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ECONOMIC FEASIBILITY ANALYSIS OF GUNDALING CARROT VARIETY FARMING IN GURUSINGA VILLAGE, BERASTAGI

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ABSTRACT

This study aimed to analyze production costs, revenue, farm income, and the economic feasibility of Gundaling carrot variety farming in Gurusinga Village, Berastagi District, Karo Regency, Indonesia. The research was conducted from April to May 2026, involving 30 carrot farmers selected through snowball sampling. Data were analyzed using a descriptive quantitative approach, including production cost, revenue, farm income, Revenue-Cost Ratio (R/C Ratio), and Break-Even Point (BEP) analyses for selling price and production volume. The results showed that average production costs amounted to IDR 20,099,195 per farmer per growing season, consisting of fixed costs of IDR 662,075 and variable costs of IDR 19,437,120. Average carrot production reached 15,180 kg at a selling price of IDR 3,436/kg, generating average revenue of IDR 52,213,166 and net farm income of IDR 32,113,971 per farmer per growing season. The R/C Ratio of 2.60 indicated that every IDR 1 spent on production generated IDR 2.60 in revenue. The BEP analysis revealed a break-even selling price of IDR 1,324/kg and a break-even production volume of 5,850 kg, both below the actual selling price and production level. These findings indicate that Gundaling carrot farming in the study area was economically feasible and profitable. Improving fertilizer and labor-use efficiency is essential to maintaining farm profitability.

Keywords: Gundaling Carrot, Economic Feasibility, Farm Income, Revenue-Cost Ratio, Break-Even Point.

ABSTRAK

Penelitian ini bertujuan untuk menganalisis biaya produksi, penerimaan, pendapatan, dan kelayakan ekonomi usahatani wortel varietas Gundaling di Desa Gurusinga, Kecamatan Berastagi, Kabupaten Karo. Penelitian dilaksanakan pada April–Mei 2026 dengan melibatkan 30 petani responden yang ditentukan menggunakan teknik *snowball sampling*. Data dianalisis secara deskriptif kuantitatif melalui analisis biaya produksi, penerimaan, pendapatan, *Revenue-Cost Ratio* (R/C Ratio), serta *Break-Even Point* (BEP) harga dan produksi. Hasil penelitian menunjukkan bahwa rata-rata biaya produksi sebesar Rp20.099.195 per petani per musim tanam, terdiri atas biaya tetap Rp. 662.075 dan biaya variabel Rp19.437.120. Rata-rata produksi mencapai 15.180 kg dengan harga jual Rp3.436/kg, menghasilkan penerimaan sebesar Rp. 52.213.166 dan pendapatan bersih sebesar Rp. 32.113.971 per petani per musim tanam. Nilai R/C Ratio sebesar 2,60 menunjukkan bahwa setiap Rp1 biaya produksi menghasilkan penerimaan Rp. 2,60. Hasil analisis BEP menunjukkan harga impas sebesar Rp1.324/kg dan produksi impas sebesar 5.850 kg, keduanya lebih rendah dibandingkan harga jual dan produksi aktual. Dengan demikian, usahatani wortel varietas Gundaling di daerah penelitian layak secara ekonomi dan menguntungkan. Peningkatan efisiensi penggunaan pupuk dan tenaga kerja diperlukan untuk mendukung keberlanjutan keuntungan usahatani.

Kata Kunci: Wortel Gundaling, Kelayakan Ekonomi, Pendapatan Usahatani, R/C Ratio, Break-Even Point

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I. INTRODUCTION

Indonesia is an agrarian country located in Southeast Asia with a tropical climate that contributes to its fertile soils and abundant, diverse natural resources. As an agrarian country, agriculture plays a vital role not only in meeting basic needs but also in supporting social development, economic growth, and trade. The agricultural sector plays an important role in the Indonesian economy by providing employment opportunities, food supplies, and raw materials for industries(Andrie, 2021).

North Sumatra Province is known for its considerable potential for agricultural development. Several agricultural commodities produced in this region are exported and contribute significantly to the Gross Regional Domestic Product (GRDP) compared to other economic sectors. The agricultural sector is one of the leading sectors driving economic growth in North Sumatra Province (Hafni *et al.*, 2023).

Vegetables are among the horticultural crops with relatively high demand, including carrots. Carrots play an important role in food provision, particularly as a source of vitamins and minerals. Horticultural farming is an important sector that contributes significantly to the local economy, especially in rural areas where most residents depend on agriculture for their livelihoods. Horticultural cultivation is one of the agricultural activities that continues to develop in Karo Regency, including Berastagi District. Favorable environmental conditions for highland crop cultivation have made Karo Regency one of the major producers of various horticultural commodities in North Sumatra. One of the widely cultivated commodities is carrots. Hafni et al. (2023) reported that Karo Regency was the largest contributor to carrot production in North Sumatra, accounting for 94.61% of the province's total carrot production in 2021. This indicates that carrots play an important role in agricultural activities in Karo Regency. A study by Sihaloho and Butar-Butar (2020) also demonstrated that Karo Regency is one of the major carrot-producing areas in North Sumatra and that carrot farming has become an important economic activity for farmers in the region.

In Berastagi District, Gurusinga Village is one of the areas where horticultural farming activities are carried out. Carrots are among the agricultural commodities cultivated by local farmers in the village. The development of carrot farming in Gurusinga Village is closely associated with the long-established reputation of Karo Regency as a highland vegetable-producing region. As carrot cultivation continues to develop, selecting varieties that are suitable for local environmental conditions and farmers' needs has become increasingly important. One cultivar closely associated with the Berastagi region is Gundaling. Albayani *et al.*, (2020) stated that Gundaling is an Indonesian local carrot cultivar originating from Berastagi. Therefore, the existence of the Gundaling variety is closely related to the development of carrot cultivation in Berastagi and Karo Regency.

The Gundaling variety was developed through the purification of local carrots from Karo Regency that have long been cultivated by farmers. Before being officially recognized as a superior variety, this commodity was known as the local Karo carrot. The Regional Technical Implementation Unit for Horticultural Seed Development (UPTD BIH) Kutagadung initiated the purification process in 2014. In 2017, tests were conducted to evaluate the variety's superiority and authenticity as requirements for registration with the Ministry of Agriculture. In 2018, the Gundaling carrot variety was officially registered and released as a superior variety of Karo Regency (Simamora *et al.*, 2020).

In addition to the Gundaling variety, carrots cultivated in Indonesia consist of various varieties or cultivars, including both local and introduced cultivars. Some of these include New Kuroda, Kuroda, Shin Kuroda, Kuroda EW, and Gemuk. Each cultivar has different growth and yield characteristics. Albayani *et al*. (2022) conducted a study involving six carrot cultivars, namely Gundaling and Gemuk as Indonesian local cultivars, and New Kuroda, Kuroda, Shin Kuroda, and Kuroda EW as introduced cultivars. The results revealed differences in growth responses, yield, productivity, sweetness levels, and root color among several of the cultivars evaluated. These findings indicate that each carrot cultivar has distinct characteristics and adaptation capabilities under different environmental conditions. Therefore, variety selection is an important factor in determining the success of carrot cultivation and production.

Gurusinga Village, located in Berastagi District, has considerable potential for carrot farming development due to its favorable geographical conditions for horticultural cultivation. However, the

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relatively high production costs incurred by farmers for purchasing seeds, fertilizers, pesticides, and labor may affect their income levels. Therefore, an analysis of production costs, income, and the economic feasibility of carrot farming is necessary to determine whether this farming activity remains profitable for farmers and economically feasible for further development in Gurusinga Village, Berastagi District, Karo Regency. The objectives of this study are: (1) to analyze the production costs and income of Gundaling carrot farming in Gurusinga Village, Berastagi District, Karo Regency; and (2) to analyze the economic feasibility of Gundaling carrot farming in Gurusinga Village, Berastagi District, Karo Regency.

II. LITERATURE REVIEW

Gundaling Carrot Variety Farming

Economic feasibility analysis is an important approach used to evaluate whether a farming activity is economically profitable and financially sustainable. In agricultural economics, farming feasibility refers to the ability of a farming enterprise to generate sufficient revenue to cover production costs and provide economic returns to farmers. This analysis is commonly conducted by examining production costs, total revenue, farm income, the Revenue-Cost Ratio (R/C Ratio), and Break-Even Point (BEP). These indicators provide information about the economic performance of farming activities and serve as a basis for decision-making regarding the continuation or development of agricultural enterprises.

In Gundaling carrot farming, economic feasibility analysis is essential because production activities require various inputs, including seeds, fertilizers, pesticides, labor, and agricultural equipment. Changes in input prices, production levels, and selling prices may influence farm profitability. Therefore, economic feasibility analysis is necessary to determine whether Gundaling carrot farming in Gurusinga Village, Berastagi District, Karo Regency, is economically feasible.

Carrot (Daucus carota L.) is an important horticultural commodity classified as a root vegetable with high economic value due to its various uses in food consumption, industrial processing, such as juice and processed food products, and household consumption. The demand for carrots generally shows a stable trend as their use for food consumption and industrial purposes continues to increase (Marpaung et al., 2022). Carrot (Daucus carota L.) is an annual vegetable crop that grows upright, reaching a height of approximately 30–100 cm, with a relatively short growing period of 70–120 days, depending on the variety (Fajaryanto, 2019).

Carrot is an herbaceous plant that stores food reserves in its underground storage root. It has a short stem and a taproot that develops into an enlarged, elongated storage root. The elongated, reddish-orange storage root is the edible part commonly known as a carrot. Carrot plants can naturally produce flowers and seeds. Carrot flowers are arranged in compound umbels, while their seeds are small and covered with fine hairs. These seeds can be used as planting materials for generative propagation (Amir, 2012).

Carrot farming is a promising agribusiness activity, particularly in highland areas such as Gurusinga Village, Berastagi District, Karo Regency. Carrot quality plays an important role in determining the harvest outcomes of farmers in this region. The success of carrot farming is influenced by the availability of high-quality seeds, adequate labor, appropriate fertilizer application, and effective land management practices. The Gundaling carrot variety is a superior local variety originating from Karo Regency. Gundaling carrots are reported to produce high-quality yields with higher productivity than imported varieties and to be well adapted to local environmental conditions, including volcanic soils. The Karo Regency Government encourages the cultivation of this variety to reduce dependence on external seed sources whose quality may not always be guaranteed.

Income and Cost Structure

According to Hastuti and Rahim, (2007), farm income is the difference between total revenue and all production costs. In other words, farm income analysis includes total revenue and net income. Gross income or total revenue refers to the total value of agricultural commodity production before deducting production costs.

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In general, costs refer to the amount of money spent by economic agents to obtain necessary goods and services. For producers, costs represent the expenditure incurred to purchase goods and services used as inputs in the production process. These inputs are subsequently utilized to produce outputs or commodities. Meanwhile, costs incurred by consumers are intended to fulfill consumption needs through the purchase of final goods and services that provide utility or benefits (Suratiyah, 2015).

Farming costs are generally classified into two categories:

1. Fixed Costs. Fixed costs are expenses that remain relatively constant regardless of the quantity of agricultural output produced. These costs continue to be incurred whether production levels are high or low. Therefore, the amount of fixed costs does not directly depend on the quantity of output. Examples include costs associated with agricultural equipment.
2. Variable Costs. Variable costs are expenses that change according to the level of agricultural production. These costs fluctuate depending on the scale of production activities. Examples include expenditures on production inputs such as seeds, fertilizers, pesticides, and labor (Zaman *et al.*, 2021).

To determine the total costs incurred in horticultural crop production, the following formula is used (Mariantha, 2018):

$$\mathbf{TC = TFC + TVC}$$

Where:

TC = Total Cost (IDR)
TFC = Total Fixed Cost (IDR)
TVC = Total Variable Cost (IDR)

Economic Feasibility

Farming feasibility is an economic measure used to determine whether an agricultural enterprise is financially viable. Feasibility analysis is conducted by comparing the total revenue generated with the costs incurred during the production process. The results of this analysis can serve as a basis for farmers in making decisions regarding the continuation and development of their farming activities.

One of the commonly used methods for evaluating farming feasibility is the Revenue-Cost Ratio (R/C Ratio). The R/C Ratio represents the comparison between total revenue (TR) and total production costs (TC) incurred during one production cycle. This analysis is used to assess the economic efficiency and profitability of farming activities (Sundari, 2011).

The R/C Ratio is calculated using the following formula:

$$\mathbf{\frac{R}{C}\,Ratio = \frac{TR}{TC}}$$

The economic feasibility criteria based on the R/C Ratio are as follows:

Where:

R/C = Revenue-Cost Ratio
TR = Total Revenue (IDR/production period)
TC = Total Production Cost (IDR/production period)

R/C Ratio	Economic Interpretation
R/C > 1	Farming is profitable and economically feasible
R/C = 1	Farming is at the break-even point
R/C < 1	Farming incurs losses and is economically infeasible

An R/C Ratio greater than one indicates that every IDR 1 spent on production generates more than IDR 1 in revenue. For example, an R/C Ratio of 1.50 indicates that every IDR 1 of production cost generates IDR 1.50 in revenue, resulting in a surplus of IDR 0.50 before considering any costs excluded from the calculation.

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III. RESEARCH METHOD

His study was conducted in Gurusinga Village, Berastagi District, Karo Regency, North Sumatra, Indonesia. The research location was purposively selected because Gurusinga Village is one of the carrot-producing areas in Karo Regency, where a large proportion of the population is engaged in horticultural farming. The study was carried out from April to May 2026, covering research preparation, data collection, data analysis, and report preparation.

The population of this study consisted of all farmers cultivating the Gundaling carrot variety in Gurusinga Village, Berastagi District, Karo Regency. Respondents were selected using the snowball sampling technique, as Gundaling carrot farmers were identified through agricultural marketing networks. The sampling process began with several farmers known to cultivate the Gundaling variety. These initial respondents were then asked to identify other farmers who participated in the same marketing networks or sold their harvests to the same traders. This referral process continued until a total of 30 respondents was obtained.

The sample consisted of 30 respondents actively engaged in Gundaling carrot farming in Gurusinga Village, Berastagi District. The sample size was determined based on the research requirements and the availability of eligible respondents identified through the snowball sampling process. According to Subhaktiyasa (2024), a sample size of 30 or more respondents is commonly considered adequate for certain quantitative analyses. Therefore, 30 farmers were included in this study to provide primary data for analyzing production costs, farm income, and the economic feasibility of Gundaling carrot farming.

Production

Production costs refer to all expenses incurred by farmers during the agricultural production process. These costs are generally classified into fixed costs and variable costs. Fixed costs (FC) are expenses that do not change directly with the quantity of agricultural output within a particular production period. In carrot farming, fixed costs may include land rent, depreciation of agricultural equipment, and other fixed expenses, depending on the farming system. Variable costs (VC) are expenses that vary according to the scale and intensity of production activities. These costs include seeds, fertilizers, pesticides, hired labor, and other operational inputs. Total production cost is calculated using the following formula:

$$\mathbf{TC = FC + VC}$$

Where:

TC = Total Cost (IDR/production period)
FC = Fixed Cost (IDR/production period)
VC = Variable Cost (IDR/production period)

The calculation of total production costs provides an overview of the financial resources required to conduct Gundaling carrot farming during one production cycle.

Total Revenue

Total revenue refers to the total monetary value obtained by farmers from selling their agricultural products before deducting production costs. Revenue is determined by multiplying the quantity of agricultural output by its selling price. The formula for calculating total revenue is:

$$\mathbf{TR = PxQ}$$

Where:

TR = Total Revenue (IDR/production period)
P = Selling Price of Carrots (IDR/kg)
Q = Quantity of Carrot Production (kg/production period)

Higher production levels and selling prices generally increase total revenue, assuming that the entire production is sold at the specified price

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Farm Income

Farm income represents the difference between total revenue and total production costs incurred during a production period. It is an important indicator for assessing the profitability of farming activities. Farm income is calculated using the following formula:

$$\boldsymbol{\pi = TR - TC}$$

Where:

π = Farm Income or Profit (IDR/production period)
TR = Total Revenue (IDR/production period)
TC = Total Production Cost (IDR/production period)

If total revenue exceeds total production costs, farming activities generate a positive profit. Conversely, if total revenue is lower than total production costs, the farming enterprise experiences a financial loss. When all relevant economic costs are included, the difference represents economic profit; when only recorded accounting costs are included, it represents accounting profit.

Revenue-Cost Ratio (R/C Ratio) Analysis

The Revenue-Cost Ratio (R/C Ratio) is a commonly used indicator for evaluating the economic feasibility of farming activities. It measures the relationship between total revenue and total production costs. The R/C Ratio indicates how much revenue is generated for each monetary unit spent on agricultural production. The R/C Ratio is calculated using the following formula:

$$\frac{\mathrm{R}}{\mathrm{C}}\mathrm{Ratio} = \frac{\mathrm{TR}}{\mathrm{TC}}$$

Break – Event Point (BEP) Analysis

Break-Even Point (BEP) analysis is a method used to determine the minimum level of production or selling price required for a farming enterprise to cover its total production costs without generating either profit or loss. BEP analysis is particularly relevant to agricultural enterprises because farm income is influenced by fluctuations in production volume, input costs, and agricultural commodity prices. In Gundaling carrot farming, BEP analysis can be used to identify the minimum selling price and production quantity required to avoid financial losses.

Break-Even Point Based on Selling Price (BEP Price

BEP Price refers to the minimum selling price per kilogram of carrots required to cover total production costs at a given production level. The formula is:

$$\mathbf{BEP_{price}} = \frac{\mathbf{TC}}{\mathbf{Q}}$$

The interpretation of BEP Price is as follows:

If the actual selling price is higher than BEP Price, carrot farming generates a profit.
If the actual selling price equals BEP Price, carrot farming reaches the break-even point.
If the actual selling price is lower than BEP Price, carrot farming incurs a loss.

Break-Even Point Based on Production (BEP Production)

BEP Production refers to the minimum quantity of carrot production required to cover total production costs at a given selling price. For a farming enterprise using a predetermined total production cost, BEP Production can be calculated using the following formula:

$$\mathbf{BEP_{production}} = \frac{\mathbf{TC}}{\mathbf{P}}$$

The interpretation of BEP Production is as follows:

If actual production exceeds BEP Production, farming generates a profit.
If actual production equals BEP Production, farming reaches the break-even point.
If actual production is lower than BEP Production, farming incurs a loss.

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IV. RESULTS AND DISCUSSION

Respondent Characteristics

The study involved 30 Gundaling carrot farmers in Gurusinga Village, Berastagi District, Karo Regency. Of the respondents, 53.33% were male and 46.67% were female. The largest age group was 40–49 years (40.00%), followed by 30–39 years (33.33%) and 50–59 years (26.67%). Regarding educational attainment, 40.00% had completed senior high school, 36.67% junior high school, and 23.33% elementary school.

Respondents had 5–25 years of farming experience, with the largest proportion having 11–20 years of experience (50.00%). In terms of cultivated land area, 60.00% farmed 0.51–1.00 hectares, while 40.00% cultivated 0.37–0.50 hectares. These characteristics indicate that Gundaling carrot farming in the study area was predominantly undertaken by relatively experienced farmers operating small- to medium-scale farms.

Production Cost Structure of Carrot Farming

Production costs consisted of fixed and variable costs. Fixed costs included depreciation of agricultural equipment, while variable costs comprised seeds, fertilizers, pesticides, and labor. Average total production costs amounted to IDR 20,099,195 per farmer per growing season, consisting of fixed costs of IDR 662,075 and variable costs of IDR 19,437,120.

Table 1. Average Gundaling carrot farming production costs per farmer per growing season

Cost component	IDR/farm	IDR/hectare	Share (%)
Fixed costs	662,075	1,103,458	3.29
Seeds	1,504,500	2,507,500	7.49
Fertilizers	12,883,120	21,471,866	64.10
Pesticides	312,833	521,388	1.56
Labor	4,736,666	7,894,443	23.57
Total production costs	20,099,195	32,395,200	100.00

Source: Primary data processed, 2026.

Variable costs accounted for approximately 96.71% of total production costs. Fertilizers represented the largest expenditure, at IDR 12,883,120 (approximately 64.10%), followed by labor at IDR 4,736,666 (23.57%). The substantial share of fertilizer costs indicates that fertilizer management is an important aspect of improving production cost efficiency in Gundaling carrot farming.

Production, Revenue and Farm Income

Average Gundaling carrot production reached 15,180 kg per farmer per growing season, with an average selling price of IDR 3,436/kg. Average revenue was IDR 52,213,166, while total production costs were IDR 20,099,195. Consequently, average net farm income amounted to IDR 32,113,971 per growing season.

Table 2. Average production, revenue, and income of Gundaling carrot farming

Financial indicator	Average per farmer	Average per hectare
Total production (kg)	15,180	25,416
Average selling price (IDR/kg)	3,436	3,436
Total revenue / TR (IDR)	52,213,166	87,021,943
Total production costs / TC (IDR)	20,099,195	33,498,658
Net farm income / NR (IDR)	32,113,971	53,523,285
R/C Ratio	2.60	2.60

Source: Primary data processed, 2026.

The positive net income indicates that revenue from carrot sales was sufficient to cover the production costs included in the study. Nevertheless, farm income remains dependent on output quantity, selling prices, and the costs of production inputs incurred during the growing season.

Economic Feasibility Analysis of Gundaling Carrot Farming

The economic feasibility of Gundaling carrot farming was assessed using the Revenue–Cost Ratio (R/C Ratio), which compares total revenue with total production costs. The analysis yielded an

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R/C Ratio of 2.60, based on average revenue of IDR 52,213,166 and average production costs of IDR 20,099,195 per farmer per growing season.

Table 3. Economic feasibility of Gundaling carrot farming

Indicator	Value
Revenue (IDR)	52,213,166
Production costs (IDR)	20,099,195
R/C Ratio	2.60
Assessment	Feasible and profitable

Source: Primary data processed, 2026.

An R/C Ratio of 2.60 indicates that every IDR 1 spent on production generated IDR 2.60 in revenue. Since the ratio exceeds one, Gundaling carrot farming in Gurusinga Village was economically feasible and profitable under the production, cost, and selling-price conditions observed during the study. These findings also emphasize the importance of efficient fertilizer and labor use, maintaining productivity, and sustaining favorable selling prices.

Break-Event Point (BEP) Analysis of Price anda Productio

Break-Even Point (BEP) analysis was used to identify the minimum selling price and production volume required for Gundaling carrot farming to avoid losses. The analysis used average total production costs of IDR 20,099,195 per farmer per growing season, production of 15,180 kg, and a selling price of IDR 3,436/kg.

BEP Price is the minimum selling price per kilogram required to cover total production costs at a given output level.

$$\mathbf{BEP_{price}} = \frac{\mathbf{Total\ production\ cost}}{\mathbf{production\ quantity}} = \frac{\mathbf{IDR\ 20,099,195}}{\mathbf{15,180kg}} = \mathbf{IDR\ 1,324/kg}$$

The BEP Price of IDR 1,324/kg was below the actual selling price of IDR 3,436/kg. The difference of IDR 2,112/kg indicates that the actual price exceeded the break-even level, assuming unchanged production volume and total costs.

BEP Production is the minimum output quantity required for revenue to cover production costs at a given selling price.

$$\mathbf{BEP_{production}} = \frac{\mathbf{Total\ production\ cost}}{\mathbf{Selling\ Price}} = \frac{\mathbf{IDR\ 20,099,195}}{\mathbf{IDR3,436/kg}} = \mathbf{5,850kg}$$

The BEP Production of 5,850 kg was below the actual average output of 15,180 kg per farmer per growing season. The difference of 9,330 kg indicates that actual production exceeded the break-even threshold.

Table 4. R/C Ratio, BEP Price, and BEP Production of Gundaling carrot farming

Indicator	Analysis result
Average production costs	IDR 20,099,195
Average revenue	IDR 52,213,166
Average farm income	IDR 32,113,971
Actual production	15,180 kg
Actual selling price	IDR 3,436/kg
R/C Ratio	2.60
BEP Price	IDR 1,324/kg
BEP Production	5,850 kg
Feasibility assessment	Feasible and profitable

Source: Primary data processed, 2026.

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The R/C Ratio of 2.60 indicates that farm revenue exceeded production costs. Both the actual selling price and actual production were also above their respective break-even thresholds. Thus, Gundaling carrot farming in Gurusinga Village, Berastagi District, Karo Regency, was considered economically feasible and profitable under the conditions observed in the study.

V. CONCLUSION

The findings indicate that Gundaling carrot variety farming in Gurusinga Village, Berastagi District, Karo Regency, was economically feasible and profitable. Average production costs amounted to IDR 20,099,195 per farmer per growing season, generating total revenue of IDR 52,213,166 and net farm income of IDR 32,113,971. The R/C Ratio of 2.60 indicates that farm revenue exceeded production costs. Furthermore, the break-even selling price of IDR 1,324/kg was lower than the actual selling price of IDR 3,436/kg, while the break-even production volume of 5,850 kg was below the actual output of 15,180 kg. These findings suggest that Gundaling carrot farming has potential for further development. Improving production efficiency, particularly in fertilizer application and labor utilization, is essential to sustaining farm profitability. Since the study involved only 30 farmers selected through snowball sampling, the findings primarily reflect the economic conditions of the surveyed farms during the research period.

REFERENCES

Afriansyah, & Tarigan, V. (2022). Analisis Break Even Point Pada Peternakan Ayam Eropa Di Huta Silulu Kecamatan Jawa Maraja Bah Jambi Kabupaten Simalungun. Jurnal Ilmiah Accusi, 4(2), 149 –. https://doi.org/10.36985/jia.v4i2.443

Albayani, M.G. et al. (2020) 'Pengaruh Frekuensi Aplikasi Pupuk Hayati Bacillus sp. terhadap Pertumbuhan dan Hasil Enam Kultivar Wortel (Daucus carota L.) di Lahan Pasir Pantai', Vegetalika, 11(1), pp. 27–38.

AMIR, A. (2012) 'Pertumbuhan Dan Hasil Tanaman Wortel (Daucus carota L.) Pada Berbagai Dosis Pupuk Kandang Ayam'. University hasanuddin.

Andrie, B.M. (2021) 'Optimalisasi pendapatan petani cabai merah dengan diversifikasi usahatani', Mimbar Agribisnis: Jurnal Pemikiran Masyarakat Ilmiah Berwawasan Agribisnis [Preprint].

Fajaryanto, B. (2019) 'Penampilan Empat Genotip Tanaman Wortel (Daucus carota L.) pada Tiga Lokasi'. Universitas Brawijaya.

Hafni, R. et al. (2023) 'Analisis produksi petani wortel di kecamatan simpang empat kabupaten karo sumatera utara', Ekonomikawan: Jurnal Ilmu Ekonomi dan Studi Pembangunan, 23(2), pp. 385–396.

Hastuti, D.R. and Rahim, A. (2007) Ekonomika Pertanian (pengantar, Teori, dan kasus), Penebar Swadaya. Jakarta.

Mariantha, H.I.N. (2018) Manajemen biaya: Cost management. Celebes Media Perkasa.

Sihaloho, H. and Butar-Butar, S. (2020) 'Analisis Faktor Produksi Terhadap Produksi, Efisiensi Dan Pendapatan Wortel Di Desa Surbakti, Kecamatan Simpang Empat, Kabupaten Karo', Jurnal Agriust, pp. 23–29.

Simamora, A.R. et al. (2020) 'Laporan PKL Pengembangan Benih Wortel (Daucus Carota L.) di UPT Benih Induk Hortikultura Kutagadung Berastagi'.

Sundari, M.T. (2011) 'Analisis biaya dan pendapatan usaha tani wortel di Kabupaten Karanganyar', SEPA: Jurnal Sosial Ekonomi Pertanian dan Agribisnis, 7(2).

Suratiyah, K. (2015) Ilmu Usaha tani (edisi revisi). Penebar Swadaya Grup.

Zaman, N. et al. (2021) Manajemen Usahatani. Yayasan Kita Menulis.

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