Jurnal Pertanian Agros Vol. 24 No.1, Januari 2022: 181 -192

THE RAINFED LAND OF FARM HOUSEHOLD ECONOMIC BEHAVIOR IN GUNUNGKIDUL REGENCY : ASPECTS OF PRODUCTION, LABOR ALLOCATION, INCOME, AND CONSUMPTION

PERILAKU EKONOMI RUMAH TANGGA DI LAHAN TADAH HUJAN KABUPATEN GUNUNGKIDUL : ASPEK PRODUKSI, ALOKASI TENAGA KERJA, PENDAPATAN, DAN KONSUMSI

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ABSTRACT

The purpose of this study is to analyze the factors that influence the economic behavior of rainfed land farmers with a household economic model that includes the aspect of production behavior, labor allocation, income, and consumption, and also investigates its response on factors that influence it. The research method used is a descriptive method, with the research site taken purposive method and farmer samples taken with proportional stratified random sampling resulting in 300 rainfed land farming households. The simultaneous equation model was used to analyze the household economic model of rainfed land farmers and is estimating parameters using two-stage least square. The results showed that most of the variables in the study significantly influenced production behavior, labor allocation, income, and consumption at an error level of 5%. That most of the parameter values from each aspect met expectations. Labor allocation in the family of off-farm is responsively influenced by land area. Labor allocation in the family of non-rice is responsively influenced by land area and labor allocation in the family of non-farm.

Key- words: Rainfed land, household economic behavior, production, labor allocation

INTISARI

Tujuan dari penelitian ini adalah untuk menganalisis faktor-faktor yang mempengaruhi perilaku ekonomi petani tadah hujan dengan model ekonomi rumah tangga yang meliputi aspek perilaku produksi, alokasi tenaga kerja, pendapatan, dan konsumsi, serta mengetahui tanggapannya terhadap faktor-faktor yang mempengaruhinya. . Metode penelitian yang digunakan adalah metode deskriptif, dengan lokasi penelitian diambil secara purposive dan sampel petani diambil secara proporsional stratified random sampling sehingga diperoleh 300 rumah tangga petani lahan tadah hujan. Model persamaan simultan digunakan untuk menganalisis model ekonomi rumah tangga petani lahan tadah hujan dan mengestimasi parameter menggunakan two-stage least square. Hasil penelitian menunjukkan bahwa sebagian besar variabel dalam penelitian berpengaruh signifikan terhadap perilaku produksi, alokasi tenaga kerja, pendapatan, dan konsumsi pada tingkat kesalahan 5%. Bahwa sebagian besar nilai parameter dari setiap aspek memenuhi harapan. Alokasi tenaga kerja dalam keluarga off-farm secara responsif dipengaruhi oleh luas lahan. Alokasi tenaga kerja pada keluarga non-beras secara responsif dipengaruhi oleh luas lahan dan alokasi tenaga kerja pada keluarga non-tani.

Kata kunci: Lahan tadah hujan, perilaku ekonomi rumah tangga, produksi, alokasi tenaga kerja

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e-ISSN 2528-1488, p-ISSN 1411-0172

INTRODUCTION

Rainfed land is the second granary for rice after irrigated rice fields. In Indonesia, rain-fed land covering an area of 1.4 million ha ranks second as a rice barn after irrigation land (IAARD, 2016). It is part of the sub-optimal land as an alternative food supply in the future. Sub-optimal land has low productivity due to internal factors such as core material, physical, chemical, and biological soil characteristics and external factors such as rainfall and extreme temperatures (Las, et al., 2012; Mulyani and Sarwani, 2013). For the Special Region of Yogyakarta, rain-fed land is mostly found in areas that have a high level of rainfall but rains rarely fall, namely in Gunungkidul District, which is famous for its critical areas, tropical climates, topographic areas dominated by highland of karst hills, making it impossible to use irrigated rice systems. Gunungkidul is predominantly covered with agricultural rain-fed dry land which is tremendously dependent on climate cycles.

The rainfed land for farmer households in Gunungkidul is the main food barns, in spite of limited water availability and low application of cultivation technology farmers cultivate upland rice. Rice grown in rain-fed areas is usually harvested once a year in order to prevent drought from happening during the dry season as water supply depends only on rainfall and area topography. The second farming season is carried out immediately after harvest and then planted again in order to seize the available time meant to avoid the plants from being dry for the next subsequent growth. Based on the experience of farmers that their production has not yielded an optimal result for it hovers only 50% -75% compared to the first season of upland rice farming (BPTP Yogyakarta, 2012). Therefore, upland rice farmers decided to grow upland rice farming based on the land conditions, and consequently, they adopt a one-time cropping pattern and a two-time cropping pattern. Farmer households apply such a cropping pattern given the seasonal nature of farming and the risk of crop failure are unpredictable for it is highly dependent on climate, something that encourages them to choose such cropping patterns.

The choice of cropping pattern will be a consideration for farmers in allocating their labor allocation. Farm households will allocate their working time of upland rice and 'palawija' based on their cropping patterns, while also working in off-farm to augment their income to meet family needs both for food and non-food needs. The behavior of farmer households as consumers will allocate the income obtained for food and non-food consumption needs from their household. The problem in doing farming is the use of production factors related to the quantity and quality of available resources, mainly the scarcity of available arable land. Sub-optimal land development will be an alternative food procurement. Sub-optimal land includes dry land, rain-fed land, tidal paddy field, swampy land.

At rainfed land farm household in Gunungkidul previous researches no one focused on the economic behavior of upland rice farmers in rainfed farm where its fields have specific characteristics. This research is useful because the results of the study will be used as a consideration in making decisions by farmers in allocating the limited resources they have. Decisions making in the behavior of production namely the behavior in combining the production factors it has. Consumption behavior, namely allocating income earned for food and non food consumption needs. Behavior in allocating family labor in upland rice farming activities, non-upland rice farming, and non-farm activities. Farmer households maximize their goals with all the limitations

they have. Based on the matter, it is important to conduct research on the factors that influence the economic household behavior of upland rice farmers in rainfed land, which includes behavior in terms of production, labor allocation, household income, and consumption.

LITERATURE REVIEW

The farm household model provides a framework for analyzing farm household behavior that integrates three decisions, namely consumption, production and labor allocation (Barnum and Squire, 1979). Farmer household economic model is very useful for decision making between income objective and resource quality, with an approach from the production and consumption side. From the production side, it is determined interms of input and output. From the consumption side, it is includes consumption for food and non-food consumption ((Ruben, R and Ruijven, A, 2001). Farmer's decisions about how to allocate resources are influenced by changes in input and output prices, measuring the impact of price policies at the farm level considering their responses on changes in rice input and output prices (Goyal and Berg, 2003). Excessive use of inputs by rice farmers is irrational. This may have been caused by the use of input factors, risk, preferences, profit expectations, positional assets, information, and financial availability; therefore, it is necessary to provide capital assistance establishing agricultural information centers meant to boost the production (Lokanandha and Radhakrishna, 2013). In rice barns, using Cobb-Douglas analysis of rice production is influenced by the use of seeds, pesticides, and fertilizers (Terano et al., 2013). Agricultural households are characterized by a dual role in producing output and coordinating the consumption of household members through time allocation spent on on-farm or off-farm duty and leisure (Chang, 2012).

Seasonality in agriculture causes a farm family to have excess labor during the slack season, thus encouraging farmers to work in non-farming activities. In Kuznetsova, A. et al (2019) opinion that in all countries there is a decrease in the number of workers in the agricultural sector. The availability of off-farm opportunities also propels farmer family to engage in them in order to boost household food security (Beyene, 2008; Kassa et al. 2017). The farm household economic research approach must consider the level of income, labor allocation, and household consumption. The level of income of farm households will determine food availability and their access to food. Indentification of the character of the farmer household is needed because most of the agricultural sector in developing countries is managed by farmer households (Nakajima, 1986). Farm households and the problems they face are complex and interesting to study, namely the complex interactions between production and consumption. In an economic context, this indicates that the goal of farm households is to achieve maximum satisfaction from using its resources. The behavior of farm households can be divided into household behavior as farm producers, as a source of labor, and as food and non-food consumers.

The behavior of farmer households as agricultural producers will manage their resources in the production process to obtain optimal production. Among them, the most important use of resources is land. Kokoye, et al., (2013) suggested that the choice of land use in farming is very closely related to the decisions of farmers on the actual land use. This is influenced by farmer's rationality for various purposes, such as: ensuring household food security, guaranteeing cash income to meet their needs, minimizing risks, leisure-related to time allocation, ensuring family members in

good and prosperous conditions, and achieving certain social classes in the community. The behavior of the household as a source of labor will allocate both family and non-family labor for activities in on farm and non-farm activities. Nguyen, D.L, et al., (2019) suggested that the allocation of the number of non farm labor depends on the number of laborers in the farmer household The behavior of households in income comes from the allocation of labor in on farm and non farm so that they will obtain income that will be used to meet the needs of farmer's households.

MATERIALS AND METHODS

The research method used in this present study is a descriptive method. The area sampling method uses the purposive method. The study area was determined in Gunungkidul District, Yogyakarta Special Region given the fact that Gunungkidul District has the largest rain-fed area in that region and is supported by the existence of upland rice cropping patterns occurring once a year and upland rice cropping patterns twice a year. In addition to cultivating upland rice, farmers also carry out agricultural activities other than upland rice and activities non-farm. The sampling method for determining the upland rice farming households uses the proportional stratified random sampling method. The number of samples was 300 upland rice farming households consisting of 122 farmers who grow rice once a year and 178 farmers who grow rice two times a year.

The econometrics approach was used to analyze the household economic model of farmers of rainfed land using a simultaneous equation model. In this specification model, the equations are grouped into four aspects, namely the production aspect, the labor allocation aspect, the income aspect, and the consumption aspect used in the farmers household economic model to be formulated in simultaneous equations.

a. Production :

$URP = a_0 + a_1LA + a_2NS + a_3NU + a_4NN + a_5LIFUR + a_6LOFUR + a_7DCP + E_1$.....(1)

Notes:

URP = Upland Rice Production(kg/year)
LA = Land Area(ha)
NS = The Number of Seeds(kg/year)
NU = The Number of Urea Fertilizers(kg/year)
NN=The Number of NPK Fertilizers(kg/year)
LIFUR = Labor Allocation in the Family of Upland Rice (Labor Days Requirements =LDR/year)
LOFUR = Labor Allocation Outside the Family of Upland Rice(LDR/year)
DCP= Dummy Cropping Patterns (0= pattern 1x of Upland Rice in one year, 1= pattern 2x of Upland Rice in one year)
The expected estimate parameter $a_1, a_2, a_3, a_4, a_5, a_6, a_7 > 0$

b. Labor Allocation :

$LIFUR = b_0 + b_1LA + b_2LIFNR + b_3LIFNF + b_4HI + b_5DCP + E_1$ .....(2)
$LIFF = LIFUR + LIFNR$.....(3)
$LOFUR = c_0 + c_1LA + c_2LIFUR + c_3HI + c_4DCP + E_3$ .....(4)
$LOF = LOFUR + CKLKNP$ .....(5)

$LIFNF = d_0 + d_1 LA + d_2 LIFUR + d_3 LIFNR + d_4 DCP + E_4$ .....(6)

$LIFNR = e_0 + e_1 LA + e_2 LIFUR + e_3 LIFNF + e_4 NLIF + e_5 DCP + E_5$ .....(7)

$HI = THI - TCE$.....(8)

Notes:

LIFNR =Labor Allocation in the Family of Non-Rice(LDR/year) LIFNF=Labor Allocation in the Family of Non-Farm(LDR/year) HI = Household Income (IDR/year) THI = Total Household Income (IDR/year) TCE = Total Consumption Expenditure (IDR/year) LIFF=Labor Allocation in the Family of Farming (LDR/year) LOF = Labor Allocation Outside the Family (HOK/year) NLIF =The Number of Labors in the Family(people) The expected estimate parameter $b_1,b_5,c_1,e_4,c_4,d_4,e_5 > 0$; $b_2,b_3,b_4,c_2,c_3,d_1,d_2,d_3,e_1,e_2,e_3 < 0$

c. Income :

$CURF = CURP + CLURF + OCURF$ .....(9)

$IURF = RURF - CURF$ ..... (10)

$INF = f_0 + f_1 IURF + f_2 INR + f_3 LIFNF + f_4 DCP + E_6$ .....(11)

$INR = g_0 + g_1 IURF + g_2 LIFNR + g_3 SE + g_4 DCP + E_7$.....(12)

$THI = IURF + INF + INR$..... (13)

Notes:

CURF=The Costs on Upland Rice Farming(IDR/year)
CURP=The Costs on Upland Rice Means of Production(IDR/year)
CLURF=The Costs on Labors of Upland Rice Farming(IDR/year)
OCURF=Other Costs on Upland Rice Farming(IDR/year)
IURF=Income from Upland Rice Farming(IDR/year)
RURF=Revenue from Upland Rice Farming(IDR/year)
INF=Income of Non-Farm(IDR/year)
INR=Income from Non-Rice(IDR/year)
SE=Spending for Education(IDR/year)
The expected estimate parameter $f_1,f_2,g_1 < 0$; $f_3,f_4,g_2,g_2,g_4 > 0$

d. Consumption :

$FEUR = h_0 + h_1 RURF + h_2 THI + h_3 NHM + h_4 DCP + E_8$ .....(14)

$FCE = i_0 + i_1 THI + i_2 NHM + i_3 NFCE + i_4 DCP + E_9$ .....(15)

$NFCE = j_0 + j_1 THI + j_2 NSt + j_3 DCP + E_{10}$ ..... (16)

$TCE = FEUR + FCE + NFCE$..... (17)

Notes:

FEUR=Food Expenditures from Upland Rice (IDR/year)
NHM=The Number of Household Members (IDR/year)
FCE=Food Consumption Expenditures (IDR/year)
NFCE=Non Food Consumption Expenditures (IDR/tahun)
NSt=The Number of School Children(people)
TCE=Total Consumption Expenditures(IDR/year)
The expected estimate parameter $h_1,h_2,h_3,h_4,i_1,i_2,i_4,j_1,j_2,j_3 > 0$; $i_3 < 0$

RESULTS AND DISCUSSION

The estimation results of the household economic model are fairly good as observed from the determination coefficient (R^2) and the value of the statistical F test shown in table 1. Table 1 demonstrates that the estimation results of the 10 structural equations concerning the household economic model of upland rice farmers obtain a determination coefficient (R2) between 0.363173 to 0.792565. Which means that the exogenous variables entered in the equation shows its endogenous variables have value from 36.3173% to 79.256565% while the remaining variables were not included in the model. F test results on all aspects of production, labor allocation, income, and consumption indicate that all exogenous variables together significantly influence endogenous variables. The variable of production, allocation of labor, income, and consumption are influenced by exogenous variables that influence them. Other than the statistical criteria, it is also seen as economic criteria that include the sign and the magnitude of the estimated parameters based on economic theory. Estimation results on upland rice production of rainfed farmers' households can be shown in table 2.

Table 1. Results of Statistical Tests on Household Economic Models of upland Rice Farmers

Equation	R^2	F-statistic	Prob-F
URP	0.758054	130.6973	0.00000*
LIFUR	0.754010	180.2346	0.00000*
LOFUR	0.584177	96.5032	0.00000*
LIFNF	0.501423	86.9121	0.00000*
LIFNR	0.792565	224.6628	0.00000*
INF	0.445550	59.2648	0.00000*
INR	0.393692	47.6209	0.00000*
FEUR	0.526627	94.2599	0.00000*
FCE	0.460007	62.8258	0.00000*
NFCE	0.363173	46.2682	0.00000*

Source: Primary data
* = significant at level α = 5%

Table 2. Estimated Results of Upland Rice Production

Variable	Coefficient	Std. Error	t-Statistic	Prob.
URP				
C	-5.961249	0.048767	-122.2384	0.0000*
LA	0.000342	2.95E-05	11.59179	0.0000*
NS	0.014899	0.003854	3.865494	0.0001*
NU	-0.001446	0.000527	-2.746218	0.0064*
NN	0.001342	0.000471	2.851864	0.0047*
LIFUR	0.003969	0.001752	2.265207	0.0242*
LOFUR	0.000918	0.001794	0.511883	0.6091^{ns}
DCP	0.340156	0.047099	7.222219	0.0000*

Source: Primary data
* = significant at level α = 5%
^{ns} = non significant

Table 2. shows that partially land area, the number of seeds, the number of urea fertilizers, the number of NPK fertilizers, labor allocation in the family of upland rice, and dummy cropping patterns variables affect upland rice production at an error level of 5%. In the production equation the existence of a sign which is different from the expected parameters, that is negative sign on the variable estimation parameter regarding the number of urea fertilizer. This is in line with research by Lailiyah, N, et al (2017) stating that urea fertilizer used in rainfed lowland rice farming has no significant effect and has a negative relationship with rainfed lowland rice production. Fertilization by rainfed land upland rice farmers uses relatively high doses, since farmers think that if the leaves are not dark green, then the N fertilizer has to be added.

Other variables correspond to the expected parameters. Dummy variable on rice cropping pattern has a positive value, which indicates that the cropping pattern shows the difference in upland rice production. Upland rice production does not become responsive to all the variables influencing it, meaning that all variables related to production have already been optimal, and as a result, once added, the rice production would decrease. Such a result corresponds with the research carried out by Swares, N.V. and Bakce, D. (2017) asserting that unresponsive rice production is influenced by all the variables that influence it, due to drought, land infertility, the use of limited use of resources, and disease pests.

The estimation results concerning the labor allocation consisting of labor allocation in the family of upland rice, labor allocation outside the family of upland rice, labor allocation in the family of non-farm, and labor allocation in the family of non-rice demonstrated in table 3.

Based on table 3. shows that partially land area, labor allocation in the family of non-rice, and dummy cropping patterns variables affect labor allocation in the family of upland rice at an error level of 5%. The labor allocation in the family on upland rice farming, the estimated parameters for the labor allocation in the family for non-rice farming, and household income are not in line expectation, expected to be negative while the results show a positive sign. This is due to the conditions that occurred at the research site where farm household members not only allocate their working time to upland rice farming activities but also engage themselves in undertaking other sources of income from non-rice farming activities. The household income towards labor allocation in the family on upland rice farming is positive because upland rice farming is the main work of the farmer despite water supply constraints. Dummy cropping pattern shows a positive value, which means that there is a difference in the labor allocation in the family on upland rice cropping patterns. In the equation of the labor allocation outside the family for upland rice obtained that partially land area and dummy cropping patterns variables affect labor allocation outside the family of upland rice at an error level of 5%. All signs that match the expected parameters. For dummy cropping patterns, it shows a positive sign, which means that there is a different use of labor allocation outside the family for upland rice-based on upland rice planting patterns. This is caused by an abundant outpouring of work outside the family is used to increase labor shortages if the family workforce experiences shortages. In general, in the study area, labor forces are predominantly fulfilled by members of the family.

Table 3. Estimation Results of Labor Allocation Upland Rice Farmers

Variable	Coefficient	Std. error	t-Statistik	Prob.
LIFUR				
C	-0.632162	1.769134	-0.357328	0.7211^{ns}
LA	0.003253	0.000602	5.401545	0.0000*
LIFNR	0.961556	0.062975	15.26888	0.0000*
LIFNF	-0.008392	0.007070	-1.187090	0.2362^{ns}
HI	9.84E-08	7.71E-08	1.275023	0.2033^{ns}
DCP	15.26963	0.897796	17.00790	0.0000*
LOFUR				
C	2.407597	0.067787	35.51684	0.0000*
LA	0.000299	3.34E-05	8.943996	0.0000*
LIFUR	-0.003573	0.002359	-1.514548	0.1310^{ns}
HI	-4.09E-09	3.94E-09	-1.038391	0.2999^{ns}
DCP	0.460612	0.065322	7.051406	0.0000*
LIFNF				
C	6.502308	0.429616	15.13516	0.0000*
LA	-0.234487	0.054426	-4.308394	0.0000*
LIFUR	-0.238636	0.157697	-1.513253	0.1313^{ns}
LIFNR	0.277265	0.122196	2.269022	0.0240*
DCP	0.001463	0.079706	0.018351	0.9854^{ns}
LIFNR				
C	0.688831	0.264315	2.606099	0.0096*
LA	-0.057093	0.025828	-2.210486	0.0278*
LIFUR	-1.083652	0.036529	-29.66544	0.0000*
LIFNF	-0.041080	0.026904	-1.526937	0.1279^{ns}
NLIF	-0.252955	0.058229	-4.344174	0.0000*
DCP	0.358230	0.030019	11.93325	0.0000*

Source: Primary data
* = significant at level α = 5%
^{ns} = non significant

In the equation of the labor allocation in the family of non-farm obtained that partially land area and labor allocation in the family of non-rice variables affect labor allocation in the family of non-farm at an error level of 5%. The sign that the variable that is not following the expected parameters that are for the labor allocation in the family of non-rice activities that should be negative, but the results showed a positive sign. This is in line with research undertaken by Mariyanto et al. (2015), asserting that the total outflow of family work in non-farm is positively influenced by the total outflow of family work on farming. This happens because non-farm activities are only carried out by the head of the family, for the outpouring of work on non-rice activities which can be done by other family members. Dummy variable on cropping pattern shows a positive sign meaning there is a different use of labor in non-farm based on upland rice cropping patterns.

In the equation of the labor allocation in the family of non-rice farming, obtained that partially land area, labor allocation in the family of upland rice, the number of labors in family, and dummy cropping patterns variables affect labor allocation in the family of non-rice at an error level of 5%. The Variable sign does not match with the expected parameters, namely for the variable number of labor in the family that should be positive but negative results were obtained. This is not in line with the research

Table 4. Estimated Results of Household Income Upland Rice Farmers

Variable	Coefficient	Std. Error	t-Statistic	Prob.
IOFF				
C	24.82348	1.209461	20.52441	0.0000*
IURF	-0.242059	0.048433	-4.997858	0.0000*
INR	-0.537904	0.068855	-7.812143	0.0000*
LIFNF	0.748516	0.065546	11.41963	0.0000*
DCP	0.273863	0.062776	4.362527	0.0000*
INR				
C	10012579	554041.4	18.07190	0.0000*
IURF	0.266961	0.122517	2.178964	0.0301*
LIFNR	89404.66	31903.57	2.802340	0.0054*
SE	0.213891	0.099391	2.152020	0.0322*
DCP	240959.8	453647.0	0.531161	0.5957^{ns}

Source: Primary data. * = significant at level α = 5%. ^{ns} = non significant

of Mariyanto et al (2015), stating that the total outpouring of family work on non-farm is positively influenced by the number of workers in the family. The dummy variable of cropping pattern shows a positive sign meaning that there is a difference in labor allocation in the family of non-rice farming based on upland rice cropping patterns. Estimation results on upland rice household income consisting of income from non-farm and income from non-rice shown in table 4.

From Table 4, it can be shown that partially all of the variables affect the income of non farm at an error level of 5%. In the income of non-farm that all of the expected parameter signs are obtained as expected. Non-farm income is positively related to labor allocation in the family of non-farm. The dummy variable of cropping pattern shows a positive sign indicating a different non-farm income based on upland rice cropping patterns because in the study area has various non-farm activities such as trading, public transportation driver, repair-shop, and handyman. The non-farm activity is carried out to generate income to meet the needs of the household because the condition of upland rice farming is very climate-dependent and prone to the risk of crop failure.

In the income from non-rice, it is obtained that partially income from upland rice farming, labor allocation in the family of non-rice, and spending for education affect income from non-rice at an error level of 5%. This condition occurs because rainfed land farmers in addition to getting income from upland rice farming also seek other income from farming besides rice and raising livestock. Other source of income from on-farm activities are maize crops and raising cattle. These results are in line with the research by Mariyanto et al (2015), which is that the income parameters from farms with positive signs show the relationship between on-farm and non-farm outpouring allocations, which should be substitution relations indicated by negative signs but the results show positive signs. Dummy variable on cropping pattern shows a positive sign, which means that there is a difference in non-rice income based on upland rice cropping patterns. Non-rice income comes from palawija and livestock farming.

Estimation results on household consumption of upland rice farmers consisting of food consumption from upland rice, food consumption, and non-food consumption can be shown in Table 5.

Table 5. The Results of The Estimated Household Expenditure of Upland Rice Farmers

Variable	Coefficient	Std. Error	t-Statistic	Prob.
FEUR				
C	663338.4	172318.8	3.849482	0.0001*
RURF	0.137954	0.019539	7.060261	0.0000*
THI	0.011348	0.007647	1.483961	0.1389^{ns}
NHM	110918.2	48246.19	2.299004	0.0222*
DCP	160458.9	104441.8	1.536349	0.1255^{ns}
FCE				
C	9629427.0	714716.0	13.47308	0.0000*
THI	0.090361	0.033230	2.719215	0.0069*
NHM	280788.4	229586.1	1.223020	0.2223^{ns}
NFCE	-1.027707	0.071244	-14.42516	0.0000*
DCP	1284570	399848.1	3.212645	0.0015*
NFCE				
C	15.17748	0.048451	313.2523	0.0000*
THI	6.40E-09	4.10E-09	1.559818	0.1199^{ns}
NST	0.340921	0.026995	12.62894	0.0000*
DCP	0.075292	0.048805	1.542700	0.1240^{ns}

Source: Primary data
* = significant at level α = 5%
^{ns} = non significant

From table 5 it can be shown household expenditure of upland rice farmers, and the number of household members affects food consumptions from upland rice at an error level of 5%. In the equation of food consumption for upland rice, all parameter signs were obtained as expected, which shows that food consumption from farming is positively influenced by revenue from upland rice, total household income, the number of household members, and dummy cropping patterns. If these variables increase, food expenditure from upland rice will also increase and vice versa. Dummy variable cropping pattern shows a positive sign meaning that there are differences infood consumption based on upland rice cropping .

In the equation of consumption for food. all parameter signs were obtained as expected. Food consumption expenditure is positively influenced by the total household income, the number of household members, and dummy cropping patterns, while non-food consumption expenditure negatively affects food consumption expenditure. This is in line with the research by Swares, N.V and Bakce, D (2017) which state that food consumption expenditure is positively influenced by household income outside of rice farming and the number of household members. Dummy variable cropping pattern shows a positive sign meaning that there is a difference in food consumption expenditure based on upland rice cropping patterns.

In the equation of non-food consumption expenditure all parameter signs were obtained as expected. Non-food consumption expenditure is positively influenced by the total household income, the number of school children, and dummy cropping patterns. This shows that the more the total household income and the number of school children are the non-food consumption expenditure will also increase and vice versa. Dummy variable cropping pattern shows a positive sign meaning that there is a difference in non-food

consumption expenditure of upland rice based on upland rice cropping patterns. Non food consumption expenditure there are certain needs that farmers can hold their expenses and will increase if total household income increases.

CONCLUSION

The economic behavior of upland rice farmers' households is explained using the economic model of farmer households that includes production behavior, labor allocation, income, and expenditure. That most of the variables in the study significantly influenced production behavior, labor allocation, income, and expenditure at an error level of 5%. That most of the parameter sign variables are as expected. This show the relationship between household economic behavior from the aspects of production, allocation of labor, income, and consumption with each of the factor that influence it. Rainfed land farmer households decide to choose a one-time or two-time upland rice farming pattern with consideration of land and climate conditions, so that there are differences in production behavior, labor allocation, income, and consumption based on the applied cropping pattern. Farmers' land condition are dependent on rainfall, so apart from cultivating upland rice, farmers also carry out on-farm other than rice and non-farm activities. Farm households allocate their labor with a double income in on-farm and non-farm to earn income to meet the needs of food consumption and non food consumption for the household.

REFERENCES

Balai Pengkajian Teknologi Pertanian (BPTP). 2012. *Laporan Tahunan*. Kementerian Pertanian Republik Indonesia.

Barnum Howard N. Dan Lyn Squire, 1979. *A Model of an Agricultural Household, Theory and Evidence.* The John Hopkins University Press. Baltimore : 9.

Beyene, A. 2008. *Determinants of Off-Farm Participation Decision of Farm Households In Ethiopia*. Journal Agrekon. 47(1): 140–161. DOI: 1080/03031853.2008.9523794.

Chang, Y.M., Huang, B.W., and Chen, Y.J. 2012. *Labor Supply, Income, and Welfare of The Farm Household.* Labour Economics. 19(3): 427–437. https://doi. Org/10.1016/j.labeco.2012.03.004

Goyal, S.K., and Berg, E. 2003. *Supply Response and Input Demand on Paddy Farm In Haryana India.* Indian Journal of Agricultural Economics. 58(2): 63

Indonesian Agency For Agricultural Research And Development 2017. *Padi Tadah Hujan dan Berumur Genjah.* Kementerian Pertanian Republik indonesia.

Kassa, B., Kassa, B., and Aregawi, K. 2017. *Off-Farm Participation Decision and Its Impact On Crop Yield In Northern Ethiopia.* Journal of Development and Agricultural Economics. 9(2): 16-25. DOI:10.5897/JDAE2016.0757

Kokoye, S.E.H., Tovignan, D.S., Yabi, J.A., and Yegbemey, R.N., 2013. *Econometric Modelling of Farm Household Land Allocation in the Municipality of Banikoara in Northern Benin.* Land Use Policy 34 (2013): 72–79. https:// doi.org/10.1016/j.landusepol.2013.02.004

Kuznetsova A., Askarov A., Gusmanov R., Askarova A., Pypłacz P. 2019. *Differentiation of Labor Productivity Level and Wages as a Basis for Changes in Labor Market*. Polish

Journal of Management Studies. 20(2). 345-357. DOI: 10.17512/pjms.2019.20.2.29

Lailiyah, N., Timisela, N.R., and Kaplale, R., 2017. *Analisis Produksi Padi Sawah (Oryza Sativa, L) Tadah Hujan Di Desa Lea Wai Kecamatan Seram Utara Timur Kobi*. Jurnal agribisnis Kepulauan. 5(2): 151-165.

Las, I., Sarwani, M., Mulyani, A. 2012. *Laporan Akhir Kunjungan Kerja Tematik dan Penyusunan Model Percepatan Pembangunan Pertanian Berbasis Inovasi Wilayah Pengembangan Khusus Lahan Sub Optimal*. Balai Besar Litbang Sumberdaya Lahan Pertanian. Bogor.

Lokanandha, R., and Radhakrisna, R. 2013. *A Study On Resource Use Efficiency Of Input Factors With Reference to Farm Size Paddy Cultivation In Nellore District*. Journal of Humanities And Social Science. 17(1): 48-55. e-ISSN: 2279-0837. P-ISSN: 2279-0845.

Mariyanto, ,J., Dwiastuti, R., and Hanani, N., 2015. *Model Ekonomi Rumahtangga Pertanian Lahan Kering Di Kabupaten Karanganyar Provinsi Jawa Tengah*. Habitat. 26(2). 108–118. ISSN : 0853-5167.

Mulyani. A. and Sarwani, M. 2013. *Karakteristik dan Potensi Lahan Sub Optimal untuk Pengembangan Pertanian di Indonesia*. Jurnal Sumberdaya Lahan. 7(1). ISSN 19070799.

Nakajima, C. 1986. *Subjective Equilibrium Theory of The Farm Household*. Elsevier Science Publisher. Amsterdam.

Nguyen, D.L., Grote, U., and Nguyen, T.T. 2019. *Migration, Crop Production and Non-farm Labor Diversification in Rural Vietnam*. Economic Analysis and Policy.Vol.63 : 175 - 187. https://doi.org/10.1016/j.eap.2019.06.003

Ruben, R and Ruijven, A, 2001. *Technical coefficients for bio-economic farm household models: a meta-modelling approach with applications for Southern Mali*. Ecological Economics 36 : 427–441. https://doi.org/10.1016/S0921-8009(00)00240-8

Swares, N. V. and Bakce, D. 2017. *Analisis Faktor-faktor yang Mempengaruhi Keputusan Ekonomi Rumahtangga Petani Padi Sawah di Kecamatan Kampar Utara Kabupaten Kampar*. Sorot. 12(2): 71–82. https://doi.org/10.31258/sorot.12.2.4698.

Terano, R., Zainalabidin, M., and Golza, R. 2013. *Farm Manajemen Analysis In Paddy Granary Areas In Enhancing On-Farm Income*. Agris On-Line Papers In Economics and Informatics. V(1): 73-81.