

The Local Government's Strategy Optimizing Extension Worker Role for Smallholder Empowerment

Sitti Aminah^{1,*} and Wirman Syafri²

¹ Research Center of Domestic Governance, National Research and Innovation Agency (BRIN), Jakarta, Indonesia, 12710

² Postgraduate Dept. Government Management Faculty, Institute of Domestic Governance (IPDN), Jakarta, Indonesia, 12560

Abstract. The study objectives were to analyze 1. The level of the extension worker's role. 2. The level of smallholder empowerment 3. Effect of the extension worker role on smallholder's empowerment. 4. Formulating strategies to optimize the extension worker's roles. The study was designed as a survey method, population is 568 farmers in four villages that carry out smallholder empowerment programs. Using a purposive sample, farmers who own land $\leq 20,000$ square meters. The data were analyzed using descriptive statistics and structural equation modelling (SEM). The study results showed that 1. The level of extension worker role in smallholder empowerment programs is in a low category. 2. The level of the smallholder's empowerment is in a low category. 3. There are two aspects of the role of extension workers effect on smallholder empowerment namely accessing information-learning and credibility-competency of extension workers. However, there is no effect of dialogic communication on smallholder empowerment 4. The local government strategies for optimizing extension worker roles through enhancing two aspects, 1. Institutional support of BPPT through providing training and disseminating innovation-technology. 2. Local government policy support to increase the capacity of extension workers through formal and informal education, providing incentives, rewarding, and preparing facilities.

1 Introduction

The poor in rural areas often view their future in agriculture with less optimism than those in urban areas [1,2]. Unfortunately, the poverty rate in rural areas is also higher than in urban areas, with 12.36 percent of people in rural areas living below the poverty line compared to 7.53 percent in urban areas. Since the village economy is primarily based on agriculture, nearly half (49.4 percent) of poor households in rural areas depend on this sector for their livelihoods [3]. Shockingly, most farmers themselves are also living in poverty, and smallholders make up half of the world's starving population [4,5].

* correspondent author: sittiaminah.kemendagri@gmail.com

In the past, agricultural development initiatives failed to properly consider the needs and empowerment of farmers, leading to low levels of empowerment. The implementation of these programs has been characterized by pseudo-participation, gaps in planning, farmer dependence, and a lack of sustainability in empowerment programs [6]. Agricultural development efforts that rely on centralism, top-down decision-making, and technology transfer have often treated farmers as a means to an end, rather than as empowered partners in achieving the national goal of self-sufficiency in food. Unfortunately, this approach has proven to be short-lived and has ultimately made farmers feel powerless [7]. However, if agricultural development initiatives can focus on empowering farmers, there is a real opportunity to reduce poverty and improve livelihoods in rural areas [8].

The empowerment of smallholders is critical to their capacity building, self-reliance, and access to development resources [9]. Agricultural extension services play a crucial role in increasing the empowerment of smallholders by providing them with knowledge and skills in farming, marketing, problem-solving, and participation in agricultural development programs. However, currently, in Indonesia, the extension services provided to farmers are inadequate, with a focus solely on achieving production targets in agricultural productivity, resulting in neglect of farmers' welfare [10]. It's, therefore, important to improve the quality of extension services to ensure that smallholders are adequately empowered to participate in agricultural development initiatives that aim to reduce poverty and improve livelihoods in rural areas [11].

From the perspective of empowering farmers, developing a strong partnership between extension workers and farmers is crucial. This kind of partnership allows for ongoing dialogue, which facilitates knowledge-sharing between both parties. Extension workers, acting as agents of change, can learn a lot from farmers, gaining respect for their ideas and insights [12]. This approach creates ample opportunities for farmers to jointly identify problems, plan and implement solutions, and evaluate different types of information and technology. By empowering farmers, extension workers play a significant role in promoting positive change within the community. From a participatory perspective, the community is viewed as a partner in development programs. Outsiders work together with the community, starting from the initial study, designing and implementing the program, and monitoring and evaluating all activities. Outsiders should not assume that they know better and should avoid forcing the community to adopt program interventions that are not appropriate to local conditions [13]. The role of extension workers is to facilitate dialogue and create a cultural renewal model that encourages farmers to participate in the decision-making process [14, 15]. They should act as initiators and planners who understand management concepts, know how to solve problems, direct group dynamics, and communicate effectively. They should also open up information access, connect with the community, and facilitate the participation model.

Previous research has shown that the role of extension workers can impact farmer empowerment. For instance, a study by Qayyimah found that the extension worker's role in facilitating participative extension had a significant influence on the empowerment of the paddy women's group in Kajoran Sub-District, Magelang [16]. Similarly, Saputrie's research revealed that the empowerment of paddy farmers in Gowa District was successful because of the role of the extension worker. However, weak extension worker roles caused a decline in orchid farming capacity [17].

The objectives of this study are to analyze: 1. the level of the extension worker's role in the smallholder empowerment program, 2. the level of smallholder empowerment, 3. the effect of the extension worker's role on smallholder empowerment, and 4. to formulate strategies to optimize the role of agricultural extension workers.

2. Methods

This research was designed as explanatory research to describe and explain the relationships and influences between variables [18]. The research was conducted in November 2021 in four Indonesian villages that implemented the Smallholder Empowerment Program - Tuada, Todowongi, Bukumatiti, and Taba Campaka. The study aimed to describe the role of extension workers, farmer empowerment, and the influence of extension workers on farmer empowerment. The research focused on West Halmahera Regency, which is known for its fertile areas and is a mainstay for agricultural development zones to meet the food needs of the provincial capital. Additionally, the district is facing the highest level of food insecurity at under five ranks in Indonesia. The study population comprised 568 heads of farming households who owned about 20,000 square meters of land. The sample was determined as 30 percent of the smallholders participating in the program in each village, totalling 162 heads of families. Data was collected using a validated and reliable questionnaire.

Table 1. Results of validity and reliability tests

Dimension	Validity	Reliability	Result
The Level of Extension Workers Roles	0.445-0.871	0.706-0.914	Valid/Reliable
The level of Smallholder Empowerment	0.363-0.782	0.79-0.846	Valid/Reliable

In parametric statistics, transformation is employed to calculate the value of each variable and scale ordinal data into intervals or ratios. In parametric statistics, transformation is employed to calculate the value of each variable and scale ordinal data into intervals or ratios [19]. The formula used to transform the data from 0 to 100 involved assigning the smallest index value to the lowest total score and 100 to the highest total score for each indicator. The categories were then grouped into four levels: 0-25 as "very low", 26-50 as "low", 51-75 as "medium", and 76-100 as "high". The formula used for the indicator transformations index is as follows:

Indicator Transformation Index:

$$\frac{\text{Total achieved scores} - \text{Total minimum expected score}}{\text{Total maximum expected score} - \text{Minimum expected score}} \times 100$$

Variable Transformation Index:

$$\frac{\text{Total achieved scores} - \text{total minimum expected score}}{\text{Total maximum expected score} - \text{Minimum expected score}} \times 100$$

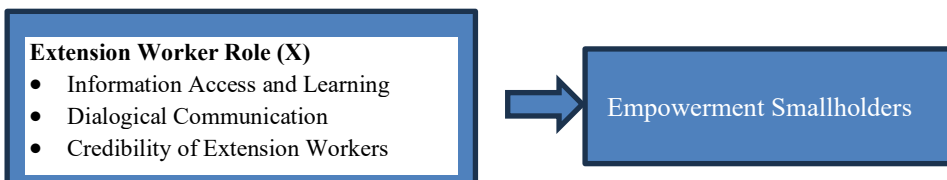


Fig. 1. Conceptual framework of the influence of the role of extension workers on the empowerment of Smallholders

The research methodology involved using descriptive statistics with the SPSS (Statistical Product and Service Solution) Versi 16 program and Inferential Structural Equation Models (SEM) using LISREL (Linear Structural Relationships) 8.70 for data analysis. The study considered the influence of the role of agricultural instructors based on three indicators, namely information access, dialogical communication, and credibility of extension workers. The conceptual framework used for analyzing the impact of the role of extension workers on empowerment is presented in Figure 1.

3 Result and discussion

3.1 Descriptive statistical analysis

3.1.1 The Level of Extension Role in the Smallholder Empowerment Program

Table 2 presents the results of the analysis, which indicates that the role of extension workers is low (average score 38.25) in three significant aspects. These aspects are information access (33.3), dialogical communication (25.3), and credibility and competency of extension workers (42,9).

Table 2. Extension Worker Role and Strata of Farmer

Extension Role Level	Category	Smallholder (%) n=162	Average
Information Access and Learning	Very Low	50	33.3
	Low	25	
	High	12	
	Very High	13	
Dialogical Communication	Very Low	57	25.3
	Low	19	
	High	10	
	Very High	14	
Credibility-Competency	Very Low	9	42.9
	Low	41	
	High	20	
	Very High	30	

Note: 0-<25 = very low, 26-<50 low, 51-75 high, 76-100=very high.

The role of extension workers in facilitating farmers' information needs cannot be overstated. Farmers require information on market trends, the latest cultivation techniques, weather patterns, rural development programs, and subsidies to effectively manage their farms [20]. Sadly, access to this information is limited, making it difficult for farmers to obtain production inputs, capital, markets, and innovation. Our research has uncovered a concerning trend: farmers are not receiving agricultural information and innovation from formal sources such as extension workers, officers, or researchers. Instead, they are turning to brokers, family, neighbors, and advanced farmers for guidance. For instance, farmers in Taba Campaka Village in East Sahu District had to rely on transmigrated farmers from Java Island for information on cultivation techniques. This is unacceptable and must change. The Research and Application Technology Agency (BPPT) must do more to inform smallholders about new technology innovations. Moreover, there must be better collaboration between farmers and extension institutions to adapt the technology they produce and disseminate it widely. It is critical that we empower farmers with the necessary resources, knowledge, and skills to increase their capacity and self-reliance. We believe that by investing in agricultural

extension services and enhancing the role of extension workers, we can help farmers access the information they need to succeed.

It is widely acknowledged that dialogue has the potential to foster intercultural understanding, build alliances, and bring about social change [21]. Unfortunately, this study has found that extension workers are not utilizing dialogic communication to its full potential. Farmers are not fully engaged in identifying problems and needs, and there is a failure to bring together diverse interests and create a convergence of interests. Furthermore, there is a significant lack of communication between smallholders and extension institutions, as well as a lack of convergence of interests between farmers and the government, program providers, and other stakeholders. It's clear that a shift is needed towards more effective use of dialogic communication, which will not only benefit the farmers and extension workers but also help to drive progress towards intercultural understanding, alliance building, and social change.

The lack of credibility of extension workers is a major barrier to effective smallholder learning. With poor cultivation technique skills, communication skills, and an inadequate understanding of community culture, extension workers are failing to establish strong connections with farmers, leading to low levels of engagement and a lack of trust. As a result, farmers often feel more knowledgeable about farming practices than extension workers themselves, which has created a disconnect between the two groups. For example, in Taba Campaka Village, farmers are confident that they possess more knowledge about peanut cultivation than extension workers. This lack of trust has also been exacerbated by the physical distance between extension workers and farming villages, which has made it challenging for them to establish regular contact with farmers. With limited interaction and visiting times restricted to nights or holidays, farmers have fewer opportunities to learn from extension workers and are left to their own devices. It's time for a change. We need to prioritize the credibility of extension workers, empower them with the necessary knowledge and skills, and foster strong relationships between them and farmers. Only then can we unlock the full potential of agriculture and improve livelihoods in rural areas.

According to the study, the agricultural extension workers have low quality and quantity in carrying out extension activities. This finding is consistent with the study conducted by Managanta (2020), which found that the extension workers had a weak role in empowering farmers as facilitators, communicators, and educators. The low competence level of middle rice farmers resulted in the weak role of agricultural extension workers [22]. Another study by Conradie (2016) found that the weak role of agricultural extension workers leads to a decline in farm productivity [23].

3.1.2 The Level of Smallholder Empowerment

The score for the empowerment of farmers in all aspects is relatively low, with an average score of 38.5, except for the aspects of adaptation and coping strategies, which are relatively high.

Based on the findings illustrated in Table 3, it is shown that the empowerment of smallholders is in a low category. This is evident that smallholders lack the necessary skills and knowledge to succeed in their field. According to the scores, their ability in cultivation techniques (score 42.5), farming management (score 41.5), and cooperation (score 28.4) is insufficient. Furthermore, business development is reported to be in a very low category (score 19.8). However, the results indicate that small farmers possess the ability to adapt and employ coping strategies relatively at a high level (score 56.5).

Smallholders are facing a major challenge when it comes to food crop cultivation techniques. They lack knowledge on how to fertilize, control pests and diseases, and handle post-harvest procedures. In addition, they are not equipped with the latest technological

innovations that can help them increase their yield and improve their income. Their farming development ability is at an all-time low, with minimal increase in income and capital savings, lack of effective marketing strategies, underutilization of production inputs, and failure to add value to crop yields. Smallholders must work together with other farmer groups, village institutions, and other farming-related parties to improve their ability to farm. These parties include traders from outside the village, institutions providing production facilities, and banking institutions.

Table 3. The Level of Smallholder Empowerment

Smallholder Empowerment	Category	Smallholder (%) n=162	Average
Cultivation technique ability	Very Low	4	42.5
	Low	70	
	High	26	
	Very High	0	
Ability Farming Management	Very Low	0.6	41.5
Low	69		
High	31		
Very High	0		
Ability to increase farming	Very Low	66	19.8
	Low	27	
	High	7	
	Very High	0	
Ability Cooperation	Very Low	22	28.4
Low	78		
High	0		
Very High	0		
Ability Adaptation	Very Low	0	56.5
	Low	8	
	High	92	
	Very High	0	

Note: 0-<25 = very low, 26-<50 low, 51-75 high, 76-100=very high.

Without collaboration and empowerment, farmers in rural areas will continue to struggle to make a living and meet the growing demand for food. It is imperative that agricultural development initiatives focus on empowering farmers and providing them with the necessary resources, opportunities, knowledge, and skills to increase their capacity to determine their future and participate in empowerment programs. By doing so, we can reduce poverty, improve livelihoods, and achieve self-sufficiency in food production in rural areas.

In contrast to previous indicators, smallholders have shown a relatively high ability to adapt and implement coping strategies to overcome low-income and food shortages. The farmer adaptation ability has been categorized as relatively high, with a score of 56.6. Farmers have adopted various activities to increase their income, such as taking up other work besides farming, encouraging family members to work to supplement family income, implementing intercropping patterns between perennials to increase family food sources, raising livestock with a profit-sharing system, and diversifying their food to replace rice. These strategies have enabled farmers to increase their income and minimize the risk of food shortages.

3.2 Inferential Analysis: The Influence of Extension Role on Empowerment

According to the results of the confirmatory factor analysis (CFA) shown in Figure 2, the constructs that comprise the SEM model have met the goodness of fit criteria. The final

results indicate a chi-square value of 494.76, a p-value of chi-square of 0.0000, RMSEA of 0.133, and df of 129, which means that the model's feasibility is accepted.

Based on the results of testing the value of the factor weight coefficient (loading factor), it was found that the t-value of the indicators was greater than the critical value (≥ 1.96) at a 5% error rate. Additionally, the standardized loading factors of the indicator were ≥ 0.70 , or in this study, the standard used was ≥ 0.50 [24].

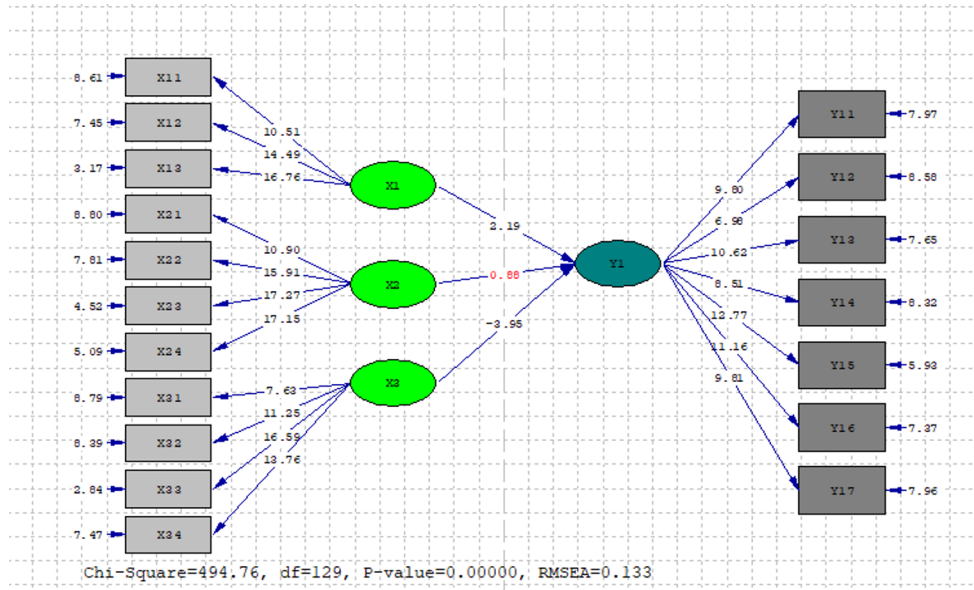


Fig. 2. Structural Model: The Effect of Extension Role on Smallholder Empowerment

Based on the structural model, the results of the hypothesis test are as follows:

- X₁, Y has -t value = 2,19 meaning, the role of extension workers in facilitating access to information and organizing learning in the smallholder empowerment program has a direct influence on smallholder empowerment.
- X₂, Y has -t value = 0,66 meaning dialogic communication does not have a direct effect on the smallholder empowerment.
- X₃ has -t value = -3,95 meaning the credibility and competence of extension agents affect the smallholder empowerment.

The findings of the analysis suggest that access to information and learning is critical for empowering farmers. Agricultural extension workers play a vital role in facilitating the dissemination of information to farmers. However, the lack of access to information and learning has resulted in low levels of empowerment among smallholders, impacting their cultivation techniques, market prices, marketing, cooperation with other parties, access to production inputs, and capital.

Furthermore, the study reveals that the credibility and competence of agricultural extension workers are essential for empowering smallholders. The agents' credibility relates to their communication skills, building close relationships, humility, care, and full understanding, which are crucial in maintaining good extension-farmer relations to support empowerment. The extension workers must have a thorough understanding of cultivation methods, comprehend the challenges of the farmers' situation, and be willing to listen and understand the complaints submitted by farmers to provide effective extension services. The competence of agricultural extension workers is vital in increasing the empowerment of

farmers. The complexity of rural situations and the flexibility required for such a process is a challenge to the skills, capacity, and identity of an extension worker who is perhaps used to being a technical agent who advises farmers on proven technologies [25].

Therefore, it is crucial to ensure that farmers have access to information and learning, and agricultural extension workers possess the necessary credibility and competence to empower smallholders. By doing so, we can increase the empowerment of farmers, reduce poverty, and improve livelihoods in rural areas.

The study found that the role of extension workers in facilitating dialogic communication does not influence smallholder empowerment. This finding contradicts the research conducted by Yumi (2002), where the participative extension approach through dialogic communication between forest farmers and other stakeholders led to increased farmer empowerment [26]. However, according to Mahbub, dialogic communication should be applied in empowerment programs for farmers with advanced knowledge, while farmers with low levels of knowledge require conventional approaches such as training and visiting systems (LAKU). Counselling with a dialogue approach is mainly used by extension workers with materials that aim to develop applied technology or transform technology for farmers [27].

3.3 Local Government Strategies to Increase the Role of Extension Workers

To effectively increase the capacity of farmers, extension workers must be equipped with the necessary skills and knowledge to carry out their roles effectively. If the capacity of extension workers is low, it can lead to a lack of trust from farmers. Therefore, it is crucial for local governments to develop strategies aimed at increasing the capacity of agricultural extension, particularly the capacity of extension workers. A strategy can be defined as a series of fundamental decisions and actions made by top management and implemented by all levels within an organization in order to achieve the goals of the organization. Based on this, two strategies are recommended for local governments to increase the role of extension workers

3.3.1 Increasing Information Access and Training

To increase the effectiveness of agricultural extension services in Indonesia, it is crucial to empower extension workers with the necessary information technology skills and knowledge. This will not only help them to effectively disseminate information to farmers but also enable them to stay up to date with the latest agricultural technologies and innovations [28]. Here are some strategic steps that could be taken to achieve this goal: 1. Providing adequate Wi-Fi and internet network facilities in each extension institution to ensure that extension agents have access to the latest information and can easily communicate with farmers. 2. Increasing the availability of funds for extension agents so that they can conduct experiments and trials of agricultural technology obtained from various sources. 3. Improving the quality and intensity of access to social media platforms for extension agents to facilitate discussions on farmers' problems, solutions, and technological innovations that can be adopted by farmers. 4. Encouraging extension agents to collaborate with other parties and look for references in compiling extension materials. 5. Increasing extension workers' awareness to assess information needs as a basis for determining the type of information or information materials and technological innovations to provide to farmers. By implementing these strategic steps, agricultural extension services can become more effective in empowering farmers and promoting sustainable agricultural development in rural areas.

3.3.2 Strengthening Institutional Support

The Local Government has partnered with the Research and Application Technology Agency (BPPT) to enhance the capabilities of extension workers in two ways. Firstly, by conducting

extension training that is tailored to meet the needs of farmers. Secondly, by disseminating agricultural technology and innovation to extension agents, either directly or indirectly through communication media and extension institutions. This finding is supported by research conducted by Mahamood et al. (2016), which suggests that development agencies are still widely used as a channel for farmers to access various farming-related information [29]. Agricultural extension workers play a crucial role in empowering smallholders. Therefore, it is imperative that the government prioritizes increasing the capacity of extension workers. One such effort is to equip extension workers with the necessary skills to utilize information technology.

Another challenge faced by extension workers is the lack of support from local government policies. Many extension workers have to work as both extension workers in villages and program facilitators, without receiving adequate incentives or operational costs. This lack of support leads to a lack of motivation among extension workers, especially as the cost of living and family needs continue to rise. According to Leeuwis, the lack of incentives for extension services can lead to negative responses such as inactivity and blaming the government. To address this issue, new ways are needed to overcome the scarcity of extension resources by involving other parties.

Despite the current favourable ratio of agricultural extension agents to household farmers (Rumah Tangga Petani-RTP) at 1:153, the role of extension workers in empowering farmers remains relatively low. To effectively address this issue, local governments must take strategic steps to provide support. By increasing the competence of extension agents through both formal and non-formal education, local governments can equip them with the necessary skills and knowledge to empower farmers. Developing an adequate reward or incentive system for extension workers will also help to motivate and retain their services. Furthermore, allocating funds for extension operations will ensure that necessary resources are available to support their work. Lastly, it is essential to motivate, reward, and provide important facilities to encourage the interest and professionalism of extension workers, especially senior ones, so that they remain committed to their work and are not tempted to move to more promising structural positions. By implementing these strategic steps, local governments can effectively empower smallholders and improve their livelihoods, leading to a more sustainable, self-sufficient, and prosperous agricultural sector.

4 Conclusion and Recommendation

According to the study's results, it was concluded that the role of extension workers in smallholder empowerment programs is low in several aspects, such as building awareness, developing participation, facilitating learning, dialogic communication, competency, and credibility. The level of smallholder empowerment is also low, particularly in the ability to cultivate techniques, farm management, and cooperation with other parties, while the ability to adapt and cope with strategies is relatively high. Two aspects of the role of agricultural extension workers, access to information and learning, and credibility and competency have an impact on smallholder empowerment. However, the role of agricultural extension workers in facilitating dialogic communication does not influence smallholder empowerment.

Based on this study, it is recommended that the Government of West Halmahera Regency take steps to improve the capacity of agricultural extension workers. This can be achieved by implementing the following measures: 1. Increasing the capacity of extension workers by utilizing information technology - this will enable extension workers to utilize and disseminate information more effectively to farmers. 2. Strengthening extension institutional support by involving BPPT in organizing extension training - BPPT can provide material adjustments according to the needs of farmers and disseminate agricultural technology and innovation to extension workers by using communication media and extension institutions.

3. Enhancing Local Government support by increasing formal and non-formal education of extension workers, developing an adequate reward or incentive system, and allocating extension operational funds. 4. Motivating, rewarding and providing important facilities to foster the interest and professionalism of extension workers. By implementing these measures, the capacity of agricultural extension workers can be improved, which will ultimately lead to better outcomes for farmers and the agricultural sector in West Halmahera Regency

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