



Research Article

Performance of Agricultural Extension Services (BPP) in Enhancing Rice Production in North Sumatra, Indonesia

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ARTICLE INFO

Article history

Received August 25, 2023

Revised September 21, 2023

Accepted October 18, 2023

Published October 31, 2023

Keywords

Agricultural Extension Officer

Agricultural Extension Service

(BPP)

Performance

ABSTRACT

Indonesia has experienced an increase in national population, the Government is targeting rice production of 54.50 million tons in 2023. North Sumatra Province has the largest rice production on the island of Sumatra, 2,088,584 tons. The effectiveness of the Agricultural Extension Service (BPP) in Percut Sei Tuan is of concern to researchers. This research method uses a differential semantic measurement scale or attitude scale to analyze performance data. The number of samples determined in the research was 10 farmers per village so that the number of samples from all villages was 30 rice farmers with 5-point rating scale and the choices "Very Good" to "Very Poor" with the interval scale formula $\{a(m-n)/b\}$ and the number of question attributes is 12 points, and the class interval is 9.6. The results performance is in the "Very Good" performance category with an average score of 4.24. However, based on their respective scores of 3.03, there is a low score of 2.53 in the category of agricultural extension officers who do not assist farmers in obtaining agricultural financing, nor do they help market their agricultural products. Extension officers have carried out but are still not optimal with answers from one research category.

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INTRODUCTION

The escalating national food demand parallels the growth in population, with a persistent government commitment to achieving self-sufficiency in order to uphold food security. Notably, rice production stands as a primary agricultural commodity that consistently bolsters its productivity (Wahyuni et al., 2019). As per the data published by the Central Bureau of Statistics, the total production of Milled Dry Grain (MDG) in 2022 reached 54.44 million tons, reflecting a 333.68-thousand-ton increase, equivalent to 0.61 percent, in comparison to the 2021 production of 54.42 million tons of MDG. The Ministry of Agriculture has set an ambitious target for rice production in 2023, aiming to reach 54.50 million tons, further underscoring the imperative nature of augmenting rice output to maintain national food self-sufficiency (BPS, 2022).

Given Indonesia's agricultural nature, the agricultural sector assumes a crucial role in contributing significantly to economic growth (Palupi et al., 2022). Consequently, all pertinent data and information

concerning agricultural activities within the jurisdiction of the BPP (which may encompass one or multiple districts) must be systematically gathered by the BPP (Safitri et al., 2023). The mining and quarrying industry, manufacturing, electricity, gas, clean water, construction, and various other services sectors are intrinsically connected (Hernalius et al., 2018).

The extension officer's role as a field technician and officer of farmer empowerment constitutes an integral component of the holistic process aimed at achieving food security (Izmi et al., 2021). In accordance with Law No. 16 of 2006, extension serves as a learning process that empowers stakeholders and essential economic actors to facilitate their access to market information, technology, capital, and additional resources. This empowerment enables them to organize effectively, ultimately leading to heightened productivity, enhanced business efficiency, and improved income and welfare (Ardita et al., 2017).

The program's effectiveness and efficiency hinge on various factors, including the quality and competence of the officers who serve as counselors, their preparedness, support, and alignment with relevant departments and industries (Tucker, 2020). One avenue for enhancing agricultural human resources is through the dissemination of agricultural technology, a strategy in alignment with the Decree of the Minister of Agriculture No. 16 of 2008 (Permentan, 2013).

Active involvement of central and regional extension agencies emerges as a pivotal factor in augmenting farmer productivity within the agricultural domain. Functioning as a vital link between research realms and the practical endeavors of farmers and their households, as well as bridging the realms of science and governmental entities, the primary objective of agricultural extension revolves around fostering community self-reliance (Sugiarta et al., 2017).

At the most localized level, the sub-district, the foundation for orchestrating agricultural extension activities is provided by the Agricultural Extension Service (BPP). In line with the stipulations of Law No. 19 of 2013, which pertains to the Protection and Empowerment of Farmers, the deployment of at least one village assistant necessitates the employment of strategic methodologies to meet the mandated quantity requirements.

According to data sourced from the Agricultural Extension Center, Ministry of Agriculture of the Republic of Indonesia for the year 2023, the agricultural extension landscape encompasses 8,438 freelancers, 24,550 civil servant instructors, 1,043 civil servant instructors, 10,932 first aid instructors, 73 civil servant instructors holding assignments and study permits, and 1,043 civil servant instructors under the purview of THL-TBPP APBN and APBD. The current population of Government Agricultural Extension Officers stands at 45,181 individuals. An imperative observation is the necessity for agricultural extension officers in each of the 74,093 villages and 8,412 sub-districts. This starkly underscores the ongoing requirement for these officers to ensure at least one extension officer per village in numerous villages and sub-districts (Bahua, 2015).

North Sumatra, situated on the island of Sumatra, stands out as a significant contributor to rice production, notably yielding 2,088,584 tons in 2022, as reported by BPS (2022). Within North Sumatra, rice cultivation thrives, with notable centers in the districts of Simalungun, Deli Serdang, Serdangbedagai, Langkat, Mandailingnatal, South Tapanuli, Tapanuli Utara, Pandanglawas Utara, and Batubara. Deli Serdang, in particular, takes the lead, achieving a total yield of 436,820 tons.

Percut Sei Tuan, a sub-district within Deli Serdang Regency, emerges as a remarkable region with abundant rice production, evidenced by its 2020 output of 59,296.05 tons of Milled Dry Grain (MDG). This prevalence of rice signifies that a significant portion of the population engages in rice farming, substantiating their livelihoods (Gurning et al., 2022).

Nevertheless, rice farmers in Percut Sei face persistent challenges. The endeavor to fortify national food security through agricultural extension services encounters persistent fundamental issues (Manik, 2019). Evidently, the performance of top-tier agricultural extension officers assumes paramount importance as a catalyst for agricultural growth and the realization of self-sufficiency in food security (Wahyuni et al., 2019). Augmenting the effectiveness of the Agricultural Extension Service (BPP) as a conduit for agricultural extension emerges as a critical imperative, with a particular focus on empowering farmers and addressing the predicaments experienced by rice farmers in Percut Sei. Consequently, the research community's concern revolves around the efficacy of the Agricultural Extension Service (BPP) in promoting rice commodities in Percut Sei Tuan.

METHOD

The study encompassed the population of rice farmers residing in the villages of Percut, Tanjung Rejo, and Cinta Damai within the Percut Sei Tuan sub-district. Employing a simple random sampling technique, sample

members were selected from the population without stratification considerations (Sugiyono, 2017). The study predetermined a sample size of 10 farmers per village, culminating in a total sample of 30 rice farmers, reflecting the assumption that the entire population received identical treatment and engagement from the Agricultural Extension Service (BPP).

For the analysis of instructor performance, this study utilized a semantic differential measurement scale or attitude scale. This scale presents a spectrum of responses, ranging from highly positive on the right to significantly negative on the left, or vice versa (Ramadhayanti, 2019). The scale encompassed a five-point rating system, incorporating responses from "Very Good" to "Very Poor" (Sumanto, 2014). The calculation for the scale interval followed the formula:

$$\text{Scale Interval} = \{a (mn)\}/b (1)$$

Where:

- a = number of attributes
- m = highest possible score
- n = lowest possible score
- b = number of rating scales to be formed

As for the evaluation of agricultural extension officer performance, respondents' responses were analyzed based on the interval scale formula:

- Highest Score : 5 (Excellent)
- Lowest Score : 1 (Poor)
- Number of Question Attributes : 12

Resulting in an interval class of 9.6, facilitating the subsequent analysis (2).

- Interval Class = $((5 \times 12) - (1 \times 12))/5$
- Interval Class = $((60) - (12))/5$
- Interval Class = 9,6

Table 1. Agricultural Extension Officer Performance Response Scores

Score	Description
12 – 21,60	Very Poor
21,61 – 31,20	Poor
31,21 – 40,80	Fair
40,81 – 50,40	Good
50,41 – 60,00	Very good

RESULTS AND DISCUSSION

Drawing upon prior research conducted by Safitri et al. (2023), our research sample comprises individuals of working age, thereby ensuring each participant's capacity to respond to a series of questionnaire items. As delineated by Bahua (2016), achievement or performance encompasses individual activities or behaviors associated with tangible tasks within an organizational context. This performance derives from the individual's competence and the efficacy of the agricultural extension officer, which varies according to the context, as posited by Zulkarnain et al. (2023). Following the integration of performance concepts from management science, wherein performance is defined as the outcomes of work, the term "work performance" has gained popularity. Performance, in this context, pertains to the concrete actions executed by individuals in response to the tasks they undertake. The core objective of agricultural extension is to enhance farmers' self-reliance and productivity. Consequently, the performance of educational staff correlates with the notion of empowerment, particularly in domains that have the potential to augment empowerment (Sutrisno, 2016).

The effectiveness of agricultural extension officers' hinges upon their capacity to guide farmers in various facets of farming, encompassing pre- and post-harvest management, as well as the successful entry of finished products into the market. In an era marked by access to advanced science and technology, the inability of farmers to adhere to sound agricultural practices can precipitate unfavorable consequences. Thus, agricultural extension officers must assume a pivotal role in assisting farmers in boosting agricultural output (Rahmawati et al., 2019).

The multifaceted roles assumed by agricultural extension officers at the Agricultural Extension Service (BPP) within the Percut Sei Tuan sub-district encompass their functions as facilitators, motivators, educators, and communicators. The effective execution of these roles is crucial for their function as agricultural extension officers. This study evaluates the performance of agricultural extension officers concerning their provision of guidance pertaining to rice commodities in Percut Sei Tuan, Deli Serdang.

The sub-district of Percut Sei Tuan consists of 20 villages, with a subset of villages, namely Percut, Tanjung Rejo, and Cinta Damai, actively engaged in rice farming. A total of ten farmers from each of these sub-villages involved in rice cultivation were selected as research respondents. The deployment of an interval scale through the semantic differential is detailed in Table 2 for reference.

Table 2. Agricultural Extension Officer Performance Interval Scale on Each Question Attribute

Interval	Performance Category
1 – 1,80	Very Poor
1,81 – 2,60	Poor
2,61 – 3,40	Fair
3,41 – 4,20	Good
4,21 – 5,00	Very good

Source: Primary data processed, 2022

Following the completion of the study, the outcomes of the analysis regarding the performance of agricultural extension officers within the Agricultural Extension Service (BPP) of the Percut Sei Tuan sub-district are as follows.

a. Performance of Agricultural Extension Officers as Facilitators

The evaluation conducted by farmers to appraise the performance of agricultural extension officers in fulfilling their role as intermediaries between farmers and those involved in agricultural cultivation and enhancement pertains to the sphere of rice farming. This metric serves as a means of assessing the extension officers' proficiency as facilitators, encompassing their abilities in providing resources, knowledge, and establishing connections between novel technologies and farmers. The subsequent presentation in Table 3 delineates the metrics for gauging the effectiveness of agricultural extension officers in their capacity as facilitators.

Table 3. Performance of Agricultural Extension Officers as Facilitators

No	Variables/Sub Variables	Score	Performance
1	Agricultural extension officers streamline the process for farmers to acquire high-quality production inputs.	4,53	Very Good
2	Agricultural extension officers aid in securing capital for farm businesses.	3,03	Fair
3	Agricultural extension officers support the marketing of agricultural produce.	2,53	Fair
4	Agricultural extension officers facilitate access to information from various sources for members of farmer groups.	3,73	Good
5	Agricultural extension officers actively contribute to the development of farmer groups by assisting farmers.	4,50	Very Good

Source: Primary data processed, 2022

Utilizing the interval scale, notable success is observed in the performance of agricultural extension officers who facilitate the acquisition of quality inputs for farmers, garnering a commendable score of 4.53. Likewise, their role in aiding farmers in the establishment of farmer organizations receives a high score of 4.50. This attests to the effective execution of their responsibilities as facilitators, as perceived by the farmers.

In contrast, attributes such as agricultural extension officers' assistance in securing business capital (with an attribute question score of 3.03) and their support in marketing agricultural products (with an attribute question score of 2.53) exhibit lower scores. Interviews with farmers reveal that agricultural extension officers grant farmers autonomy in obtaining financing for their agricultural pursuits, thus contributing to the emergence of independent farmers who have self-reliant market access for their produce.

b. Performance of Agricultural Extension Officers as a Motivator

In society, every interaction among individuals constitutes a distinct form of network. Diverse foundations of social relations yield varied networks (Rahmawati et al., 2019). In their capacity as development motivators, agricultural extension officers are tasked with a multitude of roles, encompassing education, mentorship, advisory services, information mediation, and resource provisioning. The evaluation of agricultural extension officers' effectiveness as motivators is contingent on factors such as leadership development, consultancy, and farmer resource coordination. The ensuing presentation in Table 4 details performance metrics for agricultural extension officers in their role as motivators.

Table 4. Performance of Agricultural Extension Officers as a Motivator

No	Variable/Sub Variable	Score	Performance
1	Agricultural extension officers motivate farmers to enhance their production.	4,67	Very good
2	Agricultural extension officers inspire farmers to foster innovation and generate novel ideas.	4,73	Very good
3	Agricultural extension officers promote the development of entrepreneurial skills among farmers.	3,70	Good
4	Agricultural extension officers offer guidance to farmers on acquiring agricultural capital.	3,83	Good
5	Agricultural extension officers regularly visit the fields of farmers.	4,20	Good

Source: Primary data processed, 2022

The outcomes of the performance analysis study of agricultural extension officers within the Agricultural Extension Service (BPP) of the Percut Sei Tuan sub-district provide valuable insights into their role as motivators. Of particular significance is the agricultural extension model that encourages farmers to innovate and generate novel ideas in agriculture, as it received the highest rating within this sub-variable. This resonates with the broader mission of extension officers, which is to empower farmers, promoting innovation to enhance production and augment farmers' income. Notably, this alignment underscores the pivotal role of motivation in influencing the attitudes, behaviors, and overall effectiveness of livestock extension officers in their daily activities. Furthermore, the responsibilities of an extension officer extend beyond agronomic practices to encompass the provision of motivation, fostering job satisfaction, and cultivating harmonious relationships among farmers to enhance agricultural management.

c. Performance of Agricultural Extension Officers as an Educator

Extension officers serve as educators disseminating information related to rural agriculture. Their presence is designed to reshape community mindsets, encouraging those who may be initially unwilling to become receptive and fostering a transition from ignorance to knowledge among the informed. Through their guidance, extension officers empower farmers in their agricultural pursuits, facilitating learning and skill development. The subsequent presentation in Table 5 offers an assessment of the effectiveness of agricultural extension officers in their roles as educators.

Table 5. Performance of Agricultural Instructor as Educators

No	Variable/Sub Variable	Score	Performance
1	Agricultural extension officers illustrate the selection of high-quality production inputs, encompassing seeds, fertilizers, pesticides, and equipment.	4,63	Very good
2	Agricultural extension officers showcase correct techniques for rice plant cultivation.	4,43	Very good
3	Agricultural extension officers demonstrate the proper methods for harvesting and post-harvesting, aiming to optimize production.	4,63	Very good
4	Agricultural extension officers offer training on the adoption of new agricultural technologies to farmers.	4,17	Good
5	Agricultural extension officers consistently offer solutions to challenges encountered by farmers.	4,33	Very good

Source: Primary data processed, 2022

The Agricultural Extension Service (BPP) of Percut Sei Tuan has received a commendable evaluation for the performance of agricultural extension officers, as ascertained through a study assessing their role as educators. Agricultural extension officers consistently engage in the education of farmers, imparting accurate insights into techniques for harvesting, post-harvest procedures, cultivation, and production methods, thereby enhancing farmers' knowledge. Moreover, they actively offer training to introduce farmers to novel agricultural

technologies and persist in delivering support and solutions to address the challenges faced by farmers. As Padmasari et al. (2018) affirm, the core duty of these officers as educators encompasses aiding farmers across all facets of agriculture.

d. Performance of Agricultural Extension Officers as a Communicator

Agricultural extension officers function as communicators, serving as advisors who disseminate knowledge to enhance farmers' proficiency in agricultural practices. Through their guidance, farmers acquire awareness of the precise technology applications necessary in the evolving field of agriculture. Table 6, provided below, offers an evaluation of the communication skills demonstrated by agricultural extension officers.

Table 6. Performance of Agricultural Extension Officers as Communicators

No	Variable/Sub Variable	Score	Performance
1	Agricultural extension officers possess sound technical and practical knowledge when conducting extension activities.	4,90	Very good
2	Agricultural extension officers adeptly steer and guide farmers.	4,60	Very good
3	Agricultural extension officers diligently prepare materials prior to disseminating information concerning rice crops in their extension endeavours.	4,57	Very good
4	Agricultural extension officers exhibit effective communication with farmers.	4,60	Very good
5	Agricultural extension officers adeptly oversee both internal (farmer groups) and external (government or business partners) communication.	4,57	Very good

Source: Primary data processed, 2022

The agricultural extension officers from the Agricultural Extension Agency (BPP) in Percut Sei Tuan have significantly enhanced their communication skills. Research findings indicate that each sub-variable, when considered collectively, yields "very good" outcomes. This underscores the effective fulfillment of their responsibilities by extension officers, which involves offering support to farmers, fostering robust relationships, and serving as intermediaries between farmer organizations and external stakeholders, including government and corporate partners.

Table 7. Agricultural Extension Officers

No	Variables	Score	Category
1	Performance of agricultural extension officers as a facilitator	3,66	Good
2	Performance of agricultural extension officers as a motivator	4,23	Very good
3	Performance of agricultural extension officers as an educator	4,44	Very good
4	Performance of agricultural extension officers as a communicator	4,65	Very good
Average Total Score		4,24	Very good

Source: Primary data processed, 2022

The Agricultural Extension Service (BPP) in Percut Sei Tuan achieves a "Very Good" performance rating with an average score of 4.24, as evaluated based on the performance of agricultural extension officers in their roles as facilitators, motivators, educators, and communicators.

Effectiveness of Agricultural Extension

Effective agricultural extension hinges on establishing robust communication channels with farmers in the field, fostering cooperative relationships between extension officers and farmers. To ensure effectiveness, agricultural extension must align with the specific interests and needs of farmers. A thorough investigation is essential to identify these individual and collective interests and needs, which can be satisfied within the constraints of available resources. This comprehensive understanding allows the prioritization of counseling activities based on the most critical interests and needs (Rangga et al., 2020).

The effectiveness of extension is gauged by the extent to which program objectives are achieved. The practical application of elements within rice cultivation technology, expressed through attained scores, serves as a yardstick for measuring this achievement. Central to the effectiveness of agricultural extension is the willingness of the target farmers to actively alter their behaviors through learning efforts. The effectiveness is further evaluated by considering the degree to which agricultural extension objectives are met, particularly in empowering farmers to implement recommended innovations (Faqih et al., 2015).

To assess the efficacy of extension services provided by agricultural extension officers to farmer groups, the primary benchmark employed is the increase in production, evaluated by examining the application of ten technology packages. These packages encompass the utilization of high-quality seeds, sound soil management practices, proper spacing, balanced fertilization, effective water management, diligent weeding, pest and disease control, efficient harvesting, post-harvest handling, and institutional factors.

The evaluation of agricultural extension officers' effectiveness at the Agricultural Extension Center (BPP) in Percut Sei Tuan relies on a ten-step approach, including: (1) Extension on the use of superior rice seeds; (2) Extension on comprehensive support for sound soil management practices; (3) Extension on proper planting distances; (4) Extension on balanced fertilization; (5) Extension on effective water management; (6) Extension on diligent weeding; (7) Extension on assistance with pest and disease control; (8) Extension on support for efficient harvesting practices; (9) Extension on proper post-harvest handling; (10) Extension on delivery of agricultural services. Effectiveness within each of these ten stages is measured using a semantic differential scale. A detailed data analysis of the effectiveness of agricultural extension implementation for each question attribute is presented in Table 8.

Table 8. Interval Scale Per Question Attribute of Agricultural Extension Effectiveness

Score	Category
1 – 1,667	Not Effective
1,668 – 2,334	Fair
2,335 – 3,001	Very Effective

Source: Primary data processed, 2022

After conducting the research process, the results of the analysis of the effectiveness of agricultural extension through the Agricultural Extension Center (BPP) of Percut Sei Tuan District are as follows.

Table 9. Agricultural Extension Effectiveness

No	Variable/Sub-Variable	Score	Category
1	Extension on the use of superior rice seeds	3	Very Effective
2	Extension on comprehensive support for sound soil management practices	2,467	Very Effective
3	Extension on proper planting distances	2,4	Very Effective
4	Extension on balanced fertilization	3	Very Effective
5	Extension on effective water management	2,867	Very Effective
6	Extension on diligent weeding	2,267	Fair
7	Extension on assistance with pest and disease control	2,233	Fair
8	Extension on support for efficient harvesting practices	2,667	Fair
9	Extension on proper post-harvest handling	2,5	Fair
10	Extension on delivery of agricultural services.	3	Fair
Average Total Score		2,64	Very Effective

Source: Primary data processed, 2022

The evaluation of agricultural extension officers' effectiveness at the Agricultural Extension Service (BPP) in Percut Sei Tuan reveals their commendable performance as extension officers, meriting a "very effective" categorization with an average score of 2.64. This signifies that the structured extension program encompassing ten stages has succeeded in reshaping farmers' mindsets, particularly enhancing their knowledge, skills, and attitudes toward rice farming. These findings align with the research conducted by Nastin et al. (2019), which underscores that the effectiveness of an extension program should be measured by its alignment with predefined plans and the actual outcomes realized. An ineffectiveness label is applicable when the efforts or actions do not yield the desired results.

Upon close examination of the effectiveness assessment, it is noteworthy that the stages related to seed utilization, balanced fertilizer application, and outreach to agricultural institutions secured the highest "very effective" rating. Agricultural extension officers have adeptly fulfilled their roles as facilitators, providing access to superior seeds and balanced fertilizers to boost rice productivity in Percut Sei Tuan. Moreover, these officers have proven themselves as capable mediators by fostering institutional links between farmers and governmental bodies, a role that significantly contributes to enhancing the quality of agricultural human resources and achieving agricultural development objectives, as articulated by Lesmana (2017).

CONCLUSION

The findings reveal that the performance of agricultural extension officers in their capacities as facilitators, motivators, educators, and communicators at the Agricultural Extension Service (BPP) in Percut Sei Tuan consistently falls within the "Very Good" performance category, averaging a score of 4.24. Nevertheless, the scores of 3.03 and 2.53 respectively indicate lower performance in terms of agricultural extension officers' involvement in securing agricultural financing for farmers and facilitating the marketing of agricultural products. The results of the assessment confirm the "very effective" execution of duties by agricultural extension officers at the Agricultural Extension Service Center (BPP) in Percut Sei Tuan, averaging a score of 2.64. However, the challenges faced by rice farmers, such as limited input options, seed quality, technology access, and post-harvest procedures, imply that there is room for improvement in the extension officers' overall performance.

These research findings provide valuable insights for recommending strategies to enhance the evaluation of agricultural extension officer performance through the Agricultural Extension Service (BPP) in Percut Sei Tuan. The aim is to develop and implement more effective programs and interventions, addressing persistent issues encountered by rice farmers. The ultimate goal of these programs is to stimulate agricultural innovation among farmers, fostering a positive impact on rice production and, in turn, advancing self-sufficiency in food security.

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