CHAPTER IV RESULT AND DISCUSSION

A. General Overview of Study Site

This research was conducted in the area of agricultural land cultivated by the Jaya Mandiri PIK Farmers Group which owned by the local government, located within the *Perkampungan Industri Kecil* (PIK) Pulogadung, East Jakarta. PIK is a 44-hectare industrial estate established in 1981 under Governor Decree No. 532 of 1981 as an expansion area of PT Jakarta Industrial Estate Pulogadung (PT JIEP), which was originally developed as part of the government's industrial relocation program.

The area consists of land and buildings designated for small-scale industries, public facilities, and social infrastructure. PIK accommodates various types of small-scale industries, including garment, leather, metalworking, furniture, and other manufacturing businesses. In addition, the area also contains residential settlements, public rental apartments (*rusun*), public schools, and food stalls, creating a mixed industrial–residential environment.

PIK is currently administered by the Unit Pengelola Kawasan Pusat Pengembangan Usaha Kecil dan Menengah serta Permukiman (UPK PPUKMP) Pulogadung, a Regional Public Service Agency (BLUD) established in 2009. This institution was formerly known as BPLIP, which operated directly under the Governor of Jakarta, before being reorganized into a Technical Implementation Unit (UPT) under the Department of Industry, Trade, Cooperatives, and Small–Medium Enterprises.

In accordance with Governor Regulation No. 57 of 2022, as last amended by Governor Regulation No. 40 of 2023, UPK PPUKMP is responsible for managing and developing the PIK area, including supporting micro, small, and medium enterprises (MSMEs), small-scale industries, and settlements. The management unit currently oversees approximately 1,599 facilities, including workspaces, warehouses, kiosks, and public market units. Under the BLUD financial management scheme, its operational funding is primarily generated through land and building rentals rather than the Regional Government Budget (APBD).

The agriculture land cultivated by the Jaya Mandiri PIK farmer group is currently not subject to any formal rental charges. From a legal perspective

(Governor Decree No.92 of 2003), regulations state that rental fees apply to land designated for small scale industries. However, agricultural use does not fall under this category, as they are not classified as small-scale industry and therefore are not considered as an official work facility under the management unit. Therefore, this research area cultivated land considered as a grey area, as it represents idle assets that do not generate formal revenue for the management area unit (UPK).

Nevertheless, if rental fees were to be imposed, the estimated tariff would be approximately IDR 10,000 per m^2 per month. This estimate based on the surrounding land costs or fees charged for nearby factories and buildings according to information from the area management unit (UPK). Although this rental rate is considered relatively low by Jakarta standards, it would still impose a substantial financial burden on agricultural activities because vegetable cultivation requires considerably larger land areas than most industrial uses. Consequently, land rent would become one of the largest cost components in vegetable farming and could substantially affect the economic feasibility of the farming operation. The total cultivated area covers approximately 2 hectares, distributed across eight land parcels registered under SPH (*Surat Pengakuan Hak* or Land Acknowledgment Letters), namely SPH 240, 157, 406, 176, 168, 112, 238, and 405.

In terms of physical characteristics, the agricultural land is located within an area designated as Green Open Space (RTH) and partially situated beneath high-voltage transmission lines (*SUTET*). These characteristics consequently do not support for the use of industries. Overcoming this contraints, UPK as the management area unit has conducted internal assessments to optimize the utilization of this underproductive land by proposing its development into an agro-tourism area. However, the implementation of this plan has been constrained by the absence of private investment, as UPK's BLUD status limits its access to direct government budget allocations.

The land is cultivated by ten local farmers who have been engaged in agricultural activities in the area for over twenty years. Historically, according to the farmers, the land they currently cultivate was inherited across generations because their family previously assisted with land clearing and cultivation, thus receiving portions of land to cultivate. The existing land has diminished

considerably from its original size. Several parts have been converted into residential areas and factories, and the farmers do not hold any formal contracts; consequently, they simply continue working with what remains. The Jaya Mandiri PIK farmers have become permanent residents of the area, with farming as their primary livelihood. Some possess official resident identification cards already while others only have residency certificates, and some don't, more detailed information is provided in the respondent identities section.

The commodities cultivated include Kangkong *(Ipomoea reptans*), Amaranth (*Amaranthus spp*.), chili, mustard greens, and shallots. These farmers are organized under the Jaya Mandiri PIK Farmers Group and receive technical guidance from the East Jakarta City Agricultural and Food Security Agency (*Sudin* KPKP).

Despite its regulatory inconsistency, the area holds socio-economic significance as a productive utilization of otherwise idle land in proximity to industrial infrastructure. Agricultural activities provide supplementary income and employment opportunities for local communities. However, they may also generate potential concerns, including competition for water resources and possible interference with industrial circulation systems and infrastructure development.

B. Respondent Identities

This section first presents a general overview of the Jaya Mandiri PIK Farmer Group based on interview findings, followed by a description of respondent identities derived from the UPK PPUKMP Pulogadung revitalization study and primary data collected through direct interviews.

Farmers affiliated with the Jaya Mandiri PIK Group have been cultivating land in the PIK area based on intergenerational inheritance since the early of 2000s. The Jaya Mandiri PIK Farmer Group itself was established around 2014. Currently, the head of farmer group is Mustofa, with Abdul Haris serving as the treasurer. Institutionally, Jaya Mandiri PIK Farmer Group operates under the supervision of the East Jakarta Food Security, Marine Affairs, and Agriculture Sub-Department (*Suku Dinas Ketahanan Pangan, Kelautan, dan Pertanian Kota Jakarta Timur*). However, its current role is largely administrative, functioning primarily as means of formal recognition and legitimacy by the local government rather than as an active farmers' organization. Previously, the group received assistance through

agricultural extension services, which supported farmer activities and group development. Nevertheless, such support is no longer available in the time of research, as there is currently no extension officer assigned to the group. As result, organized farm management and collaboration among members are currently inactive.

Following the institutional overview, respondent identities are described. The respondents consist of farmers who cultivate land within the PIK area are members of the Jaya Mandiri PIK Farmer Group. Based on data from UPK PPUKMP Pulogadung (2024), in terms social aspect the farmers are relatively homogeneous, as all respondents originate from Java Island. The majority belong to the Javanese ethnic group (72.7%), while Sundanese, Bantenese, and Betawi ethnicities each account for 9.1%, indicating a fairly similar socio-cultural background.

All respondents (100%) stated that they reside in the PIK area and perceive themselves as permanent residents. Their length of stay varies, with 27.3% living in the area for 1–5 years, 18.2% for 6–10 years, and 54.5% for more than 10 years. This relatively long period of residence reflects a strong sense of attachment to the land they cultivate.

In terms of administrative compliance, 63.6% of respondents have reported their presence to local RT/RW authorities, while 36.4% have not. Reporting to UPK PPUKMP Pulogadung is slightly lower, with 54.5% having reported and 45.5% not. Regarding documentation, 54.5% possess Jakarta ID cards (KTP DKJ), 9.1% hold a temporary residence letter (Suket), and 36.4% have no official documents. The main reason for not reporting formally is the perception that verbal reporting is sufficient and that no enforcement actions have occurred**.** Furthermore, all respondents (100%) do not possess legal land ownership documents such as certificates, contracts, or written agreements, indicating that land tenure in the area is informal.

Environmental conditions in the area are perceived differently by respondents. Most (63.6%) identified poor infrastructure as the main issue, while 9.1% mentioned security disturbances and 27.3% stated that there were no significant problems. Despite their interaction with UPK, all respondents (100%) stated that they were unaware of the agricultural land revitalization plan. In response to this

issue, 54.5% of respondents show a cooperative and adaptive attitude, expressing willingness to follow UPK policies while hoping to maintain future business opportunities. Meanwhile, 36.4% display a more reactive stance but are not resistant, mainly expecting clear and fair compensation if land-use changes affect their business assets.

To complement the institutional data above, this study also relied on primary data obtained through direct interviews with 10 farmers actively cultivating vegetable crops in the PIK land area. These interviews provided detailed information on farmers' socio-economic and farming characteristics, as presented in Table 4.

Table 4. Jaya Mandiri PIK Farmers respondent identities

No	Description	Total Respondents	Percentage
1	Age (Years)		
	a. <15	0	0%
	b. 15-55	6	60%
	c. >55	4	40%
2	Educational Background		
	a. No education	2	20%
	b. Play Group	1	20%
	c. Elementary School	3	30%
	d. Junior High School	0	0%
	e. Senior High School	4	40%
	f. Bachelor	0	0%
3	Farming experience (years)		
	a. <5	2	20%
	b. 5-20	4	40%
	c. >20	4	40%
4	Number of Dependents		
	a. <5	9	90%
	b. 5-10	1	10%
5	Number of Plots Cultivated		
	a. <5	0	0%
	b. 5-20	7	70%
	c. >20	3	30%
6	Main Commodities	Kangkong, Amaranth	

The interview collected data include information such as the farmers' names, addresses, ages, educational background, main and side jobs, farming experience, number of dependents and the total number of plots cultivated for Kangkong and Amaranth cultivation.

During the study period, Kangkong (*Ipomea reptans)* and Amaranth (*Amaranthus spp.*) were the main vegetable commodities cultivated by the respondents. These crops were cultivated continuously due to their relatively short production cycles of approximately one month, enabling farmers to conduct regular harvesting and maintain a continuous source of income throughout the year.

From the interview results, as presented in Table 4, the characteristics of Jaya Mandiri PIK farmers show that the group is still supported by relatively strong labor capacity but faces structural limitations. Most farmers (60%) are in the productive age range, indicating adequate physical ability to carry out labor-intensive vegetable farming. However, the presence of 40% older farmers suggests a potential future challenge in terms of farmer regeneration and long-term sustainability.

In terms of human capital, education levels are generally low to moderate, with most farmers only completing elementary or senior high school and none reaching education. This implies that farming practices are largely based on experience rather than formal knowledge, which may limit innovation and access to institutional support. Nevertheless, those with higher education levels tend to have more advanced and rational approaches in farm decision-making compared to those with lower education levels (Gusti et. al, 2021). This educational variation still offers potential for improvement through extension and training.

Farming experience among respondents is relatively strong, as most have more than five years of experience. Farming experience plays an important role in influencing farmers' performance, since those with longer experience generally possess greater knowledge, skills, and problem-solving ability in managing their farms (Sari, 2022). This extensive experience helps compensate for the generally low level of formal education, as it strengthens farmers' technical skills and adaptive capacity in vegetable cultivation.

Household conditions show that most farmers have fewer than five dependents, meaning household burdens are relatively manageable, although income remains vulnerable to seasonal and market fluctuations. In terms of land, most farmers cultivate a moderate number of plots units (locally called *garet*), but these are managed without legal land ownership. In terms of the size of land area cultivated by each farmer are based on what inherited across generations. This insecure land

tenure, combined with reliance on short-cycle vegetables such as Kangkong (*kangkong*) and Amaranth (*bayam*) as their main commodities, makes their farming system highly sensitive to external pressures.

Overall, the farmers can be characterized as experienced, small to medium scale urban vegetable growers with sufficient labor and practical skills, but constrained by low formal education and insecure land tenure, which limit their ability to improve productivity and ensure long-term economic stability.

C. Cultivation Techniques

Cultivation techniques are important activities carried out by farmers in farming practices because they are directly related to the production results they obtain. The cultivation practices observed among farmers of Jaya Mandiri PIK shows that of Kangkong (*Ipomoea reptans*) and Amaranth (*Amaranthus spp.)* are planted within the same production period, with spatial arrangements varying across plots. In some cases, each plot is planted with a single crop species, while in other cases a single plot is divided into two sections, with half planted to Kangkong and Amaranth in the other half. This indicates that the cultivation pattern reflects monocropping at the individual plot level but crop diversification at the farm level.

However, when both crops are grown simultaneously within the same plot but separated into distinct portions of land, the system corresponds to strip intercropping, defined as the cultivation of two or more crops at the same time in spatially distinct strips within a single field unit (Singh, R. P., et al, 2013). This differs from monocropping, which involves the cultivation of only one crop species on a given land unit at a time. Therefore, although some individual plots may appear as monocropped units, the presence of two vegetable species grown concurrently within one plot demonstrates that the overall planting technique represents a form of spatial intercropping rather than monoculture.

The implementation of cultivation techniques in the farming of Kangkong (*Ipomoea reptans*) and Amaranth (*Amaranthus spp.)* by the Jaya Mandiri PIK farmer group includes land preparation, planting, fertilization, irrigation, pest and disease control, and harvesting. Cultivation techniques are crucial to consider since they affect both the quality and quantity of yields as well as the profits received by farmers.

1. Land Preparation

Land preparation is the initial stage in crop cultivation. The farmland managed by the Jaya Mandiri PIK farmer group has already been divided into plots (locally called *garet*) with a size averagely 3 × 15 m² each. Land preparation begins with the removal of weeds and crop residues using herbicide (Gramoxone) at a dosage of 10 ml mixed with 1.8 L of water per plot. The implementation of the Jaya Mandiri PIK farmers is consistent with the general objective of early land preparation, which aims to reduce plant competition as well as potential sources of pests and diseases (Istiqomah et al., 2016).

After weed control, soil tillage is carried out either mechanically using a tractor or manually with a hoe to loosen the soil after the previous harvest. According to Nugroho (2018), the soil is loosened to a depth of about 20–25 cm to improve soil aeration and support optimal root development. Following tillage and prior to planting, the land is then watered and fertilized with manure at a rate of 1–2 sacks per plot (approximately 20 kg per sack). Manure serves as the basic fertilizer before planting. Its application of manure aims to improve soil fertility, enhance soil structure, and increase the soil's water-holding capacity (Siregar, 2023). In some cultivation practices, dolomite may also be added to neutralize soil acidity and increase nutrient availability in the soil (Basuki & Sari, 2020).

However, field observations perceived that consistent manure application is practiced by only one farmer, while others apply it irregularly, and no dolomite is used for soil acidity neutralization. At this initial stage, no significant differences in land preparation techniques are observed between Kangkong (*Ipomoea reptans*) and Amaranth (*Amaranthus* spp.) cultivation, indicating that both crops share similar initial soil management practices.

2. Planting

Planting practices observed in the field differ from several recommended cultivation guidelines. In this study, planting is carried out by broadcasting seeds directly onto the soil surface without specific spacing and without any prior seed preparation. For Kangkong, about 5 kg of seeds are required per plot, usually cultivated in five plots. For Amaranth, 0.5 kg of seeds per plot are used, also

cultivated in five plots. The land preparation until planting of five plots is usually completed within one week, followed by the planting of Amaranth in the following week. This staggered planting system allows farmers to maintain continuous production and harvesting cycles.

However, in recommended practices, planting is preceded by seed soaking to enhance germination (Ristianti & Chaidir, 2025). Seeds are then sown using the *tugal* method at a depth of 1–2 cm with defined spacing of 10 × 10 cm to provide optimal growing space (Aziz et al., 2022). Planting is also recommended in the afternoon to reduce heat stress on seedlings (Nuraini, 2025). These differences indicate that farmers' current planting methods are more practical and labor-saving but may not fully follow technical recommendations aimed at optimizing plant growth

3. Crop Maintenance

Crop maintenance practices implemented by farmers partially align with the literature. The literature emphasizes regular irrigation, weed control, and scheduled fertilization at 10, 20, and 30 days after planting using urea, SP-36, and KCl to support vegetative growth (Suroso & Antoni, 2016). In practice, farmers apply fertilization slightly earlier and fewer times, focusing mainly on nitrogen and phosphorus sources to accelerate vegetative growth and improve leaf quality. While the literature describes general irrigation timing, farmers implement a more intensive and adaptive irrigation schedule based on crop growth stages and weather conditions, combined with active pest and disease control using chemical inputs and field sanitation.

a. Fertilization

At the age of 7–12 days after planting, additional fertilization is carried out using a mixture of urea (2 kg) and TSP/SP-36 (1 kg) per plot. A second round of fertilization is applied during the vegetative growth stage (around 17 days after planting) using a balanced mixture of NPK fertilizers (Mutiara or Phonska*)* at a ratio of 1 Kg:1 Kg:1 Kg. Proper fertilization ensures rapid vegetative growth and improves leaf quality, which is the main product of Kangkong and Amaranth

cultivation. There is no specific difference in fertilizing techniques for each Kangkong and Amaranth.

b. Irrigation

Irrigation is carried out using diesel pumps that draw water sources from the Buaran River or drainage canals around the PIK area, applied every two days depending on weather conditions. The plots are designed so that water can be stored in between them, and irrigation water is distributed directly from these small reservoirs.

At the seedling stage (0–1 week after planting), irrigation is carried out three times a day during the dry season to maintain soil moisture. At 1–2 weeks after planting, watering is reduced to twice a day (morning and evening). As the plants approach harvest (3–4 weeks after planting), irrigation is done once a day since excessive watering can reduce leaf quality.

In general, farmers apply similar irrigation practices for both Amaranth (*Amaranthus spp*.) and Kangkong (*Ipomoea reptans*). However, Kangkong has a higher water requirement due to its semi-aquatic growth characteristics and greater tolerance for saturated soil conditions. In contrast, Amaranth is relatively less tolerant of prolonged waterlogging, so water management must be more carefully controlled to prevent root stress and potential yield or quality reduction.

c. Pest and Disease Control

Pest and disease control is carried out both preventively and curatively. Farmers commonly use Antracol (fungicide) at a dosage of 3 caps (approximately 30 ml) mixed with 16 L of water for every 10 plots, applied at 12 and 18 days after planting to prevent fungal leaf diseases. For insect pests, farmers apply Oxida Swarkon (insecticide) at a dosage of 1 cap (approximately 10 ml) per 16 L of water, applied once or twice depending on pest intensity. In addition, farmers also maintain field hygiene and practice timely weeding to suppress pest and disease development.

4. Harvesting

Harvesting is usually conducted at 3–4 weeks after planting, depending on crop growth and market demand, which is consistent with the recommended harvest age

of 28–45 days after planting depending on growth conditions (Susilo, 2015). Harvesting is done manually, either by uprooting the plants or cutting them near the base of the stem. The harvested vegetables are then cleaned by removing damaged or yellowing leaves. In many cases, farmers' wives assist in the harvesting and post-harvest cleaning process, which helps to maintain efficiency and product quality before marketing. In conclusion, farmers focus more on market-oriented harvesting schedules and simple post-harvest handling supported by family labor to ensure efficiency and acceptable product quality

In conclusion, the cultivation techniques practiced by the Jaya Mandiri PIK Farmer Group generally conform to the basic principles of recommended vegetable cultivation, although several adjustments have been made to suit local conditions. Deviations from the literature, including the absence of seed soaking, limited use of manure and dolomite, broadcasting instead of line planting, and simplified fertilization practices, are primarily influenced by economic and practical considerations. The farmers have limited financial resources to invest in additional agricultural inputs and therefore prioritize production practices that are affordable and efficient. Furthermore, most farmers continue using cultivation methods that they are familiar with, as these techniques have been applied over many years and are perceived to provide satisfactory results. This demonstrates that farmers' management decisions are not solely based on technical recommendations but are also shaped by available capital, accumulated farming experience, and the need for practical and labor-efficient cultivation in an urban farming context.

Table 5. Jaya Mandiri PIK Farmers Kangkong and Amaranth Cultivation Techniques

No.	Activity	Kangkong Cultivation	Amaranth Cultivation	Literature	Alignment with Recommendations
1.	**Land Preparation**	• **Weed control** Removal of weeds using Gramoxone at a dosage of 10 ml mixed with 1.8 L of water per plot. • **Soil Tillage** Carried out mechanically (tractor) or manually (hoe) to loosen the soil after the previous harvest • **Manure application** Fertilized with manure at a rate of 1–2 sacks per plot (approximately 20 kg per sack) No significant differences in land preparation techniques are observed between Kangkong and Amaranth cultivation		-Removal of weeds and residues to reduce competition, pests, and diseases (Istiqomah et al., 2016). - Soil Tillage to 20–25 cm depth through hoeing or plowing to support root growth (Nugroho, 2018) with the mixture of manure to enhance soil fertility and improve soil structure (Siregar, 2023) - Added dolomite to neutralize soil acidity and increase nutrient availability (Basuki & Sari, 2020).	Generally aligned. Farmers conduct weed control, tillage, and manure application consistent with recommendations. However, manure application is only done by one farmer and dolomite application is not practiced.
2.	**Planting**	Planting is carried out by broadcasting seeds directly onto the soil surface without specific spacing and without any prior seed preparation 5 kg usage of seeds per plot	0,5 Kg usage of seeds per plot	• Seed soaking before planting to enhance germination (Ristianti & Chaidir, 2025). • Seeds sown using the tugal method at 1–2 cm depth with 10 × 10 cm spacing to ensure optimal growth (Aziz et al., 2022). Afternoon planting recommended to reduce heat stress on seedlings (Nuraini, 2025).	Farmers' current planting differs to the recommendations which are more practical and labor and time saving

3.	**Maintenance** **a. Fertilization**	- 7–12 days after planting, Additional fertilization is carried out using a mixture of urea (2 kg) and TSP/SP-36 (1 kg) per plot. - 17 days after planting Second round of fertilization is applied during the vegetative growth stage using a balanced mixture of NPK fertilizers (Mutiara or Phonska*)* at a ratio of 1:1:1 (Kg).	Besides manure application recommended before planting, Chemical fertilizers also needed; urea (200 kg/ha) one week after planting, followed by TSP (200 kg/ha) and KCl (10 kg/ha) two weeks after planting,	Partially aligned; timing slightly earlier and fewer applications, focusing mainly on N and P sources.
	b. Irrigation	- (0–1 week after planting), 3x a day during the dry season to maintain soil moisture. - (1–2 weeks after planting) Twice a day: morning and evening. - (3–4 weeks after planting), Done once a day since excessive watering can reduce leaf quality.	Irrigation conducted on morning and evening (twice a day) (Susila, 2006)	Generally aligned; farmers apply adaptive irrigation based on growth stage and weather. Kangkong requires more water due to semi-aquatic characteristics.
	c. Pest and Disease Control	• Fungicide (Antracol) applied at 3 caps (~30 ml) per 16 L water per 10 plots at 12 and 18 days after planting to prevent fungal diseases. • Insecticide (Oxida Swarkon) applied at 1 cap (~10 ml) per 16 L water once or twice depending on pest intensity.	Common pests are from insects, caterpillar, and fungi. Therefore, fungicide, and insecticide are recommended to apply 2cc/l (Susila, 2006)	Generally aligned; farmers apply chemical control consistent with recommendations, adjusted to pest intensity.
4.	**Harvesting**	Manually; by uprooting the plants/cutting them near the base of the stem. Then cleaned by removing damaged or yellowed leaves Harvested on days 18-21 Harvested on days 25-30	Harvest age of 28–45 days after planting (Susilo, 2015). Done by uprooting or cutting 2-5 cm up the surface (Susila, 2006)	Align with the recommendations but are harvested earlier than the usual recommendation.

D. Farm Business Analysis

1. Land Area

The total cultivated land area managed by the 10 sample farmers from the Jaya Mandiri PIK farmer group was approximately 2 hectares, with an average landholding of 0.21 hectares per farmer. The farming system was organized into cultivation plots, each measuring approximately on the average 3 × 15 m² (45 m²). Based on field observations and farmer interviews, a total of 148 plots were actively cultivated by the sampled farmers. The number of plots managed by each farmer varied depending on land ownership and production capacity. This plot-based cultivation system enables farmers to optimize land utilization, facilitate crop management practices, and improve production efficiency. The relatively small average landholding indicates that vegetable farming in the study area is predominantly carried out on a small-scale basis, where farmers maximize productivity through intensive land management and the efficient use of available resources.

2. Production

In this study, production refers to the harvested output of Kangkong and Amaranth, measured in combined bundles. The production performance of the Jaya Mandiri PIK farmer group is influenced by climatic conditions, where extreme weather events may result in crop failure. However, during the research period, production levels were considered satisfactory, as harvest outputs remained stable due to relatively favorable and consistent weather throughout July.

Harvesting activities are carried out directly in the field, where collectors (middlemen) immediately retrieve the produce. This system enables farmers to sell their products on-site, eliminating the need for additional post-harvest handling or transportation costs. Production quantities varied among the sample farmers, influenced by differences in land area, soil characteristics, and crop management practices.

Production output was measured according to the common marketing standard used by vegetable farmers in East Jakarta. Based on the interview result, farmers' revenues were calculated per master bundle (which consist 20 individual bundles

each in one standard bundle was approximately equivalent to the circumference formed by the thumb and index finger, or about 5 cm in diameter). The total production generated average for Kangkong is 268 master bundles and 134 master bundles for Amaranth per land area per Month during the July planting period (Appendix 34 & 35).

3. Price

As farmers in the Jaya Mandiri PIK Farmer Group sell Kangkong and Amaranth in bundled form, with each master bundle of Kangkong average selling price of IDR 10.000 (consist of 20 individual bundles). Similarly, each bundle of Amaranth is sold at an average price of IDR 14.000. Each in one standard bundle was approximately equivalent to the circumference formed by the thumb and index finger, or about 5 cm in diameter, the calculation using bundle form is also referred to previous research by Saragih (2021). These prices are set by collectors who collect the produce directly from the farm, thereby exempting farmers from additional post-harvest or transportation costs. During the July 2025 planting season, the average selling prices received by farmers were IDR 10.000 per bundle for Kangkong and IDR 14.000 per bundle for Amaranth.

4. Cost of Production

The production costs in farming are generally divided into paid costs (cash cost) and imputed costs (non-cash cost). In the case of vegetable cultivation, specifically Kangkong and Amaranth, in the *Perkampungan Industri Kecil* (PIK) area, the paid costs include expenditures for seeds, hired labor (outside family labor), fertilizers, pesticides, and equipment fuels. Meanwhile, the imputed costs consist of the value of family labor, equipment depreciation, the estimated rent of owned land, and capital interest. The details of the production costs incurred by farmers cultivating Kangkong and Amaranth in the PIK area are as follows:

a. Cash cost

Cash costs or Paid costs refer to the expenses incurred in cash or directly by farmers during the implementation of vegetable farming activities (Kangkong and Amaranth) in Jaya Mandiri PIK Farmer Group. The components included in paid costs consist of expenditures for seeds, non-family labor, fertilizers, pesticides and

machine fuels, all of which are paid directly by the farmers. The details of the paid costs in Kangkong and Amaranth farming at Tani Jaya Mandiri PIK farmer group are as follows.

Table 6. Cash cost each Land area and per Ha of the Jaya Mandiri PIK cultivation in the period of July 2025.

Item	IDR/Land area/Month	IDR/Ha/Month
Seeds costs	1.182.900	5.306.895
Non-Family Labor Costs	297.143	1.126.334
Fertilizer Costs	247.850	1.095.275
Pesticides Costs	37.995	165.606
Fuel Costs	471.250	2.000.546
Total Cash Costs	**2.237.138**	**9.694.656**

From Table 6, it can be concluded that the total average cost incurred by each farmer in cultivating Kangkong and Amaranth for one planting season is IDR2.237.138 per cultivated land area. When converted to a per-hectare basis, the total cash cost amounts to IDR9.694.656 /Ha/season (Appendix 19).

The detailed breakdown of farming costs is as follows: seed costs amount to IDR 1.182.900 per land area or IDR 5.306.895/Ha; non-family labor costs are IDR 297.143 per land area or IDR 1.126.334/Ha; fertilizer costs reach IDR 247.850 per land area or 1.095.275 /Ha; pesticide costs total IDR 37.995 per land area or IDR 165.606/Ha; and fuel costs average is in IDR471.250 per Month per Land area or IDR2.000.546 per Ha per Month. These costs represent the overall cash costs expenses borne by farmers during one cropping season for Kangkong and Amaranth cultivation in the PIK land area. These are the following cash cost details of Jaya Mandiri PIK farmers in July of 2025 in one Month:

i. Seeds

Amaranth cultivation requires approximately 0,5 kg seeds per plot. In comparison, Kangkong cultivation utilizes about 4-5 kg of seed per plot. The market price of Kangkong seed ranges from IDR25.000-IDR35.000 per kilogram, depending on the quality selected by each farmer. Meanwhile, the price of Amaranth seed ranges from IDR38.000 to IDR50.000 per kilogram, with an average price of IDR43.500 per kilogram.

Table 7. Seeds cost each Land area per Month and per Ha of the Jaya Mandiri PIK cultivation in the period of July 2025.

Item	IDR/Land area/Month	IDR/Ha/Month
Kangkong seeds	1.024.000	4.622.246
Amaranth seeds	158.900	684.649
Total Seeds	**1.182.900**	**5.306.895**

*CC: Month

From the Table 7 above, it presents the seed costs per land area and per hectare for the Jaya Mandiri PIK cultivation during the July of 2025 period. Kangkong seeds represent the highest expenditure, amounting to IDR1.024.000 per land area per Month and IDR 4.622.246 per hectare per Month. In comparison, Amaranth seed costs are substantially lower, with expenditures of IDR158.900 per land area and IDR684.649 per hectare. Overall, the total average seed cost reaches IDR1.182.900 per land area and IDR 5.306.895 per hectares. The seed use for Kangkong averagely is 4,5kg used for each plot., meanwhile for Amaranth seed used per plot averagely is 0,5kg. Kangkong seeds in the range price of IDR25.000-IDR30.000/Kg depends on the quality each farmer bought. Amaranth seeds price is in the range of IDR38.000-IDR50.000/Kg with the total average in IDR43.500/Kg. Further details can be found in Appendix 9.

ii. Non-Family Labor

Non-family labor is paid directly by the farmers according to the number of working days and the prevailing wage rate in the study area. Male laborers are paid IDR100.000 per day, while female laborers receive IDR 80,000 per day. The number of laborers required depends on land conditions and the type of activities to be carried out. The following describes the labor cost in the vegetable cultivation of Jaya Mandiri PIK farmer group.

Table 8. Non-family Labor cost each Land area per Month and per Ha of the Jaya Mandiri PIK cultivation in the period of July 2025.

Item	IDR/Land area/Month	IDR/Ha/Month
Land Preparation	22.857,14	86.997,67
Planting	45.714,29	173.995,34
Maintenance	137.142,86	516.019,04
Harvesting	91.428,57	349.322,33
Total Non -Family Labor	**297.142,86**	**1.126.334,38**

Table 8 outlines the non-family labor costs per cultivated land area and per hectare for the Jaya Mandiri PIK cultivation during the July 2025 period. Land preparation requires IDR22.857.14 per land area per Month and IDR86.997,67 per hectare. Planting activities incur IDR45.714,29 per land area and IDR173.995,34 per hectare. Maintenance constitutes the highest labor expenditure, reaching 137.142,86 per land area and IDR516.019,04 per hectare. Harvesting activities amount to IDR91.428,57 per land area and IDR349.322,33 per hectare. Overall, the total average non-family labor cost is IDR297.142,86 per land area per Month and IDR1.126.334,38 per hectare. More details are presented in Appendix 14.

iii. Fertilizers

The cost of purchasing fertilizer is included in the category of expenses paid by farmers in managing their farming activities, as farmers personally pay for the fertilizers they need from local suppliers or agricultural stores. The types of fertilizers used by farmers vary, each with different purchase prices. The choice of fertilizer type generally depends on the farmer's own decision in managing their farm, based on their experience and financial capability. The following section explains the fertilizer costs incurred.

Table 9. Fertilizer costs each Land area per Month and per Ha of the Jaya Mandiri PIK cultivation in the period of July 2025

Item	IDR/Land area/Month	IDR/Ha/Month
Urea	152.400	735.344
Manure	5.600	27.021
Mutiara	34.400	165.983
Phonska	18.550	89.505
TSP	36.900	178.046
Total Fertilizers	**247.850**	**1.095.275**

Based on Table 9, the total average fertilizer cost for the Jaya Mandiri PIK cultivation in the July 2025 period amounts to IDR247.850 per cultivated land area per Month. When expressed on a per-hectare basis, the total fertilizer expenditure reaches IDR1.095.275 per Month. More details are presented in Appendix 16.

iv. Pesticides

The cost of pesticide use varies among the sample farmers depending on land area, pest infestation levels, and the types of pesticides used according to each

farmer's needs and experience. The types of pesticides commonly used include insecticides to control insects, fungicides to manage fungal diseases, and herbicides to suppress weed growth. The pesticide cost is calculated based on the amount of pesticide used multiplied by the price of pesticide per liter.

Table 10. Pesticides costs each Land area per Month and per Ha of the Jaya Mandiri PIK cultivation in the period of July 2025.

Item	IDR/Land area/Month	IDR/Ha/Month
Antracol	14.445	69.698
Abacel	16.215	78.239
Gromokson	4.715	22.750
Decis	700	3.378
Starban	1.920	9.264
Total Pesticides	**37.995**	**165.606**

Based on Table 10, the total average pesticide cost for the Jaya Mandiri PIK cultivation during the July 2025 period amounts to IDR37.995 per cultivated land area per Month. On a per-hectare basis, the total pesticide expenditure reaches IDR165.606 per Month. A more detailed explanation is provided in Appendix 18.

v. Fuels

Fuel cost in the Jaya Mandiri PIK farming activities arise from the use of diesel water pump for irrigation and tractor for land preparation. Both machines use Pertalite fuel proced at IDR10.000 per liter Jakarta based. Fuel consumption varies among farmers depending on land area (number of plot) and individual operational capacity.

The diesel pump is generally refueled periodically with 5 liters per filling, and this is typically done twice in one cropping season. One 5-liter filling is used for approximately 4-5 plot of irrigation. However, actual usage differs among farmers, as some require two refills per season while others use only one, depending on field conditions and water needs.

Table 11. Fuel costs each Land area per Month and per Ha of the Jaya Mandiri PIK cultivation in the period of July 2025.

Item	IDR/Land area/Month	IDR/Ha/Month
Diesel Pump Fuel	357.500	1.539.341
Tractor Fuel	461.204	461.204
Total Fuel Cost	**471.250**	**2.000.546**

Based on Table 11, the total average pesticide cost for the Jaya Mandiri PIK cultivation during the July 2025 period amounts to IDR471.250 per cultivated land

area per Month. On a per-hectare basis, the total pesticide expenditure reaches IDR2.000.546 per Month. A more detailed explanation is provided in Appendix 42.

b. Non-cash cost

Non-cash costs or imputed costs represent expenses that are not paid in cash by farmers during the cultivation of Kangkong and Amaranth. However, these costs are still calculated to determine the actual profit received by farmers in managing their farming activities. As shown in Table 12, the non-cash cost components include family labor costs, depreciation costs, and capital interest, along with the imputed value of land rent. The details of the paid costs in Kangkong and Amaranth farming at Kelompok Tani Jaya Mandiri PIK are as follows.

Table 12. Non-cash cost total per Land area and per Ha of the Jaya Mandiri PIK cultivation in the period of July 2025.

Item	IDR/Land area/Month	IDR/Ha/Month
Family Labor Cost	1.165.714	6.294.183
Depreciation costs	389.870	1.766.436
Land rent Costs	2.774.314	11.622.527
Capital Interest	32.835	146.889
Total Non-Cash Costs	**4.362.734**	**19.830.035**

From Table 12, it can be concluded that the total average non-cash cost incurred in the cultivation of Kangkong and Amaranth for one planting season is IDR4.362.734 per cultivated land area. When converted to a per-hectare basis, the total non-cash cost amounts to IDR19.830.035/Ha/season (Appendix 31).

The detailed breakdown of non-cash cost components is as follows: family labor costs amount to IDR1.165.714 per land area or IDR6.294.183/Ha; depreciation costs reach IDR389.870 per land area or IDR1.766.436 /Ha; and land rent amount to IDR2.774.314 averagely per land area or IDR11.622.527/Ha; and capital interest in IDR32.835 per land area or IDR 146.889/Ha. These costs represent the total non-cash expenditures considered in evaluating the economic returns of Kangkong and Amaranth cultivation in the Jaya Mandiri PIK area during the July 2025 Month.

i. Family Labor

In general, farmers in the study area maximize the use of family labor in managing their vegetable cultivation. The types of family labor (TKDK) include

both male and female workers, calculated in workdays (HKP). One unit of male labor equals 1 HKP, while female labor equals 0.8 HKP. The higher HKP value for male labor is due to men generally having greater physical strength compared to women.

The wage rate for family labor is considered equivalent to that of non-family labor, with male laborers paid IDR100.000 per day and female laborers IDR 80.000 per day, while the wage for harvesting activities is IDR 45.000 per day for both men and women. The detailed costs of labor use in the vegetable cultivation of Jaya Mandiri PIK Farmer Group are presented in Table 13.

Table 13. Family labor cost each Land area per Month and per Ha of the Jaya Mandiri PIK cultivation in the period of July 2025.

Item	**IDR/Land area/CC**	**IDR/Ha/Month**
Land Preparation	125.714,29	682.251
Planting	251.428,57	1.364.503
Maintenance	377.142,86	2.064.754
Harvesting	411.428,57	2.200.675
Total Family Labor Cost	**1.165.714**	**6.294.183**

Based on Table 13, the total average family labor cost for the Jaya Mandiri PIK cultivation during the July 2025 period amounts to IDR1.165.714 per cultivated land area per Month. When converted to a per-hectare basis, the total expenditure reaches IDR6.294.183 per Month. More specific details are provided in Appendix 24.

Comparing with the previous research by Normansyah et al. (2014), who reported that hired labor costs were approximately five times higher than family labor costs, reflecting a greater dependence on paid workers. In the present study, however, family labor exceeds hired labor, suggesting that farmers maximize the use of household labor to reduce cash expenditures and improve financial returns.

Although most farming households have fewer than five family dependents (Table 4), family labor remains the primary source of labor throughout the production cycle. This indicates that the profitability of vegetable farming relies heavily on the effective utilization of available household labor rather than household size. Consequently, replacing family labor with hired workers would substantially increase production costs and reduce farm profitability.

ii. Depreciation

Depreciation cost is one of the expenses that must be calculated in farming activities. The agricultural tools purchased and used by the farmers include hoes, sprayers, diesel machines, and tractors. These tools are not used up within a single planting season, so their cost is calculated using a depreciation formula. According to Melly et. al (2020), the residual value of buildings, machinery, and equipment is estimated at 10% of the purchase price.

The depreciation of agricultural tools is calculated using the straight-line method, which assigns an equal depreciation value each year until the economic life of the tools end. The economic lifespan of the tools varies depending on their type. The following data show the depreciation cost of equipment used by the sample farmers in the vegetable cultivation of Jaya Mandiri PIK farmer group.

Table 14. Depreciation cost each Land area per Month and per Ha of the Jaya Mandiri PIK cultivation in the period of July 2025.

Item	IDR/Land area/Month	IDR/Ha/Month
Hoe	13.970	80.924
Diesel Water Pump Machine	97.200	529.251
Tractor	250.800	1.050.197
Sprayer	27.900	106.065
Total Depreciation Cost	**389.870**	**1.766.436**

Based on Table 14, the total average depreciation cost for the Jaya Mandiri PIK cultivation during the July 2025 period amounts to IDR389.870 per cultivated land area per Month. When expressed on a per-hectare basis, the total depreciation expenditure reaches IDR1.766.436 per Month. A more specific details is provided in Appendix 29.

iii. Land Rent

Land rent is included as an imputed cost, even though in practice the land used by farmers at Jaya Mandiri PIK is not currently subject to any rental charges. However, the inclusion of land rent is intended to reflect the economic value of land use and to account for the possibility that rental charges may be imposed by the land management authority in the future.

In this study, land rent was estimated using the net benefit in which land rent is calculated as the difference between total benefit and total cost (Pambudi, 2008). This approach is consistent with the concept of land rent as an economic surplus, defined by Suparmoko (1989) as the excess of total production value over total production costs.

The prevailing rental prices of residential houses or factories located around the study area refer from UPK PPUKMP is IDR10.000 per m^2 per month. However, this value was not used directly because it does not represent the characteristics of the cultivated land. The land utilized by the sample farmers is located beneath high-voltage electricity transmission lines (SUTET), with part of the area designated as Green Open Space (RTH), resulting in significant restrictions on land use compared with residential or industrial land. Therefore, the net benefit approach was considered more appropriate for estimating the imputed land rent, as it reflects the productive value of the land under its actual utilization conditions rather than the prevailing commercial rental value.

Table 15. Land rent costs for Jaya Mandiri PIK, calculated per year, per Month (MT), and per hectare for the cultivation period of July 2025.

Item	**Total Land rent cos (IDR)**
Land rent per Land area per Season	**2.774.314**
Land rent per Ha per Season	**11.622.527**

As shown in Table 15, the average land rent cost incurred by Jaya Mandiri PIK farmers per Land area per month is IDR2.774.314 meanwhile it costs IDR11.622.527 for land rent per hectare. More detailed information regarding the calculation of land rent costs is provided in Appendix 30.

iv. Capital Interest

Capital interest cost is the cost of capital used by darmers, calculated as part of the the vegetable farming operations during one planting season. The interest rate for the People's Business Credit (*Kredit Usaha Rakyat*/KUR) at Bank DKI in the research area was 6% per year in 2025. The calculation of capital interest is obtained by summing all costs both cash and non-cash costs (excluding capital interest), multiplied by the interest rate and the crop duration for one planting season, then divided by 12 months. The average capital interest cost of the Jaya Mandiri PIK farmers' farming per unit of land area per Month was IDR 32.835 Meanwhile, the

capital interest cost incurred by farmers per hectare was IDR 146.888 per hectare per planting season. (Appendix 43).

c. Total cost

Total cost represents the sum of all expenses, both paid and imputed, incurred during one planting season of vegetable cultivation in Tani Jaya Mandiri PIK Farmer Group. Paid costs refer to expenses directly paid during the farming activities, which include the cost of seeds cost,non-family labor, fertilizers, pesticides, and fuel of machines. Meanwhile, imputed costs are expenses not directly paid by the farmers but still considered to determine the actual profit earned. These include the family labor (TKDK), imputed land rent, equipment depreciation, and interest on capital. The detailed breakdown of total costs in the vegetable cultivation of Jaya Mandiri PIK Farmer Group is presented in Table 16 (Appendix 32).

Table 16. Total cost each Land area per Month and per Ha of the Jaya Mandiri PIK cultivation in the period of July 2025.

No	Item	IDR/Land area/Month	IDR/Ha/Month
1.	**Cash Costs**	**2.237.138**	**9.694.656**
	Seeds costs	1.182.900	5.306.895
	Non-Fam Labor Costs	297.143	1.126.334
	Fertilizer Costs	247.850	1.095.275
	Pesticides Costs	37.995	165.606
	Fuel Costs	471.250	2.000.546
2.	**Non-Cash Cost**	**4.362.734**	**19.830.035**
	Family Labor	1.165.714	11.776.8711
	Depreciation Cost	389.870	1.766.436
	Land Rent	2.774.314	11.622.527
	Capital Interest	32.835	146.889
	Total Cost	**6.599.872**	**29.524.691**

As shown in Table 16, the overall cost of Jaya Mandiri PIK cultivation for the July 2025 period is IDR6.599.872 for each cultivated land area per Month. On a per-hectare basis, the total production cost amounts to IDR29.524.691 per Month. A more specific details is provided in Appendix 32.

d. Revenue

Revenue refers to the total value Farm revenue represents the total value received by farmers during the production of groundnuts, calculated by multiplying the total output by the selling price obtained by each farmer at the time of harvest

sales. The average revenue of the sample farmers per cultivated land area in the research location during the July 2025 planting season was IDR 6.586.000/Month. Meanwhile, the average revenue per hectare was IDR 29.466.579/Month (Appendix 36).

e. Income

Farm income is the difference between total revenue earned by farmers from their horticultural farming activities and the actual cash expenses incurred (cash costs) during one planting cycle per plot. These expenses include costs such as seeds, hired labor (non-family labor), fertilizers, seeds, pesticides, and fuel costs.

Table 17. Income earned by sample farmers each land area per Month and per Ha of the Jaya Mandiri PIK cultivation in the period of July 2025.

Item	**IDR/Land area/Month**	**IDR/Ha/Month**
Revenue	6.586.000	29.466.579
Cash Cost	2.237.138	11.622.527
Total Income	**4.348.862**	**19.771.992**

Referring to the Table 17 the average income of the sample farmers per cultivated land area in the research location during the July 2025 planting season was IDR4.348.862/Land area/month Meanwhile, the average income per hectare was IDR19.771.922/Ha/Month (Appendix 37).

f. Profit

Farm profit is defined as net revenue, calculated as the difference between total revenue obtained from horticultural farming activities with the total production osts, comprising both cash and non-cash cost during one planting cycle per land area.

Table 18. Profit Earned per Land area per Month and per Ha of the Jaya Mandiri PIK cultivation in the period of July 2025 Including Land Rent.

Item	**IDR/Land area/Month**	**IDR/Ha/Month**
Revenue	6.586.000	29.466.579
Total Cost	6.599.872	29.524.691
Total Profit (Land Rent Included)	**(13.872)**	**(58.113)**

As presented in Table 18, the Jaya Mandiri PIK farmers cultivation during July 2025 period resulted in a minimal negative profit. The average loss amounted to IDR 13.872 per land area per Month, while on a per-hectare basis the loss reached

IDR 58.113 per Month (Appendix 38). This outcome is primarily attributable to the inclusion of imputed land rent, which substantially increased total production costs and led to negative results.

Table 19. Profit Earned per Land area per Month and per Ha of the Jaya Mandiri PIK farmers' cultivation in the period of July 2025 without Land rent.

Item	IDR/Land area/Month	IDR/Ha/Month
Revenue	6.586.000	29.466.579
Total Cost	3.811.686	17.844.052
Total Profit (Land rent Excluded)	**2.774.314**	**11.622.527**

In practice, however, farmers in the research area do not incur actual land rental expenses. Therefore, an alternative profit calculation excluding land rent was conducted, as shown in Table 19. The results indicate a positive profit, with an average income of IDR 2.774.314 per land area per Month and is IDR 11.622.527 per hectare per Month. Detailed calculations are provided in Appendix 39.

The comparison between the two profit scenarios demonstrates that land rent is a significant cost component affecting the profitability of the Jaya Mandiri PIK farmers' cultivation. When imputed land rent is included, total production costs exceed total revenue, resulting in a slight financial loss. In contrast, under the current rent-free arrangement, the cultivation remains profitable. These findings indicate that farmers' profits are highly dependent on continued access to rent-free land, reflecting the farming system's reliance on insecure land access. These findings highlight the critical role of rent-free land in sustaining urban vegetable farming in the study area and demonstrate that any changes in land tenure or land-use policies, particularly the introduction of land rental costs, could substantially reduce profitability and threaten the economic viability of the farming system.

g. R/C ratio

The revenue-cost (R/C) ratio is a commonly used indicator used to assess the economic feasibility of farming activities by comparing total revenue (R) with total production cost (C). In this study, the R/C ratio analysis was conducted under two scenarios: (1) excluding land rent and (2) including imputed land rent, in order to reflect both standard economic valuation and actual farming conditions faced by Jaya Mandiri PIK farmers.

The total revenue obtained by farmers amounts to IDR6.586.000 per land area per Month, while total production costs by excluding land rent is IDR3.811.686. Based on these values, the resulting R/C ratio is 1,73 (Table 20). An R/C ratio greater than one indicates that the farming activity is economically feasible.

Table 20. Farm Business of the Jaya Mandiri PIK farmer group in the period of July 2025 excluding Land Rent.

Item			**Rp/Land area/Crop Cycle**	**Rp/Ha/CC**	**%**
Total Revenue	A	**A**	**6.586.000**	**29.466.579**	
Cash Cost					
Seeds costs			1.182.900	5.306.895	29,7
Non-Fam Labor Costs			297.143	1.126.334	6,31
Fertilizer Costs			247.850	1.095.275	6,14
Pesticides Costs			37.995	165.606	0,93
Fuel Costs			471.250	2.000.546	11,21
Total Cash Cost	B	**B**	**2.237.138**	**9.694.656**	**54,33**
Total Income	A-B	**C**	**4.348.862**	**19.771.922**	
Non-Cash Cost					
Family Labor			1.165.714	6.294.183	35,27
Depreciation Cost			389.870	1.766.436	9,90
Capital Interest			18.964	88.776	0,50
Total Non-Cash Cost	D	**D**	**1.574.548**	**8.149.396**	**45,67**
Total Cost	B+D	**E**	**3.811.686**	**17.844.052**	**100**
Profit	A-E	**F**	**2.774.314**	**11.622.527**	
R/C ratio	A/E	**G**	**1,73**		

Under this cost structure, farmers generate a positive profit of IDR 2.774.314 per Month, and generate R/C ratio of 1,73, indicating that the farming activity becomes economically feasible. This implies that every IDR1.00 of production cost generates IDR1.73 in revenue, yielding a net return of IDR0.73. Therefore, vegetable farming conducted by Jaya Mandiri PIK farmers is financially viable under current conditions where no land rent is charged.

However, although the cultivated land used by Jaya Mandiri PIK farmers is government-owned idle land that is temporarily allocated to support urban food production, and no actual rental payments are incurred. An alternative analysis that including land rent was conducted to evaluate a potential future scenario in which the government imposes rental charges on farmers.

In the second scenario, within the same amount of revenue and after including imputed land rent, total production costs increased into the amount of IDR 6.599.872. The estimated land rent cost was calculated based on the net benefit obtained under the first scenario (excluding land rent), representing the maximum economic surplus generated from farming activities. Consequently, the inclusion of land rent absorbs nearly all the profit previously earned by farmers.

Table 21. Farm Business Analysis of Jaya Mandiri PIK farmer Group in the period July 2025 with Land Rent.

Item			Rp/Land area/Crop Cycle	Rp/Ha/CC	%
Total Revenue	A	**A**	**6.586.000**	**29.466.579**	
Cash Cost					
Seeds costs			1.182.900	5.306.895	17,97
Non-Fam Labor Costs			297.143	1.126.334	3,81
Fertilizer Costs			247.850	1.095.275	3,71
Pesticides Costs			37.995	165.606	0,56
Fuel Costs			471.250	2.000.546	6,78
Total Cash Cost	B	**B**	**2.237.138**	**9.694.656**	**32,84**
Total Income	A-B	**C**	**4.348.862**	**19.771.922**	
Non-Cash Cost					
Family Labor			1.165.714	6.294.183	21,32
Depreciation Cost			389.870	1.766.436	5,98
Capital Interest			32.835	146.889	0,005
Land Rent			**2.774.314**	**11.622.527**	**39,37**
Total Non-Cash Cost	D	**D**	**4.362.734**	**19.830.035**	**67,16**
Total Cost	B+D	**E**	**6.599.872**	**29.524.691**	**100**
Profit	A-E	**F**	**-13.872**	**-58.113**	
R/C ratio	A/E	**G**	**0,998**		

The resulting R/C ratio is 0,998 ≈1,00, which indicates a break-even condition, where total revenue is only sufficient to cover production costs without generating meaningful profit. The slight value below one suggests that farming would become economically unfeasible if farmers were required to bear land rent equivalent to its estimated opportunity cost.

The comparison between the two scenarios demonstrates that land access is the key factor determining the financial feasibility of the Jaya Mandiri PIK farming system. This substantial difference suggests that the profitability of the farming

system is not primarily constrained by production efficiency, but by the high economic value of urban land. Under the existing arrangement, farmers are able to obtain positive returns because they cultivate government-owned idle land without paying rent. However, once land is valued as an economic production factor, nearly all farm profit is absorbed by land costs, reducing the R/C ratio from 1.73 to 0.998. These findings indicate that the economic sustainability of the farming system depends heavily on continued access to rent-free land.

Moreover, compared with the previous study by Normansyah et al. (2013), the cost structure in this study exhibits a markedly different composition. In the rural farming system, production costs were dominated by cash expenditures, particularly hired labor, indicating that operational inputs were the primary cost drivers. In contrast, the urban farming system by Jaya Mandiri PIK was characterized by the dominance of non-cash costs, mainly imputed land rent, followed by family labor. The high proportion of imputed land rent reflects the substantial opportunity cost of urban land, despite farmers cultivating the land without paying actual rent. Moreover, the large share of family labor indicates that farming activities rely heavily on household labor to minimize cash expenditures. If family labor were substituted with hired labor, production costs would increase considerably, further reducing farm profitability. These findings suggest that the financial feasibility of urban agriculture depends not only on continued access to rent-free land but also on the availability of family labor. Therefore, unlike rural farming where operational inputs primarily determine production costs, the sustainability of urban farming is strongly influenced by access to low-cost production resources, particularly land and household labor.

Although farming remains financially feasible under the existing cost structure, the resulting income is relatively modest. The average monthly profit of IDR 2,774,314 represents only 51.4% of Jakarta's Provincial Minimum Wage (UMP) in 2025, indicating that the income generated from farming alone is insufficient to meet the economic demands of urban households. Therefore, vegetable farming in Jaya Mandiri PIK functions primarily as a subsistence or supplementary livelihood rather than a sufficient primary source of household income. Consequently, farmers

remain economically vulnerable despite the positive financial performance achieved under current conditions.

This vulnerability is further intensified by institutional uncertainty. Besides depending on rent-free access to land, farmers cultivate the area without formal long-term land tenure agreements. Based on information obtained from the area management authority (UPK PPUKMP Pulogadung), the site has been planned for future development as an eco-tourism area should suitable investors become available. Such land-use changes could eventually terminate existing farming activities and eliminate an important source of supplementary income for local farmers. Therefore, the sustainability of the farming system depends not only on its financial feasibility but also on institutional arrangements that provide greater certainty over future land use.

Despite these limitations, the Jaya Mandiri PIK farming system generates benefits beyond financial returns. It contributes to local urban food availability, maintains productive green open space within an industrial urban area, creates employment opportunities, and promotes the productive utilization of idle government land. These broader socio-economic and environmental contributions suggest that the value of urban agriculture should not be assessed solely through profitability indicators but also through its broader contribution to urban sustainability and community welfare.

Considering these multiple benefits, maintaining the current non-rent land access arrangement would be more beneficial than introducing land rental charges that could undermine farm feasibility and threaten farmers' livelihoods. Therefore, a formal collaboration between UPK PPUKMP Pulogadung and the Jaya Mandiri PIK farmer group should be strengthened to provide greater certainty of land use while supporting the area's function as green open space. If the planned eco-tourism development is implemented in the future, the existing farmer group should be integrated into the development through agro-ecotourism, educational farming, and other community-based urban agriculture activities. Such a collaborative approach would not only preserve farmers' livelihoods but also enhance the multifunctional value of the area by combining food production, environmental conservation, education, and recreation.

At the same time, farmers also need to strengthen their adaptive capacity. Given that the current farming activities rely on temporary access to government-owned land without formal long-term tenure, this arrangement should be viewed as a valuable but uncertain opportunity rather than a permanent production asset. Farmers are therefore encouraged to gradually reduce their dependence on insecure land access by diversifying their income sources, improving production efficiency, and actively participating in collaborative programs such as agro-ecotourism, educational farming, and value-added agricultural enterprises. These adaptation strategies would increase farmers' resilience to future land-use changes while ensuring that urban agriculture continues to provide economic, social, and environmental benefits even under changing development policies.

Moreover, it should be noted that these findings are conditional and may vary according to seasonal conditions, production levels, input prices, and market fluctuations. Furthermore, the present analysis only includes the major commodities cultivated during the July 2025 production period. Future research may examine seasonal variations in farm income and evaluate alternative urban agriculture development models that strengthen both farmers' economic resilience and the long-term sustainability of urban farming systems.