

# The Economic Role of Women in Dryland Rice-Based Livelihoods (A Case Study of Mekarjaya Village, Ciemas District, Sukabumi Regency)

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## ABSTRACT

*This study aims to explore the role of women in agricultural labor, their involvement in household decision-making, and their contribution to household income. It also intend to identify the factors that affect women's working time and income from both farm and non-farm activities. The study employs several analytical methods, including gender role analysis (using the Harvard framework and Likert scale), income contribution analysis, and multiple linear regression analysis through the Ordinary Least Squares (OLS) method. The findings reveal that women are predominantly involved in planting, weeding, harvesting, and post-harvest tasks. Among household decisions, women are primarily responsible for managing farm finances. In households where women engage only in field or garden-based agricultural work, their annual income contribution is approximately IDR 2,394,098. In contrast, households where women work in both fields/gardens and rice paddies see a slightly lower contribution of around IDR 1,967,954 per year. Key factors affecting women's time spent on farm activities include time allocated to off-farm work, the size of agricultural land, and the number of children under five years old. Women's off-farm income is significantly influenced by the time they spend on off-farm activities, while their on-farm income is determined by the size of the land and the time they dedicate to farm work.*

**Keywords:** Harvard analysis; working time; income contribution; decision-making

## INTRODUCTION

Climate change is not the sole challenge confronting the agricultural sector. Other significant issues include population growth and the ongoing conversion of agricultural land into non-agricultural uses such as industrial, residential, and infrastructure development, leading to a continuous reduction in available farmland. Relying exclusively on paddy fields risks undermining the land's capacity to support sustainable agricultural development, which could negatively affect national food security in the long term. As a result, promoting the utilization of dry land for agricultural purposes emerges as a viable alternative solution (Mulyani et al. 2016).

Human resources are a critical factor in advancing the effective use of dry land. This aligns with the priorities outlined in the National Medium-Term Development Plan (RPJMN) IV for 2020–2024, which emphasizes the importance of developing high, quality and competitive human capital, both male and female, in agricultural development. Enhancing the capacity and involvement of these human resources is expected to contribute to improving the welfare of farming households in rural areas. (BAPPENAS 2019).

The active participation of farmers and their families, including women, plays a significant role in advancing agricultural development (Sukesi 2002). In rural communities, the involvement of women in the workforce is a common and accepted practice. The socioeconomic conditions of farming households are often closely linked to poverty, which can necessitate women's participation in income-generating activities to help support their husbands in fulfilling the family's basic needs (Bertham et al. 2011). As stated by Bagamba et al. (2009), when income from agricultural activities is insufficient to meet daily household expenses, both men and women in the household tend to seek employment outside the farming sector.

Mekarjaya Village is recognized as the central hub for dryland rice cultivation in Ciemas Subdistrict, Sukabumi Regency. Agricultural activities in this area involve not only men but also a substantial number of women, with female participation in rice farming, both upland and lowland, reaching 48.68% (Mekarjaya Village Office 2020). The management of rice farming encompasses various stages, including land preparation, production, and post-harvest activities, each characterized by distinct gender roles. In general, men in Mekarjaya Village assume a more prominent role in agricultural activities compared to women. This is closely linked to prevailing social norms and the traditional division of labor, where men are viewed as the primary figures in both the household and community. Consequently, they are typically responsible for tasks that require physical

strength, technical expertise, and familiarity with agricultural technologies and input management. On the other hand, women are often assigned to lighter duties, reflecting gendered assumptions that associate women with qualities such as gentleness, precision, orderliness, and patience.

Differences in labor roles have led to women having limited knowledge and access to agricultural resources, as they are often excluded from these activities. As a result, women working in the fields are frequently perceived as less capable, which influences household farming decisions. In Mekarjaya Village, some women carry out nearly all farming tasks, such as planting, weed control, harvesting, and fertilizing, similar to men.

This study contributes new insights by focusing on women's roles in dryland rice farming, an area that has received comparatively little academic attention versus irrigated systems. It highlights how women, despite carrying out the majority of agricultural labor, are often viewed as less competent. The research sheds light on women's invisible labor, explores gender disparities in resource access, and offers novel perspectives for developing gender-sensitive agricultural policies aimed at improving productivity, equity, and rural development. This study aims to explore the involvement of women in both upland and lowland rice farming in Mekarjaya Village, examine their participation in household agricultural decision-making, and evaluate the extent of their income contribution to the overall household earnings of dryland rice farming families. Additionally, this study intends to identify the factors that affect how women allocate their working hours and income between farming and non-farming activities, providing a comprehensive insight into women's roles and economic contributions within the rural agricultural sector.

## LITERATURE REVIEW

### WOMEN'S ROLE IN AGRICULTURAL ECONOMY

Women play a vital role in society by fulfilling their rights and responsibilities according to their social status (Roy and Kadian 2016). Within household labor divisions, men are often recognized as the heads of families and primary income earners, while women typically manage domestic duties as homemakers. Despite this, women exercise autonomy in decision-making based on their preferences (Akhter et al. 2010), and there is a growing shift in their roles to include both caregiving and income-generating activities. Women are expected to contribute economically without compromising family responsibilities and to maintain positive social relations within their communities (Gondal et al. 2019).

In agriculture, women's roles are generally categorized into productive, reproductive, and social functions, reflecting the diverse ways they contribute to household and community life. Productive roles involve direct participation in farming activities such as planting, weeding, harvesting, and post-harvest processing. Reproductive roles encompass household tasks, including childcare, cooking, and ensuring family well-being. Social roles relate to involvement in community groups, mutual support networks, and the sharing of knowledge. Despite their significant contributions, women's labor is often undervalued, poorly compensated, and constrained by unequal access to essential resources like land, credit, and technology (FAO 2011; Noviryani et al. 2019).

### FARMER HOUSEHOLD INCOME

A household is defined as one or more individuals residing together under the same roof or sharing a common kitchen, who collectively make decisions to meet daily needs and other activities. Members of a household include all individuals living together, regardless of whether they are currently present or temporarily absent (Badan Pusat Statistik 2018). A farmer's household specifically refers to a household in which at least one member engages in agricultural or horticultural activities, livestock farming, or related income-generating pursuits. Income derived from these activities serves as a crucial means for sustaining daily living requirements (Sudarta 2017).

Income, as defined by Hermanto (2018), is the total earnings an individual receives in the form of money, goods, or services as compensation for labor performed. Sutomo and Sulistini (1987) describe household income as the aggregate earnings of all household members, including spouses, children, and other co-residents, from both primary and secondary sources. Such income may comprise wages and salaries as remuneration for labor or production factors, typically paid in cash, goods, or services by employers. Additionally, income from household-operated businesses is considered gross income, calculated as the difference between the selling price of produced goods or services and the associated production costs. Additional income sources may include rental income, earnings from side businesses, remittances from family members, and other non-salary revenues (Badan Pusat Statistik 2018).

### WORK TIME ALLOCATION

Work time allocation refers to the amount of time an individual dedicates to economic activities that result in the production of goods and services. According to the International Labour Organization (ILO), as cited in Diener et al. (2010), working time pertains to a specific duration spent on tasks that contribute to productive processes

yielding goods or services. In the context of agriculture, labor time refers to the total hours household members devote to farming activities. The amount of time allocated to such work directly influences household income, as families tend to prioritize activities that offer higher economic returns, based on the employment opportunities accessible to them (Damantun et al. 2017).

Household labor time is typically divided into income-generating and non-income-generating activities. Income-generating activities include work performed in both agricultural and non-agricultural sectors, while non-income-generating activities encompass domestic responsibilities, education, personal care, and community involvement (Suprapto 2001).

Mangkuprawira (1985) explains that the allocation of working time by household members is shaped by internal factors, such as age, gender, work experience, household size, and income, as well as external factors, including wage levels, type of employment, and prevailing social structures.

Despite the relevance of these dynamics, there remains a lack of empirical research specifically examining how women in dryland rice-based agricultural systems, such as those in Mekarjaya Village, balance on-farm and off-farm labor, contribute to household income, and participate in decision-making processes. Existing studies often generalize findings across agricultural systems or focus primarily on irrigated rice farming, thereby overlooking the unique challenges and economic roles of women in dryland rice-based livelihoods. Addressing this gap is essential, particularly given the high level of female participation in agricultural labor in Mekarjaya Village and the critical need to recognize their contributions in strengthening household economic resilience.

## METHODOLOGY

This study was conducted in Mekarjaya Village, located in Ciemas Subdistrict, Sukabumi Regency, West Java Province, Indonesia. The location was purposively selected due to its status as a center of dryland rice cultivation and the notable participation of women in agricultural activities. Fieldwork took place in March 2020, with the aim of examining women's roles and contributions in both upland and lowland rice farming systems.

This study utilized a combination of primary and secondary data sources, employing both quantitative and qualitative approaches. Primary data were collected directly from farmer households, specifically from women who are the wives of rice farmers and are actively engaged in farming tasks. Data collection was conducted through structured interviews using a standardized questionnaire. Secondary data were sourced from various institutions, including the Central Bureau of Statistics (BPS), the Ministry of Women's Empowerment and Child Protection (KPPPA), the Ministry of Agriculture, the Agricultural Extension Center (BPP) of Ciemas Subdistrict, and the Mekarjaya Village Office. Additional information was gathered from academic literature, such as books, journal articles, theses, dissertations, and reputable online sources. The data obtained were cross-sectional in nature, reflecting conditions as of the year 2019.

A non-probability sampling method was applied in this study, meaning that not all individuals within the population had an equal chance of being selected. Specifically, purposive sampling was used to target women from agricultural households involved in dryland rice farming who are actively engaged in agricultural labor (Sugiyono 2017). The total number of dryland rice farming households in Mekarjaya Village was recorded at 1,568 households. From this population, a sample of 100 households was selected, consisting of 25 households engaged exclusively in upland rice farming on fields or gardens, and 75 households involved in both plantation and paddy field cultivation.

## GENDER ROLE ANALYSIS

This study adopts the Harvard Analytical Framework as outlined by Handayani and Sugiarti (2008), in combination with the likert scale approach adapted from Puspitawati (2012), to assess activity and control profiles in agricultural households. The analysis of activity profiles focuses on the division of labor within households, specifically on productive activities, which in this context refer to tasks involved in upland and lowland rice farming. These tasks include nursery preparation, land clearing, hoeing, plowing, planting, fertilizing, weeding, pest and disease control, harvesting, and post-harvest processing.

The Likert scale is utilized to measure the degree of gender-based cooperation in the division of labor within upland and lowland rice farming. Respondents rated each activity on a four-point scale, modified from Puspitawati (2012), with scores assigned as follows: male-only participation = 1, female-only participation = 2, equal/shared participation = 3, and others (e.g., hired labor) = 4. For analytical purposes, a simplified scoring system was also applied: male or female = 1, shared = 2, and others = 0, to assess the extent of gender cooperation in farm labor. The control profile analysis aims to examine women's decision-making roles within the household, particularly regarding agricultural decisions in dryland rice farming. The decision-making indicators include: land ownership, crop selection, financial management, procurement of inputs, labor allocation, nursery management, planting, fertilizing, weeding, pest and disease control, harvesting, selling of crops, and pricing decisions.

Each variable is classified into three categories—low, moderate, and high—based on index scores defined by Rahmawati et al. (2008), with cut-off points at 0.00%–33.33% for low, 33.34%–66.67% for moderate, and 66.68%–100.00% for high. A low category in labor division indicates minimal involvement from both genders; a moderate category reflects partial cooperation, often with one party being more dominant; and a high category signifies active and equal participation by both men and women. Similarly, in decision-making roles, a low level indicates that decisions are made by only one party, a moderate level involves joint decision-making with dominance from one party, and a high level reflects equal and collaborative decision-making without dominance from either side.

#### INCOME CONTRIBUTION ANALYSIS

The analysis of income contribution is employed to evaluate the extent of women's earnings in relation to the overall household income from farming activities. These calculations can be formulated as follows (Ningtiyas *et al.* 2015):

$$KPDPUP_{iz} = \frac{CWKPUP_i}{TCWKRTUP_i} \times PDRTUP_{iz}$$

Note:

KPDPUP <sub>iz</sub>	= Women's income contribution in upland rice farming (Rp/year)
CWKPUP <sub>iz</sub>	= Women's working time in upland rice farming (Hours/year)
TCWKRTUP <sub>iz</sub>	= Total household working time in upland rice farming (Hours/year)
PDRTUP <sub>iz</sub>	= Household income in upland rice farming (Rp/year)
I	= Sample i

The contribution of women's income to farmer household income in off-farm activities can be seen from the total outpouring of women working time in off-farm work and the income generated from off-farm work in wages and profits generated in certain jobs. Women's income contribution is obtained by comparing women's total income and total household income. Women's total income is the sum of women's income contribution on farm (upland rice, lowland rice, and non-rice farming) and off-farm work. Total household income is the sum of household member contributions (men, women, and children) on farm and off-farm work.

$$KPDP_i = \frac{TPDP_i}{TPDRT_i} \times 100\%$$

KPDP <sub>iz</sub>	= Women's income contribution in upland rice farming (Rp/year)
TPDP <sub>iz</sub>	= Women's total income (Rp/year)
TPDRT <sub>i</sub>	= Household total income (Rp/year)
I	= Sample i

Women's income contribution will be categorized into low, medium, and high. The cut-off is determined based on the criteria and contribution scores of Rahmawati et al. (2008), namely low (00,00%–33,33%), moderate (33,34%–66,67%), and high (66,68%–100,00%).

#### MULTIPLE LINEAR REGRESSION ANALYSIS (ORDINARY LEAST SQUARE (OLS))

##### THE WOMEN'S WORKING TIME ON FARM

Outpouring women's working time on farm is the number of working hours allocated by women in upland, lowland, and non-rice farming. The equation for women's work time in rice farming is as follows:

$$CWKPUS = a_0 + a_1 CWKPNUS + a_2 CWKLUS + a_3 LHN + a_4 JAB + a_5 UP + U_1$$

Note:

CWKPUS	= women's working time on farm (hours/year)
CWKPNUS	= women's working time in off-farm work (Hours/year)
CWKLUS	= men's working time on farm (Hours/year)
LHN	= Land area (Hectare)
JAB	= Number of children under five (person)

UP	= Women's age (years old)
$a_0$	= Constant
$a_j$	= Parameters; $j = 1, 2, 3, \dots$ etc.
$U_1$	= Confounding variable

the initial hypothesis's alleged parameters can be signed as:  $a_3, a_5 > 0$ ;  $a_1, a_2, a_4 < 0$ .

#### THE WOMEN'S WORKING TIME IN OFF-FARM WORK

The number of working hours allocated by women in off-farm work is a total of women's working time in off-farm work. The equation to calculate the outpouring of women's working time in off-farm work :

$$CWKPNUS = a_0 + a_1PDPNUS + a_2CWKPUS + a_3JAB + U_2$$

Note:

CWKPNUS	= Outpouring of women's working time in off-farm work (Hours/year)
PDPNUS	= Women's income in off-farm work (Rp/year)
CWKPUS	= Outpouring of women's working time on farm (Hours/year)
JAB	= Number of children under five (person)
$a_0$	= Constant
$a_j$	= Parameters; $j = 1, 2, 3, \dots$ etc.
$U_2$	= Confounding variable

The expected parameter estimates (hypothesis) are signed as:  $a_1 > 0; < 0 a_2, a_3$

#### WOMEN'S INCOME ON FARM

The woman's income is calculated by comparing total outpouring of women's working time with the total outpouring of household working time multiplied by total household income from farming. Women's income equation on farm is

$$PDPUS = a_0 + a_1LHN + a_2JAR + a_3CWKPUS + a_4PGPUS + U_3$$

Note:

PDPUS	= Women's income on farm (Rp/year)
LHN	= Land area (M2)
JAR	= Number of household members (Person)
CWKPUS	= Outpouring of women's working time on farm (Hours/year)
PGPUS	= Women experience on farm (years)
$a_0$	= Constant
$a_j$	= Parameters; $j = 1, 2, 3, \dots$ etc.
$U_3$	= Confounding variable

The expected parameter estimates (hypothesis) are signed as:  $a_1, a_2, a_3 > 0; a_4, a_5 < 0$

#### WOMEN'S INCOME IN OFF-FARM WORK

Women earn women's income in off-farm work as paid workers (wages) or profits generated from business endeavors. The income equation for women in off-farm work is:

$$PDPNUS = a_0 + a_1CWKPNUS + a_2UP + a_3PDDP + U_4 \dots \dots \dots (4.4.4.4)$$

Note:

PDPNUS	= Income of women in off-farm work (Rp/year)
CWKPNUS	= Outpouring of women's working time in off-farm work (Hours/year)
UP	= Women's age (Years old)
PDDP	= Women's education level (Year)
JAB	= Number of children under five (person)
$a_0$	= Constant

$$\begin{array}{ll}
 a_j & = \text{Parameters ; } j = 1, 2, 3, \dots \text{etc} \\
 U_4 & = \text{Confounding variable}
 \end{array}$$

The expected parameter estimates (hypothesis) are signed as:  $a_1, a_2, a_3 > 0 ; < 0 a_4$

According to Gujarati and Porter (2013), a reliable regression model must satisfy both statistical criteria, such as the F test, t-test, and coefficient of determination ( $R^2$ ), and econometric criteria, which include the assumptions of data normality and the absence of classical issues like multicollinearity, autocorrelation, and heteroscedasticity. These assumption tests are conducted to ensure that the data is unbiased, consistent, and efficient, thereby guaranteeing that the research results are valid and represent the Best Linear Unbiased Estimate (BLUE).

#### STATISTICAL CRITERIA

##### COEFFICIENT OF DETERMINATION ( $R^2$ )

The coefficient of determination ( $R^2$ ) indicates the extent to which the independent variables in a regression model explain the variation in the dependent variable.  $R^2$  values range between 0 and 1 ( $0 \leq R^2 \leq 1$ ), with values closer to 1 suggesting that the independent variables effectively explain the changes in the dependent variable (Gujarati & Porter 2013).

##### F-TEST

This test is used to test the significance of the effect of the independent variables in the regression model equation on the dependent variable. If  $F_{\text{cal}} > F_\alpha$  or  $\text{sig} < \alpha(0.05)$ , means variable independent overall real or significant influence on the dependent variable.

##### T-TEST

This test is used to test how much the partial effect of each independent variable has on the dependent variable. If  $t_{\text{cal}} > t_\alpha$  or  $\text{sig} < \alpha(0.05)$ , the independent variable has a real or significant influence on the dependent variable. Econometric criteria

##### NORMALITY TEST

This test aims to test whether the regression model has data that is normally distributed or not normally distributed. This normality test was carried out using the Kolmogorov-Smirnov test. If the sig value  $> \alpha (0.05)$ , it can be said that the residual data is normally distributed (Ghozali 2013).

##### MULTICOLLINEARITY TEST

According to Ghozali (2013), this test aims to determine whether or not there is a correlation relationship between independent variables in a regression model. If the Tolerance value is  $> 10$  percent (0.10) and the Variance Inflation value factor(VIF) is  $< 10$ , it can be said that the regression model is free from multicollinearity.

##### AUTOCORRELATION TEST

This test aims to assess whether or not there is a strong correlation between the residuals from one observation (sample) and other observations in a regression model. The autocorrelation in a regression model is determined using the Durbin-Watson (DW) approach. If the value of  $dU < DW < 4-dU$ , it can be said there is no autocorrelation in the regression model.

##### HETEROSCEDASTICITY TEST

This test is conducted to see whether the residual from one observation to another has a constant or not constant variance. The regression model is BLUE if the residual value of the model has the same variance (constant) or commonly called homoscedasticity. One way to determine whether data is homoscedasticity is by using the Glejser Test. If the probability value is  $> 0.05$ , the regression model does not have heteroscedasticity problems (Gujarati & Porter 2013).

TABLE 1. Analysis method used in the study

No.	Objective	Analysis method
1.	Gender role analysis	Likert scale
2.	Income contribution analysis	Income contribution formula
3.	Analysis of the factors influencing women's distribution of working time and revenue from both farming and non-farming activities	Multiple linear regression analysis

## RESULTS

### THE ROLE OF WOMEN IN RICE FARM WORK ON DRY LAND

Farming management will involve several activities, leading to household labor division between men and women. Based on the research results, both parties' labor division in upland rice farm work is almost balanced. The majority of farm work carried out together includes land clearing (65%), planting (82%), weeding (67%), harvest (80%), and postharvest (82%). Upland rice farming requires many workers, so many women participate in farm work. This is supported by the upland rice farming household cooperation level, which is categorized as the high category level. The level of household cooperation in upland rice farming is shown in Table 1.

TABLE 2. Level of household cooperation in upland rice farm work, Mekarjaya Village

Level of cooperation	Number of respondents (Person)	Percentage (%)
Low	3	3
Moderate	22	22
High	75	75
Average ± Standard deviation	75.71 ± 16.50	
Min – Max	21.43 – 92.86	

Source: Authors' own work (2020)

This study aligns with Nurjaman (2013) that the distribution of labor division of farm households in upland rice farming has a large percentage when done together. This research is also in line with Hutajulu (2015), the involvement of women in farm work on dry land has a major contribution. This is due to the openness and willingness of women to help their husbands manage farming business, in addition to the work considered natural as a housewife taking care of house chores.

However, there are differences in the distribution of labor in rice farming households, which tend to be carried out by men. This is because the implementation stage requires technology adoption, so there is a need for more knowledge and skills regarding implementation techniques where women are rarely involved in these activities (Fakih 1996). In this case, the division of labor between men and women in Mekarjaya Village is still under the stereotype theory that applies to rural communities where there is a label that heavy work is only done by men. In contrast, light work is done by women (Handayani & Sugiarti 2008). A joint force of women and men in paddy rice farm work includes planting (82.67%), weeding (73.33%), harvesting (76%), and postharvest (84%). The level of household cooperation in lowland rice farming is included in the moderate category. The level of household cooperation in paddy rice farming can be seen in Table 2.

TABLE 3. Level of household cooperation in rice farm work, Mekarjaya Village

Level of cooperation	Number of respondents (Person)	Percentage (%)
Low	5	6.67
Moderate	58	77.33
High	12	16
Average ± Standard deviation	61.48 ± 12.09	
Min – Max	22.22 – 83.33	

Source: Authors' own work (2020)

### THE ROLE OF WOMEN IN HOUSEHOLD DECISION-MAKING IN RICE FARMING ON DRY LAND

Women's participation in agricultural activities has significantly contributed to the family's economic well-being. However, the balance of decision-making power between men and women within households remains uncertain. Household decision-making patterns are closely linked to authority, which is often determined by social position and power dynamics.

According to the research findings, men predominantly make decisions in upland rice farming activities, accounting for 42.25% of overall decisions. Joint decision-making by both men and women represents 37%. Specific activities include labor allocation (42%), planting (56%), weeding (46%), harvesting (68%), marketing of produce (91%), and pricing of production (85%).

Decisions made solely by women constitute 20.75% of overall activities, with a significant majority occurring in farm financial management (86%). This suggests that women have limited influence in farm management decisions. Deacon and Firebaugh (1998) emphasize that households with constrained resources require effective financial management to optimize resource use in meeting family needs, a role typically undertaken by women. This finding aligns with the moderate level of household decision-making cooperation observed in upland rice farming. Further details on the level of household decision-making cooperation in upland rice farming are provided in Table 3.

TABLE 3. Level of cooperation in household decision making upland rice farm work, Mekarjaya Village

Level of cooperation	Number of respondents (person)	Percentage (%)
Low	39	39.00
Moderate	61	61.00
High	0	0.00
Average (score) ± Standard deviation		37.0 ± 16.08
Min – Max		00.00 – 66.67

Source: Authors' own work (2020)

While the division of labor between men and women in upland rice farming is nearly balanced, decision-making authority tends to be predominantly held by men. This is largely due to societal norms that regard men as the primary decision-makers within the household. Women's participation in decision-making is often closely tied to their traditional role as homemakers.

Similarly, in lowland rice farming households, the level of decision-making cooperation is classified as moderate, with a cooperation rate of 53.33%. Sajogyo (1993) identifies several factors that influence women's involvement in decision-making, including their educational attainment, social status within the community, marital position within the household, socialization experiences, and external factors influences. Table 4 presents the data on the level of household decision-making cooperation in lowland rice farming.

TABLE 4. Level of cooperation in household decision making paddy rice farm work, Mekarjaya Village

Cooperation level category	Number of respondents (person)	Percentage (%)
Low	35	46.67
Moderate	40	53.33
High	0	0.00
Average (score) ± Standard deviation		32.41 ± 13.87
Min – Max		00.00 – 53.85

Source: Authors' own work (2020)

#### WOMEN'S INCOME CONTRIBUTION

Women's income contribution refers to their role in generating economic value through wages, salaries, or profits derived from various business activities. This contribution is measured as the proportion of women's total income relative to the overall household income. The total income earned by women is reflected by the amount of time they allocate to productive activities that generate livelihood. Women's income contribution is categorized into two main sources: 1) income from farm work, including upland rice, lowland rice, and non-rice farming, and 2) income from off-farm activities, such as agricultural labor and trading.

Analysis of income contributions indicates that, on average, women contribute IDR 2,394,098 annually, representing 28.68% of total household income in households engaged exclusively in farming activities in fields or gardens. Table 5 provides a detailed overview of the average income contribution of women in farming households within Mekarjaya Village.

TABLE 5. The contribution of women's income in households by farming, Mekarjaya Village

Activity	Total household income (IDR/year)	Women's total income (IDR/year)	Contribution (%)
Upland rice farming	1,394,350	635,550	45.58
Non-rice farming	8,693,243	3,791,145	43.61
Off-farm	14,951,000	2,755,600	18.43
Total average	8,346,198	2,394,098	28.68

Source: Authors' own work (2020)

The average annual contribution of women to total household income in households engaged in farming both in fields/gardens and paddy fields for Mekarjaya Village is IDR 1,967,954, accounting for 29.91%, as detailed in Table 6.

TABLE 6. The contribution of women's income in households by farming in the plantation and field, Mekarjaya Village

Activity	Total household income (IDR/year)	Women's total income (IDR/year)	Contribution (%)
Upland rice farming	779,491	332,692	43.72
Paddy rice farming	5,200,682	1,788,511	34.39
Non-rice farming	8,088,999	3,521,192	43.53
Off-farm	12,246,354	2,229,421	18.20
Total average	6,578,882	1,967,954	29.91

Source: Authors' own work (2020)

Tables 5 and 6 indicate that women's total income contribution derives not only from farm work but also from off-farm activities. This finding aligns with Bashton and Yuliati (2015), who state that rural household income typically comes from multiple sources, including both farming and off-farm employment. The land ownership status of dryland rice farming households often leads women engaged solely in plantation farming to seek additional income through off-farm work. Conversely, women in households involved in both plantation and paddy field farming tend to spend more time on farm-related tasks, which reduces their participation in off-farm activities.

#### FACTORS AFFECTING THE TIME SPENT WORKING AND WOMEN'S INCOME ON FARM AND OFF-FARM BUSINESS

##### THE ALLOCATION OF WOMEN'S WORKING TIME ON FARM

Table 7 indicates a coefficient of determination ( $R^2$ ) of 0.561, meaning that 56.10% of the variation in women's working time on the farm can be explained by factors such as women's off-farm working time (CWKPNUS), men's farm working time (CWKLUS), land area (LHN), number of children under five (JAB), and women's age (UP). The remaining 43.90% is attributed to other variables not included in the model. Among these, women's off-farm working time, land area, and number of children under five have a statistically significant impact on women's farm working time.

Specifically, women's time spent on off-farm work has a significant negative effect on their time spent on farm activities, indicating that as women dedicate more hours to off-farm work, their farm work hours decrease. This suggests that due to limited available time, women prioritize activities that yield higher cash income.

TABLE 7. Estimation results of time outlay and women's income on farm and off-farm work, Mekarjaya Village

Variable	Estimating parameters	Prob>  t	Variable description
Outpouring of women's working time on farm ( $R^2 = 0.561$ )			
CWKPNUS	-0.130	0.000***	women's working time off-farm (Hours/year)
CWKLUS	0.034	0.620	men's working time on farm (Hours/year)
LHN	5.625	0.002***	Land area (Hectare)
JAB	-6.543	0.000***	Number of children under five years old (person)
UP	0.751	0.137	Women's age (years old)
Outpouring of women's working time in off-farm work ( $R^2 = 0.991$ )			
PDPNUS	9.825E-6	0.000***	Income of women in off-farm work (IDR/year)
CWKPUS	-0.039	0.772	women's working time on farm (Hours/year)
JAB	14.447	0.469	Number of children under five years old (person)
Women's income on farm ( $R^2 = 0.809$ )			
LHN	0.714	0.000***	Land area (Hectare)
JAR	-0.045	0.773	Number of household members (Person)
CWKPUS	0.651	0.000***	women's working time on farm (Hours/year)
PGPUS	-0.047	0.555	Women's experience in farming (year)
Women's income in off-farm work ( $R^2 = 0.983$ )			
CWKPNUS	6,929.170	0.000***	women's working time in off-farm work (Hours/year)
UP	-3,351.865	0.13	Women's age (Years old)
PDDP	85,252.141	0.159	Women's education level (Year)
JAB	-536,932.494	0.002***	Number of children under five years old (person)
PDPUS	-0.080	0.069*	Women's income in farming (IDR/year)

Source: Authors' own work (2020)

Note: Level  $\alpha \leq 0.05$ ; \*\*\* real at 1% level; \*\* real at 5% level; \* real at 10% level

Land area has a positive relationship and significantly affects women's working time on farm. The larger the land area, the greater the outpouring of women's working time on farm. According to Fahmi (2009), an increase in the area planted or cultivated by farmer households also tends to require a larger allocation of working time. The number of children under five has a negative and significant impact on women's time spent working on the farm. This means that as the number of young children in a household increase, women spend less time on farm work. This happens because women need to dedicate more time to caring for their children, leaving them with less time for work outside the home

#### THE ALLOCATION OF WOMEN'S WORKING TIME IN OFF-FARM WORK

Table 7 shows a coefficient of determination ( $R^2$ ) of 0.991, meaning that 99.10% of the decrease in women's farm working time can be explained by factors such as women's income from off-farm work (PDPNUS), women's farm working time (CWKPUS), and the number of children under five (JAB). The remaining 0.90% is due to other factors not included in the model.

Women's income from off-farm work has a positive and significant effect on the time they spend on off-farm activities, indicating that women who want to increase household income tend to allocate more time to off-farm work. Su et al. (2016) also found that increased off-farm work is linked to fewer days spent on staple crops, especially during harvest and sales periods, though it doesn't directly reduce overall farming time.

The time women spend working on the farm has a negative but not significant effect on their off-farm work hours. This is because women usually do off-farm work during planting waiting periods or less busy farming times, so it doesn't interfere with farm activities.

The number of children under five shows a positive but insignificant relationship with women's off-farm working time. Women with young children often rely on relatives or parents for childcare. According to Hastuti and Irawan (1989), having adult daughters also helps reduce childcare burdens, allowing women to engage in off-farm work without much interference.

#### INCOME OF WOMEN ON FARM

Table 7 presents a coefficient of determination ( $R^2$ ) of 0.809, indicating that 80.90% of the variation in women's working time on the farm can be explained by factors such as land area (LHN), number of household members (JAR), women's farm working time (CWKPUS), and women's farming experience (PGPUS). The remaining 19.10% is attributed to other variables not included in the model.

Land area shows a positive and significant effect on women's farm income, suggesting that larger cultivated land increases the potential crop yield per unit area. This higher production, in turn, boosts women's income from farming as well as the overall household income from agricultural activities. However, Balyan (2017) notes that while women contribute substantially to agriculture and related tasks, their contribution tends to have a negative correlation with farm size.

Additionally, the amount of time women dedicate to farm work has a positive and significant impact on their farm income, indicating that women's earnings from farming are closely related to the time they invest in agricultural activities.

#### WOMEN'S INCOME IN OFF-FARM WORK

Table 7 shows a coefficient of determination ( $R^2$ ) of 0.983, indicating that 98.30% of the variation in women's working time on the farm can be explained by factors such as women's off-farm working time (CWKPNU), age (UP), education level (PDDP), number of children under five (JAB), and women's farm income (PDPUS). The remaining 1.70% is due to other variables not included in the model.

Women's off-farm working time has a positive and significant impact on their off-farm income, demonstrating that the more time women dedicate to off-farm activities, the higher their earnings from these jobs. While women's education level shows a positive but insignificant effect on off-farm income, this suggests that education does not strongly influence women's earnings in off-farm work. Regardless of education level, many rural women engage in informal sector jobs where skills, rather than formal education, are prioritized. This is supported by studies from Sumule & Syafitri (2018) and Yastini & Urmila Dewi (2019), which found that in Indonesia's female informal workforce, education often does not significantly affect income or participation.

The number of children under five has a significant negative effect on women's off-farm income, meaning that as the number of young children increases, women tend to earn less from off-farm work because they must reduce working hours to care for their children.

## DISCUSSION

### THE ROLE OF WOMEN IN LABOR DIVISION AND DECISION-MAKING IN RICE FARMING

The study concludes that women actively participate in various stages of upland rice farming—including planting, weeding, harvesting, and post-harvest activities—and that household cooperation is notably high at 75%. This finding aligns with numerous studies conducted in the region. For instance, research in Pringsewu, Lampung (2018–2019) demonstrated that women engaged in organic rice farming assumed greater responsibilities in financial management and household decision-making compared to those in non-organic farming systems. Their empowerment was facilitated through involvement in farmer groups and access to training programs. These studies collectively emphasize that women's participation is essential when labor demands increase and collaborative efforts become necessary.

Despite women's extensive involvement in farm labor, their decision-making power remains limited, a trend supported by existing literature. Data from Mekarjaya Village indicate that men predominantly hold decision-making authority (42.25%), whereas decisions made solely by women account for only 20.75%. This observation concurs with findings from Nigeria, where Ajewole et al. (2015) reported that men possess greater decision-making influence in rice farming households, largely due to disparities in access to land, capital, and extension services. Similarly, Oktoriana and Suharyani (2016) found in Kubu Raya District, Indonesia, that although women participating in farmer groups tend to have increased decision-making influence, ultimate authority remains with men, reflecting social norms that prioritize male dominance in agricultural management. These comparisons illustrate that even in contexts with relatively balanced labor division, women's strategic influence is often constrained.

Analyses of upland and lowland rice cultivation in Mekarjaya revealed parallel trends: women contribute significantly to farm labor, but household decision-making cooperation is rated as moderate, with no households reaching a high level of collaboration. This pattern points to deeper structural and cultural factors. Research on gender and land-use changes in Jambi (2016–2017) found that land-use decisions in matrilineal upland communities are frequently made by elder women who hold customary inheritance rights; absent such rights, men dominate decision-making, particularly in the shift toward cash crop cultivation. These findings suggest that enhancing women's decision-making roles requires not only recognition of their labor contributions but also addressing prevailing social norms, expanding access to training, and strengthening institutional support to empower women beyond implementation roles alone.

### WOMEN'S INCOME CONTRIBUTION TO HOUSEHOLD ECONOMY

The findings of the study reveal that women's financial contributions to household income in Mekarjaya Village are substantial, stemming from both agricultural and non-agricultural activities. Specifically, women in households exclusively engaged in field and garden farming contributed 28.68% of the total household income, while those in households involved in both field and paddy farming contributed slightly more, at 29.91%. These results highlight that women's income is a vital component of household livelihood strategies rather than merely supplementary. This aligns with Bashton and Yuliati (2015), who noted that rural households often rely on multiple income sources, with women frequently diversifying their activities across agricultural and non-agricultural sectors. The flexibility in women's labor thus enhances the household's capacity to adapt to economic challenges and resource constraints.

A closer analysis of income sources shows that women's agricultural labor, particularly in upland rice and non-rice cultivation, accounts for a significant share of household income (between 43% and 46%). However, off-farm activities such as trading and agricultural wage labor also contribute meaningfully, albeit to a lesser degree (approximately 18%). This pattern is consistent with Rahman and Akter (2015), who documented that rural women in South Asia commonly supplement household income through informal and off-farm work despite facing barriers in accessing capital and markets. Similarly, Dewi et al. (2017) found that women's off-farm income plays a critical role in buffering Indonesian rice-farming households against seasonal fluctuations in agricultural earnings, underscoring the importance of both sectors in sustaining household welfare.

The variation in women's income contributions between households solely engaged in farming and those practicing mixed farming reflects differences in labor allocation and available time. Women in households cultivating both paddy and upland rice dedicate more time to agricultural tasks, consequently limiting their opportunities for off-farm income generation. This finding corroborates Kusnadi and Muawanah (2018), who reported that women's responsibilities in rice-farming households are predominantly centered on farm labor during planting and harvesting seasons, leaving limited time for supplementary employment. Furthermore, Asfaw and Neka (2019) highlighted that despite women's substantial contributions to farm income, structural barriers such as limited access to resources, training, and technology restrict their ability to maximize economic benefits across both agricultural and non-agricultural domains. Collectively, these insights emphasize the need for targeted

policies and programs that enhance women's access to productive resources, capacity-building opportunities, and market integration to strengthen their economic roles within rural household livelihoods.

#### FACTORS AFFECTING WOMEN'S WORKING TIME ALLOCATION AND INCOME IN FARM AND OFF-FARM ACTIVITIES

The findings reveal that several factors significantly influence how women allocate their time to agricultural labor. Key determinants include women's working hours in off-farm activities, land size, and the number of children under five. Women involved in off-farm employment tend to spend less time on agricultural tasks, highlighting a trade-off between these two responsibilities. This supports the findings of Su et al. (2016), who noted that increased female participation in off-farm work reduces the time devoted to staple crop activities, particularly during post-harvest periods. Additionally, larger cultivated land areas demand more labor from women, thereby increasing their time spent on farming, while the presence of young children reduces their involvement due to caregiving duties. These results emphasize the dual challenge women face in balancing productive and reproductive roles.

Women's farm income is positively related to the size of the land and the time they spend working on the farm. This means women's income from farming depends on how much land they can work on and the effort they put in. This differs from Baliyan (2017), who found that women's contribution tends to decrease as farm size grows, likely because bigger farms use more machinery or hired labor. In Mekarjaya Village, where farming is mostly done by hand, women's work is very important for increasing farm productivity and income. This agrees with Kusnadi and Muawanah (2018), who noted that women's farm income depends on both their labor and the limits they face, like limited access to land and resources.

Regarding off-farm income, women's earnings were significantly affected by the time devoted to off-farm activities, whereas educational attainment showed no significant effect. This suggests that rural women often engage in informal off-farm work—such as petty trading or agricultural wage labor—where practical skills are valued over formal education. Similar observations were made by Sumule and Syafitri (2018) and Yastini and Urmila Dewi (2019), who reported that in rural Indonesia, women's education does not necessarily translate into higher income due to the predominance of informal sector employment. Furthermore, having young children reduces women's off-farm income since they need to care for them and have less time to work. These results highlight the need for better support systems, such as childcare services, access to land, and more job opportunities, to help women improve their income and contribute more to their households.

#### CONCLUSION

This study shows that women in Mekarjaya Village are actively involved in both upland and lowland rice farming, especially in tasks like planting, weeding, harvesting, and post-harvest activities. Their contributions to dryland rice farming are significant and similar to their roles in paddy rice farming. However, women's participation in household decision-making is limited, with only about 20% of decisions made independently by women in both farming systems. Economically, women's income is relatively modest, averaging around IDR 2,394,098 per year in households focused on field and garden farming, and IDR 1,967,954 per year in households engaged in both upland and lowland farming.

The analysis also reveals that women's time spent on farm work is largely influenced by their involvement in off-farm work, the size of the land, and the number of children under five. Additionally, women's time devoted to off-farm work is closely linked to their off-farm income. Women's farm income increases with larger land size, and more time spent farming, while off-farm income is mainly affected by working hours and childcare duties. These results highlight the complex role women play, where farm productivity, household composition, and how they allocate their time all impact their economic contributions.

#### RECOMMENDATIONS

Based on these findings, several recommendations emerge. First, agricultural extension services should offer targeted programs to enhance women's technical knowledge and farming skills, helping them perform more effectively in agricultural production. Second, women should receive support in adopting new technologies, especially in farm financial management, to boost planning and efficiency. Third, empowerment efforts should focus on training women in processing agricultural products into marketable items, like banana chips and steamed banana cakes, to increase household income. Fourth, creating women-focused cooperatives is essential for improving product marketing and providing access to microfinance, which can strengthen household economic stability. Finally, future research should broaden the study of women's contributions by including performance and efficiency metrics and using more detailed models of household economic dynamics.

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