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A COMPARATIVE ANALYSIS OF ORGANIC AND CONVENTIONAL HORTICULTURAL FARMING IN THE GETASAN DISTRICT, SEMARANG INDONESIA

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ABSTRACT

The organic horticultural farming system is a horticultural farming technique that relies on natural materials in its production and is a sustainable agriculture, in contrast to the conventional horticultural farming system which still relies on chemicals in its production process. The purpose of this research was to compare organic and conventional horticultural farming systems in Getasan district, Semarang. This study is a cross-sectional descriptive-analytical study that employed survey methodologies. This study was conducted from July to December 2019 using a sample of 314 respondents, 90 organic horticulture farmers and 224 conventional horticulture farmers as research subjects. Research results showed that the average total additional cost of restoring soil nutrients in 100 m^2 / year for organic horticulture farming was IDR. 69,958.33 less than the cost for conventional farming systems, which was IDR. 79,550.00 per 100 m2 per year, with a p-value of 0.032*. The cost of purchasing fertilizer in year / 100m^2 on a conventional horticultural farm was IDR. 90,575.78, greater than the cost of organic horticulture farming which was only IDR. 73,170.38 with a p-value< 0,001*. The average yield of organic horticulture farms was somewhat higher than that of conventional farms during each growing season. The average annual income from yields in 100 m2/year for organic horticulture production was IDR 2,449,246.32, while conventional IDR. 2,369,641.10 with p-value of 0.441 although not statistically significant. The average profit per 100 m2 / year for an organic horticultural farming system was IRD. 1,549,303.42, which is greater than the profit value for a conventional horticultural farming system, which was IDR. 1,450,109.82, 959,289.06, although statistically not significant, with p-value = 0.228. The total annual production cost for the organic horticulture farming system was less than the conventional system, which was IDR 901,346.78 for the organic horticulture farming system and IDR. 921,084.17 for conventional, for every 100 m2 / year with p-value = 0.383, even though not statistically significant. Statistically, there was no significant difference in labor costs between the two agricultural systems, p-value 0.702, but descriptive analysis shows that the average labor cost per 100 m2/year for organic horticulture farming was IDR. 588,859.57, which is less than IDR. 591,760.50 for conventional horticulture farming. Based on the parameters analyzed, the outcome of this study demonstrates that the organic horticulture farming system is superior to the conventional horticultural farming system.

Key words: Environmental value Fertilization costs, Cultivation profits, Labor expenses, Production costs

INTRODUCTION

Agriculture is an important part of the economy, particularly in Indonesia because it contributes to agricultural exports which affect Indonesia's national Gross Domestic Product (GDP) [1]. However, if the agricultural sector is not managed properly, it can cause environmental damage such as changes in soil fertility due to synthetic fertilizers and pesticides, cause changes in the ecological balance, and even affect farmer health. Adoption of modern farming systems has increased agricultural output, but has been accompanied by degradation of land and environmental resources, which has the potential to render agricultural production systems unsustainable [2].

The overuse of chemicals in agriculture is responsible for most of the environmental damage. Plant pests and illnesses are easier to manage in normal agricultural cultivation, but synthetic chemicals used in conventional agricultural activities can affect biodiversity, soil fertility, ecosystems and human health [3]. Due to the lack of understanding of the effects of conventional farming by the farming community, it is very important to ask for the help of various stakeholders to promote sustainable agriculture [4]. Chemicals are used to control pests and plant diseases, which is one of the hallmarks of conventional agriculture's activities. Because pesticides have an impact on farmers and other organisms, they must be used correctly and appropriately. Excessive use of pesticides will result in environmental damage and health issues. Pesticides can also reduce the number of beneficial microorganisms in the soil due to their detrimental effects [5].

Increased yields can encourage farmers to practice environmentally sustainable farming practices [6]. Farmers' involvement in agricultural development, as well as an understanding of the negative consequences, are required for environmental awareness to grow [7]. Organic farming can yield in the same way as conventional farming under specific situations and with proper management [2]. Agriculture has become more sustainable as a result of technological advancements that conserve soil, water, energy and biological resources. Organic farming is comparable to natural farming in terms of soil fertility and environmental benefits [8]. Organic farming was developed as an environmentally friendly agricultural cultivation [9] protecting species, natural wealth and increasing soil fertility [10], maintaining agricultural environmental sustainability and reducing agricultural greenhouse gas emissions. Increased agricultural production has environmental consequences; thus, the link between economic and environmental approaches can be achieved through economic valuations and the internalization of various environmental aspects into economic calculations [11]. Statistical tests on agricultural yields, costs and income, as well as an analysis of the cost structure of two types of agricultural systems, in this case organic and conventional farming systems, are required as inputs in realizing social and environmental responsibility [12]. The balance

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between ecological and economic conditions in the management of natural resources and the environment can be achieved by using the economic aspect as a tool to regulate the rational allocation of natural resources [13].

Many farmers in Getasan District Semarang Regency still use agricultural chemicals that violate the rules, such as the excessive use of synthetic pesticides and fertilizers for a long time that can cause damage to soil fertility, resulting in decreased agricultural productivity [14]. It is necessary to understand pesticide safety for the farming community and the guidelines to anticipate undesirable environmental repercussions caused by the use of uncontrolled chemicals [15].

Organic farming is a sustainable farming system that is oriented towards environmental balance (back to nature), that does not damage the environment, is in harmony and balance with the environment, or is agriculture that is obedient and subject to natural norms. Organic farming approaches require that the constituent elements of soil nutrients be organic in nature and not derived from agrochemicals. Organic farming that is environmentally friendly is expected to have a positive impact on soil nutrient content, which can help increase agricultural productivity [16, 17]. Organic farming is a holistic and integrated agricultural production system that improves the health and productivity of natural agro-ecosystems in order to produce sufficient, high-quality, and long-term food and fiber [18]. Organic agriculture production has lower total production costs due to reduced seed costs as well as cheaper fertilizer, insecticide, and labor costs. Despite the fact that organic production typically involves more effort, it differs from conventional during peak periods. Over a ten-year period, organic farming is more profitable than conventional farming [19], shifting to organic production may be more profitable for small-scale farmers in developing nations. Better seeds, organic fertilizers, and professional assistance can help them attain bigger yields. Although organic farming is labor intensive, reduced input costs compensate. However, there is an inherent risk in organic conversions in that organic yields are at a higher price risk due to the small-scale nature of the organic market, which is immature on a broad scale [20].

The purpose of this study was to conduct a comparative analysis of organic and conventional horticultural farming in the Getasan district, Semarang.

MATERIALS AND METHODS

The Getasan District consists of 13 villages, totaling 6,579.55 Ha. The Getasan district has a landscape made up of mountains and hills with different slopes. An area with a slope of 2^0 to 15^0 is hilly and has a total area of about 2,647.90 Ha; an area with a steep slope of 15^0 to 40^0 is mountainous and has a total area of about 2,331.05 ha; and an area with a very steep slope of >45^o has a total area of about 2,600.10 Ha. and is at an

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altitude of 1200 -1350 masl and has an average temperature of around 32°C, with fertile soil characteristics [21]. Getasan District is one of the largest producers of horticultural commodities in Semarang Regency when compared to other sub-districts, with one of the factors being the geographical conditions that support vegetable cultivation [22]. Since 2010 there have been pioneers of the organic village movement by the farmer groups Tranggulasi and Bangkit Merbabu from Batur village and Citra Muda from Kopeng village. The data used is based on data from farmers' five growing seasons, and was used to calculate and compare the average cost of improving soil nutrients, the average annual income for horticultural cultivation, and the average profit from yields for organic and conventional horticultural farming [23]. Getasan District also provides data for five periods of backward growth, allowing it to be used as secondary study data. The studies took place between July and December 2018.

This study's data collection was based on primary data acquired through direct interaction with respondents. Primary data was gathered through interviews and observation. Interviews were performed to acquire information regarding existing conditions in the field, such as agricultural cultivation employed, production costs (labor, fertilizer, and production facilities), and yields. At the study site, observations were made to collect data in the form of soil nutrient content by measuring P, K, C-organic, pH and lime needs. The test samples were randomly collected from 60 soil samples, 30 of which came from organic farming areas and 30 from conventional farming areas. Soil sampling using a drill at a depth of 0-30 cm from the soil surface, with a homogeneous stretch of 0.5-1 hectare representing one composite soil sample. The soil samples were then tested using the Dry Soil Test Equipment (PUTK) to determine the need for phosphorus, potassium, soil pH and lime, as well as the recommended fertilization dosage. Parameters are categorized by value: high, >3%, medium = 3%, low < 3%.

Secondary Data was obtained by a survey of relevant literature, the outcomes of documentation, or data report archives from the Agriculture and Plantation Office of Semarang Regency. This document is in the form of written notes about various activities or occurrences in the past, as well as agricultural land data, farmer group data, and other related data [24]. Productivity is calculated as the ratio of yield (Y) to production costs (Cp), Productivity (kg/hectare) = Y/Cp. Agricultural productivity can be used as a measure of the success of an agricultural system in producing crops within a certain period of time. The calculation of farmer labor costs is based on the number of hours worked x the wage rate for labor in the Getasan sub-district. Fertilizer costs are calculated by multiplying the recommended fertilizer by the number of plants. Production costs (Cp) are estimated based on expenditure incurred during the agricultural process during one harvest period, while the profit of agricultural cultivation (IDR) is the entire difference between yields and production costs [25].

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The sample size for this study was 314 respondents, with 90 organic horticulture farmers and 224 conventional horticulture farmers as research subjects. The number of villages in the Getasan District is 13 villages which are PSU in the research cluster, so the calculations for the first stage of the cluster was; m = 0.5 x 13 = 6.5 rounded up to 7 villages. The first stage clusters were 7 villages which were sampled from 13 villages. The villages obtained were: Kopeng, Tajuk, Batur, Getasan, Ngrawan, Samirono and Wates. The cluster sampling method was used for sampling so that each unit in the population could be identified based on the category of residence and the type of land managed. Determining the number of samples is done by using the formula f= m/M = Fraction set to 50%, m = sample size, M = Number of Primary Sample Units (PSU) [26].

Except for organic farmer groups, each selected group was taken as a sample of 8 farmers. Figure 1 is a map showing the locations where samples were collected.

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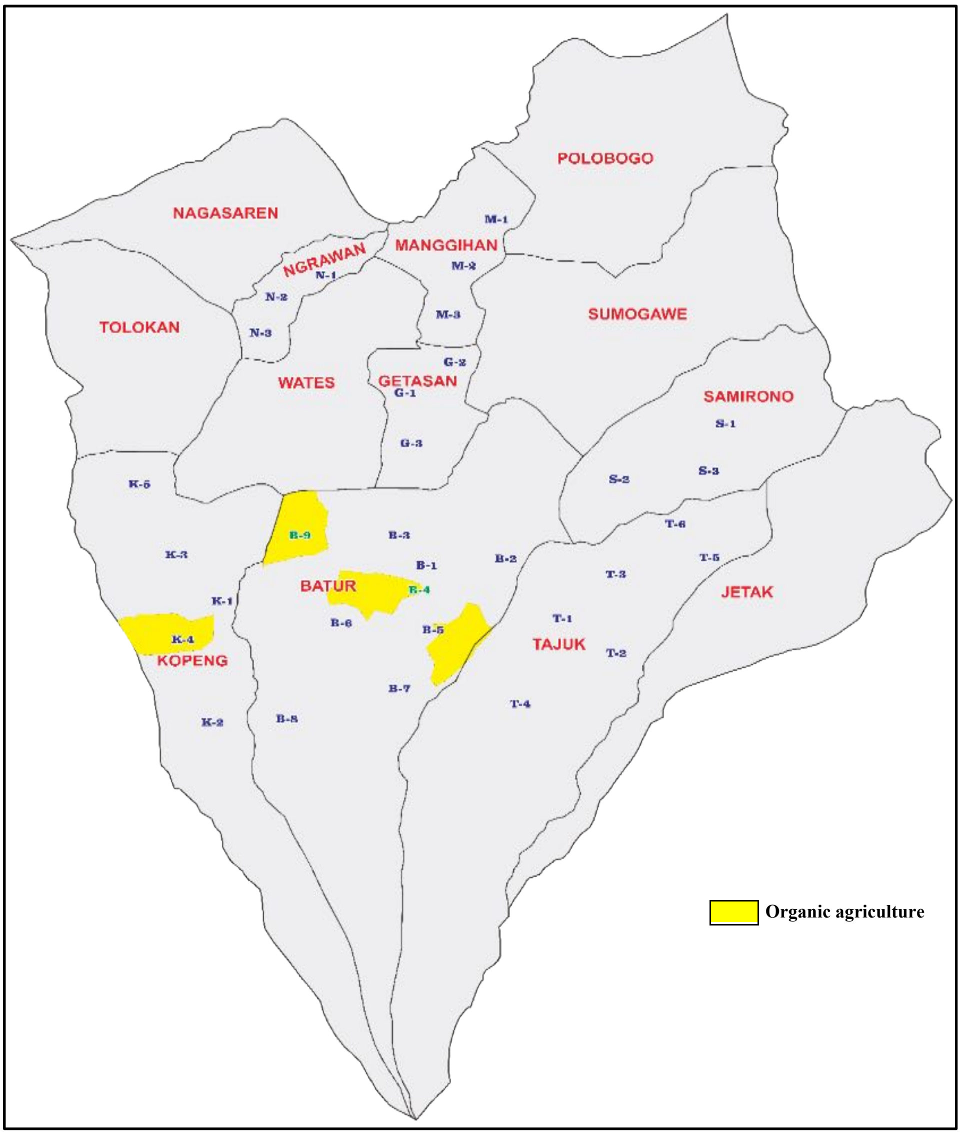

Figure 1: Map showing the locations where samples were collected

Caption

B1: Jaya Abadi Farmers Group
B2: Sumber Makmur Farmers Group
B3: The Mulya Langgeng Farmers Group
B4: Tranglasi Farmer Group (organic farming)
B5: BM Phala Tani Group (organic farming)
B6: Boga Lestari Farmers Group
B7: Nunggal Rasa Farmers Group
B8: Ngudi Makmur Farmers Group
B9: Bangkit Merbabu Farmers Group (organic farming)
G1: Sumber Karya Farmers Group
G2: Sustainable Farmers Group I
G3: Margo Utomo Farmers Group
K1: Mardi Santoso Farmers Group
K2: Setyo Manunggal Farmers Group
K3: Citra Muda Farmers Group (organic farming)
K4: Panca Margi Tani Farmers Group
K5: Ngudi Luhur Farmers Group
M1: Mukti Farmers Group
M2: Makarti Farmers Group
M3: Main Farmer Group
N1: Marsudi Farmers Group
N2: Advanced Farmers Group
N3: Ngudi Rahayu Farmers Group
S1: Hope Farmers Group
S2: Permanik Ganik Farmers Group
S3: Santi Mulya Farmers Group
T1: Ngudi Fortune Farmers Group
T2: Ngudi Sane Farmers Group
T3: Manunggal Farmers Group
T4: Mapan Mandiri Farmers Group
T5: Wonokaryo Farmers Group
T6: Manunggaling Karya Farmers Group

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The data obtained in the field was then processed using the Statistical Package for the Social Sciences (SPSS) application.

RESULTS AND DISCUSION

Vegetable cultivation activities

Generally, there is no discernible difference between organic and conventional horticulture cultivation. Farmers began their farming operations based on the Nursery Stage, Land Preparation Stage or Planting Media, Planting Stage, Maintenance Stage, Harvesting Stage, and Post-Harvest Stage. The research site had relatively easy access to water supplies. Farmers used a pipe system to move water through sources using gravity. Farmers' (respondents') commodity types included broccoli (*Brassica oleracea italica*), tomatoes (*Solanum lycopersicum*), lettuce (*Lactuca sativa*), cabbage (*Brassica oleracea capitata*), celery (*Apium graveolens*), basil (*Basil* Ocimum bacilicum), a variety of chilies (*Capsicum annum*), potatoes (*Solanum tuberosum*), eggplant (*Solanum melongena*), carrots (*Daucus carota*), lettuce (*Lactuca saliva*), mustard greens (*Brassica rapa*), cauliflower (*Brassica oleracea botrytis*), spinach (*Amaranthus hybridus*), napa cabbage (*Brassica rapa pekinensis*), beetroot (*Beta vulgaris subsp*), green onion (*Allium fistulosum*), radish (*Brassica rapa var. Rapa*), and snaps (*Phaseolus vulgaris*).

Characteristics of research participants

Respondent farmers in this study were both landowners and cultivators, with the majority working as farmers as their primary occupation and a small number working in both the formal and informal sectors. Farmers are predominantly male, with the youngest farmer being 20 years old and the oldest being 77 years old, and experience years ranging from 5 years to 68 years. The data were normalized using SPSS, and it was found that the data distribution was not normal, with the median as the midpoint for data categorization, resulting in groups greater than or equal to 40 years of age. Table 2 shows the age distribution of the respondents.

Characteristics of horticultural land

The average arable area owned by respondents was 2,804.46 m^2, with a minimum of 1000 m^2 and a maximum of 11,000 m^2. The median value of 2000 is used as a limit for land ownership categories because of the non-normal distribution.

Not all villages in the study area had farmer groups that practiced organic farming. According to the findings of the observations, only three of the seven villages used for the research had at least one farmer group that practiced registered organic farming. The respondents with the most organic cultivation were in Batur village, with 52 farmers, and the respondents with the least were in Wates village, with 18 farmers (Table 3).

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The study's findings show that farmers did not only cultivate one type of commodity, but that other commodities were planted as companion crops, and that cropping patterns were adjusted to the type of commodity.

Labor expenses

Conditions in the study area, all aspects of horticultural agriculture, both organic and conventional cultivation, still require physical work performed by humans, not machines, from land clearing to harvesting. Regarding work, most of the respondents did it themselves every day, except during land clearing where farmers used hoe labor because it was considered more effective than doing it themselves and not using machines as farming tools. This is because the cost of acquiring such machines is high, and their use is not ideal due to demographics that preclude their use. This is one of the obstacles in reducing labor costs both conventionally and organically [27].

Labor expenditures ranged between Rp. 50,000 and Rp. 70,000, with work beginning at 06:00 and finishing around 13:00. Farmers may work on small plots of land individually, but larger plots of land require the assistance of more workers, especially in land clearing.

Based on statistical results using the Mann-Whitney test and a confidence level of 0.05, an independent non-parametric test was carried out to determine significance, so there was no significant difference (p-value = 0.702) between labor costs in organic and conventional horticultural farming. However, when compared descriptively the average labor cost per 100 m2 is Rp. 588,859.57 for organic farming which is smaller than conventional horticulture farming of Rp. 591,760.50 (Table 4).

Figure 2 shows a comparison of labor expenses for the two types of agricultural cultivation.

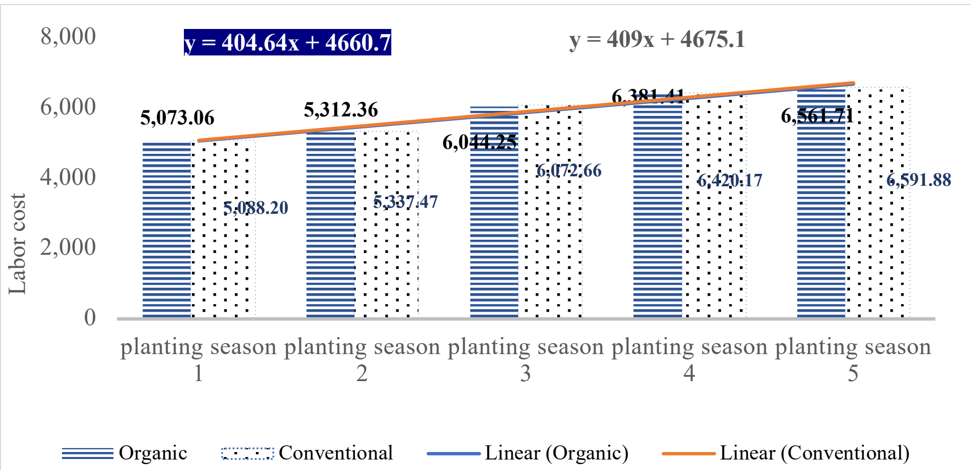

Figure 2: Horticultural farming labor costs in Getasan District, Semarang Regency

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Based on graph 2, it can be deduced that the trend of expenses incurred by organic farming is lower, equation model y = 404.64 x + 4660.7 when compared to conventional farming (y = 409 x + 4675.1), at 5 times the planting season.

Labor costs in organic farming are lower compared to conventional farming. This is due to the conversion of labor to reduced production costs, higher yields, and more efficient production. This is directly related to advances in agricultural biotechnology but the main problem faced by biotechnology in agriculture is coexistence (organic), labeling (patent rights), and labeling are often viewed as consumer rights which are not adequately addressed by applicable stakeholder laws [28], Even if it is substituted by the geographical location in Getasan Sub-district which is difficult to reach through agricultural production, it will actually result in additional labor costs which are a cost burden for conventional agriculture.

Organic farming can be substantially aided by research groups, and government subsidies are extremely beneficial in lowering the valuation value of organic agricultural labor. Organic farming produces nearly the same amount as non-organic farming, but at a higher cost. The difference in prices is converted to labor costs. After three years, organic farming yields will be constant and comparable to non-organic farming yields, and environmental damage will be avoided [29]. Organic farming is more profitable in terms of production costs for small landholders, small and marginal farmers, and small and marginal farmers in developing countries. Organic farming is more profitable in terms of production costs for small landowners, small and marginal farmers in developing countries. It is even more significant if the comparison is long term. The impact of bio-input costs on profitability in organic production and the importance of appropriate government intervention in promoting organic farming [30].

Fertilizer costs

Fertilization is used in horticultural farming activities to fertilize plants and boost yield. Manure is used as the primary fertilizer in both farming systems. The added fertilizer is what makes the difference. Traditional horticultural agriculture uses synthetic materials, whereas organic horticulture agriculture employs natural components.

The average cost of fertilizing per 100 m2 for conventional agricultural fertilizers is Rp. 90,575.78 higher than Rp. 73,170.38 for organic farming. When comparing the two farming approaches statistically, the result is significant with a p-value of 0.001*. (Table 4).

Based on the equation model based on 5 planting periods, Figure 2 shows the pattern of purchasing fertilizer costs, with the cost of organic fertilizers being cheaper compared to conventional fertilizers.

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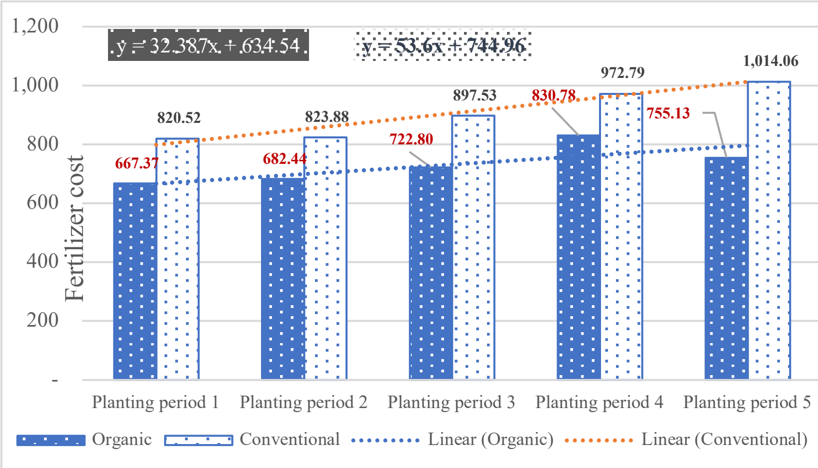

Figure 2: The cost of purchasing fertilizer for horticultural farming in Getasan District, Semarang Regency

Based on the equation model, it shows that the organic farming system is y = 32.387 x + 634.54 < (smaller) compared to the conventional farming system with the model y = 53.6 x + 744.96.

The usage of organic fertilizers is more prudent given the outcomes of the difference in expenses spent because doing so will result in cost savings [31].

Production Cost

Organic fertilizers have long been used by farmers to help them grow crops and increase their yields. This is done so that farmers can utilize high-quality organic fertilizers in agricultural activities to increase high-quality yields and produce chemical-free crops. Under these conditions, the utilization of the remaining natural resources can be used to meet the increasing demand for agricultural production facilities. Raw components for organic fertilizers are found in nature. These materials are in the form of livestock waste and other organic waste. Livestock waste is the most important material. Figure 3 shows the cost of production from organic and conventional farming per 100 m^2 incurred annually for 5 years.

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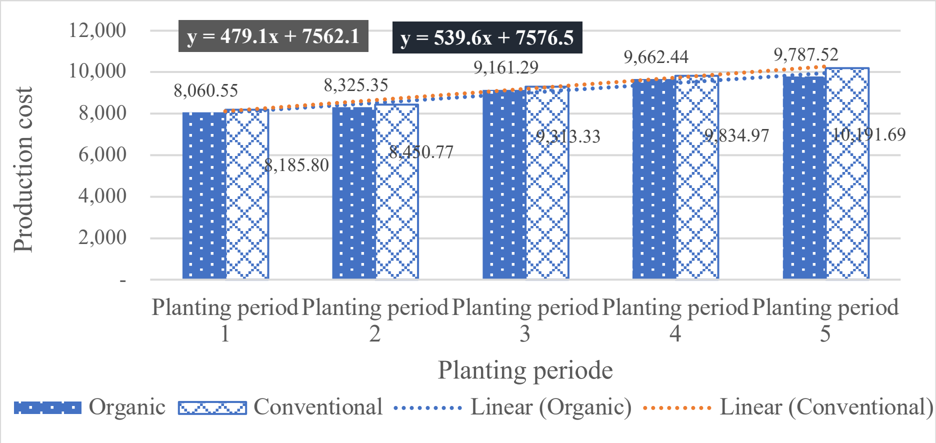

Figure 3: Graph of annual agricultural production costs per 100 m^2 in horticultural farming conducted by respondents in Getasan District, Semarang Regency

Based on the model equation, it can be seen that the cost of production in the organic farming system is y = 479.1 x + 7562.1 < (smaller) compared to the conventional farming system with the model y = 539.6 x + 7576.5.

The results showed that the average organic horticulture farm has a lower total production cost per year than conventional farming, which is Rp. 901,346.78 for organic and Rp. 921084.17 for conventional, for every 100 m^2. Although the statistical tests carried out did not show a significant number (p=0.383), in simple terms it can be seen that there is a difference in the linear equation model between the two farming systems. This difference is influenced by the use of fertilizers which have significant numbers. Other studies have found that there is no significant difference in cost per hectare in the two farming models, even though the production cost structures show very large deviations.

Organic farming is more profitable to farmers in terms of production expenses than chemical farming [32]. In the meanwhile, research by Ehn and Fox demonstrates that the expense of organic farming has a higher economic value. The use of natural materials is preferable and does not rely on industrial goods, thus organic horticulture farming is still advised in terms of production costs even though there is no much of a difference [33]. Organic farming methods can be considered economically sustainable if the net yield is high enough to sustain livelihoods and the risks are not too great; and environmentally friendly if the system can be maintained from time to time without reducing natural resources. Organic farming is more profitable in terms of production costs for small landowners, small and marginal farmers, and small and marginal farmers in developing countries when compared to conventional farming on the same scale [34]. Organic rice farming is more profitable than conventional farming, which is caused by the higher market price of organic rice so that it can convert other production costs [35].

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Yields

According to the following data (Table 4), the average harvest revenue per 100 m^2 for organic horticulture cultivation is Rp. 2,449,246.32 and for conventional Rp. 2,369,641.10 per year.

Table 4's statistics indicate that, although the average output from harvest per 100 m^2 of land is not statistically significant ($p=0.441$), organic horticulture farming nevertheless produces a higher yield, at Rp. 2,449,246.32 compared to Rp. 2,369,641.10 for conventional farming.

Even though statistically there is no difference, it seems there is based on the yield pattern obtained each year, with organic farming showing an increasing trend and conventional farming showing a decreasing trend.

Based on the model equation, it can be seen that the cost of yield in the organic farming system is y = 966, 91 x + 21592 > (greater than) compared to the conventional farming system with the model y = 407,27 x + 22475.

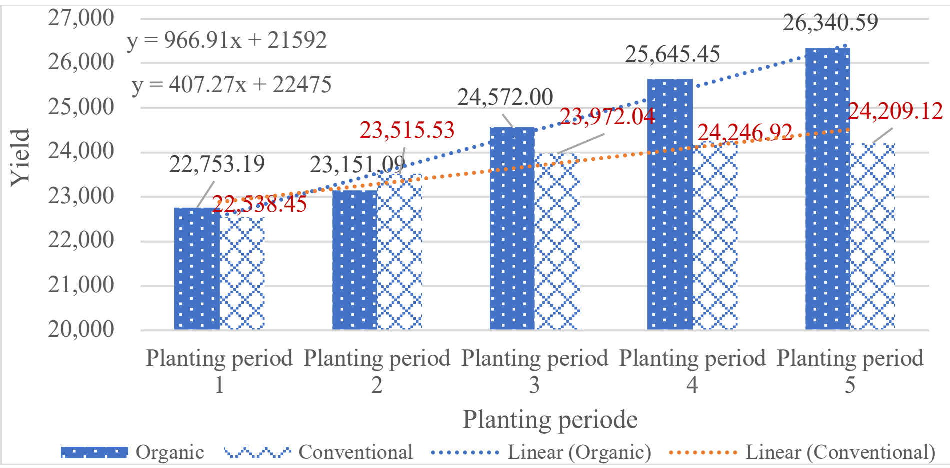

Figure 4: Graph of Annual agricultural yield per 100 m^2 in horticulture farming in Getasan District, Semarang Regency

Organic yields are usually lower than conventional yields, but under certain conditions or in the long term, organic yields can match or even be better than conventional yields. The superiority of organic farming is due to mutual interactions between soil microorganisms with well-established nutrients [36].

Profits from agricultural cultivation

Based on a comparison of conventional and organic horticultural cultivation, both exhibit profits, albeit in different amounts, with the profit for conventional farming declining

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yearly but not significantly in comparison to organic farming, which exhibits profits at each planting period.

According to the results of the profits from the two agricultural cultivation systems, organic farming is more profitable, y = 487.81x + 14030, than conventional farming systems, y = -132.33 x + 214898, and the trend of conventional farming is decreasing, negative (-), as shown in Figure 5.

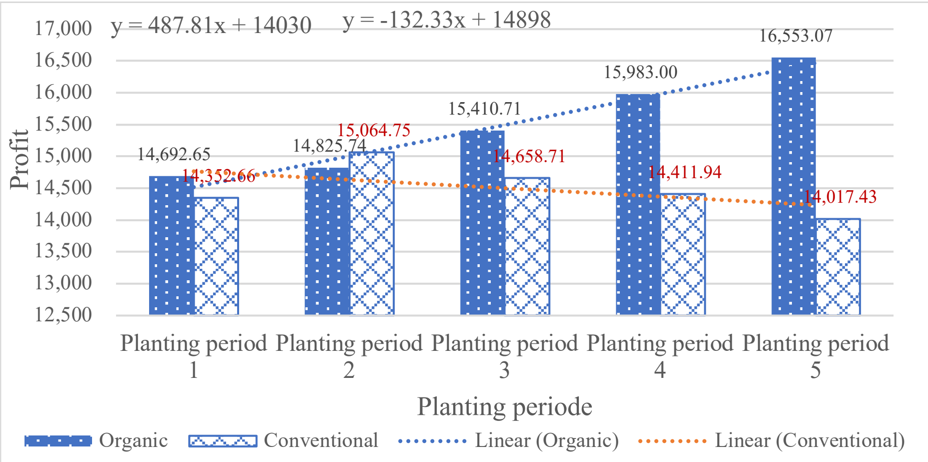

Figure 5: A graph showing agricultural profit per year per 100 m² in horticultural farming Getasan District, Semarang Regency

Organic farming proves to be more profitable, taking into account all variables but this economic advantage is not explicit by any means [37]. Organic farming can enhance agricultural revenues, however when compared to conventional farming, the biggest obstacles are certification and market restrictions [38].

Environmental values (soil nutrients)

The identification of soil nutrients, including organic P, K, C, soil pH and lime need as tested by PUTK (dry soil test kit), is used to derive environmental values. The findings of 60 soil samples, 30 of which were used for organic farming and 30 of which were used for conventional farming, reveal that the nutritional content of the soil in the organic farming group is higher, as shown in Table 5.

In accordance with the recommendations in the PUTK guidelines, a different type of fertilizer is needed in order to stabilize soil nutrients that are suitable for getting good plants. This need is shown in Table 6 for every 100 m² of agricultural land.

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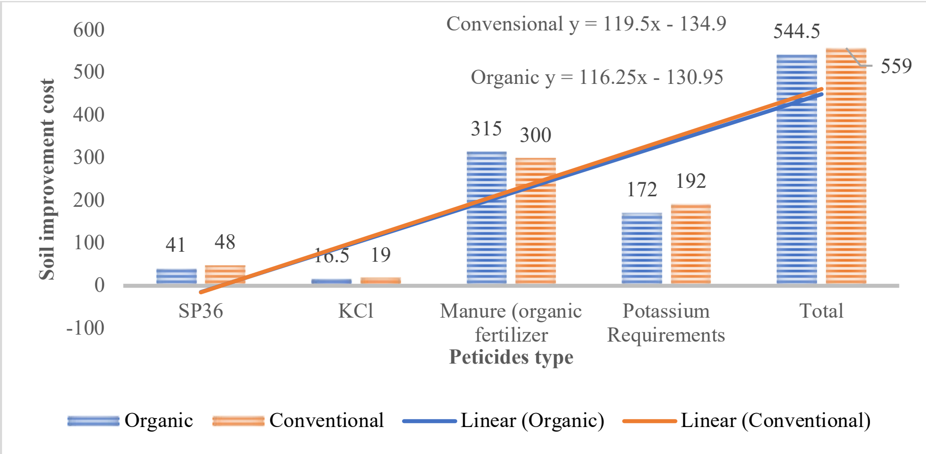

Figure 6: Chart fertilizer requirement per 100 m^2 to improve soil nutrients at research sites in Getasan District, Semarang Regency (n=60) Soil Improvement Costs

Overall, based on Fig. 6, it is evident that organic farming requires less fertilizer than conventional farming and is therefore more effective [39]. Conventional agricultural practices cause soil deterioration, increased compaction, water erosion, and salinization, as well as decreases in soil organic matter, nutrient content, and biodiversity, all of which have a detrimental influence on productivity, soil health, and long-term soil sustainability [40].

The price used to determine the amount of fertilizer required, adjusted for the market price per kilogram of fertilizer, depending on the type of fertilizer required. The average cost of improving soil nutrients in horticultural farming is presented in Table 7.

Overall, the average total additional cost for improving soil nutrients from both types of farming, the conventional group IDR 79,550.00 ± 16,911.11, much higher than that of organic farming IDR 69,958.33 ± 19,697.10 with a p-value 0.032.

Based on the trend of additional costs for improving soil nutrients from the two types of group farming, the conventional farming trend requires greater costs compared to organic farming with a trend ratio of $y = 119.5x – 134.9$ (conventional) > $116.25x -130.95$ (organic).

CONCLUSION

The performance of farmer groups utilizing organic farming systems is superior to that of farmer groups using conventional farming systems in terms of labor expenses, fertilization costs, production costs, agricultural cultivation profits and environmental value (soil nutrition). Organic farming practices that follow sustainable agriculture's guiding principles can preserve soil fertility and boost crop yields.

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Table 1: Sample data of organic and conventional farmer groups

Vilage name	m=f.M		Farmers	Σ Farmer group members	Σ Sample
Kopeng	5	1.	Mardi Santoso	56	8
		2.	Setyo Manunggal	111	8
		3.	Citra Muda *)	20	20
		4.	Panca Margi Tani	108	8
		5.	Ngudi Luhur	53	8
Tajuk	6	1.	Ngudi Rejeki	72	8
		2.	Ngudi Waras	44	8
		3.	Manunggal	35	8
		4.	Mapan Mandiri	66	8
		5.	Wonokaryo	25	8
		6.	Manunggaling Karya	40	8
Batur	9	1.	Jaya Abadi	10	8
		2.	Sumber Makmur	54	8
		3.	Mulya Langgeng	26	8
		4.	Tranggulasi *)	32	32
		5.	Phala Tani BM	18	18
		6.	Boga Lestari	20	20
		7.	Nunggal Rasa	62	8
		8.	Ngudi Makmur	83	8
		9.	Bangkit Merbabu *)	20	20
Getasan	3	1.	Sumber Karya	101	8
		2.	Lestari I	74	8
		3.	Margo Utomo	27	8
Ngrawan	3	1.	Marsudi	49	8
		2.	Maju	40	8
		3.	Ngudi Rahayu	107	8
Samirono	3	1.	Harapan	54	8
		2.	Permanik Ganik	67	8
		3.	Santi Mulya	21	8
Manggihan	3	1.	Tani Mukti	45	8
		2.	Makarti	50	8
		3.	Tani Utama	88	8
Total sampel				314	

*Organic farmer group (90 samples)

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Table 2: Gender, age and ownership of the respondents and cultivated land characteristics Getasan District (n=314)

	Farm Type		Σ
Gender	**Conventional**	**Organic**	
Man	194	82	276
Woman	30	8	38
Σ	224	90	314
Age	**Conventional**	**Organic**	
<= 40 th	109	45	154
> 40 th	115	45	160
Σ	224	90	314
Arable Land Area	**Conventional**	**Organic**	
< = 2000 m^2	124	46	170
> 2000 m^2	100	44	144
Σ	224	90	314

Table 3: Distribution of horticultural farming carried out by respondents by village in Getasan district, Semarang Regency (n=314)

Distribution of horticultural farming			
Village name	**Conventional**	**Organic**	**Σ**
Batur	72	52	124
Getasan	24	0	24
Kopeng	32	20	52
Ngrawan	24	0	24
Polobogo	16	0	16
Samirono	24	0	24
Wates	32	18	50
Σ	224	90	314
Types of Agricultural Cultivation			
Planting pattern	**Conventional**	**Organic**	**Σ**
Monoculture	0	0	0
Intercropping	224	90	314
Σ	224	90	314

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Table 4: Annual Cost for annual labor, fertilizer, production, yield, profit per 100 m2 of horticulture farming (n=314)

Annual labor expenditure			
Planting period	**OrganiC (IDR) X± SD**	**Conventional (IDR) X± SD**	**p-Value**
Planting period I	524.547,80 ± 113.952,04	526.043,41 ± 112.937,40	0,808
Planting period 2	535.068,03 ± 132.790,75	539.149,20 ± 124.812,77	0,676
Planting period 3	597.737,94 ± 137.894,50	600.010,14 ± 132.748,85	0,750
Planting period 4	632.401,65 ± 144.311,88	636.362,52 ± 141.653,09	0,746
Planting period 5	654.542,42 ± 148.579,08	657.237,23 ± 144.300,62	0,753
Average	588.859,57 ± 134.758,14	591.760,50 ± 130.318,25	0,702
The cost of purchasing fertilizer			
Planting period	**Organic (IDR) X± SD**	**Conventional (IDR) X± SD**	**p-Value**
Planting period 1	66.736,75 ± 13.239,58	82.051,85 ± 24.607,19	< 0,001*
Planting period 2	68.243,98 ± 12.478,11	82.388,27 ± 24.647,35	< 0,001*
Planting period 3	72.279,97 ± 13.158,58	89.753,14 ± 26.446,92	< 0,001*
Planting period 4	83.078,12 ± 90.401,57	97.279,33 ± 28.262,93	< 0,001*
Planting period 5	75.513,10 ± 13.668,61	101.406,3 ± 29.562,87	< 0,001*
Average	73.170,38 ± 23.087,43	90.575,78 ± 25.930,17	< 0,001*
Annual agricultural production costs			
Production cost	**Organic(Rp.) x ± SD**	**Conventional (Rp.) x ± SD**	**p-Value**
Planting period 1	823.296,34 ± 177.493,18	835.802,79 ± 176.927,92	0,54
Planting period 2	836.366,67 ± 193.756,02	850.479,52 ± 185.953,48	0,476
Planting period 3	909.442,35 ± 202.812,87	924.077,02 ± 197.480,83	0,455
Planting period 4	960.505,31 ± 224.429,18	977.843,25 ± 209.004,26	0,38
Planting period 5	977.123,24 ± 217.615,76	1.017.218,28 ± 245.609,57	0,199
Average	901.346,78 ± 199.840,751	921.084,17 ± 197.824,649	0,383
Annual agricultural yield			
Yield	**Organic (Rp.) X± SD**	**Conventional (Rp.) x ± SD**	**p-Value**
Planting period 1	2.275.319,14 ± 1.000.656,48	2.253.845,48 ± 1.019.670,16	0,843
Planting period 2	2.315.108,97 ± 1.013.088,15	2.351.552,55 ± 1.081.526,75	0,911
Planting period 3	2.457.200,14 ± 1.048.290,85	2.397.203,93 ± 1.088.016,75	0,507
Planting period 4	2.564.544,76 ± 1.079.071,09	2.424.691,61 ± 1.106.270,96	0,200
Planting period 5	2.634.058,61 ± 1.098.986,01	2.420.911,93 ± 1.152.338,32	0,058
Average	2.449.246,32 ± 1.043.283,04	2.369.641,10 ± 1.082.194,72	0,441
Agricultural profit			
Agricultural profit	**Organic (IDR.) X± SD**	**Conventional (IDR) X± SD**	**p-Value**
Planting period 1	1.469.264,60 ± 871.573,72	1.435.265,78 ± 907.554,32	0,693
Planting period 2	1.482.574,39 ± 876.390,50	1.506.475,10 ± 963.904,01	0,971
Planting period 3	1.541.071,04 ± 907.314,73	1.465.870,85 ± 966.578,65	0,345
Planting period 4	1.598.300,48 ± 950.660,67	1.441.194,28 ± 974.699,77	0,069
Planting period 5	1.655.306,61 ± 949.721,91	1.401.743,08 ± 1.031.665,27	0,009
Average	1.549.303,42 ± 904.941,03	1.450.109,82 ± 959.289,06	0,228

Significant at 95% level of confidence (P≤0.05)

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Table 5: Soil nutrient content at the study site in Getasan District, Semarang Regency (n=60)

Soil nutrient		Agricultural System	
		Organic	Conventional
P (Phosphorus) (me/100gr)	Low	1	10
	Medium	20	16
	High	9	4
K (Potassium) (me/100gr)	Low	24	19
	Medium	6	6
	High	0	5
C-Organic (%)	Low	11	16
	Medium	12	12
	Medium (+)	7	2
pH	Acid	1	9
	More acid	13	12
	Neutral	13	6
	On base	3	3
Ca (lime) necessities - to neutralize soil pH (me/100gr)	1 drop	20	16
	2 drops	4	4
	3 drops	6	10

Table 6: Fertilizer requirement per 100m2 to improve soil nutrients at research sites in Getasan District, Semarang Regency (n=60)

Fertilizer type		Farm Type		Σ
		Organic	Conventional	
SP36	1,0 kg	9	4	13
	1,5 kg	20	16	36
	2,0 kg	1	10	11
KCL	0,50 kg	24	19	43
	0,75 kg	6	6	12
	1,00 kg	0	5	5
Manure	5,0 kg	11	16	26
	10,0 kg	12	12	24
	20,0 kg	7	2	9
Potassium requirement	3,0 kg	4	4	8
	5,0 kg	20	16	36
	10,0 kg	6	10	16

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Table 7: The average cost of improving soil nutrients in horticultural farming in Getasan District, Semarang Regency (n=60)

Jenis Pupuk	Organic (IDR.) Average ± SD	Conventional (IDR.) Average ± SD	p-Value
P (SP36)	136,67 ± 26,04	160,00 ± 33,22	0,005*
K (KCL)	55,00 ± 10,17	63,33 ± 19,40	0,092
C-Org. (P Kandang)	1.583,33 ± 657,63	1.800,00 ± 466, 09	0,054
Keb. Kapur	566,67 ± 236,11	633,33 ± 276,47	0,006*

*significant at 95% level of confidence (P≤0.05)

Table 8: The average total additional cost of improving soil nutrients in horticultural farming in Getasan District, Semarang Regency, (n=60)

Average total Additional cost	Organic (IDR.) Average ± SD	Conventional (IDR.) Average ± SD	p-Value
Soil nutrient costs	69.958,33 ± 19.697,10	79.550,00 ± 16.911,11	0,032*

*significant at 95% level of confidence (P≤0.05)

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