

# The Household Welfare Level of Integrated Plantation Polyculture

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## The Household Welfare Level of Integrated Plantation Polyculture Farmers

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**Abstract.** Many studies have reviewed economic benefits and ecological benefits of the integration of crop-livestock, but the author has not found a study that examines the farmer's welfare. This is important because welfare is one of the sustainable (agricultural) development goals. In addition, as an agrarian country, attention to the welfare of farmers in Indonesia is considered very strategic. This study aims to examine the value of the Farmer Household Income Exchanges Rate (FHIER) as an indicator of the welfare level Integrated Plantation of Polyculture Farmers' (IPPF) households. This study was conducted in Tasikmalaya Regency. The survey method has been carried out to 83 respondents (IPPF). The result based on the value of FHIER shows that IPPF households included in the welfare category. Meanwhile, the result of statistic analysis shows that revenue is a more important factor in determining FHIER. In more detail, it is known that revenue and expenditure from integrated plantation polyculture activities are becoming more important factors as determining the value of FHIER. Therefore, it is suggested to improve the revenues of farming households through the integrated plantation of polyculture farming in order to reach the welfare category (higher value of FHIER).

### 1. Introduction

The integrated plantations polyculture is actually Mixed Crop-Livestock farming, which is an integrated farming system that includes crops and livestock, which is often known as integrated crop-livestock farming [1]. This agricultural pattern aims to meet food needs and ecosystem conservation [2] in the rainforest in the category of high, medium, and low rainfall [3].

There are several studies which state that the crop-livestock integration exploits the synergies between cropping and livestock systems, for example, through organic fertilization and the use of crop residues to feed livestock, and offers many opportunities to improve productivity, as well as to increase resource use efficiency and improve the resilience of the whole farming system [4]. The results of evaluations of small farmers implementing integrated crop-livestock indicate that their productivity has increased and is technically efficient [5]. Diversified crop rotations with or without cattle are profitable farming systems but require greater capital and labor inputs [6]. Diversification, including integrated crop-livestock systems in dryland, can be used to improve total productivity, economic performance, soil quality, and reduce many negative environmental externalities [7] can also help reduce pollution associated with agricultural production [8]. From some of the studies above it can be seen that the integration of crop-livestock can provide economic benefits and ecological benefits. However, the author has not found a study that examines the farmer's welfare. This is important because welfare is one of the sustainable (agricultural) development goals. In addition, as an agrarian country, attention to the welfare of farmers in Indonesia is considered very strategic.



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Plantation business is currently spread out in various regions in Indonesia, one of them is in Tasikmalaya Regency, West Java. The total area and production level of smallholder plantations in Tasikmalaya Regency are wider and higher than plantation companies. Commodities cultivated in smallholder plantations and plantation companies are very diverse, and coconut is the most cultivated commodity followed by tea, sugar palm, rubber, and coffee. However, smallholder plantation farmers' land ownership is generally narrow. The polyculture plantation of smallholder plantations in Tasikmalaya Regency is a farming that is carried out on dry land. This encourages farmers to increase their land productivity by intensifying farming through polyculture planting patterns that are integrated with livestock [9] [10] [11] [12] [13].

One measure of farmers' welfare used today is Farmer Exchange Rate (FER). However, FER as a measure of farmers' welfare contains two fundamental weaknesses. First, conceptually, FER does not have a direct and firm relationship with farmers' value or purchasing power of income. The main problem lies in combining the household consumption price index and farm input price index in calculating the price index paid by farmers, which is used as a denominator in calculating FER. Secondly, empirically, FER only accommodates farm household income from farming, whereas in reality farm households in Indonesia also receive non-agricultural business income. Subsequently, the FER measurement to<sup>16</sup> was developed into the Farmer Household Income Exchange Rate (FHIER).<sup>16</sup> is concept can be defined as the ratio between total household income and household expenditure. Total farm household income is the sum of all farm income and non-farm income, while farmer expenditure is the sum of expenditures for farming costs and household consumption (expenditures for non-farm costs) [14][15].

The author is interested in conducting a study of the value of FHIER in the integrated smallholder plantation system. FHIER as an indicator of the level of welfare of farmers considers two things namely farmer's household income and farmer household expenditure. Which is more important, the factor of farmer's household income or farmer's household expenditure? The results of this study are expected to help agricultural development policymakers in order to determine priority steps to improve the welfare of farmers, especially smallholder farmers on dry land in Tasikmalaya Regency.

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## 2. Research Method

### 2.1. Location and Time

The research carried out in Karangnunggal Subdistrict, Tasikmalaya Regency, West Java Province from February to November 2019. Karangnunggal Subdistrict consists of 14 villages and the research conducted in two villages namely Cikupa and Ciawi Villages. The object observed in this study was integrated plantation polyculture farmers.

### 2.2. Sampling Method

The research method used was a survey method. Farmer sampling was determined by proportional stratified random sampling from the population of polyculture farmers in Cikupa and Ciawi villages, respectively 74 people and 30 people, according to the Slovin Sampling Formula, then samples taken from each village were 59 people from Cikupa Village and 24 people from Ciawi Village, so that the total sample size is 83 people.

### 2.3. Data Analysis

The concept of the Farmer Household Income Exchange Rate<sup>4</sup>ate (FHIER) used as a measure of farmers' welfare level [16]. FHIER<sup>4</sup> used as a comparison between total household income and total household expenditure. The total income of farmer's households is the sum of the total value of the production of agricultural commodities produced by farmers, the value of agricultural labor, the value of non-agricultural business production, the value of non-agricultural labor, and others. Whereas farmers' expenditure is the sum of expenses for household consumption and expenditure for production costs. Mathematically the concept of FHIER is calculated by the following formula:

$$FHIER = \frac{R}{E}$$

Where:

$$R = R_a + R_{na}$$

$$E = E_a + E_{na}$$

Information: R=Total Income; E=Total Expenditures;  $R_a$ =Total income from agriculture business;  $R_{na}$ =Total income from non-agricultural businesses;  $E_a$ =Total expenditure for agriculture business;  $E_{na}$ =Total expenditure for non-agricultural businesses

Furthermore, to analyze the factors that influence the level of welfare of farmers is done by doing multiple regression analysis using SPSS Version 25 program, while the factors studied (the level of influence) are  $R_a$ ,  $R_{na}$ ,  $E_a$ , and  $E_{na}$ . Statistical values that describe the strength of the independent variable are the Standardized Regression Coefficient or in the SPSS program known as the *Standardized Beta coefficient* [17].

### 3. Findings and Discussion

#### 3.1. Income Structure of Farmer Household

There are two sources of IPPF income. They are income from Integrated Plantation of Polyculture (IPP) itself and income from outside IPP (another business). The average of the total income of IPPF in one year in Cikupa Village, Ciawi Village, and Karangnunggal District are Rp. 24,797,837, Rp. 32,125,000 and Rp. 26,916,535 or equivalent to Rp. 2,066,486, Rp. 2,677,083 and Rp. 2,243,045 per month. Compared to the Regional Minimum Wage (RMW) of Tasikmalaya Regency in 2019 of Rp. 2,075,189 per month, IPP farmers in Cikupa Village have lower total income than RMW, but farmers in Ciawi Village and Karangnunggal District have a total income that exceeds RMW.

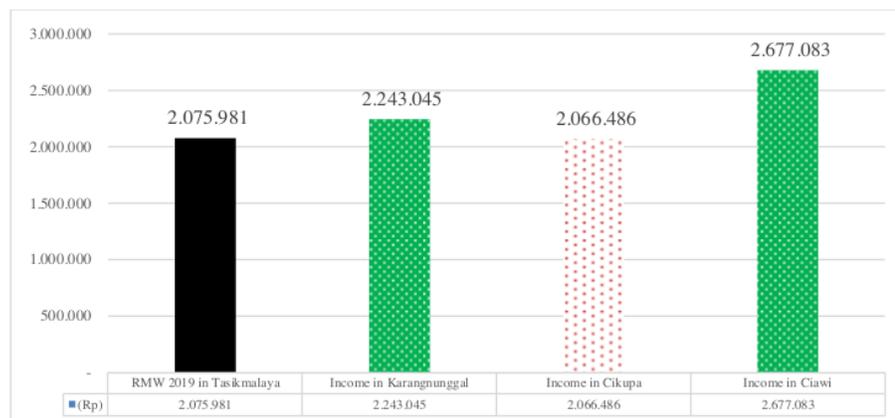
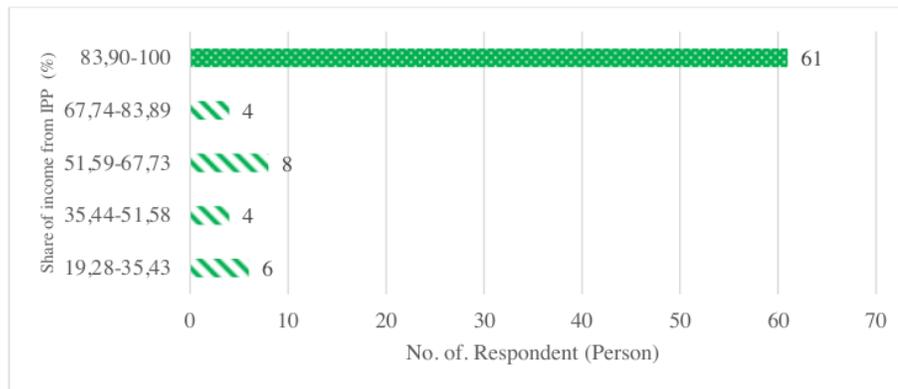


Figure 1. Comparison of IPPF Household Income with RMW of Tasikmalaya Regency in 2019

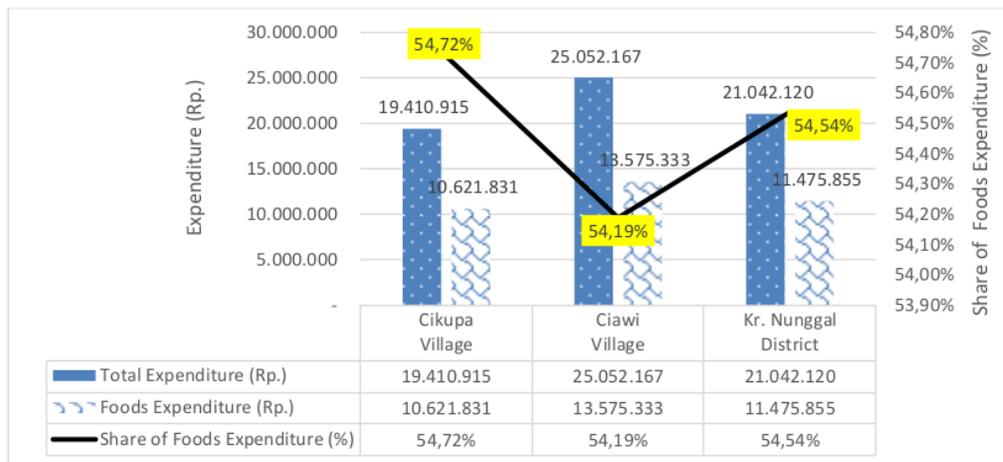


**Figure 2.** Distribution of IPP Farmer PPSP Value

Furthermore, the result from the combined data (Cikupa and Ciawi) analysis we know the share of income from IPP to the total household's income. Figure 2. shows that 61 respondents had a share of income from IPP from 83.9 up to 100 percent. This means that the structure of the majority household income in the study area is dominated by income from IPP.

**3.2. Farmer Household Expenditure Structure**

Household expenses are divided according to food and non-food expenditure. The structure of household expenditure of farmers is seen from the total consumption, namely the share of food expenditure to total expenditure including farming costs (food consumption, non-food and farming costs). Figure 3. shows that the household expenditure in Cikupa Village, Ciawi Village, and Karangnunggal District are 54.72 percent, 54.19 percent and 54.54 percent for their food. This shows that the structure of farmer household expenditure is still dominated by expenditures for food needs which are the basic needs.



**Figure 3.** Food expenditures and share of food expenditure

**3.3. Farmer Household Income Exchange Rate (FHIER) as Welfare Indicator**

FHIER of IPP farmers' values in Cikupa Village, Ciawi Village, and Karangnunggal District can be seen in Table 1 respectively.

**Table 1.** FHIER IPP farmers in Cikupa Village, Ciawi Village and Karangnunggal District

Description	Cikupa Village	Ciawi Village	Karangnunggal District
Total Revenue from the Agriculture Sector ( $R_a$ )	21.400.380	27.562.500	23.182.198
Total Revenue from Non-Agricultural Sector ( $R_{na}$ )	3.397.458	4.562.500	3.734.337
Total Expenditures From the Agriculture Sector ( $E_a$ )	10.621.831	13.575.333	11.475.855
Total Expenditure from Non-Agriculture Sector ( $E_{na}$ )	8.789.085	11.476.833	9.566.265
FHIER	1,28	1,28	1,28

FHIER > 1 indicates that the farmer has a surplus, the price of production is greater than the price of consumption and production costs. Thus the level of welfare of farmers in the Cikupa Village, Ciawi Village, and Karangnunggal District, Tasikmalaya Regency is included in the prosperous category. Nevertheless, ongoing efforts are needed to continue to increase the income of farmers' households in relation to the exchange rate of agricultural commodities which tend to decrease while production costs and food and non-food consumption need to increase continuously.

### 3.4. Analysis of Factors affecting Farmer's Welfare

Multiple linear regression analysis is conducted to find out the relative importance of  $R_a$ ,  $R_{na}$ ,  $E_a$  and  $E_{na}$  factors on FHIER as an indicator of farmer welfare. The result of statistical analysis (*Standardized coefficient beta*) shows that farmers' household income which comes from the IPP ( $R_a$ ) has a stronger effect on FHIER (2.159), compared to farmers' income which comes from outside of IPP/ $R_{na}$  (1.326). The expense of farmers' households which comes from the IPP ( $E_a$ ) has a stronger effect on FHIER (-1.449) compared to farmers' expense which comes from outside of IPP/ $E_{na}$  (-1.211). From the table, we have known that household income has a higher absolute value of standardized coefficient beta than household expenditure, it indicates that income is a more important factor than expenditure on welfare.

**Table 2.** Results of Statistical Analysis using the SPSS Version.25 program

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	1.282	.064		20.036	.000
X1 ( $R_a$ )	5.812E-8	.000	2.159	11.665	.000
X2 ( $R_{na}$ )	6.317E-8	.000	1.326	9.594	.000
X3 ( $E_a$ )	-7.259E-8	.000	-1.449	-8.996	.000
X4 ( $E_{na}$ )	-7.558E-8	.000	-1.211	-9.577	.000

### 4. Conclusion and Suggestion

From the description of the findings and discussion, it can be concluded that IPPF in Tasikmalaya Regency are in the prosperous category. In general, the amount of revenue has a stronger influence on welfare compared to expenditure. Specifically, it is also known that both revenue and expenditure from integrated plantation polyculture have a stronger effect on welfare. From these conclusions, the authors suggest to policymakers that in order to achieve the welfare of integrated plantations polyculture farmers need to prioritize those factors directly related to household income rather than an expenditure. An also suggested that farmers should continue to increase farm household income through the more optimal management of IPP so that production and productivity can increase.

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