

# STRUCTURES OF REVENUE, EXPENDITURE, AND WELFARE OF HOUSEHOLD FARMERS IN KAMPAR REGENCY, RIAU INDONESIA

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*Abstract:* - Kampar Regency is one of the districts in Riau Province; it has considerable contributions to the economy of Riau Province, especially in the agricultural sector through plantations. Rubber plantations have important roles and positions economically and socially, absorbing labor and ecological roles. Plantations are also a source of prosperity, progress, independence, and pride of Kampar district government. This study aims to analyze the household income structure of rubber farmers, the household expenditure of rubber farmers, dominant factors affecting the household expenditure of rubber farmers, and the welfare level of rubber farmer households. These objectives are addressed using income analysis, descriptive analysis, multiple linear regression model, and poverty line. Results show that the highest income structure of rubber farmer households is 52.59%, the income is 43.32%, and the non-farm income is 4.09%. The largest percentage of Kampar rubber farmer households is 61.42% from non-food expenditure, especially education expenditure of 43.94%. The dominant factors that affect the household expenditure of rubber farmers in Kampar Regency include household income, number of family members, dummy of land area, and savings, whereas the traditional variable of farmer education is insignificant to household expenditure of rubber farmers. Furthermore, Kampar rubber farmer households belong to the prosperous household group because the per capita income per month is above the poverty line.

*Key-Words:* Rubber Farmer, Income Structure, Expenditure, Welfare

## 1 Introduction

The agricultural sector in Indonesia is divided into five subsectors, namely, food agriculture, plantation, forestry, livestock, and fishery. The agricultural sector is continually required to play a role in the national economy through the formation of gross domestic product (GDP), foreign exchange gain, food supply and industrial raw materials, poverty alleviation, employment provision, and income generation. The contribution of the agricultural sector to the total value of GDP of Riau Province ADHK-DM in 2010 had an increasingly fluctuating trend. In 2010, the contribution of the agricultural sector to the total value of gross regional domestic product (GRDP) of ADHK-DM Province was 17.1%, which increased to 17.7% in 2014. In 2010–2014, the average growth of agricultural sector contribution increased by 0.8% per year. The agricultural sector ranked second after the mining sector (Central Bureau of Statistics (BPS) Riau, 2015). The BPS Kampar percentage GRDP value for Kampar Regency from the agricultural sector was 29.9% in 2009 and 28.9% in 2013, indicating a decrease of 0.70%. The agricultural sector in

Kampar District ranks second after the mining sector. Thus, the agricultural sector considerably contributes to Kampar Regency GRDP. Such a large contribution cannot be separated from the plantation subsector supported by existing plantation area and production, nationally and regionally, at the provincial and district levels. The regional level of Riau Province is similar to the national scale, that is, in 2013 the oil palm plantation has the largest area of 2,399,172 ha, followed by the coconut plantation at 520,261 ha and the rubber plantation at 505,264 ha [1].

One of the rubber-producing regions in Riau Province is Kampar Regency. On the basis of the potential area of rubber commodity development in Riau, Kampar Regency has the second largest rubber development area after Kuantan Singingi Regency in 2015. The rubber plantation area in Kuantan Singingi Regency is 146,215 ha, whereas that in Kampar Regency is 102,234 ha (Dinas Plantation of Riau Province, 2016). Table 1 presents the land and rubber production in Kampar Regency.

Table 1. Total area and rubber productivity in Kampar Regency in 2013–2015

Year	Total area (ha)	Production (ton)	Productivity
2013	101.966	75.484	0,74
2014	102.353	77.556	0,76
2015	102.234	74.285	0,73

Source: Dinas Perkebunan Provinsi Riau, 2016

Refere to Table 1, the land area and production show a fluctuating trend from 2013 to 2015, with the highest production in 2014 at 77,556 tons and the lowest in 2015 amounting to 74,285 tons. The decline in production reduces the income of rubber farmers. A decrease in income affects the purchasing power of the community, thereby affecting the household expenditure of rubber farmers. High household income affects household expenditure patterns. Household expenditure is divided into expenditures for food and non-food items. For low-income families, the proportion of their opinions is widely used to satisfy food requirements in the form of food and beverages [2]. Low-income in rubber farming cannot satisfy all household needs of farmers, thereby causing some members of the households to find alternative sources of income, either by diversifying farming or by increasing the allocation of labor outsourcing outside the farm. As a source of income, side businesses increase the diversity of sources of income. Various sources of income affect the income structure of farm households. The income structure describes the level of welfare of farm households. The source of income of rubber farmers, from agriculture and non-agricultural sectors, is relatively diverse. The study on the structure and level of household income by agriculture and non-agricultural sectors is useful to understand the potential and direction of the development policy of a region to determine which sector should be prioritized and can increase income and expansion of job opportunities in a region.

One of the indicators that can describe the welfare of the population is by studying the household expenditures. Household expenditures are differentiated by food and non-food groups. When the income level is high, the share of expenditure shifts from food expenditure to non-food expenditure. The shift in food to non-food expenditure patterns occurs because the demand elasticity of food is generally low, whereas the demand for non-food goods is generally high [3]. Household consumption, especially food, is influenced by income, food price, the number of family members, and education.

Welfare is the ultimate goal of regional development. The pattern of consumption and the amount of household consumption are the measures to achieve welfare in a household [4], [5].

In addition, when the poverty rate is high, the income is low [1], [6]–[11]. Low income decreases the household expenditure. The poverty rate is addressed by the number of poor individuals and the poverty line. Poor residents have an average monthly per capita expenditure below the poverty line, which is the value of minimum food expenditure equalized to 2,150 kilo calories per capita per day plus the minimum requirement of non-food expenditure, including housing, clothing, education, and health [12]. On this basis, the present work aims to analyze the structures of income and expenditure, dominant factors affecting household expenditure, and the welfare of rubber farmer households in Kampar Riau Province

## 2 Research Methodology

The study was conducted in Kampar Regency using multi-stage purposive sampling method [13], with criteria of 1–3 ha of land and with rubber plants aged 13–25 years old. Samples were obtained from three sub-districts, namely, Kampar Kiri Hulu, Kampar Kiri Hilir, and XIII Koto Kampar sub-districts because these three districts are the rubber production centers in Kampar Regency. In each sub-district, 20 rubber farmers were selected, obtaining a total sample of 60 rubber farmers. The study was conducted from March to September 2017.

Data collected in this study include primary and secondary data. Primary data collection was performed through interview using questionnaire, which includes the identity of sample farmers, land area, farming experience, production amount, and production cost for one year. Secondary data were obtained from relevant agencies, such as plantation service, BPS, and other literature related to the study. The methods used in the analysis include income analysis, descriptive analysis, multiple linear regression model, and poverty line.

## 2.1 Income structure of rubber farmer households

Revenue from rubber farming is calculated based on the formula from Soekartawi's farming analysis [14]. The net income of rubber farming is obtained as follows:

$$\begin{aligned}\Pi &= TR - TC \\ \Pi &= Y \square Py - (VC + FC)\end{aligned}\quad (1)$$

where

$\Pi$  = Income of rubber farmers (Rp/year)  
 TR = Total revenue (Rp/year)  
 TC = Total production cost (Rp)  
 Y = Total rubber production (Kg/year)  
 Py = Market rubber price (Rp)  
 VC = Variable cost (Rp)  
 FC = Fixed cost (Rp)

The income structure is based on income analysis, where the sources of work and non-work incomes are described. Work income includes the income of rubber farming, non-rubber income, and other incomes. The income structure is analyzed by using the income level using the formula of [15] and then adjusted to the present study.

$$\begin{aligned}Y_{rt} &= (A) + (B) \\ Y_{rt} &= (A1 + A2 + A3) + (B)\end{aligned}\quad (2)$$

where

$Y_{rt}$  = Household income (Rp/year)  
 A = Work income (Rp/year)  
 A1 = Rubber farmer income (Rp/year)  
 A2 = Non-rubber farmer income (Rp/year)  
 A3 = Miscellaneous income (Rp/year)  
 B = Non-work income (Rp/year).

## 2.2 Expenditure analysis of rubber farmer household

Household expenditure is the cost incurred for living necessities within a one-year period; it consists of expenditures for food and non-food expressed in Rupiah per year [3]. Household expenditure is determined using descriptive and tabulation analyses and using the following household expenditure equation [3]:

$$C_t = C_a + C_b + C_n \quad (3)$$

where

$C_t$  = Total expenditure of household (Rp/year)  
 $C_a$  = Expenditure of food consumption (Rp/year)  
 $C_b$  = Expenditure of non-food consumption (Rp/year)  
 $C_n$  = Other expenditure (Rp/year)

## 2.3 Dominant factors affecting the expenditure of rubber farmer households

Many factors influence household expenditure, especially food and non-food consumption. Factors affecting household expenditure include household income, the number of family members, education of farmers, dummy of rubber, and savings. To analyze the factors affecting household expenditure of rubber farmers, multiple linear regression model is used, as shown as follows [16].

$$Y = a + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 D_1 + \beta_5 X_4 + e \quad (5)$$

where

Y = Household expenditure (Rp/year)  
 A = Constanta  
 $X_1$  = Household income (Rp/year)  
 $X_2$  = Number of family members (Jiwa)  
 $X_3$  = Farmer course/workshop attended (year)  
 $D_1$  = Area of rubber (ha):  
 $D = 0$  if area > 1 ha  
 $D = 1$  if area < 1 ha  
 $X_4$  = Savings (Rp)  
 $\beta_1, \beta_2, \beta_3, \beta_4, \beta_5$  = Coefficient sizes  
 e = Error

To provide econometrically valid results, testing several econometric assumptions, including the detection of normality, multicollinearity, heteroscedasticity, and autocorrelation of equations, in the regression model is necessary [17]–[20].

## 2.4 Analysis of the satisfaction level of rubber farmer households

Welfare is a condition, where the society has fulfilled its basic needs. The level of welfare is determined from several indicators. However, in this study, the welfare from poverty is calculated through the poverty line. The welfare of rubber farmer households is measured by comparing the per capita income of rubber farmer household per month using the poverty line issued by the BPS of Kampar Regency. Rubber farmer households are prosperous if their per capita income is greater than the poverty line in Kampar Regency. On the contrary, the rubber farmer households are poor if their per capita income is less than the poverty line.

BPS Indonesia (2008) also uses the concept of basic needs approach to measure poverty. With this approach, poverty is an economic inability to satisfy the basic needs of food and non-food, as measured by expenditure. Thus, poor households have an average monthly per capita expenditure below the poverty line.

$$GK = GKM + GKNM \quad (6)$$

where

- GK = Poverty line  
 GKM = Food poverty line  
 GKNM = Non-Food poverty line.

### 3 Results and Discussion

In the [4], [21] suggested that the income structure of rubber farmer households is the amount of income earned in a certain period of time, such as the main and side incomes obtained for one month or one year. Revenue is one of the indicators of the welfare of the population, in addition to the right to education, sense of freedom, security and politics, or freedom of expression. Furthermore, income is used to satisfy the needs for food and non-food products. Farmers' income includes income from rubber farming. This revenue is derived

from the reduction of revenue with production costs. The result of average farmer household income in rubber farming is Rp 33,889,506/year, whereas the average monthly income is Rp 2,824,125. This income is the net income or total revenue from rubber farming.

#### 3.1 Structure of income and expenditure of rubber farmer households

Farmers' income from other agricultural and non-agricultural sectors is calculated on the basis of information provided by rubber farmers. The result of the study shows that the total income is the total amount of farmer income from various sources. The income structure of rubber farmer households is shown in Table 2. As the main occupation of rubber farmers in Kabupaten Kampar, rubber farming provides a low contribution to the total household income compared with other farm incomes. The average income of farmers from rubber farming is 43.3%, whereas oil palm farming has a large contribution to household income, that is, 52.6% of the total average income of rubber farmer households.

Table 2. Average structures of income and expenditure of rubber farmer households

Income or expenditure	Average/family (Rp/Year)	Percentage (%)
<b>Income</b>		
Rubber farming	33,889,506	43.32
Palm oil farming	41,145,908	52.59
Non-rubber farming	3,200,000	4.09
Total revenue	78,235,414	100
<b>Expenditure</b>		
Food	15,875,954	38.6
Non-food	25,274,782	61.4
Total	41,150,736	100

The low income of rubber farming is caused by the unproductive or old-aged rubber plantation; rubber prices fluctuated and tended to vary between farmers[22]. This finding is similar to that in the study [23]. Furthermore, the low income of rubber farming is caused by the number of farmers who converted rubber farmland into palm oil farming area sawit [24], [25]. Oil palm farming can increase the income of rubber farmer households in Kampar Regency.

Households with some income are used for a number of options to satisfy household needs. Revenue is spent on purchasing food and non-food items, as well as on savings. The large share of the income spent varies greatly depending on the amount of income. The household expenditure of rubber farmers is used to satisfy food and non-food needs. The largest household expenditure of rubber farmers is non-food expenditure because the costs incurred for non-food needs are more expensive, such as household facilities, education, clothing, health, and recreation; thus, farm households spend more than the cost of food needs (Table 2).

### 3.2 Food and non-food expenditures of rubber farmer households

Household expenditure consists of different types of expenditure of goods consumed by a household. Household consumption comprises food and non-food expenditures. Food expenditure includes carbohydrates (whole grains and tubers), side dishes (beef, chicken, fish, tofu, tempeh, beans, anchovies, and salted fish), vegetables (spinach, kale, and cassava leaves), fruits (bananas), and other consumption (indomie, sugar, milk, tea, coffee, and cooking oil). The amount of food expenditure of rubber farmer households is presented in Table 3. The largest food expenditure of rubber farmer households in Kampar Regency is on grains and tubers (rice, yam, maize, and cassava), followed by side dishes (beef, chicken meat, fish, tofu, tempe, beans, anchovies, and salted fish), and the smallest expenditure is on tobacco/cigarette. This finding

shows that the expenditure of rubber farmers on food is mostly to satisfy the basic needs for carbohydrates.

Non-food expenditures are divided into housing and household facilities, such as housing (fuel, electricity, and gas), education (pocket money, school fees, textbooks, school supplies, uniforms, and other clothing), clothing, health (toothpaste, toothbrush, bath soap, shampoo, laundry soap, doctor, puskesmas, medicines, herbs, and eucalyptus oil), and recreation (family visit, entertainment venue, and party invitation). Non-food expenditure of rubber farmer households is presented in Table 3. The largest non-food expenditure is on education. Although school fees or tuition are free, education expenditures are still high. The smallest non-food expenditure is on clothing given that rubber farmers buy clothes only during Eid.

Table 3. Average food and non-food expenditures of rubber farmer households

Expenditure type	Amount (Rp/Year)	Percentage (%)
<b>Food</b>		
Carbohydrates	6,093,191	38.38
Side dishes	4,013,441	25.28
Vegetables and fruits	2,611,594	16.45
Beverage (sugar, tea, coffee, snack)	2,395,681	15.09
Cooking oil, seasonings	382,610	2.41
Tobacco/cigarette	379,435	2.39
Average food expenditure	15,875,954	100
<b>Non-Food</b>		
Properties and furniture	3,844,294	15.21
Education	11,105,739	43.94
Clothing	2,039,675	8.07
Health	3,700,228	14.64
Refreshments	4,584,845	18.14
Average non-food expenditure	25,274,782	100

### 3.3 Dominant factors affecting the expenditure of rubber farmer households

The dominant factor affecting the expenditure of rubber farmer households was analyzed by using multiple linear regression analysis. The model parameter of the expenditure of rubber farmer households is estimated using ordinary least square method. To determine the influence of factors affecting household expenditure with non-free variable, the expenditure of farmer households is used. However, the independent variables used include household income, the number of family members, education, dummy of land area, and

savings. The factors affecting the expenditure of rubber farmer households are presented in Table 4.

The expenditure of rubber farmer households is significantly influenced by household income, number of family members, dummy of land area, and savings. The coefficient of determination ( $R^2$ ) is 0.897 or 89.70%, indicating that the variable of household income, the number of family members, the dummy of land area, and the savings used in the model can explain the expenditure of rubber farmer households (89.70%), and the remaining 30% represents other variables not included in the model.

Table 4. Estimation results of the multiple linear regression model of the dominant factors that affect rubber farmer households in Kampar Regency in 2017

Variable	Parameter estimation	T count	Sig
Constanta	-4,763,000.55	-1.087	0.282
Household income	0.68	8.993	0.000*
Number of family member	3,445,759.29	3.668	0.001*
Duration of education	32,017.34	0.152	0.879
Dummy (total area)	7,994,307.95	4.161	0.000*
Saving	-0.55	-7.718	0.000*
R <sup>2</sup>			0.897
Adjusted R <sup>2</sup>			0.778
F count			42.388
F sig			0.000 <sup>a</sup>
Durbin-Watson			2.01

Note: \* significant at level  $\alpha = 5\%$

Household income is income received by the household either from the household head or other members. It is derived from the income of rubber farming and palm oil and other non-farm incomes, such as from teaching, performing casual labor, and photography. The income of rubber farmer households positively affects their expenditure, with parameter estimation of 0.682. Thus, if the income of rubber farmer households increases by Rp 1/year, then their expenditure increases by Rp 0.682/year. If they have a high income, then the income earned is sufficient to satisfy their needs and they have greater ability to send their children to school. This is in line with the study Kirk, Kilic, & Carletto and Xu, Guo, Xie, Liu, & Cao, [26], [27]

Families with high income tend to choose excellent educational institutions or schools for their children. Thus, their consumption, especially in the field of education becomes greater because they assume that education is the best investment for their children. With a high family income, the fulfillment of nutrition and health needs for family members becomes well. However, families with low incomes spend most or all of the revenue for their basic needs. [28] suggested that the increase in income indicates an increase in the opportunity to purchase food and non-food items with better quantity and quality. On the contrary, the decrease in income causes a decrease in the quantity and quality of food and non-food purchases.

The number of family members positively affects the expenditure of rubber farmer households, with an estimated parameter of 3,445,759.29. That is, if the number of family members' increases by one, then the expenditure of rubber farmer household increases by Rp 3,445,759.29/year. The large number of family members is related to the size of food the family needs. A family with a large number of members incurs greater expenses. On the contrary, families with a smaller number of

members can easily satisfy the needs of family members. [9], [29]. suggested that the increasing number of family members' results in the additional food and non-food requirements of households, thereby increasing cost. Moreover, [23] stated that the number of family members affects consumption and explained that social correlations are positively correlated to household consumption.

Farmers' education positively affects the expenditure of rubber farmer households, with an estimated parameter of 32,017.34. That is, if the education of farmers increases by one year, then the expenditure of rubber farmer households increases by Rp 32,017.34/year because the knowledge of the head of the family contributes to the awareness of the importance of education. Thus, the head of the family will strive to provide his children with better education. Thus, household expenditures for education costs increase. Education must be developed because science and technology continue to grow; hence, human capabilities should be tailored through education. Highly educated family leaders realize the importance of health for their families; thus, the fulfillment of family health and nutrition needs is better than that of the heads of families with low education. This finding is in line with the results of studies conducted by [30], who stated that when the level of family education is high, the family reduces spending on carbohydrates and consume high-protein foods.

The dummy area of land positively affects household expenditure of rubber farmers, with an estimated parameter of 7,994,307.95. Thus, the expenditure of rubber farmer households with land area > 1 ha is greater than those with a land area < 1 ha, that is, Rp 7,994,307.95/year. [31] suggested that savings is the ability and willingness to withstand unimportant consumption to achieve a satisfactory consumption. Savings negatively affects

the expenditure of rubber farmer households, with regression coefficient of  $-0.551$ . A

### 3.4 Rubber farmer household prosperity

The highest income of rubber farmer's households is 52.6% of the income of palm oil farmers, 43.3% of which is rubber income and 4.09% is non-farm income. The largest expenditure of rubber farmer households is non-food expenditure (61.42%), especially expenditure for education (43.9%). The dominant factors affecting the expenditure of rubber farmer households in Kampar Regency include household income, number of family members, dummy of land area, and savings. Rubber farmer households in Kampar belong to a fairly good household class because their per capita income per month is above the poverty line.

## 4 Conclusion

The highest income of rubber farmers households is 52.6% of the income of palm oil farmers, 43.3% of which is rubber income and 4.09% is non-farm income. The largest expenditure of rubber farmer households is non-food expenditure (61.42%), especially expenditure for education (43.9%). The dominant factors affecting the expenditure of rubber farmer households in Kampar Regency include household income, number of family members, dummy of land area, and savings. Rubber farmer households in Kampar belong to a fairly good household class because their per capita income per month is above the poverty line.

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### References

- [1] Badan Pusat Statistik, *Riau Dalam Angka 2015*. Pekanbaru: Badan Pusat Statistik Provinsi Riau, 2016.
- [2] D. Novita, *Evaluasi Mutu Gizi dan Pendugaan Umur Simpan Cookies Tepung Komposit Berbasis Talas Banten (*Xanthosoma undipes* K. Koch) Sebagai Makanan Tambahan Ibu Hamil*. Bogor: Fakultas Ekologi Manusia Institut Pertanian Bogor., 2011.
- [3] Badan Pusat Statistik, *Statistik Indonesia*. Jakarta: Badan Pusat Statistik, 2016.
- [4] J. M. Berge, M. Draxten, A. Trofholz, C. H. Bradley, K. Justesen, dan A. Slattengren, "Similarities and differences between families who have frequent and infrequent family meals A qualitative investigation of low-income and minority households," *Eat. Behav. An Internastional J.*, vol. 4, no. February 2018, hal. 1–26, 2018.
- [5] M. Suyastiri, Ni, *Perencanaan Pangan dan Gizi*. Jakarta: PT Bumi Aksara, 2008.
- [6] J. Behringer dan T. van Treeck, "Income distribution and the current account," *J. Int. Econ.*, vol. 114, no. June 2018, hal. 238–254, 2018.
- [7] E. Berisha dan J. Meszaros, "Household debt, economic conditions, and income inequality: A state level analysis," *Soc. Sci. J.*, vol. 54, no. 1, hal. 93–101, 2017.
- [8] R. Blundell, R. Joyce, A. Norris Keiller, dan J. P. Ziliak, "Income inequality and the labour market in Britain and the US," *J. Public Econ.*, vol. 162, no. 2017, hal. 48–62, 2018.
- [9] W. Dassanayake, M. K. Luckert, dan S. Mohapatra, "Heterogeneity of household structures and income: Evidence from Zimbabwe and South Africa," *J. Policy Model.*, vol. 37, no. 4, hal. 668–692, 2015.
- [10] P. Soriano-Hernández, M. del Castillo-Mussot, O. Córdoba-Rodríguez, dan R. Mansilla-Corona, "Non-stationary individual and household income of poor, rich and middle classes in Mexico," *Phys. A Stat. Mech. its Appl.*, vol. 465, no. Agustust, hal. 403–413, 2017.
- [11] S. Z. Walelign, L. Charlery, C. Smith-Hall, B. B. K. Chhetri, dan H. O. Larsen, "Environmental income improves household-level poverty assessments and dynamics," *For. Policy Econ.*, vol. 71, hal. 23–35, 2016.
- [12] Badan Pusat Statistik, *Kampar Dalam Angka 2015*. Bangkinang: Badan Pusat Statistik Kabupaten Kampar, 2016.
- [13] M. Zainuddin, *Metodologi Penelitian Kefarmasian dan Kesehatan*. Surabaya: Airlangga University Press, 2011.
- [14] Soekartawi, *Teori Ekonomi Produksi Dengan Pokok Bahasan Analisis Fungsi Cobb-Douglas*. Jakarta: Raja Grafindo Persada, 2005.

- [15] S. Widodo, *Indikator Ekonomi Dasar Perhitungan Perekonomian*. Yogyakarta: Kansius, 1990.
- [16] E. FH dan A. Salendu, "Analisis Ekonomi Rumah Tangga Peternak Sapi di Kecamatan Sinonsayang Kabupaten Minahasa," *J. Agribisnis dan Pembang. Masy. (AGROPEM)*, vol. 1, no. 1, hal. 1–9, 2012.
- [17] D. Gujarati, *Basic Econometrics*, Fourth Edi. Singapore: International. Edition Mc Graw-Hill, 2003.
- [18] R. S. Pindyck dan D. L. Rubinfeld, *Econometric Model and Econometric Forecasts*, Fourth Edi. New York: McGraw-Hill International Editions, 1998.
- [19] A. Koutsoyiannis, *Theory of Econometrics: An Introductory Exposition of Econometric Methods*, Second Edi. London New York: The MacMillan Press Ltd, 1977.
- [20] M. Verbeek, *A guide to modern econometrics*, Fifth Edit. John Wiley & Sons Ltd, 2017.
- [21] Khadariah, *Pengantar Ekonomi Mikro*. Jakarta: Penerbit FEUI, 1994.
- [22] H. Heriyanto dan D. Darus, "Analisis Efisiensi Faktor Produksi Karet Di Kabupaten Kampar Provinsi Riau," *Din. Pertan.*, vol. xxxiii, no. 1, hal. 1–10, 2017.
- [23] H. Heriyanto, "Perilaku Konsumsi Pangan Sumber Karbohidrat Rumahtangga Petani Kelapa Sawit Di Kecamatan Kandis Kabupaten Siak," *J. Ilm. Pertan.*, vol. 13, no. 1, hal. 22–30, 2016.
- [24] J. Bou Dib, Z. Alamsyah, dan M. Qaim, "Land-use change and income inequality in rural Indonesia," *For. Policy Econ.*, vol. 94, no. March, hal. 55–66, 2018.
- [25] J. Bou Dib, V. V. Krishna, Z. Alamsyah, dan M. Qaim, "Land-use change and livelihoods of non-farm households: The role of income from employment in oil palm and rubber in rural Indonesia," *Land use policy*, vol. 76, no. March, hal. 828–838, 2018.
- [26] A. Kirk, T. Kilic, dan C. Carletto, "Composition of Household Income and Child Nutrition Outcomes Evidence from Uganda," *World Dev.*, vol. 109, hal. 452–469, 2018.
- [27] D. Xu, S. Guo, F. Xie, S. Liu, dan S. Cao, "The impact of rural laborer migration and household structure on household land use arrangements in mountainous areas of Sichuan Province, China," *Habitat Int.*, vol. 70, no. October, hal. 72–80, 2017.
- [28] Yustiati, *Analisis Pendapatan dan Pola Pengeluaran Rumah Tangga Nelayan Buruh di Wilayah Pesisir Kampak Kabupaten Bangka Barat*. Skripsi Fakultas Pertanian UBB. Bangka Belitung, 2012.
- [29] W. Ma, A. Renwick, P. Nie, J. Tang, dan R. Cai, "Off-farm work, smartphone use and household income: Evidence from rural China," *China Econ. Rev.*, hal. #pagerange#, 2018.
- [30] Djami, H. Heriyanto, dan Elinur, "Dampak Pengendalian Harga dan Peningkatan Pendapatan Terhadap Pengeluaran Konsumsi Pangan Pokok Rumahtangga di Provinsi Riau," in *Prosiding Seminar Nasional Dies Natalis XIII MMA UGM*, 2012, hal. 304–310.
- [31] S. Shirahase, "Income inequality among older people in rapidly aging Japan," *Res. Soc. Stratif. Mobil.*, vol. 41, no. April, hal. 1–10, 2015.