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Comparative Analysis of Paddy and *Genjer* Farming Incomes and Their Benchmarking Against the Minimum Wage in Mekar Sari Village, Southeast Sulawesi

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A B S T R A C T

This study analyzes the income differences between rice paddy farming and *genjer* (*Limnocharis flava*) cultivation in Mekar Sari Village, Palangga sub-district, South Konawe Regency (Indonesia), and examines these incomes relative to the district's minimum wage. A survey of 20 wetland paddy farmers and eight *genjer* farmers was conducted. Farming costs, revenues, and net incomes were calculated per hectare over one year. An independent samples *t*-test was used to assess the significance of income differences, and farm incomes were compared to the 2024 South Konawe minimum wage (Upah Minimum Kabupaten, UMK) as a welfare benchmark. Results show that average net income from *genjer* farming far exceeded that from paddy farming, approximately Rp165.3 million versus Rp21.3 million per hectare per year. This difference was statistically significant. *Genjer* farmers earned about 2.03 times the local UMK, indicating a substantially better economic welfare level, whereas paddy farmers' earnings were only about 36% of the UMK, which is insufficient for a decent living standard. The higher *genjer* income is attributed to more frequent harvest cycles, higher market prices, and intensive cultivation despite greater input costs. These findings highlight the potential of crop diversification into high-value vegetables like *genjer* to improve rural livelihoods, and suggest that supporting such diversification could enhance smallholders' income and economic resilience.

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INTRODUCTION

Agriculture remains a critical sector for livelihoods in Indonesia, yet many farm households struggle with low income levels and poverty. Roughly 43% of Indonesia's population lives in rural areas, and nearly 29% of the workforce is employed in agriculture (World Bank, 2020, 2022). Most of these are smallholder farmers with limited land; around half of Indonesian farmers cultivate less than one hectare and earn on average only about US$3.20 per day (World Bank, 2022). This equates to roughly Rp45,000 per day, underscoring that many farming families live on modest earnings. Indeed, national surveys indicate that the average income of informal agricultural workers is just about Rp1.4 million per month, roughly half of Indonesia's average provincial minimum wage (Rizqiyah, 2023). Such earnings are not much above the national poverty line, and nearly half of households classified as poor are engaged in the primary agricultural sector (Moeis et al., 2020). These statistics highlight a persistent reality: small-scale farmers, especially rice farmers, often cannot attain an income level comparable to formal-sector wages (KumparanBISNIS, 2024). Vice President Jusuf Kalla even remarked that in 2019, the lowest regional minimum wage was about three times higher than the income of a diligent farmer (CNN Indonesia, 2019). The low profitability of staple crop farming has been identified as a key reason younger generations are reluctant to remain in agriculture, perceiving it as a low-wage, high-risk occupation (Geo & Saediman, 2019; Ngadi et al., 2023; Saediman, Indarsyih, et al., 2021). Addressing this income challenge is crucial for improving rural welfare and achieving sustainable development goals in Indonesia (Purnawan et al., 2022; World Bank, 2020).

Rice paddy (*Oryza sativa*) is Indonesia's main staple crop (Saediman, Aisa, et al., 2019; Saediman, Limi, et al., 2021) and occupies the largest share of cultivated land. It is culturally and economically important, yet small paddy farmers typically earn meager returns (Saediman, Mustika, et al., 2019; Saediman, Astuti, et al., 2021; Saediman, Indarsyih, et al., 2021). Studies across various regions consistently show that net incomes from traditional paddy farming are low. For example, an analysis in Gorontalo province found that rice farmers with an average farm size of 0.64 ha earned only about Rp3.94 million in net income per crop cycle (Bakari, 2019). Even with two cropping seasons, their annual income (Rp7.9 million) remained far below local living wage standards, forcing farmers to seek supplemental off-farm income to meet basic needs (Bakari, 2019). Similarly, a survey in Central Java (Banyumas) reported paddy's benefit–cost ratio and profit margins were modest compared to certain vegetables, despite comparable yields, due to the low farmgate price of rice (Aprilia et al., 2021).

Rice's status as a controlled staple with price caps can limit farmers' profitability. In contrast, horticultural crops often command higher market prices, offering an opportunity for better earnings (Aprilia et al., 2021; Saediman, Indarsyih, et al., 2021). Researchers have found that switching part of the cropping pattern to high-value vegetables can dramatically increase smallholder incomes (Srinivasan, 2025). For instance, vegetable cultivation in

parts of Cambodia and Vietnam yielded profits per hectare that were 3–14 times higher than rice cultivation, with labor productivity roughly double that of rice farming (Srinivasan, 2025). Vegetables are generally more labor- and input-intensive, but they can be harvested multiple times a year and sold at premium prices, which boosts total revenue (Srinivasan, 2025). This income advantage has also been documented in Indonesia. Aprilia et al. (2021) compared paddy with water spinach and a local flower vegetable in West Java and found that, on the same land area, the vegetable enterprises generated significantly greater net income due to higher unit prices, even though variable costs were also higher (Aprilia et al., 2021). Nugroho et al. (2020) similarly reported that farming water spinach yielded a higher profit than rice in a comparative study in Banyumas. These findings are consistent with the general trend that diversification into horticulture can alleviate rural poverty by raising farm incomes (Srinivasan, 2025; World Bank, 2020).

One such promising high-value crop is *genjer* (Limnocharis flava), known commonly as yellow bur-head. *Genjer* is an aquatic leafy vegetable native to Latin America that has become part of local cuisine in Southeast Asia (Assauwab et al., 2023). It grows well in wetland environments similar to rice paddies, often considered a wild swamp weed, but its young leaves and flower buds are edible and sold in markets. Nutritionally, *genjer* is rich in protein, vitamins, and minerals (Assauwab et al., 2023). In Indonesia, *genjer* has traditionally been foraged, but in recent years, some farmers have begun cultivating it intentionally due to rising demand and attractive prices (Assauwab et al., 2023). The plant's biology allows for continuous harvest; farmers can cut *genjer* leaves repeatedly (weekly or biweekly) throughout the year. This rapid biomass production, coupled with stable market prices for *genjer* bundles, means that revenue per hectare can greatly exceed that of rice. Case studies have shown *genjer* cultivation to be highly profitable under the right conditions. For example, Assauwab et al. (2023) report that *genjer* farmers in Southeast Aceh province could earn around Rp619,600 per month on average. Although that figure is modest (likely reflecting small-scale operations), other observations suggest that more intensive *genjer* farming on larger plots yields much higher incomes. Notably, *genjer* grown in fertile, intensively managed plots has variable costs that can exceed Rp100 million/ha/year, yet it also generates correspondingly high revenues and profits. Such high input costs were more than offset by the substantial revenues, making those ventures lucrative. Thus, while *genjer* farming demands more labor, fertilizers, and careful water management than rice, it presents an opportunity for enterprising farmers to dramatically improve their earnings.

The concept of comparing farm income to a minimum wage benchmark is employed in this study as a measure of livelihood adequacy. In Indonesia, minimum wages are set by provincial and district governments to represent the minimum monthly pay for formal workers needed to meet basic living expenses (Asryani et al., 2025). For South Konawe Regency in 2024, the official UMK (district minimum wage) was Rp2,885,964 per month (approximately US$190). It should be noted that minimum wage regulations legally apply only

to formal sector employees (e.g., factory or plantation workers) and do not cover self-employed farmers (Wicaksono & Suman, 2015; World Bank, 2020). Nevertheless, the minimum wage provides a useful reference point for assessing farm incomes in terms of welfare. If a farming household's earnings are well below what an urban unskilled worker would earn at minimum wage, it suggests the household may struggle to attain a decent standard of living. Using the UMK as a benchmark can thus highlight the income disparity and potential welfare gap faced by smallholders (Asryani et al., 2025). In recent years, Indonesia's minimum wages have risen faster than farmgate prices, widening the rural-urban income gap (World Bank, 2020). This study explicitly uses the South Konawe UMK as a yardstick to evaluate whether local paddy and *genjer* farmers are achieving "living incomes." Comparisons of farm income to UMK have been applied in other research at least informally (Asryani et al., 2025). For instance, Wicaksono & Suman (2015) noted whether different-sized rice farms in East Java earned above or below the regional minimum wage, finding that only farmers with larger landholdings met or exceeded that threshold. By benchmarking incomes against the UMK, we can infer the relative welfare level: an income equal to or above the UMK suggests the farming enterprise provides a livelihood at least on par with the expected minimum standard for labor, whereas an income far below the UMK indicates potential economic vulnerability of the farm household (Asryani et al., 2025).

Based on the above context, this study focuses on a village case study to quantify and compare incomes from paddy and *genjer* farming and to relate those incomes to the prevailing minimum wage. The specific objectives are: (1) to determine the average income (net profit) per hectare from wetland paddy cultivation and from *genjer* cultivation in the study area; (2) to analyze whether there is a statistically significant difference between the incomes obtained from paddy versus *genjer* farming; and (3) to compare these farming incomes with the South Konawe UMK 2024, evaluating how each type of farming performs relative to a basic decent income standard.

LITERATURE REVIEW

Farm Income and Rural Welfare

Rural poverty in Indonesia is closely linked to the low income of smallholder farmers. Over 50% of the rural labor force is engaged in agriculture, so raising agricultural incomes is a critical pathway to reducing rural poverty (World Bank, 2020). Yet, farm incomes have lagged. A World Bank analysis noted that since 2007, real incomes of rural farm workers outside the main islands have essentially stagnated, increasing by only 15% over a decade, whereas wages in more urbanized regions (Java-Bali) rose by over 60% (World Bank, 2020). This disparity reflects structural issues: small farmers are often trapped in low-return activities, facing constraints such as tiny landholding size, limited market access, and price volatility for their products (Purnawan et al., 2022; World Bank, 2020). Most Indonesian rice farmers are classified as "small family farms," typically cultivating less than 0.5 ha of paddy land. Such fragmentation severely limits their production volume and income potential (Purnawan et al., 2022). Indeed, national statistics in 2023 showed that the

average net income of informal workers in the agriculture sector was approximately Rp1.0–1.4 million per month, the lowest of all sectors and only 50% of the average provincial minimum wage (Rizqiyah, 2023). These low earnings explain why rural poverty rates, while improved over past decades, remain higher than urban poverty rates. In August 2022, nearly half of Indonesian households living below the poverty line derived their primary income from the agriculture sector (Moeis et al., 2020).

Multiple studies underscore that typical incomes from rice farming fall short of providing a decent living. A study in West Java (Indramayu) found net incomes from 1 ha of rice were insufficient to meet a family's basic needs, with many rice farmers earning below the local minimum wage level (Ambarsari et al., 2014). Research by Bakari (2019) in Gorontalo (Sulawesi) showed the average rice farming income of only Rp3.93 million per farmer per year (for 0.64 ha land), which the author as "still very low". At that level, farmers would be making around Rp330,000 per month, far below the official poverty threshold. Such findings reinforce the argument that small rice farmers remain economically marginalized and often must rely on secondary occupations or remittances. The concept of the "farmer exchange rate" (*Nilai Tukar Petani*, NTP) published by Statistics Indonesia also reflects this reality. It often hovers around 100, meaning farmers' production revenues barely cover their household and production costs. Low farm income has broader implications: it discourages youth from farming, leads to aging farmer populations, and can perpetuate a cycle of underinvestment in farm productivity (Ngadi et al., 2023). Ngadi et al. (2023) observe that agriculture's low financial returns and high uncertainty make it unattractive to young workers, contributing to rural-to-urban migration and an aging rural workforce. They note that for rural youth, farm jobs are often the "last choice" due to the perception (and reality) of low wages and risk (Ngadi et al., 2023). In summary, the literature clearly indicates that improving smallholder incomes is vital for uplifting rural welfare. As the World Bank's rural poverty report argues, enhancing agricultural incomes, whether via yield improvements or higher-value activities, is an obvious route to reduce poverty since over half of rural workers depend on farming (World Bank, 2020).

Comparative Profitability of Crops: Staples vs. High-Value Vegetables

One widely recommended strategy for improving smallholder income is crop diversification, particularly introducing higher-value crops into predominantly staple-crop systems (Alam et al., 2022; de Jager et al., 2023; Srinivasan, 2025; Vial et al., 2020). Numerous case studies in Indonesia and elsewhere demonstrate the income benefits of switching from or complementing staples like rice with horticultural or cash crops (Geo & Saediman, 2019; Saediman, Astuti, et al., 2021; Saediman, Indarsyih, et al., 2021; Sarmia et al., 2024). Srinivasan (2025) provides a broad overview, noting that while small-scale rice farming yields low returns (only around USD 200–600 per hectare per season in many cases), integrating vegetables or legumes can dramatically raise profitability. Vegetables often have farm-gate prices several times higher than rice per kilogram. In addition, many vegetables (especially leafy greens or fruit vegetables) can be harvested multiple times a year,

enabling a much higher annual cropping index. According to Srinivasan's review, vegetable production in Cambodia and Vietnam resulted in 3–14 times higher profit per hectare than rice farming, and also generated at least twice the earnings per labor-day, despite requiring more labor inputs. One reason is that vegetables like tomatoes, leafy greens, or beans achieve yields (in mass and value) that far exceed a single annual bulk harvest of grain. For instance, a vegetable like chili or eggplant might produce continuously over a 3-4 month period; when improved practices are used, such vegetable crop yields can be 200–350% higher (in value terms) compared to the baseline cereal crop it replaces (Srinivasan, 2025).

Indonesian studies echo these findings. Aprilia et al. (2021) performed a cost and income comparison of paddy versus two vegetable commodities, namely *kangkung* (water spinach) and *bunga kingkong* (a type of edible flower), in Cirebon, West Java. They found that on an equal land area (100 m² plots), the highest net income was obtained from *bunga kingkong*, followed by *kangkung*, with paddy last (Aprilia et al., 2021). While production quantities (in kg) were similar across those crops, the selling price per kg of *bunga kingkong* was much greater than that of rice or *kangkung*, leading to superior profits (Aprilia et al., 2021). These results align with the general notion that market price is a key differentiator, where vegetables and specialty crops often simply sell for more money than staple grains (Aprilia et al., 2021). However, it is also noted that vegetables entail higher input costs (seeds, fertilizers, labor) and risks (price fluctuations, perishability). This implies that without proper management and sufficient capital, diversification might be challenging for some farmers. Yet, even accounting for the cost increase, the net margins tend to favor the vegetables. For example, an economic analysis in Bengkulu, Sumatra, found that introducing an irrigated *kangkung* crop in the dry season after rice increased farmers' profits by ~35.8% compared to rice alone (Putra et al., 2017). The *kangkung* cropping had higher production costs but still achieved a better return, as evidenced by an R/C (revenue-cost) ratio that was 38.9% higher than that of rice (Putra et al., 2017). Diversification can also mitigate risk by spreading income across different products and times of year, which is important given the seasonality of rice (long fallow or waiting periods between rice harvests) (Ngadi et al., 2023).

Within the Indonesian context, *genjer* stands out as a high-value leafy vegetable that can be grown in similar conditions to paddy. *Genjer* is often found in waterlogged fields and bunds where rice is also grown, making it a convenient complementary or rotational crop. Traditional knowledge treated *genjer* as a subsistence or wild vegetable, but emerging market demand (especially in certain Javanese and Sundanese cuisines) has commercialized it. A recent study by Assauwab et al. (2023) in Aceh reported that although *genjer* was not yet widely cultivated there, it showed *promising potential* to increase community income. They noted that in observed areas, *genjer* farmers harvested on average 58–156 bundles per week, with prices ranging from Rp993 to Rp1,560 per bundle. Even at those modest prices, the continuous weekly harvests provided a steady income stream. However, the Aceh *genjer*

cultivation remained traditional and not optimized, in which farmers paid little attention to soil fertility or proper agronomic practices, focusing only on cleaning wild stands and harvesting. As a result, their yields and incomes (around Rp619 thousand per month) were limited (Assauwab et al., 2023). In contrast, in places where farmers cultivate *genjer* more professionally with fertilization and pest management, yields are much higher. The present study's region (Southeast Sulawesi) is one such place where *genjer* farming has become more intensive and profitable. Local extension reports suggest that *genjer* has a fast growth cycle (it can be harvested about every 2 weeks) and strong market demand, enabling farmers to earn millions of rupiah each month. This makes *genjer* an intriguing case of a non-traditional crop providing livelihood benefits.

Minimum Wage and Living Income Benchmarks

The use of minimum wage as a comparative benchmark for farm income is found in several studies and discussions, though it is not a standard indicator in academic literature. Essentially, it serves as a proxy for a "living wage," namely, the minimum income needed for a worker to afford basic needs (Loughrey et al., 2021). Indonesia's minimum wage policy is set through government regulation (e.g., Government Regulation No. 36 of 2021 on wages), which defines how provincial (UMP) and district (UMK) minimum wages are calculated based on economic growth and cost of living indices. Minimum wages are intended to protect workers in formal employment (Asryani et al., 2025). Farmers, being mostly self-employed, are not legally entitled to a fixed wage, but the concept can be extended to them analytically. If a farm household's net income falls below the annualized minimum wage, it implies that their farming business does not yield an income equivalent to the lowest legal wage for labor (Asryani et al., 2025). Several Indonesian researchers have implicitly used this comparison. Wicaksono & Suman (2015) in East Java categorized rice farmers were categorized by land size and noted what percentage of them earned above the UMR (regional minimum wage), finding that only those with 1 ha or more tended to surpass the UMR income. Another study in Bengkulu evaluating rice farm feasibility highlighted that average farm income per season was above the provincial UMP of Rp2.67 million (per month) in their study location (Pirngadi et al., 2023). This was an exceptional case where yields or prices were high enough that rice farming was actually yielding a decent living. But such cases are the exception rather than the norm. More common is the finding that small farmers operate below minimum wage levels. Analysis of BPS data noted that even the average *formal* agricultural wage (for plantation or agri-company workers) was about Rp2 million/month, which is below many provinces' minimum wage (Rizqiyah, 2023). Informal farm earnings are lower still.

Using the minimum wage as a welfare yardstick has some limitations, as it does not account for non-cash farm outputs and regional variation in living costs. However, it is a clear-cut, policy-relevant benchmark easily understood by stakeholders. If farming cannot earn as much as a basic unskilled job in a city, it raises questions about the sustainability of such livelihoods. It also relates to the concept of a living income for farmers, which has gained attention

in sustainable agriculture discourse. A living income is the net annual income needed for a household in a particular place to afford a decent standard of living. While our study does not calculate a living income, the UMK can be viewed as a rough lower-bound of it (since UMK itself is based on a decent living needs index) (Asryani et al., 2025). Therefore, this literature review suggests that comparing farm incomes to UMK is a meaningful exercise to gauge relative welfare. It provides an accessible indicator to policymakers. For instance, if farmers earn only 30% of UMK, targeted interventions may be needed to raise their earnings, or alternative employment might be necessary to escape poverty.

METHODOLOGY

Study Area and Respondents

The study was conducted in Mekar Sari Village, located in Palangga sub-district of South Konawe Regency, Southeast Sulawesi, Indonesia. Mekar Sari is a rural village with an agrarian economy; most residents engage in farming as their primary livelihood. The village has wet tropical climate conditions suitable for paddy rice cultivation, typically with two cropping seasons per year under rainfed and supplemental irrigation conditions. In recent years, a portion of farmers in Mekar Sari began cultivating *genjer* (an aquatic vegetable) in some of the village's lowland plots. For this research, Mekar Sari provides a case where both paddy farming and *genjer* farming are practiced contemporaneously, allowing for a direct income comparison under similar agro-ecological conditions.

The target population consisted of all paddy farmers and *genjer* farmers in the village. According to village records and agricultural extension data, there were approximately 110 farming households in Mekar Sari engaged in either or both of these crops. Specifically, about 102 households cultivated wetland paddy, and 8 households were actively farming *genjer*. For sampling, a stratified approach was taken by crop type. From the 102 paddy farmers, a random sample of 20 farmers (approximately 20%) was selected to represent paddy farming income. All 8 identified *genjer* farmers were included in the study (census sampling for the *genjer* group) due to their small number. Thus, the study involved 20 paddy farmers and 8 *genjer* farmers, for a total of 28 respondents.

Data Collection

Data were collected through a structured survey and interviews during the 2023 farming year. Each respondent was asked to provide detailed information about their farming activities for the most recent full year (covering all cropping cycles in that year). The survey gathered:

- **Land area** under cultivation (hectares) for the crop in question (paddy or *genjer*).
- **Production and Yield:** For paddy, farmers reported the total rice production (usually in kilograms of unmilled dry paddy, GKP/GKG) harvested in the year. For *genjer*, because harvesting is continuous, production was quantified as the total weight of *genjer* harvested over the year (in kilograms). Farmers typically sell *genjer* in bundles; we

standardized the data by recording approximate weight per bundle and multiplying by the number of bundles sold annually.

- **Revenue (Gross Income):** The total income from selling the crop over the year was recorded in Indonesian Rupiah (Rp). This was calculated as output sold times the selling price. Paddy farmers sell either unmilled paddy or rice; their revenue was computed accordingly (including any harvest kept for household consumption valued at market price, to measure full income). *Genjer* farmers provided the price per bundle and how many bundles (or kilograms) they sold each harvest and how many harvests in the year, which we aggregated.
- **Costs:** We divided costs into variable costs (costs that vary with production volume, such as seeds/seedlings, fertilizers, pesticides, hired labor, transport, etc.) and fixed costs (costs that do not depend on output in the short term, such as equipment depreciation, land rent if any, irrigation fees, etc.).

From these data, we computed net farm income for each respondent as:

$$\textbf{Net Income} = \textbf{Total Revenue} - (\textbf{Variable Costs} + \textbf{Fixed Costs})$$

Net income represents the return to the farmer's labor, land, and management after paying all cash costs. All monetary values were standardized to a per-year basis. If a paddy farmer harvested twice, revenues and costs of both seasons were summed for the year. For *genjer*, which has many small harvests, all were summed for the year.

To ensure accuracy, farm record books (if available) were consulted, and local price data were cross-checked with the village agricultural extension officer. The 2024 UMK for South Konawe (Rp2,885,964 per month) was obtained from the official provincial decree and labor department information. For comparison purposes, this monthly wage was multiplied by 12 to yield an annual figure of Rp34,631,568 per year. We also considered the monthly equivalent income of each farmer by dividing their annual net income by 12, to compare directly with the monthly UMK.

Data Analysis

Descriptive statistics were used to summarize the characteristics of paddy versus *genjer* farming. We calculated the mean values of landholding, production, gross revenue, cost components, and net income for each farming type. These averages were then compared. In addition, we computed the ratio of each farmer's income to the UMK (annual basis) and particularly noted the average income as a multiple of the UMK for each group.

To address the first objective (average incomes), results are presented in tabular form showing the mean outcomes for paddy and *genjer* farms. To fulfill the second objective (income difference significance), we employed an independent samples *t*-test. Before the test, a Shapiro-Wilk test for normality was conducted on the income data of each group, and Levene's test was used to check homogeneity of variance. The incomes (Rp/year) data were somewhat skewed given the small sample and large differences, but for the test, we proceeded with log-transformation to ensure approximate normality, then tested for differences in means. We set the significance level at 0.05 (95%

confidence). The null hypothesis H0 was that the *mean income of paddy farmers* = *the mean income of genjer farmers*, and the alternative H1 was that they differ (two-tailed).

For the third objective (comparison with minimum wage), we did not use a formal statistical test, but rather a benchmarking analysis. We calculated each group's Income/UMK ratio. For example, if a paddy farmer earned Rp12 million in a year, dividing by Rp34.63 million (annual UMK) gives 0.35 or 35%. An average ratio for each farming type was obtained. We then interpreted these ratios in terms of the ability to meet a "decent living standard." In addition, we counted how many farmers in each group had incomes above the UMK vs. below it.

RESULT AND DISCUSSION

Farm Characteristics

The surveyed paddy farmers had an average rice field size of 0.63 hectares, whereas *genjer* farmers on average cultivated 0.40 hectares of *genjer*. On the surface, the *genjer* farmers operated slightly smaller plots. However, those *genjer* plots were intensively cropped throughout the year. Paddy farmers typically obtained two harvests per year from their land (some with a short-season variety or leaving one season fallow), yielding an average annual production of about 4,227 kg of unmilled rice (GKP) per farmer. In contrast, *genjer* farmers harvested repeatedly; cumulatively, they produced about 12,375 kg of *genjer* (fresh weight) per farmer annually. Table 1 summarizes the key comparative figures for paddy and *genjer* farming in the village.

From Table 1, we observe that the average net income of *genjer* farmers was over 3.3 times higher than that of paddy farmers on a per-year basis. Paddy farmers earned about Rp21.3 million net per hectare per year (which, given their average 0.63 ha, translated to Rp12.56 million net income per farmer annually, or Rp1.05 million per month). Meanwhile, *genjer* farmers earned about Rp165.3 million net per hectare, and with an average of 0.40 ha, this gave Rp70.23 million per farmer per year, equivalent to Rp5.85 million per month. This is a striking disparity. In other words, one hectare of *genjer* cultivation yielded as much net profit as roughly 7.8 hectares of paddy (since 165.3 / 21.3 = 7.76). Even when accounting for different land sizes, the typical *genjer* farmer in the village made about 5.6 times the income of a typical paddy farmer in absolute terms

Table 1. Average Land, Production, Income, and Wage Comparison for Paddy Vs. *Genjer* Farming (2023)

Item	**Paddy Farming**	**Genjer Farming**
Average Land Area (ha)	0.63 ha	0.40 ha
Annual Production (total yield)	4,227 kg of paddy	12,375 kg of *genjer* leaves
Gross Income (Rp/year)	Rp 36,638,793	Rp 227,615,625
Total Cost (Rp/year)	Rp 15,336,178	Rp 157,386,219
– Variable Costs	Rp 14.832 million	Rp 154.946 million

– Fixed Costs	Rp 0.504 million	Rp 2.440 million
Net Income (Rp/year)	Rp 21,302,615	Rp 70,229,406
Net Income (Rp/month)	Rp 1,046,600	Rp 5,852,451
Income relative to UMK (2024 UMK = Rp2,885,964/month)	0.36 × UMK (36%)	2.03 × UMK (203%)

(Source: survey data. Costs include both cash expenses and imputed values; net income is profit. UMK = district minimum wage.)

It is worth noting the cost structure behind these figures. *Genjer* farming was far more input-intensive and costly than paddy farming. The average total production cost for *genjer* (Rp 157.4 million/yr) was an order of magnitude greater than that for paddy (Rp 15.3 million/yr). Specifically, *genjer* farmers spent heavy on variable inputs: fertilizers (both chemical and organic), frequent harvesting labor, and marketing/transport. *Genjer* variable costs averaged Rp155 million, which is nearly 10 times the paddy farmers' Rp14.8 million. Fixed costs were relatively minor for both, but *genjer* farmers did report slightly higher fixed costs. Despite the massive cost difference, the revenue from *genjer* (Rp 227.6 million/yr) was so high that it more than paid for these costs, leaving a handsome profit. The profit margin for *genjer* was about 30.8%, whereas for paddy it was about 58.1%. Thus, paddy farming had a higher percentage margin (because costs are low), but the absolute profit was low; *genjer* had a lower margin percentage because costs took nearly 70% of revenue, yet the absolute profit was very high. This reflects a high-input, high-output system for *genjer*. Farmers essentially traded higher expenses for much greater income, which is a feasible strategy if one has capital or credit to invest in inputs. In Mekar Sari, many *genjer* farmers operated almost like agribusiness entrepreneurs, intensively managing their plots, while paddy farmers often followed more traditional practices with minimal inputs.

Statistical Test of Income Difference

The difference in mean net incomes between paddy and *genjer* farmers was tested with an independent *t*-test. The test confirmed that the difference is highly significant. Using log-transformed income to address skewness, the *t*-test gave $t = -12.678$ with $df \approx 26$ and a *p*-value of <0.0001. Thus, we reject the null hypothesis of equal means. In plain terms, *genjer* farming yields significantly higher income than paddy farming in this village. The negative *t* value indicates the paddy mean is lower than the *genjer* mean. This statistical outcome was expected given the magnitude of difference observed. This finding aligns with other comparative studies wherein switching to vegetables or cash crops led to statistically significant income gains (Aprilia et al., 2021). Our result here strengthens the case that *genjer* cultivation, in the conditions of Mekar Sari, is a much more lucrative venture than traditional rice cultivation.

Income vs. Minimum Wage Benchmark

Perhaps the most telling result is how each type of farming fared relative to the district minimum wage (UMK). As shown in Table 1, the average paddy farmer's monthly income (Rp1.05 million) was only 36% of the UMK. In other words, paddy farming on 0.6 ha provided roughly a third of the income that a

formal minimum-wage job would pay. This indicates that a paddy farmer would need roughly three times their current land or yields, or a tripling of rice price to reach an income equivalent to even the lowest legally acceptable wage for labor. This finding resonates with statements by Indonesian officials. For instance, Jusuf Kalla's remark that even the hardest-working farmers earn only a fraction of what an urban laborer earns (CNN Indonesia, 2019). Our data put that fraction at about one-third in this locale, which is within the range observed nationally. This has serious implications: a farming family relying only on paddy income at this level likely falls below a decent living standard, potentially struggling to afford education, healthcare, and other needs. Indeed, many of the paddy farmers in Mekar Sari supplemented their income by working as farm laborers for larger landowners or by other side jobs. The result underscores a common scenario in rural Indonesia: subsistence-level rice farming that does not provide a living wage, contributing to persistent rural poverty (Kumparan BISNIS, 2024).

On the other hand, *genjer* farming in Mekar Sari presented a stark contrast. The average *genjer* farmer's monthly income (Rp5.85 million) was 203% of the UMK, meaning more than double the minimum wage. Even the lowest-earning *genjer* farmer among the 8 had an income above 1× UMK, and half of them earned well above 2× UMK. Earning over two times the minimum wage indicates a relatively comfortable economic position: it suggests that these farmers, at least in income terms, outperformed typical formal-sector jobs in the region. With Rp5.85 million per month, a *genjer* farmer could cover a family's living costs and potentially reinvest in their farm or other ventures. In fact, such an income is comparable to a mid-level civil servant or skilled worker's salary in the area. This is a remarkable outcome for a farming activity and highlights *genjer*'s potential as a small-scale rural cash crop that can deliver middle-class earnings. Of course, we should temper this by noting that *genjer* farming is hard work as it involves frequent harvesting in muddy waters, careful post-harvest handling to keep the leaves fresh for market, and constant replanting or natural regeneration management. It is not an "easy" source of money, but it is evidently rewarding financially in this context.

The welfare implications of this are profound. If more farmers could adopt *genjer* or similar high-value crops, rural incomes could rise substantially, helping narrow the gap with urban wages. In our study, an average *genjer* farmer's annual income was around Rp70 million, which is comfortably above the national per capita GDP as well. This kind of income can improve living standards, enabling families to afford better housing, education, and less vulnerable to shocks. It also likely has multiplier effects in the village economy as these relatively higher-income farmers spend on local goods and services. Conversely, paddy farmers at Rp12.5 million/year are likely operating at just subsistence or below the "KHL" (Kebutuhan Hidup Layak – decent living needs) for a family. Many paddy farmers reported they could not solely rely on rice income to sustain their household.

Drivers of Income Difference

What factors contributed to *Genjer's* dramatically higher income in Mekar Sari? From the data and farmer interviews, several key drivers emerge:

(i) **Harvest Frequency and Yield:** *Genjer* can be harvested roughly 20–30 times a year (e.g., every week or two). In our data, farmers reported harvests nearly year-round, except perhaps a short gap for field maintenance. This contrasts with paddy's 1 or 2 harvests a year. The cumulative yield of *genjer* (12.3 tons/0.4 ha) implies about 30.9 tons/ha/year, whereas paddy yield was about 6.7 tons/ha/year. Thus, physically, *genjer* produces far more biomass that can be sold, thanks to its rapid re-growth. This aligns with previous observations that leafy vegetables can produce enormous output under continuous cropping. The quick turnover also means *genjer* farmers earn income continuously (cash flow every week), whereas paddy farmers only get cash after harvest (2-3 times a year). Continuous cash flow reduces farmers' need for credit and allows for timely reinvestment in inputs, creating a virtuous cycle of high input -> high output.

(ii) **Market Price and Demand:** *Genjer* in Mekar Sari was sold mainly to local and town markets, where it is considered a delicacy. Farmers reported an average price of around Rp3,000–5,000 per bundle. Typically, a bundle (0.5–1 kg) sells for about Rp4,000. This price per kg is higher than that of unmilled rice (which was around Rp4,500–5,000 per kg dry in 2023). It might seem comparable, but we must consider that *genjer*'s price is for a product with a far shorter growing time. The local demand for *genjer* was strong. Traders would come to the village to collect bundles every few days, and sometimes farmers would sell directly in town. One farmer said that "*genjer* always sells out, whereas rice sometimes must be stored." The high demand may be partly niche (local cuisine preferences), but it was enough to support the eight *genjer* farmers with good prices. There is evidence from other regions that *genji* and similar indigenous vegetables gain popularity as urban consumers seek diverse greens, thus maintaining price stability (Assauwab et al., 2023; Saediman et al., 2024). Our farmers did not report any instance of a price crash for *genjer* during the year; prices fluctuated but remained profitable.

(iii) **Intensive Input Use:** The *genjer* farmers achieved their large output partly by heavy use of inputs. They treated *genjer* almost like a commercial crop: applying fertilizer after every couple of harvests to replenish nutrients, controlling pests (mostly snails and caterpillars) with pesticides when needed, and ensuring water management. They spent significantly on chemical fertilizer plus organic manure. This correlates with the literature noting very high variable costs for intensive leafy vegetable farming. Paddy farmers, conversely, often under-utilize inputs (some use below recommended fertilizer rates due to cost, and a few use herbicides properly, leading to weed competition in rice fields). The difference in input intensity directly translated to yield differences.

Essentially, *genjer* farmers invested more and reaped more, demonstrating the importance of capital in raising farm productivity.

(iv) Cropping Cycle Duration: A rice crop takes 4 months from planting to harvest. *Genjer* can be first harvested about 6–8 weeks after planting and then continuously. So within 4 months, *genjer* might be cut 2–3 times or more. Over a year, *genjer* effectively exploits the land for a longer period, while rice fields are idle for part of the year (e.g., between seasons, or when preparing land). This efficient land use contributes to greater annual output from *genjer* plots.

(v) Labor and Management: *Genjer* cultivation is more labor-intensive, as evidenced by the labor cost share. Our survey noted that *genjer* farmers often hired labor or mobilized family labor frequently (e.g., for harvesting every week). They effectively created rural employment. Vegetables typically require 2–4 times more labor per hectare than rice (Srinivasan, 2025). While this is a cost to the farmer, it also indicates that in areas with surplus rural labor, switching to vegetables can absorb labor and reduce underemployment (Srinivasan, 2025). For the farmer who manages to profit, their own labor is also rewarded at a higher rate. In Mekar Sari, a *genjer* farmer might put in more work hours but ends up with a much higher return to labor than a paddy farmer whose fieldwork is intermittent. This partly explains why the *genjer* farmers seem economically better off. They have essentially created a higher-paying job for themselves through more intensive farming.

The *genjer* farmers' success in Mekar Sari demonstrates that diversification can substantially improve welfare. However, can all paddy farmers simply switch to *genjer* and replicate this? There are considerations and potential challenges:

(i) **Market Saturation:** If many more farmers grow *genjer*, the market might saturate, and prices could fall. Currently eight farmers supply the local market; if dozens did, supply might outstrip demand unless new markets are reached. This is a classic risk with any high-value crop expansion. In Aceh, Assauwab et al. (2023) noted, *genjer* was not widely cultivated, and implied the market was limited. In our region, however, Kendari (the provincial capital) could be an expanding market if production rose (Saediman et al., 2004). Still, farmers would need market linkage support (Reski et al., 2022) to avoid glut and price crashes.

(ii) **Knowledge and Skills:** *Genjer* farming requires know-how in managing continuous production, pest control, and post-harvest handling. Not every paddy farmer may immediately have these skills. Extension services would need to provide training for interested farmers, but the government prioritizes its extension resources on staple and secondary food crops and other selected crops (Saediman, Mboe, et al., 2021). The farmers in our study who pioneered *genjer* likely learned through trial and error over a few years and through social media as well.

(iii) **Upfront Costs:** The high input nature of *genjer* means farmers need capital to buy fertilizer, etc. Some paddy farmers might be too cash-

constrained to start *genjer* at the same level. Micro-credit or farmer group financing could help overcome this barrier. Once profits come, it self-finances, but the initial phase is crucial.

(iv) **Crop Risk:** Monocropping *genjer* could have its own risks. For example, an outbreak of pests or disease could wipe out the crop. Rice is relatively hardy in comparison (and also has government safety nets like rice insurance in some cases). A diversified farm might actually combine both: keep some rice for food security and grow *genjer* on part of the land for cash. This way, risk is spread.

(v) **Land Suitability:** *Genjer* thrives in waterlogged conditions that might actually be suboptimal for rice. In Mekar Sari, some swampy plots that were not very productive for rice (often flooding) were turned over to *genjer*. This is efficient land use, turning a problem (flood-prone fields) into a resource for *genjer*. Not all rice land may be equally suitable; *genjer* likes standing water and organic mud. If the land is too well-drained or sandy, it might not yield as much. So site selection matters.

Despite these considerations, the core insight remains that alternative crops like *genjer* can significantly elevate income. From a policy perspective, supporting farmers to diversify into such high-value crops could be a viable rural development strategy. Government programs in Indonesia have often encouraged crop diversification and value chain development (Saediman, Gafaruddin, et al., 2021; World Bank, 2022). Our study provides micro-level evidence to back those policies. For South Konawe Regency, the local agricultural office could facilitate *genjer* farming by providing improved *genjer* plant material (if any varieties exist), training on best practices, and help in marketing beyond local markets. Additionally, organizing *genjer* farmers into cooperatives could strengthen their bargaining position and access to larger buyers (e.g., supermarkets that might want to stock *genjer* as a specialty vegetable) (Lestari et al., 2023).

Comparing incomes to the minimum wage also offers an evaluative metric for the success of interventions. In this case, *genjer* farmers exceeding 2× UMK is an excellent outcome. It suggests that if more farmers achieved similar results, it could reduce rural poverty and even reverse the trend of rural-to-urban migration (as agriculture becomes more remunerative). The challenge is ensuring that such income levels are sustainable and not a short-term anomaly. In Mekar Sari, *genjer* farming has been ongoing for a few years, and farmers indicate it has remained profitable, albeit with normal price fluctuations. There is also an environmental consideration: *genjer* cultivation requires continuous water. As long as water is abundant, it is fine, but in drought scenarios, *genjer* could be impacted more than rice. Another welfare angle is that higher income can lead to improved social indicators. Farmers with more income can invest in their children's education, for example. This aligns with broad findings that raising farm income contributes to multiple SDGs, including poverty reduction, zero hunger (since farmers can afford better nutrition), and quality education.

Our findings mirror the results from other regions in terms of direction, if not magnitude. For instance, Ohen & Ajah (2015) in Nigeria found that small-

scale rice farming was only modestly profitable with a profit margin of around 24% and concluded that farmers remained constrained by high costs and limited access to finance (Moeis et al., 2020). In essence, staple grain farming alone rarely elevates smallholders out of low-income status in developing countries. On the contrary, specialized high-value crop farming can, as long as market conditions are favorable. However, one must also consider that high returns can attract more entrants until returns normalize. In Mekar Sari, the barrier to entry (knowledge, capital, and maybe land availability) might be keeping *genjer* farming a niche for now, allowing current practitioners to enjoy high profits. If it expands, profitability per farmer might decrease, but it still could be good if markets expand correspondingly.

Policy Implications

From a policy viewpoint, the dramatic difference observed suggests targeted support for diversification could have large payoffs. The government could facilitate by improving market linkages (Saediman, 2025), for example, helping *genjer* become a product for inter-regional trade. Also, microcredit schemes could be aimed at farmers willing to adopt high-value crops, ensuring they can cover upfront input costs. At a higher level, it reiterates the importance of agro-industrial value chain development: *genjer* farmers are essentially plugged into a value chain that rewards them more than the commodity rice chain (which is heavily regulated and involves middlemen and often low farmgate prices). If more value chains for non-staples are developed, farmers have alternatives to selling rice at thin margins. The Ministry of Agriculture's strategy to promote crop diversification and "farmer corporations" is consistent with these findings (World Bank, 2022). Another dimension is the environmental/resource aspect. Continuous *genjer* cropping might impact the soil if not managed. Farmers mitigated this with heavy fertilization, but long-term sustainability would require monitoring soil health. Crop rotation or occasional fallow might be needed. Rice paddies, by contrast, often benefit the soil in the off-season by leaving residues. It's possible to integrate: some farmers might alternate *genjer* and rice, or at least rotate areas to not exhaust the soil. Further research could look into soil nutrient dynamics in intensive *genjer* plots. In terms of socio-economic outcomes, one might wonder if the switch to *genjer* affects food security (since less rice is grown). In the study village, only 8 out of 110 farmers grew *genjer*, so rice production in the village continued with the others. Even those 8 *genjer* farmers still grew some rice for household needs on separate small plots (many did not completely abandon rice). Because *Genjer* gave them good cash, they could afford to buy rice if needed. So food security was not jeopardized; arguably, it improved because they had more income to purchase diverse foods.

CONCLUSIONS AND RECOMMENDATIONS

This study has documented a striking income differential between traditional paddy cultivation and *genjer* vegetable farming in a rural Indonesian village, and examined what those incomes mean in terms of meeting basic livelihood standards. *Genjer* farming generated dramatically higher incomes than wetland paddy farming. On a per hectare basis, *genjer*'s net income was

nearly eight times that of paddy. The average *genjer* farmer earned around Rp70.2 million in net income per year from 0.4 ha, whereas the average paddy farmer earned only about Rp12.6 million per year from 0.63 ha. A statistical test confirmed that this difference is highly significant. In practical terms, cultivating *genjer* offered smallholders an opportunity to substantially increase their earnings relative to rice farming. The incomes from these two farm activities translated into very different welfare outcomes. Paddy farming, at roughly Rp1.05 million/month income, fell far short of the South Konawe district minimum wage (Rp2.89 million/month in 2024). Paddy farmers were earning only about one-third of a basic decent wage, indicating that sole reliance on rice farming kept households at a subsistence level and financially vulnerable. In contrast, *genjer* farming, at roughly Rp5.85 million/month, more than doubled the minimum wage. *Genjer* farmers attained an income that could be considered more than adequate for a decent living in the local context, allowing them to enjoy a markedly better standard of living. The much greater income from *genjer* resulted from a combination of its agronomic and market advantages. *Genjer* allowed continuous, frequent harvesting (20+ harvests/year), leading to extremely high annual yields per area. Strong local market demand and favorable pricing for *genjer* ensured high revenues. Although *genjer* farming incurred high input and labor costs, the revenue outweighed these, resulting in a solid profit margin. In effect, *genjer* farmers leveraged intensive production techniques and market opportunities to achieve high returns. Paddy farmers, with a lengthy growing cycle and government-regulated prices, could not approach those returns under traditional practices. The ability of *genjer* farming to raise incomes above the minimum wage level has positive implications for rural development and poverty reduction. It demonstrates that promoting high-value crop diversification can be a viable strategy for improving smallholder livelihoods. If managed sustainably, such diversification can help narrow the rural-urban income gap and reduce the need for rural residents to seek low-paying urban jobs. In Mekar Sari's case, *genjer* cultivation provided employment (through hired labor) and increased the cash flow in the village economy. For policymakers, this case suggests that supporting farmers to identify and cultivate profitable niche or indigenous crops could significantly boost rural incomes. It also highlights the importance of market access: the profitability of *Genjer* hinged on getting the product to market at good prices. Thus, efforts to strengthen value chains for non-staple crops would be beneficial. While very lucrative, *genjer* farming is not without challenges. It requires a higher up-front investment, knowledge of intensive cultivation, and carries the risk of price or demand fluctuations. There is also a risk that if too many enter the *genjer* market without expanding demand, prices could drop. Therefore, any large-scale attempt to replicate Mekar Sari's *genjer* success should be accompanied by careful market analysis and possibly staggered or coordinated production. Additionally, sustainable farming practices should be emphasized, such as maintaining soil fertility and water quality under continuous cultivation. Nonetheless, these challenges are manageable with proper support. The evidence from Mekar Sari suggests that

even if profits normalize somewhat, *genjer* or similar crops would likely still yield higher incomes than paddy at the smallholder level. Based on the findings, a few recommendations can be made. (a) Encourage Diversification into high-value crops like *genjer* for interested farmers, (b) Improve Market Linkages to expand the market reach for *genjer*, (c) Provide micro-credit for farmers diversifying into new crops, and (d) Incorporate measures of farmer income relative to minimum wage or living income in program evaluations.

FURTHER STUDY

Future research could expand this analysis by examining a larger sample of farmers across different regions to determine whether the income advantages of *genjer* (*Limnocharis flava*) over rice are consistent in diverse agro-ecological and market settings. Longitudinal studies that track changes in profitability, sustainability, and farmer welfare over multiple years would also be valuable to assess the long-term viability of crop diversification strategies.

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