipakamari Group in Gowa Regency. Primary data were collected through interviews using a questionnaire, the data included household characteristics of maize farmers (age, education, experience and land ownership), data on average maize production, data on dissemination technology, data on extension and farmer participation in extension activities. Secondary data in the form of production data at the provincial and national levels from the Central Statistics Agency.

2.1. Test the relationship between farmer participation and corn production level

The variables used to see the relationship between farmer participation levels of corn production in Jeneponto Regency and Gowa Regency are (1) the intensity of farmers in participating in the extension, (2) recipients of assistance, (3) using integrated crop management technology, (4) the usefulness of extension for farmers, (5) activeness in disseminating technology information to other farmers, (6) knowing corn farming technology, (7) corn farming technology needs, (8) agricultural machinery needs. Data analysis using Chi-square test, can be formulated as follows:

\[ X^2 = \frac{(O-E)^2}{E} \]

Where:
- \( X^2 \) = Chi Square
- \( O \) = Observation Frequency
- \( E \) = Expected Frequency

The results of the Chi Square test resulted in the Asympotic Significance value (Asymp. Sig.) which indicated that there was no relationship between the two factors studied, and then compared with the value (0.05). Benchmark decision making Based on the Asymp value. Signature. is Asim. Signature. smaller than the value (0.05), then Ho is rejected, where:
H0: There is no significant relationship between farmer participation in extension activities and corn production level
H1: there is a significant relationship between farmer participation and corn production level

3. Results and Discussion

3.1. Characteristics of respondents

Figure 1. Characteristics of respondent farmers

Figure 1 showed the characteristics of corn farmers in the research location. Farmers in productive age and in doing farming are considered capable of absorbing technological information obtained from extension activities, although the average farmer's education is only up to elementary school level, but through farming experience and non-formal education who they participate in such as agricultural field schools, counselling held in extension center, can improve their ability in farming.

The average number of members of a farmer's family is 5 people, including the medium category. Judging from the education they have, farming is the only livelihood to meet the needs of the family. The average farming experience is quite long (21 years), productive age, land area is quite large and not too far from the land, so that farmers have the potential to be able to produce optimal results if supported by technological innovations in farming. Therefore, technological information conveyed through counselling must be packaged properly and can be understood by farmers with low education and technology training is delivered in a simple and easy-to-understand manner by farmers, so that the technology can be utilized on farmers' land. [4].

Characteristics of respondents at the research location have an effect on corn production results, this is based on the results of a simple regression test which shows that the influence of respondents' characteristics has an effect of 58.1% on corn production where R Square is 0.581. The large area of land and the experience of farmers for approximately 21 years are factors that affect corn production. With a large area of land, it makes it easier for farmers to optimally cultivate corn by applying the technology obtained from counseling. Sufficient farming experience makes farmers more skilled in managing their farming and are open to the innovation technology offered. Farmer's experience, land area, number of family members owned by farmers are one of the characteristics that affect farming performance to produce maximum production [5]. Land area affects the level of technical efficiency in farming and has a positive effect on corn farming production [6].
3.2. Characteristics of production technology

The characteristics of the technology carried out by farmers in corn farming are as follows:

![Figure 2. The average use of production inputs on corn farming](image)

The Figure 2 shows the product inputs and technological characteristics of the respondent farmers. The seeds used by farmers are usually obtained from farmers’ shops and the seeds planted are superior seeds from research institutions and are labeled. Cultivation of land without tillage, and the use of seeds is relatively small because the average is 11 kg with an average land area of 1 ha. The use of seeds per planting hole has an effect on growth because it is directly related to competition between plants in one clump. A smaller number of seeds per planting hole will provide space for the plant to spread and deepen the roots [7].

The number of workers used is an average of six people for work such as planting and harvesting, fertilizing and controlling pests are usually carried out alone and with family members. The fertilizers used vary and the dominantly ones used by farmers are Urea, NPK and ZA fertilizers, for organic fertilizers they are less used because farmers think that organic fertilizers do not have a fast reaction like chemical fertilizers and access to organic fertilizers is a consideration for farmers. The results shows that the majority of farmers do not use manure, citing the unavailability of animal manure, and farmers prefer artificial fertilizers because they can reach easily [8].

3.3. Farmer’s participation in agriculture extension field

In extension activities, farmer participation is a pillar of successful extension. The participation of farmers is very important in controlling and preserving agricultural programs. The participation of farmers in empowerment activities is expected to always be encouraged, consistent and maintained [9]. The participation of respondent farmers in corn extension activities can be seen in table 1.
Table 1. Farmer’s participation in corn commodity extension activities

| Description | Yes | Less (%) | No |
|-------------|-----|----------|----|
| Intensity of farmers following Extension Activities | 47.5 | 47.5 | 5 |
| Farmers receive assistance from the government | 47.5 | 52.5 | 0 |
| Farmers take part in corn integrated crop management activities | 82.5 | 17.5 | 0 |
| Farmers feel that the extension information is useful for their farming | 92.5 | 7.5 | 0 |
| Farmers disseminate information to other farmers | 40 | 60 | 0 |
| Farmers apply technology that is informed through extension activities | 0 | 100 | 0 |
| Farmers need other technology information | 20 | 80 | 0 |
| Farmers need agricultural machinery | 37.5 | 62.5 | 0 |

Source: Primary data processed, 2021

In the table it can be seen that the participation of farmers in extension activities is in the high category, especially in field activities such as Integrated Crop Management of maize and farmers feel that the information provided is useful for their farming. As for farmers who still feel that extension services are not optimal in their farming, according to research, this is due to, among other things: the existing groups are not in accordance with their needs because group activities only gather when there are visits from outsiders and often spend time; group activities have not developed or have not changed from the past until now; farmers had unpleasant experiences with previous farmer group activities; farmer group activities do not solve farmers' problems; and some farmers do not know the benefits of the group. Farmers' awareness of the benefits of farmer groups determines their involvement in farmer groups and the formation of farmer groups [10].

3.4. Relationship between farmer participation in extension and corn production level

From the results of the chi square analysis, it can be concluded that the relationship between farmer participation in extension activities and the level of corn production shows that the p value is 0.00, which means this value is smaller than the alpha value (0.05) based on the hypothesis it means there is a significant relationship between participation farmers with corn production levels where H0 is rejected and H1 is accepted.

Table 2. Analysis Results Chi-Square relationship between farmer participation in extension and corn production level

| Description | Value | df | Asymp. Sig. (2-sided) | Exact Sig. (2-sided) | Exact Sig. (1-sided) | Point Probability |
|-------------|-------|----|------------------------|----------------------|----------------------|-------------------|
| Pearson Chi-Square | 23.975$^a$ | 5 | .000 | .000 | .000 |
| Likelihood Ratio | 30.356 | 5 | .000 | .000 |
| Fisher's Exact Test | 24.250 | | .000 | |
| Linear-by-Linear Association | 16.989$^b$ | 1 | .000 | .000 | .000 | .000 |
| N of Valid Cases | 40 | |

a. 10 cells (83.3%) have expected count less than 5. The minimum expected count is .50.
b. The standardized statistic is -4.122
The involvement of farmers in empowerment programs and increasing agricultural production is highly expected. Farmers are the spearhead of agriculture to achieve food self-sufficiency. Farmer participation is the participation of farmers both individually and in groups with full awareness and responsibility in the field of agricultural business. Participation is a very important factor in carrying out various agricultural activities or programs. Strengthening agricultural extension systems and increasing farmer capacity are important means of increasing agricultural production [11]. The decision of farmers to participate in agricultural extension activities is influenced by internal and external factors, the results of the study show that education, farmer household conditions, and farmer membership in groups can increase farmer participation in extension programs [12].

4. Conclusion
Based on the results of the study, it was found that there were 58.1 percent of farmer characteristics such as land area and farming experience which were the most influential factors on corn production. While the participation of farmers in extension activities is significantly related to the level of corn production, this indicates that the technological information obtained by farmers from extension activities is applied by farmers on their farms. Farmers' participation cannot be separated from internal and external factors that influence farmers in running their farms, such as family, experience, and membership in farmer groups.

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