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Income Contribution of Maize (*Zea mays*) and Peanut (*Arachis hypogaea*) Intercropping Farming to Total Household Income

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ABSTRACT
This study analyzes the income generated from intercropping maize and peanuts and its contribution to total household income for farmers in Kontumere Village, Muna District, Indonesia. A survey of 49 farming households was conducted, and data were analyzed using farm income analysis and contribution analysis. Results show that the maize-peanut intercropping system generates an average net farm income of IDR 6,162,446 per farmer over a four-month growing season (equivalent to IDR 12,738,244 per hectare). This intercropping income constitutes approximately 88% of the total household income on average, underlining the heavy dependence of these farm families on crop farming. However, the majority (86%) of respondent households earned less than the regional minimum wage (UMK) standard for the equivalent period. Only 14% of farmers achieved a farm income above the four-month UMK (IDR 11.54 million). Despite the modest income levels, the intercropping system is the primary livelihood source and plays a vital role in household economic stability. Maize-peanut intercropping provides important, though not fully sufficient, income for farming households. It recommends efforts to improve productivity and income diversification to enhance household welfare.

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INTRODUCTION

Intercropping of cereals and legumes is known to offer agronomic and economic advantages. Global research has shown that intercropping can improve land productivity and resource use efficiency (Willey, 1990; Xu et al., 2020). For instance, a meta-analysis reported an average land equivalent ratio (LER) of about 1.31 for maize-peanut intercropping, indicating a 31% higher combined yield per area compared to monocultures (Feng et al., 2021). Such systems can yield a "win–no-loss" outcome where one crop's yield gain compensates for the other's slight reduction (Feng et al., 2021). The cereal-legume combination is particularly beneficial as maize provides canopy structure and efficient use of light, while peanuts (a legume) can fix atmospheric nitrogen, potentially improving soil fertility for both crops (Huss et al., 2022; Li et al., 2023; Toker et al., 2024). Studies also suggest intercropping enhances agroecosystem resilience (Huss et al., 2022). These benefits make intercropping an attractive practice for smallholders seeking to maximize outputs from limited land.

Despite its agronomic potential, the economic viability of intercropping for small farmers must be carefully evaluated. Farm income, which is the net profit obtained from crop production, influences household welfare and sustainability of farming. In rural Indonesia, smallholder farmers often face low and fluctuating incomes due to factors such as reliance on rainfall, traditional farming methods, distant field locations, and price variability (Saediman, Indarsyih, et al., 2021; Surni et al., 2020). In the study village, maize-peanut intercropping farms are rain-dependent and use traditional techniques. These challenges can constrain crop productivity and profitability. Consequently, many farm households engage in additional livelihood activities to supplement their earnings. Understanding how much income the intercropping system actually provides, and what share of total household income it accounts for, is crucial for assessing farmers' economic well-being and the need for livelihood diversification.

Previous studies in Indonesia and beyond have highlighted the importance of farm income contributions and off-farm income in rural households. For example, Ajo & Wardita (2018) used regional minimum wage standards as a benchmark for decent farm income and found that many rice farmers did not meet this threshold, implying their farming alone was not economically sufficient . Similarly, research in Aceh by Fauziah & Soejono (2019) on straw mushroom farming showed that while such farm enterprises can be profitable, their contribution to overall household income was of moderate level, necessitating other income sources for a stable livelihood. Off-farm work is often a strategy to overcome income shortfall. In some cases, side jobs can contribute roughly one-third of total income, as observed in Pamekasan, East Java, where farmers' secondary occupations contributed about 29% of household income on average (Sholeh & Mublihatin, 2021). These findings collectively suggest that while farming is the mainstay of rural households, its income alone may be insufficient to meet family needs, prompting additional income-generating activities.

Within this context, the present study focuses on the maize-peanut intercropping system in Kontumere Village in Muna District of Southeast Sulawesi. The majority of the village's population is engaged in farming, about 72% of residents identify as farmers, and rainfed agriculture is prevalent. Maize (maize) and peanut are among the village's key crops, often grown together in an intercropping system called *tumpang sari*, wherein two crops are cultivated simultaneously on the same land (Saediman & Arisman, 2025). This practice aims to optimize land use and productivity by capitalizing on the complementary characteristics of the crops.

Maize and peanut are important cash crops: maize is a staple with broad market demand, and peanuts offer a valuable legume crop that can be sold or consumed. Intercropping these two allows farmers to harvest dual outputs from the same plot, potentially increasing total revenue. However, it is essential to quantify the actual income from this intercropping and determine how far it goes toward supporting the household. By analyzing the contribution of intercropping income to total household income, we gain insight into the level of dependency on farming and whether farm earnings are adequate for a decent standard of living.

Maize and peanut are important cash crops. Maize is not only a widely traded staple with strong market demand but also a traditional food commodity that plays a central role in food security in regions such as Muna, where it has long served as a traditional staple (Saediman, 2015; Saediman et al., 2016; Saediman, Aisa, et al., 2019). Peanuts, meanwhile, are a valuable legume crop that can be sold or consumed, providing both dietary protein and marketable surplus. Intercropping these two crops allows farmers to harvest dual outputs from the same plot, thereby increasing total revenue while also supporting household food availability. Beyond income, the cultivation of maize contributes directly to food security by ensuring a locally reliable supply of a staple food (Saediman et al., 2016, 2019)., while peanuts add nutritional diversity. However, it is essential to quantify the actual income derived from this intercropping and assess how far it supports household welfare.

This study aims to: (1) measure the production costs, revenues, and net income of maize-peanut intercropping farming in Kontumere Village; (2) assess the economic viability of this farm income in comparison to the regional minimum wage standard (UMK) as an indicator of basic needs; and (3) evaluate the contribution of the intercropping farm income to the total household income of farmers. By achieving these objectives, we hope to clarify the economic role of intercropping in the household economy and provide evidence for agribusiness policy and development interventions. The findings will be useful for agricultural planners, extension agents, and the farming community by highlighting whether improvements or complementary income sources are needed to ensure sustainable livelihoods.

LITERATURE REVIEW

Farm Income and Livelihood Contribution

Farm income is generally defined as the difference between the total revenue from crop production and the total production costs. It represents the

return to the farmer's land, labor, and management after accounting for expenses. In agrarian households, farm income can range from being the sole source of livelihood to just one component of a diverse income portfolio. The significance of farm income's contribution to household economies has been widely examined across different regions and commodities. For example, Anton & Marhawati (2016) reported that paddy farming contributed over 70% of household income in a community in Central Sulawesi, highlighting a high dependence on a single agricultural commodity. Similarly, a study by Utama et al. (2018) in Jembrana District, Bali, found that clove farming contributed as much as 80.05% of total household income, while Mahardika et al. (2018) reported that pepper farming in Konawe Selatan, Southeast Sulawesi, contributed 66.3% to farming households' income. These findings demonstrate how cash crop cultivation often forms the backbone of household economies. In contrast, studies like Sholeh & Mublihatin (2021) illustrate scenarios where farming alone is insufficient, and secondary jobs (such as wage labor or small-scale trade) provide nearly one-third of household income. Collectively, these variations underscore that the contribution of farm income is context-specific, influenced by factors such as farm size, productivity, crop type, market prices, and the availability of off-farm opportunities.

High dependency on farm income (a large contribution percentage) implies that any shock to the agricultural sector, such as crop failure, price collapse, or adverse weather, can directly and significantly impact household welfare. Conversely, a lower farm income contribution (and thus higher non-farm contribution) might indicate greater diversification, which can buffer against farming risks. However, heavy reliance on off-farm income might also reflect that farm earnings are inadequate to meet household needs.

Intercropping Systems and Economic Benefits

Intercropping, which is the practice of growing two or more crops simultaneously on the same land, has long been utilized as a strategy to improve land use efficiency and reduce the risk of crop failure. The maize-peanut intercropping system is a classic example, combining a tall cereal with a low-growing legume. Literature suggests several benefits of such systems. Agronomically, intercropping often results in a Land Equivalent Ratio (LER) greater than 1, meaning the land productivity is higher than if each crop were grown separately. Feng et al. (2021) conducted a comprehensive meta-analysis of maize-peanut intercropping experiments and found an average LER of about 1.15–1.31, confirming a consistent productivity advantage (Feng et al., 2021; Li et al., 2023). This implies that intercropping can produce roughly 15–31% more yield from the same area than monocultures, due to better utilization of light, nutrients, and space. The meta-analysis also indicated that maize in the intercropping tends to have a high relative yield (compared to sole maize), which largely drives the LER gains (Feng et al., 2021). This may be because maize benefits from the nitrogen fixed by peanuts and faces reduced competition for light (since peanuts are shorter), whereas peanut yields might slightly decrease under maize due to shading (Li et al., 2023). Nonetheless, the

combined output is greater and more diverse, which can be economically advantageous.

In terms of profitability, intercropping can increase gross revenue by producing two harvestable products. Li et al. (2023) found that a maize-peanut intercropping system yielded a higher gross income per hectare than either crop's monoculture, owing to the additional peanut output, although net profit depended on the cost structure and market prices for both crops (Li et al., 2023. Importantly, while total revenue can rise, the cost profile of intercropping also differs: there may be additional costs for managing two crops (such as labor for harvesting two crops, or inputs for both). However, certain costs are shared (land preparation, some fertilizer applications, etc.), potentially leading to cost efficiencies. For instance, if peanuts cover the ground, they can suppress weeds, possibly reducing herbicide expenditure in maize-peanut fields (Li et al., 2023). Studies in Yogyakarta, Indonesia have directly compared intercropping with monoculture. As quoted by Devi et al. (2022), Lubis et al. reported that maize-peanut intercropping in Gunungkidul yielded an average profit of around IDR 13.96 million per hectare per season, which was significantly higher than the profit from maize monoculture on an equivalent area (Sinaga, 2023). This suggests that intercropping not only made better use of the land but also boosted farmers' income, supporting its adoption as a financially sound practice in that region.

Beyond yields and monetary returns, intercropping can provide additional benefits. A review by Toker et al. (2024) highlights that intercropping contributes to improved resource use efficiency and can enhance ecological services such as pest control and soil health. Legume intercrops like peanut can improve soil nitrogen and reduce the need for synthetic fertilizers in the long run, potentially lowering costs and increasing sustainability. Furthermore, Huss et al. (2022) note that diversified cropping reduces pest and disease pressure by breaking host continuity and creating habitat complexity, which can lower crop losses and the cost of pesticides. However, they also caution that intercropping can introduce complexity in farm management, for example in coordinating planting and harvesting times and in crop-specific input applications. Thus, while agronomically beneficial, intercropping's success on small farms requires adequate knowledge and labor availability to manage the system effectively.

Farm Income Viability and Minimum Income Standards

In evaluating whether farm income is sufficient, researchers sometimes compare it to a benchmark such as the poverty line or minimum wage. In Indonesia, an interesting benchmark is the regional minimum wage (*Upah Minimum Kabupaten/Kota*, UMK), which represents the minimum monthly income considered necessary for a worker to afford basic living needs in that region. Although UMK is designed for formal labor wages, some agribusiness studies use it to appraise farm income adequacy. The rationale is that if a farmer's income from agriculture over a given period is below what an unskilled laborer would earn at minimum wage in the same period, the farm income could be deemed economically "not viable" or not fully sufficient for

decent living. Ajo & Wardita (2018) employed this method in Southeast Sulawesi with paddy farmers and categorized farmers as having "viable" income if their farm earnings met or exceeded the UMK, and "not viable" if below. They then calculated how much additional land or productivity would be required for those below the threshold to reach it. This approach provides a practical perspective, translating abstract income figures into a measure of livelihood sufficiency in the local economic context.

In the present study's context (Muna Regency), the UMK for 2024 is IDR 2,885,964 per month. Over a typical four-month farming season, this accumulates to roughly IDR 11.54 million. Using the UMK benchmark helps to interpret the farming income not just in absolute terms but relative to a living wage standard. It allows us to address questions like: Can the income from maize-peanut intercropping alone sustain a household at a basic needs level? If not, how large is the gap? This perspective is valuable for policy implications; if most farming households fall short of the UMK level, it indicates a need for either boosting agricultural income (through productivity, price support, cost reduction, etc.) or supplementing it with alternative livelihood strategies.

In summary, the literature suggests that maize-peanut intercropping is agronomically productive and can be economically beneficial, but the actual outcomes in farmers' fields depend on local conditions and management. Evaluating the income from such intercropping against household needs and alternative income options provides insight into the system's contribution to rural livelihoods.

METHODOLOGY

The research was conducted in Kontumere Village, Muna District, Indonesia. This location was selected purposively because of its reliance on maize and peanut intercropping as a primary source of farmer income. The village has a tropical climate with dry and rainy season, which is critical for the rainfed cropping system. Farms are typically small-scale and managed by family labor.

The study population consisted of farmers who cultivate maize and peanuts in an intercropping system. A total of 49 farmers were selected as respondents. This number represents the farmers who practiced the maize-peanut *tumpang sari* during the study period. Because the number was manageable, a census approach was used.

Both primary and secondary data were utilized. Primary data were obtained through structured interviews with the 49 farmer respondents, using a questionnaire that covered: farmer demographics, farm characteristics, input use, yields and production output of maize and peanuts, prices received for each crop, production costs, and other household income sources outside the maize-peanut farm. The recall period for income and production questions was the most recent completed cropping season (approximately four months, corresponding to one planting-harvest cycle for maize-peanut in 2024). Secondary data were gathered from relevant sources to supplement the analysis, including regional wage standards (UMK) from government reports

and village statistics from the local administration and Badan Pusat Statistik Kabupaten Muna (2024) for contextual information.

The interviews were conducted in-person on the farmers' home or farm in the local language. Care was taken to ensure accuracy of quantitative responses. For instance, farmers were asked about the quantities of inputs and outputs, which were then cross-checked with any available records or by referencing typical usage rates in the area. Price data for maize and peanuts were confirmed by checking local market prices at the time of harvest, as reported by the farmers and triangulated with the village trader and extension officer.

The study employs descriptive and quantitative analysis techniques, namely (1) cost and returns analysis and (2) household income and contribution. For Cost and Returns Analysis (Saediman, Astuti, et al., 2021; Saediman, Mustika, et al., 2019) , we calculated the total production cost for the intercropping system per farmer and per hectare. Production cost was divided into fixed costs and variable costs. Fixed costs included the depreciation values of farm tools and equipment used in the cultivation. Depreciation was computed using the straight-line method, where the initial cost of each asset was divided by its economic lifespan to derive a per-season cost. Variable costs encompassed all inputs that vary with the scale of production, such as seeds, fertilizers, pesticides, and hired labor (if any). Family labor was not explicitly costed in cash terms but is discussed in context when interpreting net income.

Revenue (gross farm income) was calculated for each farmer by multiplying the output of maize and peanut by their respective selling prices, and summing the two. The net farm income (profit) was then obtained by subtracting the total production cost from the total revenue for each respondent. These values were averaged across the sample to get the mean revenue, cost, and net income per farmer for the four-month season, as well as per hectare.

Equation-wise:

Net Income=Revenue (maize + peanut) −Total Cost (fixed + variable).

We computed each respondent's total household income for the four-month period by adding the net intercropping farm income to any other income the household earned in that period. Other income sources in the village context included off-farm wages (e.g., as a driver or village official), small trading, livestock rearing, and pensions for retirees. The contribution of the maize-peanut farming to household income was then determined by the ratio: Contribution (%)= (Intercropping Net Income/Total Household Income)×100%.

We calculated this percentage for each household and then took the average contribution across all respondents to characterize the typical dependency on farming income. Households were also categorized by their degree of dependence.

To address the question of income sufficiency, we compared each farmer's net intercropping income (4-month total) to the Muna District's UMK for four months (IDR 11,543,856). We classified farmers into two categories: "Economically Viable (Layak)" if their four-month intercropping income ≥ IDR

11.543 million, and "Not Viable (Tidak Layak)" if it was below that threshold. For each category, we examined the number of farmers and the average income.

RESULT AND DISCUSSION

1. Farm Costs, Revenue and Net Income

Table 1 summarizes the average production costs and returns of the maize-peanut intercropping system in the study village for one four-month season. All values are presented both on a per-farmer basis (the average farm in our sample) and per hectare.

Table 1. Average Production Cost and Income for Four Months

Item	IDR per farmer	IDR per hectare
Gross revenue (maize + peanut)	6,713,857	13,865,563
Total production cost	551,411	1,127,319
– Fixed costs	65,554	117,825
– Variable costs	485,857	1,009,493
Net income (farm profit)	6,162,446	12,738,244

As shown in Table 1, the average net income per farmer from the intercropping system was IDR 6.16 million over 4 months, which equates to about IDR 12.74 million per hectare in that period. This net income is the surplus after covering a modest total cost of roughly IDR 0.55 million per farmer. The cost structure reveals that variable costs form the bulk of production expenses (about 88% of total cost), while fixed costs are minimal. On average, variable inputs cost IDR 486 thousand per farmer (1.01 million per ha), whereas fixed costs (tool depreciation) were only around IDR 66 thousand per farmer (118 thousand per ha). This indicates that the intercropping farming in the study village is not capital-intensive in terms of equipment. Farmers primarily incur costs for consumable inputs like seeds, fertilizer, and agro-chemicals.

Breaking down the variable costs, peanut seeds emerged as the largest single expense. Peanut seed expenditure averaged IDR 474,273 per farmer (1.06 million/ha), making it by far the dominant cost component. The high cost is due to the large quantity of peanut seeds needed and their price per kilogram. In comparison, maize seed cost was negligible (only IDR 28,000 per farmer on average) because maize seeding rates are lower and/or farmers might save seeds from prior harvests. Other variable costs included fertilizer (IDR 201k per farmer) and pesticides (IDR 338k per farmer), which together constituted the remaining variable expenses. These figures suggest that improving seed management, for example, by farmers producing or saving more peanut seed, or accessing seed at subsidized rates, could significantly reduce cash outlays. The prominence of peanut seed cost is consistent with observations by Nadhar et al. (2024), who noted that key input prices (like seed, fertilizer, pesticides) heavily influence production cost in crop farming. Any increase in seed price directly raises total costs and can squeeze net income if output prices do not rise correspondingly.

The gross revenue of IDR 6.71 million per farmer (IDR 13.87 million/ha) reflects the combined sales of maize and peanut harvests. While we do not have the exact yield figures presented here, this revenue suggests a reasonably good output given that the costs are low. Maize and peanuts likely share the revenue in some proportion (commonly, maize might contribute a larger portion of yield by weight, but peanut often has a higher price per kg). Interviews indicated that farmers often sold their produce immediately after harvest, sometimes at less-than-ideal prices due to urgent cash needs. This behavior of selling when prices are low post-harvest can reduce revenue. Farmers in tight financial conditions may not be able to wait for price increases. The consequence is lower gross revenue than potentially attainable. Strengthening farmers' capacity to store grain or providing credit to avoid distress sales could help improve revenue.

Overall, the net income of IDR 6.16 million/season per farmer is the return to the farmers' labor and management. Translating this to monthly terms, it is roughly IDR 1.54 million per month per farmer from the intercropping activity. For context, this amount is modest and it falls below regional minimum wage levels. Nonetheless, it is important to emphasize that the intercropping is profitable; the revenue is about 12 times the production cost, implying a high gross margin. The benefit-cost ratio (BCR) is 12.17, indicating that each IDR 1 of cost generates IDR 12.17 of revenue. This extremely high BCR is partly because many cost items (like land, family labor) are not counted as cash costs. If we impute the value of family labor or land rent, the cost would rise and the BCR would be lower, but the enterprise would still likely be profitable. The current figures suggest that, from a cash-flow perspective, maize-peanut intercropping in the study village yields a substantial surplus relative to cash expenses, which is encouraging for farmers with limited capital.

Comparing our income figures with those from other regions reveals both similarities and differences. The net income of IDR 12.74 million/ha/season aligns reasonably well with Lubis et al. (2019)'s report of IDR 13.96 million/ha from maize-peanut intercropping in a Java context (Sinaga, 2023), considering variations in year and location. This suggests that the economic performance of maize-peanut intercropping in Kontumere is on par with other areas, despite local challenges. On the other hand, monoculture maize farming typically yields lower profits per hectare. For example, in the same study by Lubis et al., monoculture maize profit was lower (not explicitly stated above but implied to be significantly less) (Devi et al., 2022). Likewise, a study in North Sulawesi by Sondakh et al. (2019) observed that peanut farming was more profitable than maize farming, implying that adding peanuts could raise total profit in a combined system. Our results reinforce that notion: the peanut component, while incurring costs, likely provided a valuable second income stream on the same land, boosting overall net returns.

However, the absolute income levels, even if profitable relative to costs, may still be low in terms of sustaining a household. Farming small plots inherently limits the total earnings. In our sample, the average land area under intercropping per farmer was about 0.48 hectares (as inferred from the fact that

per hectare income 2× per farmer income). Such land fragmentation is common in Indonesia and can keep farm incomes low even when per hectare productivity is decent. Therefore, while Table 1 indicates that farmers efficiently turn inputs into outputs (high profitability ratio), the next question is whether the resulting income is adequate for household needs. This is where a livelihood perspective and comparison to wage standards become relevant.

2. Household Income and Contribution of Farming

The maize-peanut intercropping is the main livelihood activity for most surveyed households in Kontumere. We found that, on average, 88% of the household's total income came from the maize-peanut farming itself. In monetary terms, as the average farm income was IDR 6.16 million/season, and this constituted 88%, the average total household income would be around IDR 7.0 million in the four-month period. This leaves only about 12% (approximately IDR 0.84 million over 4 months) coming from other sources. In other words, most households had limited supplementary income during the cropping season. Table 2 presents the household income composition and further details on farm income's dominance.

Table 2. Maize–Peanut Farm Income Contribution to Household Income, and Comparison to Regional Wage Standard (UMK) Over 4 Months

Category	**Value / Description**
Average intercropping net income per household (4 months)	IDR 6,162,446
Average total household income (4 months)	IDR 7,002,000
Intercropping income as share of total	88%
Other income as share of total	12%
Households with farming as main income (>50% of total)	47 out of 49 (96%)
Regional minimum wage in Muna (2024) per month	IDR 2,885,964 per month
Regional minimum wage in Muna (2024) for 4 months	IDR 11,543,856 for 4 months

From Table 2, it is evident that intercropping is the primary income source for most respondent households. In 96% of the cases, farming contributed more than half of the total income, qualifying it as the mainstay of the household economy. Non-farm income sources were minor and often irregular. Some farmers or their family members engaged in secondary occupations, such as working as a village official or as drivers, and a few received pension funds (for retired civil servants), which in fact was the largest single source of non-farm income at an average of IDR 18.4 million for those who had it. However, only a small fraction of households had pensions. The majority relied almost entirely on farming. The average "other income" of around IDR 0.84 million (for four months) among all respondents is quite low (roughly IDR 210,000 per month), indicating limited alternative earnings. For context, this other income could come from occasional day labor or small-scale trading. The finding here is that, unlike some communities where off-farm jobs

contribute significantly (e.g., 29% in Pamekasan as reported by Sholeh & Mublihatin, 2021), in Kontumere village the dependence on farming is extremely high at 88%. In this regard, the contribution of maize–peanut intercropping in the study village, can be categorized as very high, even when compared with other major cash crops such as paddy, pepper, or clove (Anton & Marhawati, 2016; Mahardika et al., 2018; Utama et al., 2018). Such heavy reliance amplifies the vulnerability of households to agriculture-related risks. If a crop fails or market prices drop, the impact on household income would be severe, since there are few other income buffers.

The near-monolithic income structure also reflects the lack of diverse economic opportunities in the village. Kontumere is a rural area where farming is the predominant occupation available, which is a typical scenario in many Indonesian villages where industrial or service sector jobs are scarce. This outcome underscores the importance of improving the returns from farming, as there are limited fallback options.

3. Comparison to Regional Minimum Wage (Income Adequacy

While the farming income provides the bulk of household earnings, an important question is whether this income level is sufficient for a basic standard of living. We used the regional minimum wage (UMK) as a benchmark. The UMK of Muna Regency in 2024 is IDR 2,885,964 per month. Over a four-month period, this amounts to IDR 11,543,856. Ideally, a household would earn at least this much in four months to be considered as having an adequate income that meets local basic needs.

Our analysis reveals that the majority of farming households in the study village did not reach this income threshold with their intercropping farming. Specifically, out of 49 households, 42 households (about 86%) earned less than IDR 11.54 million in the four-month season, placing them in the "not yet viable" category economically. Only seven households (14%) managed an intercropping income equal to or above the four-month UMK. These findings are summarized in Table 3.

Table 3. Farmers' Income Viability Relative to Muna District's Minimum Wage Over 4 Months

Income Category (4-month basis)	**Number of Farmers (% of 49)**	**Mean Income (IDR/4 mo)**	**Mean Landholding (ha)**
Below UMK (< IDR 11,543,856)	42 (85.7%)	4,701,184	0.5
At/Above UMK (≥ IDR 11,543,856)	7 (14.3%)	14,930,023	0.7
Total / Average	49 (100%)	6,162,446	0.54

It can be concluded from Table 3 that most farmers are below the living wage benchmark. With an average four-month income of only IDR 4.70 million, those in the below-UMK category earned roughly 40.7% of the targeted IDR 11.54 million. This shortfall indicates significant economic vulnerability. The farmers in this group typically had smaller landholdings (around 0.5 ha on

average) and possibly lower yields. They might be younger farmers with less experience or resources, or conversely, very smallholders with limited capital. According to the research, these farmers would need, on average, an additional 1.30 hectares of land (more than double their current land) to reach the UMK-equivalent income at the current productivity level. Clearly, acquiring such additional land is not realistic for most, implying that alternative strategies are needed to improve their income (such as intensification to raise yield per hectare, diversification into higher-value crops, or supplementary non-farm work).

However, some farmers achieve high incomes. The 7 farmers above the threshold had quite robust incomes, averaging IDR 14.93 million in 4 months. Their mean land size was about 0.70 ha. These could be farmers who either obtained exceptional yields or had more land than the rest, or benefited from better prices (for example, maybe they stored produce and sold at a higher price later). Notably, their per-hectare net income appears to be very high (the table suggests their per-ha net might be on the order of IDR 21 million/ha, given 0.70 ha yielding 14.93 million net), which is significantly above the average of 12.74 million/ha. This hints at either superior farming practices or perhaps situational advantages like more fertile land or timely planting with good rainfall. For this group, their income already exceeds the UMK standard, so by that measure, they are doing well; they needed no additional land to meet basic income needs (some had income 130% of the threshold, as 14.93 vs 11.54 million). However, this group is small (14% of farmers). They illustrate what is possible in terms of intercropping income, providing a target or benchmark for others.

The fact that 86% of farm households are below the basic income threshold is a cause for concern. It aligns with patterns in many developing regions where smallholder farmers often operate at near-subsistence income levels. Using UMK as a yardstick, our result is analogous to saying 86% of these farmers live below a "living wage" line (for a household) if farming is their main income. This doesn't necessarily mean they are below the official poverty line (which is usually lower than a minimum wage), but it does signal economic hardship and likely inability to meet all household needs comfortably. Indeed, with about IDR 4.7 million earned in 4 months (IDR 1.175 million per month) for the below-UMK majority, they are living on a very tight budget. Comparatively, the UMK in Muna is IDR 2.885 million per month, so they are at roughly 40% of that level.

Our findings echo those of Ajo & Wardita (2018) in Baubau in Southeast Sulawesi who found many rice farmers fell short of a decent living income and would require more land or improved yields to reach it. It is a recurring theme that small farm sizes constrain total income. Manyamsari & Mujiburrahmad (2014) observed that farmers with very small land in West Java struggled to be economically viable, which resonates with our study. Another perspective is offered by Mamondol & Sabe (2016), who found land size had a positive effect on farm income in paddy farms: larger land led to higher income, albeit with

proportionally higher costs. Our data clearly support the notion that land size is a limiting factor: those with 0.7 ha did better than those with 0.5 ha.

Besides land expansion, improving productivity (yield per ha or profit per ha) could help bridge the gap. If the average farmer could increase net income per hectare from 12.7 to around 20 million, then even 0.5 ha could yield 10 million (nearly at UMK). Achieving such productivity gains might involve better seed varieties, improved agronomic practices, or integration of modest irrigation to counter rainfall variability (since dependence on rain is cited as a challenge). Additionally, post-harvest handling and market timing could significantly impact net returns. As mentioned earlier, farmers selling immediately at low prices dampen their revenue. If farmers can form cooperatives (Lestari et al., 2023) or have access to credit to delay sales, they might secure better prices for maize and peanuts, thereby raising revenue without increasing costs. That could push some incomes closer to the UMK mark.

It is also noteworthy that when considering total household income (including non-farm income), a few more families meet the threshold. Specifically, earlier we saw seven households met it with just farm income; when including all income, the number of households meeting the 4-month UMK increased slightly (to 10 households, or 20%). This indicates that off-farm earnings did help a couple of families cross the line. For example, a farmer who was a bit short with farm income might have a family member working part-time or a small sideline business that provided the extra boost. Still, even with total income, 80% of households remained below the UMK level, reaffirming that poverty/low-income prevalence is high.

The results portray a situation of high dependence on a farming system that, while technically profitable, yields insufficient income in absolute terms for most families. This has several implications, such as the need for income diversification (Saediman, Limi, et al., 2021), improvement of productivity and efficiency within the intercropping system, collaborative marketing (Saediman, 2025), land tenure and expansion, and alternate cropping or value crops.

In summary, while maize-peanut intercropping is an important and largely positive component of Kontumere's livelihood, it is not a panacea for rural poverty. The system itself is sound (as indicated by the high profitability ratios), but the scale and current productivity constrain incomes. Empowering farmers with better resources, knowledge, and market linkages will be key to translating this farming practice into improved living standards. The strong contribution of farming to income (88%) means any improvements in farming will directly uplift household income significantly. Conversely, any downturn in farming (due to drought or pest outbreak) would have a disastrous impact. This dual-edged situation highlights the need for building resilience, through both improving the farming system and diversifying livelihood options.

CONCLUSIONS AND RECOMMENDATIONS

This study examined the income from maize-peanut intercropping farming in Kontumere Village and its contribution to total farmer household income. The maize-peanut intercropping system provides a positive net income to smallholder farmers, averaging about IDR 6.16 million per farmer for a four-month cropping cycle, equivalent to IDR 12.74 million per hectare per cycle. This indicates that the intercropping practice is financially beneficial and yields a substantial return relative to its low cash production costs.

The intercropping income constitutes the majority of household earnings, contributing approximately 88% of total household income on average. This underscores that farming is the backbone of household economy in the study village. Non-farm income sources exist but are generally small, with only about 12% of income coming from outside the farm on average. Most households (96%) are effectively *farm-dominant* in their income profile.

Despite the profitability of intercropping, the absolute income level is generally low, and most farming households struggle to meet basic income standards. Around 86% of the surveyed farmers earned less than the regional minimum wage (UMK) equivalent over the four-month season. In other words, their farming income does not reach what is considered a minimally adequate living income in the region. Only 14% of farmers met or exceeded the four-month UMK benchmark. These finding signals that, for the majority, current farm income is insufficient to fulfill household needs for the period, potentially leaving gaps that may result in sacrifices or debt.

Based on the findings, the following recommendations are proposed for farmers, community leaders, and policymakers to enhance the outcomes of the maize-peanut intercropping system and improve farmer livelihoods: (1) Increase Productivity through Improved Farming Practices, (2) Facilitate Access to Credit and Finance, (3) Strengthen Farmer Groups and Market Linkages, (4) Promote Income Diversification and Off-Farm Opportunities, (5) Land Management and Agrarian Support, and (6) Monitoring and Supporting Price Stability.

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