

**THE ROLE OF EXTENSION WORKERS IN EMPOWERING ORGANIC VEGETABLE FARMING
IN THE HIDUP BARU FARMER GROUP IN BAUMATA TIMUR VILLAGE, TAEBENU DISTRICT,
KUPANG REGENCY**
(Peran Penyuluh dalam Pemberdayaan Usaha Tani Sayuran Organik pada Kelompok Tani Hidup Baru
di Desa Baumata Timur, Kecamatan Taebenu, Kabupaten Kupang)

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ABSTRACT

This study was conducted in Baumata Timur Village, Taebenu District, Kupang Regency, from June to July 2025. The objectives of this study were: (1) to describe the role of extension workers in empowering organic vegetable farming in the Hidup Baru Farmer Group in Baumata Timur Village; and (2) to determine the amount of farmer income obtained from organic vegetable farming. The research location was selected purposively, while the sample was determined using a saturated sampling technique involving all 33 members of the Hidup Baru Farmer Group. The data were analyzed using quantitative descriptive analysis through the calculation of average scores and the revenue-to-cost ratio (R/C ratio). The results showed that the role of agricultural extension workers in empowering organic vegetable farming in Baumata Timur Village was in the "as expected" category, with an average score of 3.48 and a maximum score achievement percentage of 69.68%, which falls within the "as expected" range of 68–83%. Financially, the R/C ratio was 1.57, meaning that every Rp1.00 of production cost generated Rp1.57 in revenue. An R/C value greater than 1 indicates that organic vegetable farming is feasible and profitable to develop. The study concludes that extension-based empowerment and production cost efficiency contribute substantially to increasing farmer income and supporting the sustainability of organic farming.

Keywords: role of extension workers, farmer empowerment, organic farming, R/C ratio.

ABSTRAK

Penelitian ini dilaksanakan di Desa Baumata Timur, Kecamatan Taebenu, Kabupaten Kupang, pada bulan Juni hingga Juli 2025. Tujuan penelitian ini adalah: (1) mendeskripsikan peran penyuluh dalam pemberdayaan usahatani sayuran organik pada Kelompok Tani Hidup Baru di Desa Baumata Timur; dan (2) mengetahui besarnya pendapatan petani yang diperoleh dari usahatani sayuran organik tersebut. Lokasi penelitian dipilih secara purposif, sedangkan sampel ditentukan menggunakan teknik sampling jenuh yang melibatkan seluruh 33 anggota Kelompok Tani Hidup Baru. Data dianalisis menggunakan analisis deskriptif kuantitatif melalui perhitungan skor rata-rata dan rasio penerimaan terhadap biaya (rasio R/C). Hasil penelitian menunjukkan bahwa peran penyuluh pertanian dalam pemberdayaan usahatani sayuran organik di Desa Baumata Timur berada pada kategori "sesuai harapan", dengan skor rata-rata 3,48 dan persentase pencapaian skor maksimum sebesar 69,68%, yang masuk dalam rentang kategori "sesuai harapan" (68–83%). Secara finansial, rasio R/C tercatat sebesar 1,57, yang berarti setiap Rp1,00 biaya produksi menghasilkan penerimaan sebesar Rp1,57. Nilai R/C yang lebih besar dari 1 menunjukkan bahwa usahatani sayuran organik tersebut layak dan menguntungkan untuk dikembangkan. Penelitian ini menyimpulkan bahwa pemberdayaan berbasis penyuluhan dan efisiensi biaya produksi berkontribusi signifikan terhadap peningkatan pendapatan petani serta mendukung keberlanjutan pertanian organik.

Kata kunci: peran penyuluh pertanian, pendampingan petani, pertanian aorganik, R/C ratio

INTRODUCTION

Agricultural extension is a form of nonformal education that plays an important role in improving farmers' knowledge, skills, and behavioral change in managing farming activities (Mardikanto, 2009; Levis, 2013). Agricultural extension workers do not only function as providers of technical information, but also as motivators, facilitators, innovators, and companions who encourage farmer independence (Mardikanto, 2009).

In facing increasing food needs, farmers are required to optimize production sustainably. However, limited knowledge, excessive use of synthetic chemicals, high input costs, and declining soil quality remain major problems in the agricultural sector. These conditions encourage the need to implement environmentally friendly and sustainable farming systems.

Organic farming is present as an alternative that emphasizes balance among environmental, social, and economic aspects (Mayrowani, 2012; Djafri et al., 2016). The implementation of organic farming in Baumata Timur Village is considered capable of reducing production costs while maintaining soil fertility and the quality of agricultural products. However, the success of this system is highly dependent on the role of agricultural extension workers in the farmer empowerment process. Therefore, this study is important for examining the extent of the role of agricultural extension workers in empowering organic vegetable farming in the Hidup Baru Farmer Group.

This study aims to analyze the role of agricultural extension workers in the process of empowering organic vegetable farming in the Hidup Baru Farmer Group in Baumata Timur Village, Taebenu District, Kupang Regency. Specifically, this study is directed at describing the role of extension workers as educators, facilitators, motivators, and innovators in increasing farmer capacity, as well as assessing their contribution to the development of sustainable organic farming and increased farmer income. The results of this study are expected to serve as a reference for strengthening agricultural extension strategies based on farmer empowerment and organic farming development in rural areas (Mayrowani, 2012; Bulu, 2018).

METHODS

This study was conducted in Baumata Timur Village, Taebenu District, Kupang Regency, from June to July 2025. The research location was determined purposively because the village actively develops organic vegetable farming. The research method used was quantitative descriptive research with a survey approach (Arikunto, 2013; Creswell, 2014).

The research population consisted of all 33 members of the Hidup Baru Farmer Group, and all members were used as the research sample through saturated sampling. The data collected consisted of primary and secondary data. Primary data were obtained through interviews, questionnaires, and observation, while secondary data were obtained from literature studies and documentation from related agencies.

Data analysis was conducted using quantitative descriptive analysis to assess the role of extension workers based on average scores for four role indicators (Sugiyono, 2016). In addition, R/C Ratio analysis was used to assess the feasibility of organic vegetable farming.

RESULTS AND DISCUSSION

General Condition of the Research Location

Baumata Timur Village is one of the villages located in the eastern part of Taebenu District, Kupang Regency, at an elevation of approximately 0–500 meters above sea level, with an area of 1,016.75 ha. Baumata Timur Village is divided into five hamlets, namely Hamlet I Manefu, Hamlet II Manefu, Hamlet III Neketuka, Hamlet IV Bilamun, and Hamlet V Manuat, with 10 community units (RW) and 20 neighborhood units (RT). The distance from the village to the capital is 20 km and to the regency capital is 33 km. The distance from the village center to the district capital is 5.8 km, and the distance from Baumata Village to the regency capital is 50 km.

Geographical Location

Geographically, Baumata Timur Village is located in Taebenu District, with an area of more than 1,016.75 ha and with the territorial boundaries of Baumata Timur Village as stated in the source document.

Respondent Characteristics

The role of farmers in farming, such as providing capital, labor, and other resources, is very important in order to achieve maximum profit. This role is closely related to the identity of the farmers themselves. Farmer identity, such as age, education level, and number of family dependents, constitutes several indicators that may affect farmer quality in farming practices. The farmers in this study were farmers who belonged to the Hidup Baru Farmer Group in Baumata Timur Village, Taebenu District, Kupang Regency, totaling 33 people.

Gender

Gender is the biological difference between women and men from birth. Gender factors also determine the level of participation and productivity of a person at work. In general, men tend to be more productive in work that relies on physical strength. However, in certain circumstances, women's productivity can sometimes be

higher than men's because women are more careful, patient, and diligent. The data showed that 20 respondents (60.61%) were male and 13 respondents (39.39%) were female. This indicates that most members of the farmer group in Baumata Timur Village were men.

Age

Age is one factor that can influence farmers' physical ability and mindset in managing their farming activities. In addition, farmer age is closely related to work capacity in carrying out farming activities. Age can be used as a benchmark for observing a person's work activity, because when a person is still in a productive age condition, they are likely to be able to work well and optimally.

Based on primary data processing, most respondents were in the productive age group (15–64 years), totaling 30 people or 90.91%, while the remaining respondents were in the nonproductive age group (>64 years), totaling 3 people or 9.09%. This condition describes the farmers in Baumata Timur Village, Taebenu District, Kupang Regency.

Education Level

Education increases knowledge, develops attitudes, and fosters farmers' interests, especially in facing change. Education enables a person to think scientifically and therefore make decisions from various alternatives in managing farming activities to obtain higher income.

Formal Education

Formal education refers to the length of education completed in an educational institution. Formal education greatly influences the mindset of respondents in carrying out farming activities. The levels of formal education completed by respondents varied. The formal education levels of respondents were: elementary school (SD) as many as 12 people (36.36%), junior high school (SMP) as many as 7 people (21.21%), senior high school (SMA) as many as 11 people (33.33%), and bachelor's degree as many as 3 people (9.09%). Based on these data, it can be concluded that the highest percentage of respondent farmers in Baumata Timur Village, Taebenu District, Kupang Regency, had elementary school education.

Nonformal Education

Nonformal education is education followed by a person outside formal schooling. This education usually takes the form of extension activities, training, or courses. Nonformal education aims to increase farmers' knowledge and skills in carrying out their farming activities. All respondent farmers had participated in agricultural extension activities.

Number of Family Dependents

The number of family dependents refers to the number of family members who are still dependent on the household, including wife, children, family members, or other people living in the same house who are not yet working and whose clothing, food, and housing needs depend on the household income. The data showed that most respondent farmers had a medium number of family dependents (1–3 people), totaling 18 respondents (54.55%). This was followed by respondents with 4–5 family dependents, totaling 15 respondents (45.45%).

Farming Experience

Farming experience is one indicator that indirectly influences the overall success of farming carried out by farmers. Farming experience is always measured by how many years a farmer has been directly involved in farming and has depended on farming as a permanent occupation. Respondents with 3–20 years of farming experience totaled 18 respondents (54.55%), respondents with 20–30 years of farming experience totaled 9 respondents (27.27%), and farmers with more than 30 years of farming experience totaled 6 respondents (18.18%). This indicates that most farmers had relatively long farming experience.

Farm Land Area

The results of the data analysis showed that the land area for organic vegetable cultivation in Penfi Timur Village was 3–10 ares. This is based on the idea that a larger land area encourages efforts toward more efficient actions. Farmers with land areas of 3–7 ares totaled 18 people (54.55%), while respondent farmers with land areas of more than 7 ares totaled 15 people (45.45%). Based on land area, most respondents, namely 18 people (54.55%), had relatively large land areas of 3–7 ares.

The Role of Agricultural Extension Workers in Farmer Empowerment

The role of extension workers was measured using four indicators: educator, innovator, facilitator, and motivator. The results of the data analysis are presented below.

Table 1. Measurement of the Role of Extension Workers Based on Four Indicators

No.	Role Aspect	Dominant Role Category	Frequency (People)	Percentage (%)	Overall Category
1	Educator	As expected	19	57.57	Good
2	Innovator	As expected	20	60.61	Good
3	Facilitator	As expected	20	60.61	Good
4	Motivator	As expected	21	63.64	Good
	Total respondents		33	100	

Source: Processed primary data, 2025.

The results showed that all indicators of the extension workers' role were in the "as expected" category. However, the educator indicator had the lowest percentage (57.57%), making it an aspect that needs to be strengthened through increased technical training and field learning.

The factors affecting the achievement of the extension workers' role included:

- The frequency of training was still limited;
- Supporting facilities were limited;
- Farmer participation was not yet optimal;
- The extension workers' time was divided among several assisted groups.

The highest role indicator was motivator (63.64%), indicating that extension workers successfully provided encouragement and influenced farmers' attitudes toward organic farming.

1. Role as Educator

Extension workers provided education to farmers through training on organic vegetable cultivation techniques, the use of organic fertilizers, the preparation of botanical pesticides, land processing, and crop maintenance. Farmers obtained new knowledge so that they were able to apply cultivation techniques that were more environmentally friendly and efficient.

Table 2. Distribution of Respondents Based on the Role of Agricultural Extension Workers as Educators

No.	Percentage of Maximum Score Achievement	Extension Worker Role Category	Frequency (People)	Percentage (%)
1	20–35	Very not as expected	0	0.00
2	36–51	Not as expected	0	0.00
3	52–67	Moderately as expected	14	42.42
4	68–83	As expected	19	57.57
5	84–100	Very as expected	0	0.00
	Total		33	100

Source: Processed primary data, 2025.

2. Role as Facilitator

Extension workers played a role in facilitating farmers by providing access to superior seeds, organic fertilizers, agricultural tools, and market information. This facilitation helped farmers overcome limitations in production facilities and improve the sustainability of organic farming.

Table 3. Distribution of Respondents Based on the Role of Agricultural Extension Workers as Facilitators

No.	Percentage of Maximum Score Achievement	Extension Worker Role Category	Frequency (People)	Percentage (%)
1	20–35	Very not as expected	0	0.00
2	36–51	Not as expected	0	0.00
3	52–67	Moderately as expected	13	39.39
4	68–83	As expected	20	60.61

5	84–100	Very as expected	0	0.00
	Total		33	100

Source: Processed primary data, 2025.

3. Role as Innovator

Extension workers provided intensive guidance and helped farmers solve various constraints, such as pest attacks, crop failure, or technical cultivation errors. Extension workers also accompanied farmers in decision-making related to business development.

Table 4. Distribution of Respondents Based on the Role of Agricultural Extension Workers as Innovators

No.	Percentage of Maximum Score Achievement	Extension Worker Role Category	Frequency (People)	Percentage (%)
1	20–35	Very not as expected	0	0.00
2	36–51	Not as expected	0	0.00
3	52–67	Moderately as expected	13	39.39
4	68–83	As expected	20	60.61
5	84–100	Very as expected	0	0.00
	Total		33	100

Source: Processed primary data, 2025.

4. Role as Motivator

Extension workers provided direct motivation through routine visits, group discussions, and appreciation for farmers' success. Motivational factors are very important for maintaining farmers' enthusiasm, discipline, and consistency in implementing organic farming.

Table 5. Distribution of Respondents Based on the Role of Agricultural Extension Workers as Motivators

No.	Percentage of Maximum Score Achievement	Extension Worker Role Category	Frequency (People)	Percentage (%)
1	20–35	Very not as expected	0	0.00
2	36–51	Not as expected	0	0.00
3	52–67	Moderately as expected	12	36.36
4	68–83	As expected	21	63.64
5	84–100	Very as expected	0	0.00
	Total		33	100

Source: Processed primary data, 2025.

Income Analysis of Organic Vegetable Farming (R/C Ratio)

Production cost is one factor that influences the generation of a product within one planting period. Production costs consist of fixed costs and variable costs. Fixed costs are costs whose amounts do not change and continue to be incurred even when production output is not constant, while variable costs are costs whose size is affected by the amount of production generated.

Fixed costs include depreciation of agricultural tools, while variable costs include seed costs and liquid organic fertilizer. The total fixed cost incurred by all respondent farmers was Rp1,650.00, with an average fixed cost per farmer of Rp50,000. When calculated further, the average fixed cost per are reached Rp7,270. This cost reflects the fixed burden that farmers must bear even when harvest yields fluctuate.

The fixed cost component came from depreciation of agricultural tools, amounting to Rp1,650,000, or Rp50,000 per farmer and Rp7,270 per are. This depreciation reflects the allocation of economic value for the use of production tools such as hoes, sprayers, and other equipment that have a service life of more than one planting season.

Variable costs are production cost components whose amounts change according to production volume or farming scale. In the context of organic vegetable farming in Baumata Timur Village, variable costs consisted of the main components of seed costs, organic fertilizer, and other costs such as cultivation support materials and daily operational expenses.

The total variable cost incurred by all respondents reached Rp9,534,000. On average, each farmer incurred a variable cost of Rp288,909 per planting season. Meanwhile, the average variable cost per are was Rp42,000, reflecting the level of operational cost requirements based on land area units.

The seed component occupied the highest portion of the total variable costs, amounting to Rp4,994,000, or Rp151.33 per farmer and Rp22.00 per are as stated in the source text.

Meanwhile, the cost of liquid organic fertilizer (POC) was Rp454,000 for all farmers, with an average of Rp137,576 per farmer and Rp20,000 per are, indicating efficiency in the use of natural fertilizer. This value also reflects the possibility that farmers utilized self-produced organic fertilizer, such as household compost or local organic waste, so that fertilizer expenditure was not too high.

In the context of empowerment, agricultural extension workers play an important role in helping farmers prepare effective variable cost planning, including the selection of quality seeds, the utilization of local organic fertilizer sources, and savings in other operational costs. Good assistance can improve farming efficiency and support the success of a sustainable organic farming system.

The total fixed cost incurred by all farmers was Rp1,650.00, with an average fixed cost per farmer of Rp50,000 and an average per are of Rp7,270. The main component of fixed costs included depreciation of agricultural tools amounting to Rp1,650,000 (Rp50,000 per farmer). This component is fixed because it does not change regardless of production level and serves as the basis for calculating long-term capital efficiency.

Meanwhile, variable costs, which included seeds and liquid organic fertilizer, reached a total of Rp9,534,000. The average variable cost incurred per farmer was Rp288,909, and the average per are was Rp40,000. Seed costs of Rp4,994,000 (Rp151,333 per farmer) indicate that the procurement of initial inputs remained the main burden, while the cost of liquid organic fertilizer of Rp4,540,000 (Rp137,576 per farmer) indicated the potential use of self-produced organic fertilizer from local materials or household waste.

Overall, the total production cost of organic vegetable farming, consisting of fixed costs and variable costs, was Rp11,184,000. Thus, the average total cost borne by each farmer per planting season was Rp338,909, while the average total cost per are was Rp47,270. This value provides a comprehensive overview of the cost burden that farmers must incur in running organic farming at small to medium scale.

After calculating fixed costs and variable costs, the total cost incurred during one planting season could be determined. Total cost is the result of fixed cost (TFC) plus variable cost (TVC), or can be formulated as follows:

$$TC = TFC + TVC$$

Description:

TC = Total cost

TFC = Fixed cost

TVC = Variable cost

Therefore:

$$TC = 1,650,000 + 9,534,000 = 11,184,000$$

Therefore, the total cost obtained was Rp11,184,000. Thus, the average total production cost per farmer was Rp339,818 and the average per are was Rp47,270. These results show that the variable cost component was the largest part of total production costs, with the contribution of seed costs amounting to 52.37% (Rp151,333 per farmer) and liquid organic fertilizer amounting to 47.63% (Rp137,576 per farmer). This indicates that the efficiency of production input use, particularly in the procurement of seeds and organic fertilizer, greatly affects the profit obtained by farmers.

Revenue of Organic Vegetable Farming

Revenue or total revenue (TR) is one important indicator in assessing farming success because it reflects the total gross income obtained by farmers before production costs are deducted. Mathematically, revenue can be calculated using the following formula:

$$TR = Q \times P$$

where:

Q is the amount of harvest sold per farmer,

P is the selling price per product unit.

Based on the research results, the selling price of vegetables at the farmer level was Rp5,000 per 3 bundles, or equivalent to Rp1,666.67 per bundle after division.

Thus, the total revenue (TR) obtained by each farmer in one planting season was as follows: based on the table, the total production of 33 farmers was 10,563 bundles, so:

$$TR = 10,563 \times \text{Rp}1,666.67 = \text{Rp}17,606,613$$

$$\text{Average per farmer} = \text{Rp}533,533.73$$

This value shows that farmers' gross income from the sale of organic vegetables during one planting season was Rp17,606,613. This revenue then becomes the basis for calculating net income or farming profit after subtracting total production costs.

Income of Organic Vegetable Farming

After revenue (TR) and total cost (TC) were known, the income of organic vegetable farming obtained by farmers in Baumata Timur Village in the Hidup Baru Farmer Group during one planting season was calculated. Income is total revenue minus total cost, or can be written as follows:

$$\text{Income (I)} = \text{Total Revenue (TR)} - \text{Total Cost (TC)}$$

$$I = TR - TC$$

Description:

I = income (Rp mt-1);

TR = total revenue (Rp mt-1);

TC = total cost (Rp mt-1).

Therefore:

$$I = \text{Rp}17,606,613 - \text{Rp}11,184,000 = \text{Rp}6,422,613$$

$$I = 533,533.73 - 338,909 = 194,624.73$$

Thus, the net income per farmer per planting season was Rp194,624.73.

Total income for 33 farmers: Rp17,606,613 - Rp11,184,000 = Rp6,422,613.

This value shows that although the scale of organic vegetable farming carried out was still relatively small, this activity was still able to provide a positive difference between revenue and production costs, thereby generating profit for farmers.

R/C Ratio Analysis

The R/C ratio is one analysis used to determine the feasibility of an agricultural business, whether it is profitable or not. Agricultural business is considered profitable if the R/C ratio value is greater than 1.

Based on the calculation results, the feasibility value of organic vegetable farming was obtained using the following formula:

$$\text{R/C Ratio} = TR / TC$$

TR (Total Revenue) = Rp17,606,613

TC (Total Cost) = Rp11,184,000

$$\text{R/C} = \text{Rp}17,606,613 / \text{Rp}11,184,000 = 1.57$$

The R/C ratio value of 1.57 shows that every Rp1 of production cost generated Rp1.57 in revenue, meaning that this farming business is highly feasible and financially profitable. An R/C value greater than 1 indicates that income is greater than the total costs incurred.

CONCLUSION

This study concludes that the role of agricultural extension workers in empowering organic vegetable farming in the Hidup Baru Farmer Group in Baumata Timur Village was categorized as as expected. Extension

workers played active roles as educators, facilitators, innovators, and motivators in increasing farmer capacity and supporting the implementation of organic farming systems.

The role as motivator showed the highest achievement, while the role as educator still needs to be improved through stronger technical training and continuous assistance.

From the economic aspect, organic vegetable farming was proven feasible and profitable, with an R/C Ratio of 1.57, indicating that farming is able to provide profit for farmers and has the potential to be developed sustainably.

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