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Research Article

Correlation between the Performance of Agricultural Extension Workers and the Behavior of Vegetable Farmers in Terjun, Medan Marelan, North Sumatra, Indonesia

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ABSTRACT

This study aims at assessing the performance of agricultural extension services (also known as agricultural advisory services) and the behavior of vegetable farmers while examining the correlation between these two variables. Data were collected through direct interviews, discussions with farmers, and on-site observations conducted in the Terjun region of Medan Marelan, North Sumatra, Indonesia. A simple random sampling method was employed, with 48 samples selected without consideration of population strata. This research adopts a descriptive and quantitative qualitative research approach. The findings reveal two key performance indicators for agricultural extension workers. First, the assessment of visits and training indicated an average score of 146.2, with a 76.14% rating, categorizing it as 'good.' Second, the evaluation of the extension workers' performance yielded a similar score of 146.2, also categorized as 'good.' The correlation analysis between farmer behavior and the performance of agricultural extension workers yielded three distinct outcomes. Firstly, the correlation between farmers' knowledge and the performance of extension workers resulted in a value of 0.175, indicating a very weak correlation with a significance value exceeding 0.05. Secondly, the correlation between farmers' characteristics and the performance of extension workers showed a coefficient of 0.014, suggesting a very weak correlation with a significance value exceeding 0.05. Lastly, the correlation between farmers' skills and the performance of extension workers resulted in a coefficient of 0.166, denoting a very weak correlation with a significance value exceeding 0.05.

INTRODUCTION

Initially, agricultural development primarily centered on production; however, contemporary agricultural development necessitates an agribusiness-oriented approach, encompassing not only production but also market-oriented strategies (Denysiuk et al., 2023; Krasnorutskyy, 2022). A prominent facet of agribusiness-centered development initiatives involves the cultivation of horticultural commodities, with a specific focus on the diversification of crops, environmental sustainability, and the expansion of production hubs. The

advancement of horticultural sub-commodities, particularly vegetables, demands a concentrated and commercially-driven effort on an agribusiness scale, underpinned by professional management. The overarching objectives of this approach are to stimulate job creation, augment the income of agribusiness stakeholders, and bolster regional revenue and foreign exchange reserves. These endeavors align with the overarching goals of agricultural development in Indonesia, which include elevating agricultural output, enhancing the financial well-being of farmers, improving the quality of food products, bolstering community nutrition, and catalyzing economic prospects in rural areas (Bahua, 2016).

Development encompasses endeavors aimed at instigating positive societal transformation, and agricultural development constitutes a pivotal dimension of this broader pursuit (Alexander, 2022; Helfenstein et al., 2022). Agricultural development transcends mere economic enhancement; it necessitates concomitant human development, with farmers serving as integral participants. The active engagement and benefit derived by farmers from development initiatives are contingent upon the advancement of individual quality.

A crucial element of agricultural development, agricultural extension services (also known as agricultural advisory services) plays a fundamental role in empowering farmers and various stakeholders within the agricultural sector to augment productivity, income, and overall welfare. The role of agricultural extension within development activities is paramount, acting as a vital link connecting farmers with development programs. This linkage through agricultural extension activities facilitates the cultivation of farmers' human resources, instilling them with qualities that embody technological proficiency, openness, transparency, and active participation in civil society (Tamsah & Yusriadi, 2022).

In accordance with the Regulation of the Minister of Agriculture No. 273/Kpts/OT.160/2007, an extension worker holds the authority, sanctioned by an officially recognized organization within the realms of agriculture, fisheries, and forestry, to facilitate agricultural extension activities. Notably, the Minister of Agriculture's Regulation No. 37/Permentan/OT.10/3/2007 delineates a key responsibility of extension workers: fostering the maturation and capacity development of farmers, promoting their autonomy, and enhancing their responsibility in the utilization and enhancement of agricultural resources (Hernanda & Fatchiya, 2015).

Agricultural extension workers are tasked with the transformation of farmers' conventional modes of thought, labor, and lifestyle into contemporary, forward-looking practices aligned with current agricultural advancements. An extension worker assumes the role of an educator, equipped with the ability to induce changes in the knowledge, skills, attitudes, and practices of the farmers under their supervision. Furthermore, an extension worker must embody leadership qualities, possess the capacity to captivate farmers' attention and elicit the desired outcomes, while skillfully directing farming activities towards improved profitability and efficiency. These extension workers often collaborate with farmer leaders for the development of extension materials, integrating various competencies such as effective communication, comprehensive knowledge, and adaptability to the diverse characteristics of farmers (Bahua et al., 2010; Hernanda & Fatchiya, 2015).

Extension workers are entrusted with pivotal tasks and functions, and their effectiveness hinges on their ability to function as motivators, educators, supporters, and catalysts for behavioral shifts within the agricultural community. Consequently, extension workers must possess a diverse array of competencies, including adept communication skills, an in-depth knowledge base, and the flexibility to tailor their approach to suit the unique attributes of the farmers they serve (Hernanda & Fatchiya, 2015).

The government recognizes the pivotal role of agricultural extension workers in advancing the agricultural sector as they directly engage with farmers. Their successful execution of extension activities hinges upon their own commitment and capabilities. Extension workers are entrusted with the task of formulating work plans and delivering extension services tailored to the specific requirements of target communities. To fulfill this mandate, proficient and capable extension workers are imperative in discharging their responsibilities. These workers serve as guides, technicians, liaisons, organizers, and catalysts who influence farmers within the agricultural context (Sudiadnyana et al., 2019).

Performance, in the organizational context, refers to the tangible accomplishments or achievements of an individual as they effectively and efficiently carry out their designated roles and responsibilities over a defined period. The effectiveness of extension workers is of paramount importance as it serves to persuade policymakers and secure funding for extension programs, reinforcing regional development. Extension workers should endeavor to design extension initiatives aligned with the region's potential and market demands, catering to diverse community needs. The superior performance of agricultural extension workers substantially contributes to heightened agricultural yields, signifying their pivotal role in addressing the challenges faced by farmers throughout the agricultural process (Sudiadnyana et al., 2019).

The Minister of Administrative Reform's Regulation No: PER/19/M.PAN/10/2008, which outlines the Functional Position of Agricultural Extension Workers and their Performance Evaluation, stipulates that the Performance of Agricultural Extension encompasses two key components:

1. Training and Visits

The training component of agricultural extension combines instructional sessions with the primary objective of enhancing the capacities of extension workers in fulfilling their duties. Subsequently, visits to individual farmers or farmer groups are conducted in accordance with a pre-established schedule, with the overarching aim of achieving extension goals, including instigating changes in the behavior, skills, and knowledge of farmers.

2. Evaluation

Evaluation constitutes an integral facet of the extension process, involving an assessment of changes in various aspects, including farmers' knowledge, behavior, attitudes, the availability of facilities and infrastructure, and the efficacy of extension methods employed (Sugiarta et al., 2017).

Behavior encompasses a set of actions undertaken by individuals in response to various stimuli, gradually evolving into habits influenced by personal values. Human behavior represents human actions and activities, encompassing observable and unobservable interactions with the environment. This expression materializes in the form of knowledge, attitudes, and actions. Behavior can be rationally comprehended as an organism's or individual's response to external stimuli, taking on two forms: passive and active. The passive form comprises internal reactions occurring within individuals, while the active form denotes behavior directly observable by others (Hernanda & Fatchiya, 2015).

Farmers constitute the primary stakeholders in agricultural production and represent a segment of the Indonesian population actively pursuing enhanced well-being and intelligence. One means of elevating intelligence is through extension activities. The presence of extension workers is anticipated to facilitate the absorption and acceptance of agricultural information by farmers. The extent to which farmers utilize information significantly influences the effectiveness of extension initiatives. Effective implementation of activities, as advised by extension workers, necessitates suitable communication channels to ensure farmers' receptive engagement. A strong rapport between Field Agricultural Extension Workers (Indonesian: *Penyuluh Pertanian Lapangan*, abbreviated PPL) and farmers in the Medan Marelan region contributes to the success of PPL activities, potentially enhancing farmers' skills and altering their policies regarding vegetable farming. Extension activities play a crucial role in assisting farmers in achieving superior outcomes in vegetable production. Proficient PPL implementation serves as a catalyst for farmers to enhance their vegetable cultivation practices (Bahua et al., 2010).

Medan Marelan, situated in North Sumatra, Indonesia, encompasses a population of 182,515 individuals and spans an area of 44.47 square kilometers. As per data from the Agricultural Extension Center, a single PPL operates in Terjun, Medan Marelan, North Sumatra, Indonesia, servicing a single farmer group. Given the limited agricultural knowledge and awareness among the local farming community, the presence of PPLs in this region assumes considerable significance.

Farmer groups in Terjun, Medan Marelan, North Sumatra, Indonesia, exhibit active engagement in extension service activities. This active participation is driven by the belief that extension workers provide invaluable guidance, solutions, and educational support, aiding farmers in achieving optimal crop growth, thereby enhancing product quality and market value. Motivated by these dynamics, the present study seeks to explore "The Correlation Between Agricultural Extension Performance and Vegetable Farmer Behavior in Terjun, Medan Marelan, North Sumatra, Indonesia."

The Research Questions; How is the performance of agricultural extension described in Terjun, Medan Marelan, North Sumatra, Indonesia?; How is the behavior of vegetable farmers towards extension performance in Terjun, Medan Marelan, North Sumatra, Indonesia?; and What is the correlation between farmer behavior and the performance of agricultural extension in Terjun, Medan Marelan, North Sumatra, Indonesia?

The Research Objectives is to assess the performance of agricultural extension in Terjun, Medan Marelan, North Sumatra, Indonesia; To analyze the behavior of vegetable farmers regarding the role of extension in Terjun, Medan Marelan, North Sumatra, Indonesia; and To determine the correlation between farmer behavior and the performance of agricultural extension in Terjun, Medan Marelan, North Sumatra, Indonesia.

METHOD

Research Method

This research adopts a descriptive approach that combines qualitative and quantitative methodologies to address contemporary issues through data analysis. The descriptive qualitative aspect of this study is applied to gather insights into the performance of agricultural extension workers and the behavior of vegetable farmers (Sugiono et al., 2021).

Method Used for Research Site Determination

The research site was determined using purposive sampling, a technique guided by specific criteria. It was conducted in Terjun, Medan Marelan, North Sumatra, Indonesia, selected due to the active participation of vegetable farmer groups in extension activities.

Sampling Method

The research employed the simple random sampling method to select respondents. This approach, known as simple random sampling, entails the random selection of individuals from the population without consideration of strata. It can be executed by random and ordinal tables (Sudiadnyana et al., 2019). In the case of this study, the total population of registered farmer group members in Terjun, Medan Marelan, North Sumatra, Indonesia, was 325 farmers. To determine the sample size, the study followed established guidelines: when the subject population is less than 100, it is advisable to include all subjects as samples, whereas if the subject population exceeds 100, a sample size ranging from 10-20% or 20-25% can be selected (Yalitoba, 2019). Considering practicality and constraints, this study opted for a 15% sample of the total population, calculated using the Slovin formula:

$$n = 15\% \times 325$$
$$= 48{,}75$$
$$= 48 \text{ sample}$$

Where:
n = number of samples
N = total population

Data Collection Methods

This research employed both primary and secondary data collection methods. Primary data was acquired through face-to-face interviews and discussions with farmers in Terjun, Medan Marelan, North Sumatra, Indonesia. In contrast, secondary data was sourced from relevant agencies, such as the Central Bureau of Statistics office, along with various supporting journals, literature, and online resources. The data collection techniques encompassed (Bakhtiar et al., 2020):

1. Observation, entailing direct observation of the subject of study.
2. Interviews, involving structured interviews with the sampled farmers.

Data Analysis Method

To address the first research question regarding the performance of agricultural extension in Terjun, Medan Marelan, North Sumatra, Indonesia, the performance of agricultural extension workers encompasses three fundamental aspects: training, visits, and evaluation. These three dimensions are systematically executed by extension workers on a weekly basis. The analytical approach employed is descriptive statistical data analysis, which entails the use of frequency distribution tables to assess extension worker performance in Terjun, Medan Marelan, North Sumatra, Indonesia. To gauge the performance of extension workers in this context, a Likert Scale is applied, with measurements assigned weighted scores for each indicator. To facilitate data analysis, a scoring system is utilized:

Table 1. Alternative Answer for Likert Scale

Alternative Answer	Weight
Strongly Agree (SA)	4
Moderately Agree (MA)	3
Agree (A)	2
Disagree (D)	1

Source: Sugiono et al. (2021)

To derive interpretation results, it is imperative to ascertain the highest score value, score index, and score interval. This involves the following calculations:

1. Determining the maximum score:
   Maximum score = Number of Respondents × Likert Highest Score × Number of Questions.
2. Computation of the score index:
   Score Index (%) = (Calculated Score / Maximum Score) × 100.
3. Interval Formula:

$$I = \frac{100}{\text{Jumlah skor likert}}$$

To facilitate data analysis, a scoring system is implemented. As per Sugiono et al. (2021), the criteria for interpreting respondents' achievement levels based on their scores are as follows:

1. Scores ranging from 20% to 39.99% are categorized as "Poor."
2. Scores ranging from 40% to 59.99% are categorized as "Good enough."
3. Scores ranging from 60% to 79.99% are categorized as "Good."
4. Scores ranging from 80% to 100% are categorized as "Very good."

To address the second research question, pertaining to the behavior of vegetable farmers regarding the performance of extension services in Terjun, Medan Marelan, North Sumatra, Indonesia, qualitative data was acquired through interviews and observations. In this study, the researchers aimed to elucidate, categorize, and compare the data to draw an informative conclusion. Performance was assessed by aggregating the scores of both positive and negative questions.
Formula:

$$Interval = \frac{Maximum\ Score - Minimum\ Score}{Number\ of\ Categories}$$

$$Interval = \frac{3-1}{3} = \frac{2}{3} = 0{,}66$$

1.00 + 0.66 = 1.66
1.67 + 0.66 = 2,33
2.34 + 0,66 = 3
3.01+ 0,66 = 3.67

The classification of research findings aligns with the calculated class intervals as follows:

- 3.01-3.67, categorized as “high.”
- 2.34-3.00, categorized as “medium.”
- 1.67-2.33, categorized as “low.”
- 1.00-1.66, categorized as “very low.”

To address the third research question concerning the correlation between farmer behavior and the performance of agricultural extension in Terjun, Medan Marelan, North Sumatra, Indonesia, IBM SPSS Statistics 25 was utilized. After acquiring data suitable for statistical analysis, it was processed and analyzed using non-parametric statistics through the Spearman rank correlation test (rho or rs) within the SPSS 25 program. The Spearman rank coefficient formula, as outlined by (MacFarland & Yates, 2016), is as follows:

$$rs = \frac{\sum x^2 + \sum y^2 - \sum di^2}{2\sqrt{\sum x^2 \sum y^2}}$$

Where:
rs : Spearman correlation coefficient
di : Difference
x : Independent variable
y : Dependent variable

To establish the correlation between the two variables, namely the correlation between farmer behavior and the performance of agricultural extension workers in the Medan Marelan sub-district, please refer to Table 1 below. The guidelines for interpreting the correlation coefficient, as suggested by Sugiono et al. (2021).

Table 2. Interpretation of Correlation Coefficient

No	Interval	Correlation
1	0,00 – 0,199	Very Low
2	0,20 – 0,399	Low
3	0,40 – 0,599	Moderate
4	0,60 – 0,799	Strong
5	0,80 – 1,00	Very strong

Source: Sugiono et al. (2021)

RESULTS AND DISCUSSION

Performance of Extension Workers in Terjun

Agricultural extension in Terjun, Medan Marelan, North Sumatra, Indonesia, entails the active engagement of extension workers in the field, with the objective of assisting farmers by offering insights to facilitate informed decision-making. The performance evaluation of agricultural extension in Terjun encompasses three primary components: conducting visits, providing training, and conducting evaluations.

To gauge the assessment of agricultural extension workers' performance in Terjun, Medan Marelan, North Sumatra, Indonesia, it can be elucidated through the respondents' evaluations, as follows:

Performance of Extension Worker Visit

Table 3. Indicators of Data for Visit Performance and Training of Extension Workers

No	Statements	Respondents' Perceptions								Total Score	%
		SA		A		D		SD			
		R	S	R	S	R	S	R	S		
1	Agricultural extension workers assist farmers in obtaining production facilities.	16	64	18	54	7	14	7	7	139	72,39
2	Agricultural extension workers convey information through easily understandable media.	22	88	24	72	2	4	-	-	164	85.41
3	Agricultural extension workers excel in communication.	22	88	24	72	2	4	-	-	164	85.41
4	Agricultural extension workers excel in supervision.	17	68	27	81	3	6	1	1	156	81.25
5	Agricultural extension workers ensure that the information they convey is readily comprehensible to farmers.	3	12	22	66	19	38	4	4	120	62.5
6	Agricultural extension workers conduct visits regularly, typically occurring 1 to 3 times a month.	22	88	24	72	2	4	-	-	164	85.41
7	Agricultural extension workers refrain from endorsing activities conducted by farmer groups.	-	-	-	-	27	54	21	21	75	39.06
8	Agricultural extension workers actively promote the enhancement of farmers' skills.	22	88	25	75	1	2	-	-	165	85.93
9	Agricultural extension workers offer training sessions to farmer groups.	21	84	20	60	6	12	1	1	157	81,77
10	Agricultural extension workers demonstrate the process of selecting high-quality production facilities, such as seeds, fertilizers, pesticides, and equipment.	17	68	29	87	2	4	-	-	159	82.81

Source: Primary data processed, 2023

Description: SA = Strongly Agree, A=Agree, D= Disagree, SD= Strongly Disagree, R= Respondent, S = Score

The results of farmers' perceptions regarding the performance of agricultural extension workers in terms of visits and evaluations indicate that the highest score is attributed to the statement affirming that agricultural extension workers actively promote farmers' skill enhancement, receiving a score of 165, corresponding to 85.93%. Conversely, the lowest score pertains to the statement indicating that agricultural extension workers refrain from endorsing activities organized by farmer groups, with a score of 75, equivalent to 39.06%. Based on the calculations presented in the table above, it can be deduced that the performance of extension workers in conducting visits and training falls under the "good" category.

Direct research in the field, involving the distribution of questionnaires to farmers, underscores that extension workers exhibit competence. Farmers who have availed themselves of the guidance and training offered by extension workers every Tuesday or Thursday at 09:00 AM, in the designated focal area for vegetable farming within Terjun, are particularly appreciative. The extension activities, though not mandatory, serve as a valuable resource (Dos Santos et al., 2018).

During these sessions, extension workers provide instructions and training in plain language, ensuring farmers grasp the guidance easily. They cover various aspects, including the essential steps in vegetable cultivation such as securing quality production materials like seeds, fertilizers, pesticides, and suitable agricultural equipment. The instruction encompasses the broader spectrum of cultivation techniques, encompassing seeding, plowing, planting, maintenance, and harvesting.

The extension workers diligently document the proceedings, aligning with prior research findings (Imran et al., 2019), which underscore that farmers derive significant benefits from extension activities. These activities not only enhance the farmers' knowledge and skills but also result in practical applications in their agricultural endeavors. This positive impact parallels findings from previous studies conducted, emphasizing that extension methods implemented by local government agencies, particularly Agriculture Offices, have empowered farmers with knowledge, fostered innovation, and improved their agricultural practices.

Performance of Extension Worker Evaluation

Table 4. Indicators of Data for Performance of Extension Worker Evaluation

No	Statement	Respondents' Perception								Total Skor	%
		SD		A		D		SD			
		R	S	R	S	R	S	R	S		
1	Agricultural extension workers facilitate access to capital for farmers.	-	-	-	-	30	60	18	18	78	40.62
2	Agricultural extension workers promote collaboration among farmers and farmer groups.	22	88	24	72	2	4	-	-	164	85.41
3	Agricultural extension workers motivate farmers to enhance their production.	22	88	25	75	1	2	-	-	165	85.93
4	Agricultural extension workers foster innovation and the generation of novel ideas among farmers.	22	88	25	75	-	-	1	1	164	85.41
5	Agricultural extension workers emphasize the significance of farmers participating in farmer groups.	20	80	24	72	4	8	-	-	160	83.33
Average										**146.2**	**76.14**

Source: Primary data processed, 2023

Description: SA = Strongly Agree, A=Agree, D= Disagree, SD= Strongly Disagree, R= Respondent, S = Score

Based on the findings presented in Table 4, it is evident that farmers' perceptions of agricultural extension workers' performance regarding extension programs can be summarized. The highest score, indicating strong agreement, is associated with the third statement - agricultural extension workers play a pivotal role in motivating farmers to enhance their production, achieving a score of 165 and a percentage of 85.93%. In contrast, the lowest score is linked to the first statement - the facilitation of capital access for farmers, scoring 78 with a percentage of 40.62%.

In practice, farmers reported that they did not directly receive capital from the extension workers. Instead, they obtained subsidized fertilizers and seeds from the government, which were distributed by agricultural extension workers to farmer groups. These farmer groups, in turn, allocated seeds and subsidized fertilizers to their members. Subsidized fertilizers were made available to farmers at a reduced cost, such as Urea fertilizer at IDR 2,500 per kilogram and NPK at IDR 3,500 per kilogram. Seeds were distributed to farmers at no cost. Furthermore, agricultural extension officers encouraged farmers to join these farmer groups, highlighting the various benefits, including access to subsidized seeds and fertilizers, as well as opportunities for collaborative efforts to increase production (Famela et al., 2023).

This observation aligns with prior research, as Hernanda and Fatchiya (2015) underscore the essential role of evaluation in extension, emphasizing its position in program planning. This perspective, positing that evaluation involves the analysis of an object's strengths and weaknesses, offering insight into unmet needs. Similar to program preparation, evaluation serves as a guiding tool for extension workers and stakeholders during program implementation. Further maintains that evaluation can be linked to the analysis of program-

related challenges within the program environment or the target conditions to be realized. Evaluation, therefore, should be an integral component of extension activities, aiding in the identification of program deficiencies and assessing the extent to which program objectives have been accomplished.

Behavior of Vegetable Farmers towards the Performance of Agricultural Extension Workers

The assessment of vegetable farmers' behavior in Terjun, Medan Marelan, North Sumatra, Indonesia, involves evaluating their knowledge, attitudes, and skills. These criteria are gauged based on various provided statements, and the measurement of farmer behavior is presented in Tables 5, 6, and 7 below.

Table 5. Level of Farmers' Knowledge in Terjun, Medan Marelan

No	Statement	Total Score	Criteria
1	Conventional planting system with established spacing.	103	Moderate
2	Essential land cultivation activities (clearing, hoeing, plowing).	112	Moderate
3	Optimal timing for fertilization (during tillage, maintenance, or pre-harvest).	120	High
Total		**335**	Moderate
Average		**112**	

Source: Primary data processed, 2023

Table 5 illustrates the level of knowledge among farmers in Terjun, Medan Marelan. The highest score was obtained for the third statement, indicating the ideal timing for fertilization during various stages such as land cultivation, maintenance, or before harvest, with a score of 120, classifying it as "high." Conversely, the lowest score was assigned to the first statement, representing the use of a conventional planting system with known planting distances, resulting in a score of 103, categorizing it as "medium."

Field research indicates that farmers in Terjun primarily employ the conventional planting system. The cultivation process begins with land clearing, ensuring that the soil is free from weeds. Soil processing occurs approximately one week before planting, followed by creating planting holes spaced at 40x50 cm. Subsequently, 4-week-old seedlings are transplanted into these pre-prepared holes. Ongoing maintenance includes the replacement of dead plants, weeding to manage any unwanted plant growth, and strategic watering based on prevailing weather conditions. During dry spells, watering is conducted either in the morning or afternoon. Fertilization, administered three times, is vital. Pesticides are applied as needed to combat plant pests. The fertilizers utilized encompass Urea, NPK, Poska, and KCL, with the initial application of manure during planting, followed by subsequent applications at 2 and 5 weeks of age.

Table 6. Level of Farmers' Attitudes in Terjun, Medan Marelan

No	Statement	Total Score	Average Score	Criteria
1	Utilizing manure to enhance soil nutrients and improve its elemental composition.	110	2.29	Moderate
2	Applying fertilization techniques through spraying facilitates a more rapid and uniform distribution, enhancing plant absorption.	107	2.23	Moderate
3	Employing high-quality local seeds is conducive to elevating production yields.	119	2.48	High
Total		**336**	**7.00**	**Moderate**
Average		**112**	**2.33**	

Source: Primary data processed, 2023

Based on the findings presented in Table 6, the assessment of farmers' attitudes in Terjun, Medan Marelan is notable. The highest score is attributed to the third statement, which highlights that the utilization of locally superior seeds significantly contributes to enhanced production, earning a score of 119 and falling under the high criteria. Conversely, the lowest score pertains to the first statement, emphasizing the utilization of manure to enrich soil nutrients and elements, achieving a score of 110, classifying as moderate.

The empirical investigation involved distributing questionnaires directly to farmers in the field. According to the responses, farmers typically apply manure at the initiation of vegetable planting, using various types such as chicken manure, cow manure, and goat manure. The primary aim of this practice is to boost soil nutrient levels. Furthermore, the fertilization process is performed through spraying, albeit in a relatively manual and straightforward manner. Farmers dissolve the fertilizer in water within a bucket, stir it until achieving a homogeneous mixture, and subsequently apply it using a repurposed glass directly onto the vegetable plants. Additionally, farmers predominantly rely on seeds provided by agricultural extension workers. These extension

workers instruct the farmer group's leader to distribute the available fertilizers from the warehouse. While the fertilizers are not distributed free of charge (Charles & Hwang, 2011), they are offered at a reduced price compared to non-member farmers, underlining the importance of farmer group membership (Sugiono et al., 2021).

Table 7. Level of Farmers' Skills in Terjun, Medan Marelan

No	Statement	Total Score	Average Score	Criteria
1	Engaging in weeding approximately 20 days after the initial planting.	104	2.17	Moderate
2	Implementing specific plant spacing techniques during planting to ensure sufficient room for root absorption of fertilizers.	109	2.27	Moderate
3	Watering practices involve morning and evening sessions while avoiding over-saturating or allowing the soil to become excessively dry.	120	2.50	High
Total		**333**	**6.94**	Moderate
Average		**111**	**2.31**	

Source: Primary data processed, 2023

Following direct field research involving questionnaire distribution to farmers, it became evident that the skill levels of farmers in Terjun, Medan Marelan, North Sumatra, exhibit variations. Notably, the third statement highlighting the practice of morning and evening irrigation without creating excessively muddy or arid soil received the highest score, signifying a high level of proficiency (score of 120). Conversely, the statement regarding weeding plants approximately 20 days after planting received the lowest score, reflecting a medium proficiency level (score of 104). The variation in proficiency can be attributed to the diverse range of vegetables cultivated by farmers in the Medan Marelan.

The research also elucidated that weeding commences when the vegetables reach a 20-day growth stage, with subsequent weeding taking place approximately every two weeks, especially during the rainy season. Adequate plant spacing, a critical factor influencing plant growth, is determined to minimize competition among plants and optimize sunlight exposure. This parameter also facilitates seed quantity calculation and eases maintenance tasks, particularly weeding (Reddy, 2016; Saulić et al., 2022). The irrigation schedule is adjusted according to prevailing weather conditions, with watering executed in the morning and evening when dry conditions necessitate it.

Correlation between Behavior of Farmers and Performance of Extension Workers
Correlation between Knowledge of Farmers and Performance of Extension Workers

To compute the Spearman rank correlation based on questionnaire responses, the data initially needs to be transformed into ordinal form through ranking. The Spearman rank correlation coefficient was assessed using the SPSS Statistics software, applying the Spearman rank correlation method, yielding the subsequent output:

Tabel 8. SPSS Output for Analysis of Spearman Rank Correlation Coefficient between Knowledge of Farmers and Performance of Extension Workers

Correlations

			Extension Workers' Performance	Farmers' Knowledge
Spearman's rho	Extension Workers' Performance	Correlation Coefficient	1.000	.175
		Sig. (2-tailed)	.	.234
		N	48	48
	Farmers' Knowledge	Correlation Coefficient	.175	1.000
		Sig. (2-tailed)	.234	.
		N	48	48

Source: Primary data processed, 2023

Table 8 presents the correlation analysis results, which indicate a correlation coefficient of 0.175, derived from the Spearman rank test. This value suggests a very low correlation between farmers' knowledge and the performance of extension workers. Furthermore, considering the significance of the two-tailed test, it is evident that neither variable holds statistical significance, as the alpha value exceeds 0.05.

Field research findings reveal that farmers' knowledge remains relatively low. Many farmers choose not to participate in extension activities because they are not obligatory, some prefer to rely on their existing

knowledge, and others may be unable to participate due to age and limited educational backgrounds. Notably, the average educational attainment among farmers extends only up to the equivalent of high school. Additionally, the effectiveness of village-level counseling is hampered by the infrequent visits of extension workers, typically limited to approximately three times per month (Pasaribu & Novanda, 2022), with only one extension worker assigned to each farmer group despite their relatively large membership.

Correlation between Attitude of Farmers and Performance of Extension Workers

The Spearman rank correlation was calculated based on the questionnaire results. Initially, the data was transformed into ordinal values and ranked accordingly. The Spearman rank correlation coefficient was then computed using the SPSS Statistics program, resulting in the following output:

Tabel 9. SPSS Output for Analysis of Spearman Rank Correlation Coefficient between Attitude of Farmers and Performance of Extension Workers

Correlations

			Extension Workers' Performance	Farmers' Attitude
Spearman's rho	Extension Workers' Performance	Correlation Coefficient	1.000	.014
		Sig. (2-tailed)	.	.926
		N	48	48
	Farmers' Attitude	Correlation Coefficient	.014	1.000
		Sig. (2-tailed)	.926	.
		N	48	48

Source: Primary data processed, 2023

The table above reveals a correlation coefficient of 0.14, as derived from the Spearman rank test. This indicates a very low correlation between farmers' attitudes and the performance of extension workers. The significance value (Sig.) of 0.926 is greater than α (0.05), suggesting a lack of statistical significance in the relationship between these two variables.

Field research corroborates this finding, as it demonstrates that the correlation between farmers' attitudes and the performance of extension workers is notably weak (Alemnew & Abebe, 2023). Many farmers rely on traditional, inherited farming practices rather than adhering to the guidance provided by extension workers. For instance, although extension workers offer certified seeds at no cost, some farmers revert to using uncertified local seeds once the provided seeds are depleted due to the allure of lower prices. Consequently, this leads to suboptimal vegetable production results.

Additionally, farmers' limited participation in extension activities stems from the fact that extension officers only visit the land of the farmer group leader to conduct agricultural extension meetings (Cahyono & Agunga, 2016). This geographical distance between farmers' lands deters their attendance, and the absence of participation often goes unpunished as extension workers do not enforce consequences. Furthermore, the extension workers' role largely consists of offering advice and guidance upon farmers' request. Practical demonstrations in areas such as planting, crop care, and harvesting are seldom provided, and extension workers primarily fulfill a formality of their office duties. These factors contribute to the observed very low correlation between extension workers and farmers.

Correlation between Skill of Farmers and Performance of Extension Workers

In calculating the Spearman rank correlation from the questionnaire results, the data must first be transformed into ranked ordinal values. We conducted the Spearman rank correlation coefficient test using the SPSS Statistics program, which yielded the subsequent results:

Tabel 10. SPSS Output for Analysis of Spearman Rank Correlation Coefficient between Skill of Farmers and Performance of Extension Workers

Correlations

			Extension Workers' Performance	Farmers' Skill
Spearman's rho	Extension Workers' Performance	Correlation Coefficient	1.000	.166
		Sig. (2-tailed)	.	.261
		N	48	48
	Farmers' Skill	Correlation Coefficient	.166	1.000
		Sig. (2-tailed)	.261	.
		N	48	48

Source: Primary data processed, 2023

The table presented above was used to interpret the correlation between two variables, resulting in a correlation coefficient of 0.166 from the Spearman rank test. This value indicates a very weak correlation between farmers' skills and the performance of extension workers. Furthermore, the significance value was tested, with a value of Sig. 0.261, indicating a lack of significant correlation between the two variables.

Field research has provided insights into the weak correlation between farmer skills and extension workers' performance (Purnomo & Kusnandar, 2019). This is primarily due to the simplicity of the skills possessed by farmers, such as manual irrigation practices using basic tools like water machines. Although extension workers initially provide certified seeds to enhance productivity, their assistance is limited in frequency, prompting farmers to revert to using local, uncertified seeds, which are more affordable but yield suboptimal results in vegetable farming.

CONCLUSION

The performance of extension workers is assessed through the following indicators: firstly, visits and training, scoring an average of 146.2 with a 76.14% rating, categorizing it as 'good.' Secondly, the evaluation of extension worker performance also received a score averaging 146.2, with a 76.14 index, classifying it as 'good.' Farmers' behavior towards extension workers' performance is categorized into three aspects. First, the level of farmers' knowledge is rated with 'moderate' criteria, scoring an average of 112 and an index of 2.32%. Second, the attitude of farmers also falls within the 'moderate' category, with an average score of 112 and an index of 2.32%. Third, the skill level of farmers shows 'moderate' characteristics, averaging 111 in scores and 2.31% in index. The correlation between farmers' behavior and the performance of agricultural extension workers is divided into three sections. Firstly, the correlation between farmers' knowledge and the performance of extension workers is found to have a value of 0.175, indicating a very low correlation and a non-significant relationship ($\alpha > 0.05$). Secondly, the correlation between farmers' attitudes and the performance of extension workers is evaluated with a score of 0.014, indicating a very low correlation and a non-significant relationship ($\alpha > 0.05$). Thirdly, the correlation between farmers' skills and the performance of extension workers shows a result of 0.166, signifying a very low correlation and a non-significant relationship ($\alpha > 0.05$).

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