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Household income exchange rates and farmer welfare in rice-farming communities: Evidence from Lampung Province, Indonesia

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ABSTRACT

The Household Farmer's Exchange Rate (NTPRP) is an indicator of farmer welfare in Indonesia. Farmers' purchasing power can be predicted through the NTPRP. The problem faced by farmers is low income, caused by farmers' expenditures on production inputs not being commensurate with their farm income. Furthermore, low income means that farmers' purchasing power for household consumption is insufficient to meet their basic needs. This study aims to analyze the income of farmer households, the level of farmer welfare with the NTPRP, and the determinants of farmer welfare. This study used a survey of 168 rice farmers in Lampung Province who were selected by random sampling. Lampung Province was chosen purposively as one of the fifth largest rice producers in Indonesia. The research was conducted from February to May 2025. This study used an analysis of farmer household income, cost analysis, and binary logit analysis. The results showed that the income of farmer households derived from rice on-farm contributed significantly to the household income of farmers, and the level of welfare based on the net total revenue to total cost of production of farmers in a less prosperous condition. The determinants of farmer welfare showed that rice farming income and off-farm income were positive and significant to farmer welfare, while food consumption expenditure was negative and significantly affected the welfare of rice farmer households in Lampung Province. The results of this study recommend that farmers diversify their income with the support of the agro-industry in rural areas, ease of access to modern technology, and the government needs to provide superior seeds, fertilizers, mini-mechanization, and sustainable intensification through farmer development and institutions.

Keywords: welfare, exchange rate, household, farmers, rice, development.

1. INTRODUCTION

Economic growth is an important instrument for improving welfare and alleviating poverty (Balasubramanian et al., 2023; Qadir et al., 2022). The relationship between rural poverty and welfare outcomes is a significant social issue, as poor areas face challenges such as low income, nutritional imbalances, and inadequate policy regulations (Peng et al., 2023).

In Indonesia, farmer welfare is measured using the Farmer Exchange Rate (NTP). The Farmer Exchange Rate (NTP) compares the price index received by farmers to the price index paid by farmers. This exchange rate is an indicator of the level of ability/purchasing power of farmers in rural areas. The NTP also shows the exchange rate (*terms of trade*) of agricultural products for goods and services consumed and for production costs. The higher the NTP, the stronger the level of ability/purchasing power of farmers. Over the past five years, the farmer exchange rate in Lampung Province, especially in the food crop subsector, has remained below 100, meaning that the price paid by farmers for agricultural products is much higher than what they receive. The development of the NTP in Indonesia is shown in Figure 1.

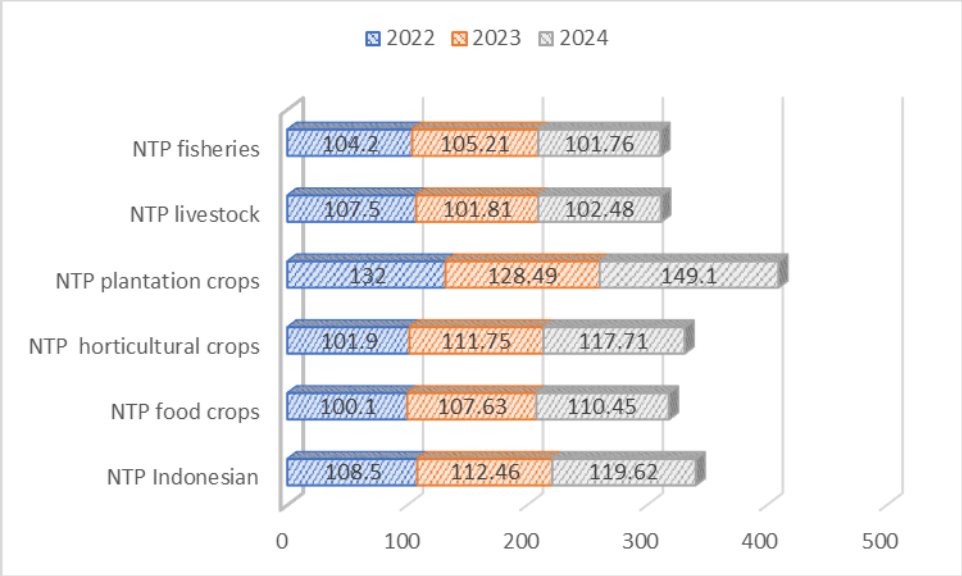


Figure 1. Farmer's Exchange Rate (NTP) in Indonesia 2022 – 2024

Source: BPS Indonesia, 2024

In Figure 1, in 2024, the highest NTP was achieved in the plantation subsector, namely 1.49, and the lowest NTP was in the livestock subsector, namely 102.48. Meanwhile, in 2024, the food crop subsector experienced an increase of 110.45. The food crop subsector is the most fundamental aspect of meeting food needs in Indonesia. Food availability must receive more attention from the government, especially because food is a basic need for all Indonesians. The prediction of a food crisis expressed by economists will disrupt the logistics system; therefore, breakthroughs are needed to make the future food system more comprehensive and sustainable through production, processing, distribution, trade, and food consumption activities. The sustainability of the food system impacts farmers' welfare (Arifin, 2022). The traditional agricultural sector has ensured food security for the growing population. However, the biggest obstacles faced by farmers are low yields and high production costs, one of which is inflation. Inflation at the producer level, measured by the producer price index (PPI), is much higher than that at the consumer level (CPI) (Arifin, 2022). Inflation and rising food prices will threaten farmers' livelihoods by increasing the cost of consumer goods (Kuma & Gata, 2023; Lastri et al., 2020) . This condition results in low farmer income and poor welfare (Marsudi et al., 2020; Pangesti, 2021; Saridewi, 2021).

Rice is one of the strategic food crops crucial to the national economy. Rice is a strategic commodity in Indonesia due to its crucial role in food security, economics, and politics. Rice is viewed as

a political commodity whose price stability must be maintained through the role of state institutions such as BULOG (Mariyono, 2014; Ruspayandi et al., 2022). Rice has been shown to behave like a Giffen good, reflecting its nature as a household staple (Hamzah & Huang, 2023). However, challenges in rice seed production and distribution indicate that institutional support and improvements to the distribution system are essential to ensure the sustainability of rice as a strategic commodity (Qadir et al., 2024). Indonesia's rice production in 2019 reached 54,604,033.34 tons. However, in 2024, the harvested area and rice production significantly declined. The rice harvested area in 2024 was 10.05 million hectares, down to 167.57 thousand hectares, or 1.64 percent compared to the rice harvested area in 2023. Rice production in 2024 is 53.14 million tons of dry grain (GKG), a decrease of 838.27 thousand tons, or 1.55 percent, compared to 2023 rice production of 53.98 million tons of dry grain (GKG).

Lampung Province ranks 6th out of 34 provinces in Indonesia, with 2,791,347.53 tons of GKG (Dry Milled Grain) on a harvest area of 1,678,479.21 hectares. Rice production in Central Lampung, South Lampung, East Lampung, Tanggamus, and Pesawaran ranks among the five largest producers in Lampung Province. Although rice production in Lampung Province is high, the NTP of the food crop subsector remains low. The Farmer Exchange Rate and household consumption expenditure are interrelated. If the NTP is low, farmers' purchasing power will be low, both for food and purchasing power for non-food consumption. The lowest NTP in Lampung Province occurred in the food crop subsector at 95.56 in 2020. A low NTP indicates that food crop farmers are currently in a state of poverty.

The low Farmer Price Index (NTP) is due to the lower Farmer Price Index (It) compared to the Farmer Price Index (Ib). Research related to the NTP includes Koylal et al. (2022), who stated that the NTP is significant in reducing rural poverty levels but is not very effective if not accompanied by equitable income distribution. The small effect of improving farmer welfare on rural poverty may be due to the NTP variable used, which is insufficient to describe farmer welfare. Further research (Runtunuwu, 2020; Ramadhanu et al., 2021) shows that the producer price of paddy and inflation variables have a positive influence on the farmer 's exchange rate, while the wage variable has a negative influence on the farmer's exchange rate. In line with the research results (Indah et al., 2023), the factors of inflation, labor, GRDP, and interest rates have a significant influence on the Farmer Exchange Rate in Lampung Province. An NTP below 1 indicates widespread poverty in rural areas, with most households relying on agriculture with limited land. In addition to the NTP, another measure of farmer welfare is the Rice Farmer Household Income Exchange Rate (NTPRP).

The NRPRP is an indicator that reflects the economic welfare of rice farming households by comparing the income received from agricultural production with their expenditures for consumption and production needs. If this exchange rate is above 100, farmers are prosperous. Conversely, an NTPRP value below 100 indicates that farmers are not prosperous. This indicates that farmers' income is insufficient to cover consumption and production needs, which means that their economic conditions are less favorable. Based on the above problems, it is important to analyze farmers' welfare comprehensively, that farmers' welfare does not only look at rice farming income but also looks at income outside of rice farming, namely, on-farm income outside of rice, off-farm income, and non-farm income. This study aims to analyze farmers' household income, the level of farmer welfare with the food farmer household exchange rate (NTPRP), and the determinants of farmer welfare.

2. METHOD

This study uses a survey method. Primary data were obtained from primary sources, namely rice farmers, while secondary data were obtained from various sources, including BPS (Statistics Indonesia), the Food Security Agency and other stakeholders. The respondents were 168 rice farmers selected using *random sampling*. This study will be conducted from February to May 2025. The analysis used farmer household income, NTPRP, and binary logit analyses. Answering the first objective, namely by analyzing the income of farmer households, namely

Prt = Prt $_{\text{onfarm paddy}}$ + Prt $_{\text{non-rice onfarm}}$ + Prt $_{\text{off-farm}}$ + Prt $_{\text{non-farm}}$

Information :

Prt = Household income of rice farmers
Prt $_{\text{onfarmpadi}}$ = Income derived from paddy farming
Prt $_{\text{non-rice on-farm}}$ = Income derived from farming businesses other than rice
Prt$_{\text{off-farm}}$ = Income outside of rice farming
Prt$_{\text{non-farm}}$ = Income outside the agricultural sector

To answer the second objective, namely the level of welfare of food farmers, we used the NTRTP welfare analysis. The formula for calculating the exchange rate of farmer household income is as follows:

$$NTPRP = \frac{Y}{E}$$
$$Y = Y_P + Y_{NP}$$
$$E = E_P + E_K$$

Information:
NTPRP = Exchange Rate of Farmer Household Income
Y = Farmer's household income (IDR)
E = farmer's household expenditure (IDR)
Y $_{P}$ = total income from farming (IDR)
Y $_{NP}$ = total income from non-agricultural farming (IDR)
EP = total expenditure for farming (IDR)
EK = Total Expenditure for Non-Agricultural Businesses (IDR)

Therefore, the exchange rate of farmer household income is used as a benchmark for the level of welfare: NTPRP<1 means that the farmer's welfare level is not yet included in the prosperous group, and NTPRP>1 means that the farmer's welfare level has entered the prosperous group.

The third objective, namely the determinants of farmer welfare food in Lampung Province, was achieved using *binary logit* analysis. This study uses ordinal logit considering that the dependent variable is ordinal data and has two categories (Prasmatiwi et al., 2023; Molla et al., 2023; Nadeem et al., 2021; Ullah et al., 2022).

The ordinal logit regression equation is as follows:

$$Pi = {}_{F}(Zi) = {}_{F}({}_{\alpha} + \beta_{1} X_{1} + \beta_{2} X_{2} + \beta_{3} + \beta_{7} X_{7} + \beta_{8} X_{8} + \beta_{9} X_{9} + \beta_{10} X_{10})$$

To find Zi, the following formula is used:

$$Zi = \text{Ln}\left[\frac{Pi}{1-Pi}\right] = (\alpha + \beta_{1} \text{LAPP} + \beta_{2} \text{AGE} + \beta_{3} \text{JART} + \beta_{4} \text{LMPEND} + \beta_{5} \text{PNGLMUT}\ \beta_{6} \text{INCPD} + \beta_{7} \text{INCOFF} + \beta_{8} \text{INCNON} + \beta_{9} \text{PGN} + \beta_{10} \text{PNPGN})$$

Where :

Pi = Farmer welfare criteria (NTRTP)
Zi = prosperous farmers 1, not yet prosperous 0
α = intercept
βi = parameter regression coefficient (i= 1,2,3,…6)
LAPP = Outside rice harvest area (hectares)
AGE = Age (years)
JART = Number of household members (people)
LMPEND = Education (years)
PNGLMUT = Farming experience (years)

INCPD = Rice farming income (IDR)
INCOFF = Off-farm Income (IDR)
INCNON = Non-farm Income (IDR)
PGN = Food expenditure (IDR)
PNONpgn = Non-Food Expenditure (IDR)

3. RESULT AND DISCUSSION

3.1. Respondent Characteristics

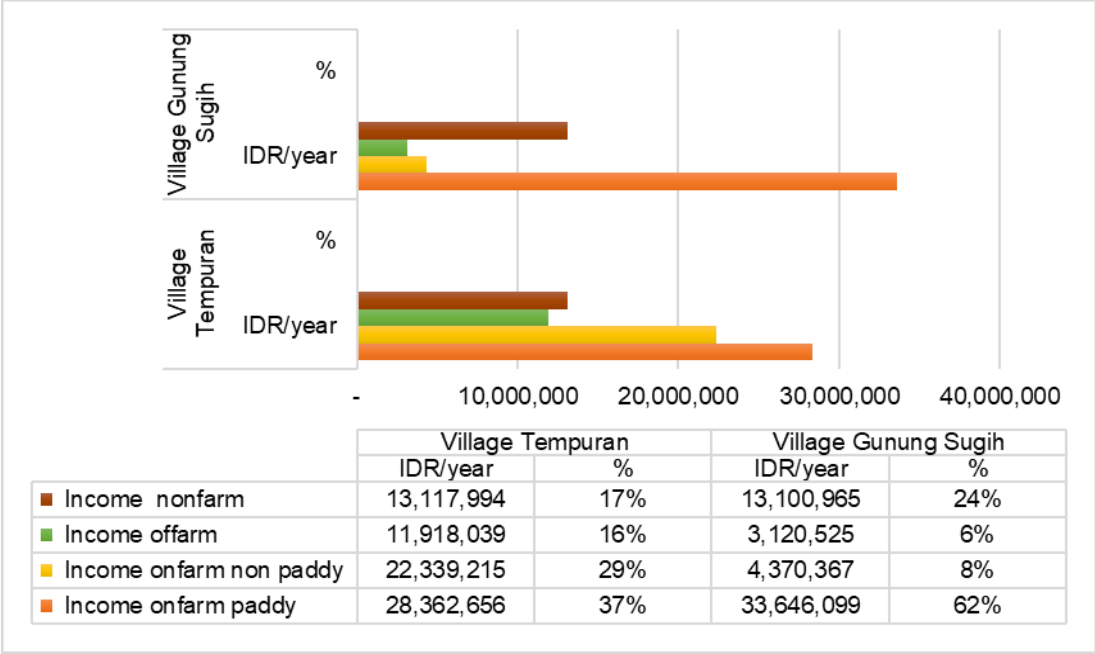
Rice farmers in Tempuran Village, Central Lampung Regency, and Gunung Sugih Village, Pesawaran Regency, have a low level of education, ranging from elementary school to junior high school (SMP), with an average productive age of 40 years. Education and productive age influence the performance of farmers' farms. Young farmers with good physical and health conditions influence rice productivity (Hatta et al., 2023). The average rice farmer's farming experience is approximately 30 years. Longer farming experience brings changes in the resilience of rice farming. This is in line with (Haile et al., 2025; Methamontri et al., 2022; Salam et al., 2024; Sedebo et al., 2021; Yeleliere et al., 2023), who showed that farming experience has a significant impact on production and farm income. The rice respondents in the study had an average family of three to four dependents, and a large number of dependents affected the income and expenses of rice farming households. This is supported by research results (Gittins et al., 2025) that a large number of family members will help meet basic household needs because there are family members who work. In both villages, most of the side jobs of rice farmers are *off-farm* as farm laborers.

The land area in both villages is small, under 1 ha. The average land area used by rice farmers in the study area is 90 percent below 1 ha. Most rice farms in Indonesia are small and fragmented due to historical, socioeconomic, land conversion pressures, and institutional factors. Land fragmentation occurs primarily because of inheritance systems that divide land into many small plots among family members. Land conversion for industry, housing, and infrastructure further reduces the area of productive rice fields. Biophysical factors and limited access to potential land also restrict the expansion of new rice fields. Meanwhile, the socioeconomic structure of smallholder farmers encourages households to maintain small plots of land for subsistence farming. Conversely, suboptimal agrarian policies exacerbate fragmentation. These factors hinder mechanization, reduce efficiency, and weaken farmers' income resilience.

3.2. Analysis of Household Income of Rice Farmers

Figure 2 shows that the household income of rice farmers in Tempuran Village, Central Lampung Regency, and Gunung Sugih Village, Pesawaran Regency, comes from several sources: on-farm paddy income, non-rice on-farm income, off-farm income, and non-farm income. On-farm paddy income in both villages contributes the most to household income in Tempuran Village, at 37 percent, and in Gunung Sugih Village, at 62 percent.

The results of this study indicate that rice is not only an economic commodity but also a staple food and the main activity of the rural economy, producing a relatively large output per unit of land per year. Because almost every farming family cultivates its own rice fields, most household income still comes from on-farm activities. This is consistent with empirical studies. Triyono et al. (2024) shows that the proportion of income from rice farming often reaches a dominant share of more than 50 percent of rice farming income, which is more dominant than other income. The lowest income in both villages was from off-farm income, with a value of 16 percent in Tempuran Village and 6 percent in Gunung Sugih Village. This indicates that the income sources of farming households have not been optimized owing to limited employment opportunities. The absence of local industry, inadequate infrastructure, and limited education make it difficult for households to diversify their income outside the agricultural sector. Thus, farmers continue to rely on on-farm income as their primary source of household support.



	Village Tempuran		Village Gunung Sugih	
	IDR/year	%	IDR/year	%
Income nonfarm	13,117,994	17%	13,100,965	24%
Income offarm	11,918,039	16%	3,120,525	6%
Income onfarm non paddy	22,339,215	29%	4,370,367	8%
Income onfarm paddy	28,362,656	37%	33,646,099	62%

Figure 2. Household income of rice farmers in Tempuran Village, Central Lampung Regency and Gunung Sugih Village, Pesawaran Regency

Source: Primary Data, 2025 (data processing results)

This is consistent with research findings (Kusnadi, 2025), which show that off-farm income is significantly influenced by the village's proximity to the market, the center of economic activity, and significantly influences the village's income. These findings indicate that the contribution of rice income to total household income depends on a combination of structural, economic, social, and policy-related factors. Improving farmer welfare is crucial for strengthening the foundation of on-farm income while simultaneously opening opportunities for off-farm income diversification.

3.3. Farmer Household Exchange Rate Analysis (NTPRP)

The NTPRP is crucial for monitoring farmer welfare because it provides a snapshot of their purchasing power and economic balance in meeting their daily needs. Furthermore, the NTPRP can serve as an indicator for the government to design policies that support farmer welfare, particularly in the face of fluctuating prices for agricultural products and basic necessities. The exchange rate of household income of rice farmers in Tempuran Village, Central Lampung Regency, and Gunung Sugih Village, Pesawaran Regency, in 2024 is presented in Table 1. The Farmer Household Income Exchange Rate (NTPRP) in Table 1 shows the difference in economic welfare between Tempuran and Gunung Sugih Villages. In Tempuran Village, the household income of rice farmers reached Rp68,553,291, consisting of agricultural income of Rp55,191,058 and non-agricultural income of Rp13,362,233. In Gunung Sugih Village, the household income of farmers was Rp51,274,123, with contributions from the agricultural sector of Rp37,824,685 and non-agricultural Rp13,449,538. The results of this study show that agricultural income in Tempuran Village is higher than that in Gunung Sugih Village, which contributes to the difference in the NTPRP between the two villages. Production and consumption costs also affect farmers' welfare in both villages.

Table 1. Calculation of the Exchange Rate of Household Income of Rice Farmers in Tempuran Village, Central Lampung Regency and Gunung Sugih Village, Pesawaran Regency

No	Information	NTPRP	
		Village Tempuran	Village Gunung Sugih
A	Income (Rp)	68.553.291	51.274.123
	1. Income farmer	55.191.058	37.824.585
	2. Income non-farmer	13.362.233	13.449.538
B	Biaya Produksi	8.120.203	9.419.619
C	Consumtion	29.931.569	40.155.976
	1. Food	13.073.462	21.411.438
	2. Non-food	16.858.107	18.744.538
D	Total Expenditure	38.051.771	49.575.595
E	Income exchange rate		
	1. Value Total	1,80	1,03
	2. Production cost	8,44	5,44
	3. Food consumtion	5,24	2,39
	4. Non food comsumtion	4,07	2,74
	5. Total Consumtion	2,29	1,28

Source: Primary Data, 2025 (data processing results)

In Tempuran Village, production costs were recorded at Rp8,120,203, lower than in Gunung Sugih Village which reached Rp9,419,619. Food and non-food consumption in Tempuran Village were Rp13,073,462 and Rp16,858,107, respectively, while in Gunung Sugih Village, it was recorded at Rp21,414,538 for food and Rp18,744,538 for non-food. The total expenditure in Tempuran Village was Rp38,051,771, lower than that in Gunung Sugih Village, which reached Rp49,575,595, indicating differences in expenditure patterns that affect the NTPRP. The results of this study indicate that the higher the income level, the greater the farmer's expenditure, indicating that farmers are more prosperous. This is in line with the results of research (Wang et al., 2024), which shows how increased income is reflected in expenditure patterns, indicating greater welfare.

The NTPRP calculation shows that farmers in Tempuran Village have a higher income exchange rate than those in Gunung Sugih. The exchange rate to total income in Tempuran Village is 1.80, while in Gunung Sugih Village, it is only 1.03, indicating that farmers in Tempuran Village can better meet household needs. The exchange rate to food consumption in Tempuran Village is 5.24, which is higher than that in Gunung Sugih Village (2.74), indicating better food purchasing power in Tempuran Village. These findings indicate that the NTPRP in Tempuran Village shows a relatively higher level of welfare than that in Gunung Sugih Village, supported by higher agricultural income and higher food expenditure. This is consistent with the results of previous research (Gbadebo et al., 2022), which shows that consumption patterns are dominated by staple foods that are relatively cheap per unit of energy (rice, wheat, corn, and sago). Due to the large quantity (calories) requirements, the total food expenditure is high, even though the price per unit is relatively low. Household survey studies have shown that staple foods account for the majority of food consumption.

Table 2 shows the average Household Income Exchange Rate of Rice Farmers (NTPRP) in Tempuran Village, Central Lampung Regency, and Gunung Sugih Village, Pesawaran Regency in 2024, based on the area of land owned by farmers with land areas of less than 1 ha and more than or equal to 1 ha. In Tempuran Village, the average NTPRP of farmers with land less than 1 ha is 0.69, while for land more than or equal to 1 ha, it is 1.81. The percentage of farmers with NTPRP below 1 in Tempuran Village is quite high, namely 80.90 % for land less than 1 ha and 4.2.86 % for land more than or equal to 1 ha,

which shows that the majority of farmers with small land have difficulty meeting their consumption and production expenses. The minimum value of NTPRP in Tempuran Village for land less than 1 ha is 0.05, while the maximum value reaches 2.28, indicating a fairly wide variation in welfare between farmer households.

Table 2. Average Exchange Rate of Household Income of Rice Farmers in Tempuran Village, Central Lampung Regency and Gunung Sugih Village, Pesawaran Regency in 2024

No.	NTPRP	Village Tempuran		Village Gunung Sugih	
		Land < 1 Ha	**Land ≥ 1Ha**	**Land < 1 Ha**	**Land ≥ 1Ha**
1	Min	0,05	0,30	0,01	0,42
2	Max	2,28	12,20	3,21	2,11
3	Average	0,69	1,81	0,81	1,12
4	**Percentage of those with NTPRP < 1**	**80,90%**	**42,86%**	**81,25%**	**41,18%**

Source: Primary Data, 2025 (data processing results)

In Gunung Sugih Village, the NTPRP (National Food Inventory) also shows a significant difference between farmers with land holdings of less than 1 ha and those with land holdings of more than 1 ha. The average NTPRP for land holdings of less than 1 ha is 0.81, while that for land holdings of more than 1 ha is 1.12. The percentage of farmers with an NTPRP below 1 in Gunung Sugih Village is higher for those with land holdings of less than 1 ha, at 81.25 %, compared to those with land holdings of more than 1 ha, at 41.18%. This indicates that farmers with smaller plots of land in Gunung Sugih Village have greater purchasing power. The minimum NTPRP value in this village is also very low, at 0.01 for land holdings of less than 1 ha, while the maximum value reaches 3.21, indicating inequality in the economic capabilities of farming households in the area. This is in line with the research results of Areef et al. (2021), who found the influence of land ownership size on consumption expenditure inequality in agricultural households. Based on the NTRTP, both NTRTP villages are categorized as less prosperous, and their income from farmer expenditures is low. This is consistent with the findings of Adriani et al. (2020) and Setiawan et al. (2019). Measuring the level of welfare using NTP and NTPRP shows that farmer welfare is still in the low category because the income they receive from farming is still unable to meet the needs of their households. This is in line with the results of Delvi et al. (2024), which indicate that a high NTPRP indicates that farmers have achieved prosperity, while a low NTPRP indicates that farmers are not yet prosperous.

3.4. Determinants of the welfare of rice farmers in Tempuran Village, Central Lampung Regency and Gunung Sugih Village, Pesawaran Regency

Table 3, using the Farmer Household Exchange Rate (NTRTP) welfare indicator, shows that the factors that influence farmer welfare are rice farming income, off-farm income, and household food consumption expenditure. Rice farming income influences welfare because it is the main source of income for farmers, which determines their purchasing power and ability to meet their basic needs. Off-farm income is influential because it provides stable additional income and is an important strategy for reducing economic risk. Food consumption expenditure reflects the level of a household's ability to meet basic needs and is a strong indicator of welfare. The combination of these three variables comprehensively describes the economic dimensions of farmer households; naturally, all three variables have a significant influence on farmer welfare. This is in line with the results of Kimkong et al. 's(2023) cross-household empirical study, which shows a positive link between income diversification (a combination of farming and off-farm) and welfare indicators, including food consumption patterns that support the role of food

expenditure and income sources. The variables that do not influence are rice harvest area, farmer age, number of family members, education, farming experience, non-farm income, and non-food consumption. The results of this study are in line with Kuncorojati (2025), who found that several socioeconomic variables (age, education, and experience) had no real effect on NTP.

Table 3 shows that the rice farming income variable (INCPD) is obtained with a probability value of 0.0001, meaning that rice farming income positively affects farmers' welfare. An odds ratio of 1.000 means that every one rupiah increase in farming income will increase farmer welfare by one fold. The probability of the off-farm income variable (INCOFF) of 0.0004 indicates that this variable has a significant effect on the NTPRP, with an odds ratio of 1.000, meaning that farmer welfare will increase one-fold if off-farm income is significant and positive with a probability of 0.0004. The results of this study are in line with the research of Kassegn and Endris (2021), who found that off-farm rice income is positive and significant, meaning that off-farm income can increase additional income for farmers as farm laborers, thereby increasing farmer welfare.

Table 3 . Binary logit regression analysis of factors influencing farmer welfare (NTPRP) on the characteristics of rice farmers in Tempuran Village, Lampung Regency

Variable	Coefficient	Std. Error	z-Statistic	Prob.	Odd Ratio
C	-6.015066	2713024	-2217108	0.0266	0.002
LAPP	0.060000	0.813373	0.073767	0.9412	1.062
AGE	0.046877	0.041599	1,126,890	0.2598	1.048
JART	-0.063089	0.194660	-0.324100	0.7459	0.939
LMPEND	0.089852	0.093852	0.957382	0.3384	1.094
PNGLMUT	0.032098	0.028998	1,106,876	0.2683	1.033
INCPD	1.12E-07	2.83E-08	3,949,034	0.0001	1.000
INCOFF	1.50E-07	4.28E-08	3,511,925	0.0004	1.000
INCNON	-1.66E-08	1.43E-08	-1,160,723	0.2458	1.000
KPGN	-2.27E-07	6.08E-08	-3,738,123	0.0002	1.000
KNPGN	2.39E-08	2.90E-08	0.825646	0.4090	1.000
McFadden R-squared	0.433404	Mean dependent var		0.196429	
LR statistic	7,214,363				
Prob (LR statistic)	0.000000				

*Note: * Significant at the 99% confidence level*
Source: Primary data (processed results), 2025

Furthermore, Table 3 shows that the variable of food consumption of farmer households is very important in meeting the needs of farmers. The results of the binary logit food consumption variable show positive results and a significant effect on the NTPRP, with a probability value of 0.0002 and an odds ratio of 1.000. In line with research of Adriani et al. (2020) that NTPRP affects farmers' purchasing power, the higher the NTPRP value, the more farmers' purchasing power will increase in improving the welfare of their households. The results of this study recommend that farmers diversify their income with the support of the agro-industry in rural areas, ease of access to modern technology, and the government needs to provide superior seeds, fertilizers, mini-mechanization, and sustainable intensification through farmer development and institutions.

4. CONCLUSION

The results of the study indicate that the income of farmer households derived from on-farm rice contributes significantly to the income of farmer households. Based on the farmer household exchange rate (NTRTP) in Lampung Province, farmers are in a less prosperous condition with an NTPRP lower than 1, low farmer income, and the condition of farmers is not prosperous. The results of the binary logit analysis show that rice farming income and off-farm income are positive and significant, while food consumption expenditure negatively and significantly affects the welfare of rice farmer households in Lampung Province. The policy implications for farmers include the importance of income diversification, production efficiency, institutional strengthening, and improving human resources.

Ethical Approval

Not Applicable

Informed Consent Statement

Not Applicable

Authors' Contributions

LSMI contributed to the development of the research framework and methodological design, including defining the survey approach, purposive site selection in Lampung Province, random sampling procedures, and the analytical strategy. BA contributed to strengthening the theoretical foundation of farmer welfare and NTPRP as a welfare indicator, refining the research questions and model specification, and supervising the interpretation of the empirical findings—especially the welfare status results and the determinants (rice on-farm income, off-farm income, and food consumption expenditure). A contributed to the econometric support and validation of the binary logit estimation, including robustness checks, interpretation of coefficient signs and significance, and alignment of welfare determinants with household economic behavior.

Disclosure statement

Throughout the research process and writing of this journal article, the research team affirms that none of the researchers had any personal interest in the research, data collection, data analysis, or publication. This study was conducted to ensure that the journal article produced by the research team would have an impact, particularly on the management of sustainable tourism, with the goal of increasing local revenue from the tourism sector and improving the welfare of the surrounding community.

Data Availability Statement

The primary data in this study is sourced from the direct results of the research, while the secondary data is sourced from several research publications. If any researcher wishes to conduct further research on the same topic, the researcher is willing to share the data.

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REFERENCES

Adriani, E., Hasminidiarty, H., & Fahmi, A. (2020). Nilai tukar petani dan pola konsumsi rumah tangga (Studi kasus: Petani tanaman pangan dan hortikultura di Kecamatan Sabak Timur Kabupaten Tanjung Jabung Timur). *J-MAS (Jurnal Manajemen dan Sains), 5*(1), 77. https://doi.org/10.33087/jmas.v5i1.152

Areef, M., Radha, Y., Rao, V. S., Gopal, P. V. S., Paul, K. S. R., Suseela, K., & Rajeswari, S. (2021). Does size of landholding contributing highest share to consumption expenditure inequalities among agricultural households? *39*(4), 1–8. https://doi.org/10.9734/AJAEES/2021/v39i430557

Arifin, B. (2022, June 17). Antisipasi krisis pangan global. *Kompas Media*. https://www.kompas.id/baca/opini/2022/06/17/antisipasi-krisis-pangan-global

Balasubramanian, P., Burchi, F., & Malerba, D. (2023). Does economic growth reduce multidimensional poverty? Evidence from low- and middle-income countries. *World Development, 161*, 106119. https://doi.org/10.1016/j.worlddev.2022.106119

Delvi, R., Ginting, L., & Indra, I. (2024). Analisis nilai tukar pendapatan rumah tangga petani (NTPRP) nilam di Kecamatan Kluet Tengah Kabupaten Aceh Selatan. *Jurnal Ilmiah Mahasiswa Pertanian, 9*, 139–146. https://doi.org/10.17969/jimfp.v9i3.31542

Gbadebo, N., Gbenga, A., Sikiru, O., Tonuchi, E., & Bank, C. (2022). Determinants of household food expenditure: Does Engel law hold in Nigeria? *2*(3), 11–17. https://doi.org/10.53790/aemr.v2i3.65

Gittins, P., Apostolopoulos, S., Anastasopoulou, E. E., & Apostolopoulos, N. (2025). Responding to Greece's constrained agricultural context: Farm diversification strategies used by family farmers. *Journal of Rural Studies, 113*(November 2024), 103522. https://doi.org/10.1016/j.jrurstud.2024.103522

Haile, F., Mohamed, J. H., Aweke, C. S., & Muleta, T. T. (2025). Impact of livelihood diversification on rural households' food and nutrition security: Evidence from West Shoa Zone of Oromia Regional State, Ethiopia. *Current Developments in Nutrition, 9*(1). https://doi.org/10.1016/j.cdnut.2024.104521

Hamzah, I. N., & Huang, W. (2023). The dynamics of strategically important food preference in Indonesia: An empirical evaluation of consumption pattern and welfare loss. *Economic Analysis and Policy, 79*, 435–449. https://doi.org/10.1016/j.eap.2023.06.024

Hatta, M., Sulakhudin, Burhansyah, R., Kifli, G. C., Dewi, D. O., Kilmanun, J. C., Permana, D., Supriadi,

K., Warman, R., Azis, H., Santari, P. T., & Widiastuti, D. P. (2023). Food self-sufficiency: Managing the newly-opened tidal paddy fields for rice farming in Indonesia (A case study in West Kalimantan, Indonesia). *Heliyon, 9*(3), e13839. https://doi.org/10.1016/j.heliyon.2023.e13839

Indah, L. S. M., Zakaria, W. A., & Sari, D. (2023). Pengaruh inflasi, PDRB, suku bunga dan tenaga kerja terhadap nilai tukar petani Provinsi Lampung. *Jurnal Ekonomi Pertanian dan Agribisnis (JEPA), 7*(3). https://doi.org/10.21776/ub.jepa.2023.007.03.16

Kassegn, A., & Endris, E. (2021). Review on livelihood diversification and food security situations in Ethiopia. *Cogent Food and Agriculture, 7*(1). https://doi.org/10.1080/23311932.2021.1882135

Kimkong, H., Promphakping, B., Hudson, H., Day, S. C. J., & Long, L. V. (2023). Income diversification and household wellbeing: Case study of the rural framing communities of Tang Krasang and Trapang Trabek in Stung Chreybak, Kampong Chhnang, Cambodia. *Sustainability (Switzerland), 15*(14), 1–17. https://doi.org/10.3390/su151411106

Koylal, J. A., Kuang, S. M., & Abineno, J. C. (2022). Perkembangan nilai tukar petani ternak ruminansia besar dan faktor-faktor yang mempengaruhinya di Nusa Tenggara Timur: The development of the exchange rate of large ruminant farmers and the factors affecting it in East Nusa Tenggara. *23*(3), 323–337. https://doi.org/10.25181/jppt.v23i3.2703

Kuma, B., & Gata, G. (2023). Factors affecting food price inflation in Ethiopia: An autoregressive distributed lag approach. *Journal of Agriculture and Food Research, 12*. https://doi.org/10.1016/j.jafr.2023.100548

Kuncorojati, Dayu Tri., Yuliati, Nuriah., Atasa, Dita. (2025). Analisis faktor-faktor yang mempengaruhi nilai tukar petani padi di Desa Singkalan Kecamatan Balongbendo Kabupaten Sidoarjo. *14*(1), 33–43. https://doi.org/10.33005/agridevina.v14i1.4759

Kusnadi, N. (2025). Determinants of off-farm household income: Evidence from rice farmers in Indonesia. *13*(1), 214–222. https://doi.org/10.29244/jai.2025.13.1.214-222

Lastri, W. A., & Anis, A. (2020). Pengaruh e-commerce, inflasi, dan nilai tukar terhadap pertumbuhan ekonomi Indonesia. *Jurnal Kajian Ekonomi dan Pembangunan, 2*(1), 151. https://doi.org/10.24036/jkep.v2i1.8902

Mariyono, J. (2014). Rice production in Indonesia: Policy and performance. *Asia Pacific Journal of Public Administration, 36*(2), 123–134. https://doi.org/10.1080/23276665.2014.911489

Marsudi, E., Syafitri, Y., & Makmur, T. (2020). Faktor-faktor yang mempengaruhi nilai tukar petani padi dan perkembangannya di Provinsi Aceh. *Jurnal Agrisep, 21*(2), 51–60. https://doi.org/10.17969/agrisep.v21i2.17220

Methamontri, Y., Tsusaka, T. W., Zulfiqar, F., Yukongdi, V., & Datta, A. (2022). Factors influencing participation in collective marketing through organic rice farmer groups in northeast Thailand. *Heliyon,* 8(11). https://doi.org/10.1016/j.heliyon.2022.e11421

Molla, E., Melka, Y., & Desta, G. (2023). Determinants of farmers' adaptation strategies to climate change impacts in northwestern Ethiopia. *Heliyon, 9*(8), e18514. https://doi.org/10.1016/j.heliyon.2023.e18514

Nadeem, A. M., Ali, T., Wei, W., Cui, Q., & Huang, S. (2021). Can irrigation conditions improve farmers' subjective well-being? An investigation in rural Pakistan. *Water, 13*(4), 505. https://doi.org/10.3390/w13040505

Pangesti, A. W. (2021). *Analisis kausalitas harga beras dengan tingkat inflasi di Indonesia*. digilib.uns.ac.id. https://digilib.uns.ac.id/dokumen/detail/83823/Analisis-Kausalitas-Harga-Beras-Dengan-Tingkat-Inflasi-di-Indonesia

Peng, Y., Peng, X., Yin, M., He, J., & Ma, L. (2023). The welfare effects of impoverished rural areas: Review and research prospects. *Heliyon, 9*(9). https://doi.org/10.1016/j.heliyon.2023.e19513

Prasmatiwi, Erry F., Zahra, Rahmita., Evizal, R.., & Astuti, Novi T. (2023). Farmers' decision to delay selling of coffee in West Lampung, Indonesia. *E3S Web of Conferences, 444*, 02038. https://doi.org/10.1051/e3sconf/202344402038

Qadir, Abdul, Suhartanto, M. R., Widajati, E., Budiman, C., Zamzami, A., Rosyad, A., & Diaguna, R. (2024). Commercial rice seed production and distribution in Indonesia. *Heliyon, 10*(3), e25110.

https://doi.org/10.1016/j.heliyon.2024.e25110
Qadir, Aneela, Arshad, M., Li, G., & Rafique, M. (2022). Representative farming and non-farming communities as a dynamic mirror of unidimensional poverty in Pakistan. *Research Square Platform LLC*. https://doi.org/10.21203/rs.3.rs-2033130/v1
Ramadhanu, R., Ginting, R., & Ayu, S. F. (2021). Analysis of factors affecting farmer exchange rate in North Sumatera Province. *IOP Conference Series: Earth …*. https://iopscience.iop.org/article/10.1088/1755-1315/782/2/022050/meta
Runtunuwu, P. C. H. (2020). Analysis of macroeconomic indicators on the farmer exchange rate of North Maluku Province: A case study of smallholder plantation subsector. *Society*. https://society.fisip.ubb.ac.id/index.php/society/article/view/235
Ruspayandi, T., Bantacut, T., Arifin, B., & Fahmi, I. (2022). Market-approach-based policy to achieve rice price stability in Indonesia—Can it be a complement? *Economies, 10*(12), 1–19. https://doi.org/10.3390/economies10120296
Salam, M., Auliyah, N., Saadah, Tenriawaru, A. N., Diansari, P., Rahmadanih, Muslim, A. I., Bakheet Ali, H. N., & Ridwan, M. (2024). Determinants of rice production in Bantaeng Regency, Indonesia: In search of innovative sustainable farm management practices. *Heliyon, 10*(23), e40634. https://doi.org/10.1016/j.heliyon.2024.e40634
Saridewi, L. P. (2021). Analisis nilai tukar petani komoditas padi di Yogjakarta. *Journal of Agribusiness Science and Rural Development, 1*(1), 18–25. https://doi.org/10.32639/jasrd.v1i1.11
Sedebo, D. A., Li, G. C., Abebe, K. A., Etea, B. G., Ahiakpa, J. K., Ouattara, N., Olounlade, A., & Frimpong, S. (2021). Smallholder farmers' climate change adaptation practices contribute to crop production efficiency in southern Ethiopia. *Agronomy Journal, 113*(6), 4627–4638. https://doi.org/10.1002/agj2.20900
Setiawan, R. A. P., Noor, T. I., Sulistyowati, L., & Setiawan, I. (2019). Analisis tingkat kesejahteraan petani kedelai dengan menggunakan pendekatan nilai tukar petani (NTP) dan nilai tukar pendapatan rumah tangga petani (NTPRP). *Jurnal Agribisnis Terpadu, 12*(2), 178. https://doi.org/10.33512/jat.v12i2.6779
Triyono, T., Al Qudsi, M. F. F., Rahmawati, N., Rozaki, Z., & Kamarudin, M. F. (2024). The role of organic rice farm income on farmer household welfare: Evidence from Yogyakarta, Indonesia. *9*(1). https://doi.org/10.1515/opag-2022-0273
Ullah, A., Mishra, A. K., Bavorova, M., & Kächele, H. (2022). The effect of COVID-19 pandemic on market integration: Evidence from vegetable farmers in Pakistan. *International Journal of Disaster Risk Reduction, 80*(May). https://doi.org/10.1016/j.ijdrr.2022.103220
Wang, L., Ding, X., Hong, M., Xiong, W., & Tan, Y. (2024). Exploring changes and influencing factors of farmers' welfare in different villages under the background of homestead system reform. *Habitat International, 153*, 103190. https://doi.org/10.1016/j.habitatint.2024.103190
Yeleliere, E., Antwi-Agyei, P., & Guodaar, L. (2023). Farmers response to climate variability and change in rainfed farming systems: Insight from lived experiences of farmers. *Heliyon, 9*(9), e19656. https://doi.org/10.1016/j.heliyon.2023.e19656