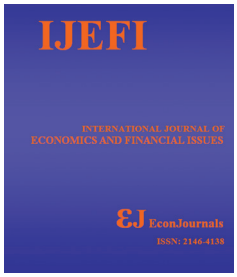

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Analysis the Effect of Coconut Production Risk and Price on the Economic Behavior of Coconut Farmers in Seruyan District, Central Borneo Province, Indonesia

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ABSTRACT

Coconut farmers are always faced with risks, including the risk of production and price risk. This production risk causes the productivity of the head to decline. In addition, the price risk faced by farmers will also have an impact on the income received so that in the end it will affect the farmer household decision making in allocating existing resources. The purpose of this study was to analyze the effect of changes in the level of production risk and price on farmer household behavior in coconut farming production decisions. This research was conducted in Seruyan District, Central Borneo Province with 200 farmers as respondents. The results showed that there was a risk that production would increase the use of herbicides, reduce the allocation of time to use male labor in the family on family farms and increase the use of male labor from outside the family and reduce spending on health, education and household savings. Meanwhile, the price risk will result in reduced use of female labor from outside the family, reduced non-food, education expenditure and reduced business investment.

Keywords: Coconut Farmer Household Economic Behavior, Production Risk, Price Risk
JEL Classifications: D10, D13, D14, Q12

1. INTRODUCTION

Coconut farmers are always faced with risks, including the risk of production and price risk. Indications of the existence of production risk and prices are shown by the ups and downs of production and the prices received by coconut farmers every season. The existence of this production risk causes the productivity of the head to decrease. As for coconut production, as a whole, the production of coconut plantations in the District of Seruyan in 2013 was 3360.2 tonnes/year and in 2014 it was 974.38 tonnes/year (BPS Seruyan, 2017). The main sources of risk that are generally felt by farmers include uncertainty of weather, pests and diseases and uncertainty of product prices (Patrick et al., 1985). There are several risks faced by coconut farmers that often arise, namely the uncertainty of coconut prices. The risk of product prices causes the price obtained by coconut farmer households to fluctuate. The product price risk is largely determined by the strength of demand and coconut retention in the market. Based on observations in the field of coconut prices in February 2019, it was 1500/coconut. Even at the end of 2018 the price of coconut reached 800/coconut. This condition will result in a decrease in coconut peni household income.

In addition to on-farm farming activities, coconut farmers allocate labor from their family members to activities outside of off-farm farming and outside non-farm farming, with these activities, coconut farmers household income will be used for daily consumption. With this production and price risk, it will affect the

economic behavior of coconut farmer households both in making decisions on production, consumption and allocation of labor.

Nakajima (1986) states that one of the important aspects in assessing the agricultural sector in developing countries is the characteristics of the farm household as an interrelated economic unit. Public policies directed at farmers or farms certainly need to pay attention to the behavior of these farmers' decision-making, so that the policies taken can achieve their goals effectively and efficiently. Various research results indicate that the existence of production and price risks will have an impact on decreasing production and household income. So that in the end it will affect the farmer household decision making in allocating existing resources (Ellis, 1988; Harwood et al., 1999 Fariyanti et al., 2007; Hartoyo et al., 2004; Jufri et al., 2018).

Therefore, it is important to conduct research on household economic behavior due to the risk of production and prices in coconut farming. So that the purpose of this study is to analyze the effect of production risk and price on coconut farmer household economic performance and the factors that affect production, use of labor, and household expenditure.

2. LITERATURE REVIEW

In the research of Beach et al. (2008) formulated the elements of production risk and product price risk in the model of farmer household economic behavior. In which it assumes the Present Value of utility expectations with constraints of time, production function and budget. Farm households have the following objective functions:

$$\text{Max}\int e^{-rt} EU(t)dt \quad (1)$$

If production and prices are stochastic, then household utility will depend on expectations and variance in the consumption level (C), the availability of leisure time (Tl) and the characteristics of the farmer household (Zh) as follows:

$$EU=U(E(C), Var(C), T_l; Z_h) \quad (2)$$

Assumed $\frac{\partial U}{\partial å(C)} > 0$ dan $\frac{\partial U}{\partial Var(C)} £ 0$.

If the farmer household allocates labor resources in the family and the cultivated land it owns to manage the farm in producing a commodity by combining output for each period, the constraints are as follows:

1. Time constraints: $T=T_f+T_o+T_l, T_o \geq 0$ (3)
2. Production function: $Q=Q(N, T_f, L_f, X, \varepsilon)$ (4)
3. Budget constraints: $p_q Q+w_o T_o+Y=p_x X+w_h H_f+p_n N+p_c C$ (5)

Where T is the total time for the household, Tf is the time for the household to work on the farm, To is the time for the household to work outside the farm, Tl is the time for the household to relax (leisure), Q is the output, N is the area of land, Lf is the labor rent, Xi is the input of production, ε is the risk, pq is the price of output, pc is the price of consumer goods, wo is the wage of non-farm labor, px is the input price, wh is the wage of rented labor, pn is the price of land, Y is income not from work, and C is a consumer good.

Production and prices are assumed to be sources of uncertainty, farmers often experience uncertainty in production prices when making decisions on production activities. The risk that is often faced by farmer households in cultivating farming is the risk of production, this appears due to weather, pests and plant diseases. If it is assumed that there is no joint product, the production function is as follows:

$$Q_i=Q_i(N_i, T_{fi}, L_{fi}, X_i, \varepsilon_i) \quad (6)$$

In this research, the commodity under study is coconut, this commodity is the most dominant commodity cultivated by farmer households in the district of the district, the sub-district of the Lower East, East Borneo, Central Borneo. If it is assumed that the uncertainty of production is a multiplication, then the production function is as follows:

$$Q_i=\varepsilon_i Q_i(N_i, T_{fi}, L_{fi}, X_i) \quad (7)$$

Where are the expectations

$$E(\varepsilon_i)=\mu; \text{ variance var } (\varepsilon_i)=\sigma_i^2 \quad (8)$$

Furthermore, with the production function shown in equation (4), the current period profit function for coconut farming activities is written as follows:

$$\pi=\sum_i (p_{qi} \varepsilon_i Q_i(\bullet)-w_f T_{fi}-w_h L_{fi}-p_x X_i-p_n N) \quad (9)$$

In this case wf shows the time value used by the farmer household in coconut farming. Given the production risk and price defined as E (Pi) = θi and the price variance as var (Pi) = ϕi2, the expected profit can be written as follows:

$$E(\pi)=\sum[\theta_i \mu_i Q_i(\bullet)-w_f T_{fi}-w_h L_{fi}-p_x X_i-p_n N] \quad (10)$$

The expected profit variance can be written as follows

$$Var(\pi)=\sum_i Q_i^2(\bullet)(\varphi_i^2\sigma_i^2+\varphi_i^2\mu_i^2+\theta_i^2\sigma_i^2) \quad (11)$$

Furthermore, the Lagrangian function of the model can be written as follows:

$$L \equiv U(E(C), Var(C), T_l; Z_h) \lambda [\theta_i \mu_i Q(N, T_f, L_f, X)-p_x X-p_n N-w_h L_f+w_o T_o+V-p_c C]+\tau [T-T_f-T_o-T_l]+\mu T_o \quad (12)$$

When the conditions are optimal, the function of demand for input and supply of output can be derived by applying the Kuhn Tucker condition, which is as follows:

$$N_i=N_i(\theta_i, \phi_i^2, \mu_i^2, \sigma_i^2, w_h, p_x, w_o, A_{t-1}, Z_h) \quad (13)$$

$$T_{fi}=T_{fi}(\theta_i, \phi_i^2, \mu_i^2, \sigma_i^2, w_h, p_x, w_o, A_{t-1}, Z_h) \quad (14)$$

$$T_o=T_o(\theta_i, \phi_i^2, \mu_i^2, \sigma_i^2, w_h, p_x, w_o, A_{t-1}, Z_h) \quad (15)$$

$$L_f=L_f(\theta_i, \phi_i^2, \mu_i^2, \sigma_i^2, w_h, p_x, w_o, A_{t-1}, Z_h) \quad (16)$$

The function of input demand includes production for land area (N_i), labor for coconut farming (T_F), labor outside coconut farming (T_o), labor hired for coconut farming (L_f) and other variable inputs such as fertilizers and pesticides. Thus, the demand function on the expected goods consumed (C) is influenced by the variables mentioned above, non-work income (V) and the price of consumer goods (pc).

3. METHODS

This research was conducted in Seruyan Regency, Central Borneo Province purposively with the consideration that Seruyan Regency is one of the main coconut producing districts in Central Borneo Province. The data used in this study are primary data and secondary data. Primary data is cross section data for the 2019 planting season. Data was obtained by conducting direct interviews with 200 coconut farmer households using a questionnaire prepared by the researcher. Meanwhile, secondary data was obtained from several related agencies, such as the Ministry of Agriculture, the Central Bureau of Statistics and other sources. This data is used to support the analysis in this study.

Coconut Farmer Household Economic Model

1. Production

$$PROD=a_0+a_1*PUGM+a_2*HBSA+a_3*JBKP+a_4*TPDK+a_5*TWDK+a_6*TTLK+a_7*LUTK+a_8*SDPK+E_1 \quad (17)$$

2. Input Usage

$$PUGM=b_0+b_1*JBKP+b_2*HUGM+b_3*UMPK+b_4*TBUK+b_5*SDPK+b_6*EXPK+E_2 \quad (18)$$

$$HBSA=c_0+c_1*HHBS+c_2*LHKP+c_3*TTDK+c_4*TTLK+c_5*SDPK+c_6*EXHK+E_3 \quad (19)$$

3. Use of Labor

$$TPDK=d_0+d_1*TBUK+d_2*TPNP+d_3*EXHK+d_4*EXPK+d_5*SDPK+E_4 \quad (20)$$

$$TWDK=e_0+e_1*TBUK+e_2*TWNP+e_3*EXHK+e_4*EXPK+e_5*SDPK+E_5 \quad (21)$$

$$TTDK=TPDK+TWDK \quad (22)$$

$$TPLK=f_0+f_1*JBKP+f_2*UTLK+f_3*PTUK+f_4*TPDK+f_5*EXHK+f_6*SDPK+E_6 \quad (23)$$

$$TWLK=g_0+g_1*LHKP+g_2*TPLK+g_3*EXPK+g_4*SDHK+E_7 \quad (24)$$

$$TTLK=TPLK+TWLK \quad (25)$$

4. Spending

$$KOPG=h_0+h_1*JMAK+h_2*TPRT+h_3*EXPK+h_4*UMPK+h_5*TTDK+E_8 \quad (26)$$

$$KNPG=i_0+i_1*KOPG+i_2*TBUK+i_3*EXHK+i_4*SDHK+E_9 \quad (27)$$

$$TKON=KOPG+KNPG \quad (28)$$

$$PKES=j_0+j_1*JMAK+j_2*TPRT+j_3*PEIS+j_4*SDPK+j_5*PPEN+E_{10}$$

$$PPEN=k_0+k_1*JASE+k_2*PELK+k_3*EXPK+k_4*SDHK+k_5*SDPK+k_6*TPRT+k_7*JMAK+k_8*TKON+E_{11} \quad (29)$$

$$TRAN=TKON+PKES+PPEN \quad (30)$$

$$TABP=l_0+l_1*TRAN+l_2*TPRT+l_3*PEIS+l_4*EXHK+l_5*SDPK+E_{12} \quad (31)$$

$$INVES=m_0+m_1*TABP+m_2*JPNP+m_3*JPUT+m_4*PEIS*m_5*EXHK+m_6*EXPK+m_7*SDHK+E_1 \quad (32)$$

3.1. Variables Description

- PROD = Coconut productivity
- EXHK = Coconut price expectations
- EXPK = Coconut production expectations
- SDHK = Coconut price risk
- SDPK = Coconut production risks
- PUGM = Use of salt
- HBSA = Use of herbicides
- TPDK = The use of male labor in the family in coconut farming
- TWDK = The use of female labor in the family in coconut farming
- TTDK = Total use of labor in the family in coconut farming
- TPLK = The use of male labor outside the family in coconut farming
- TWLK = The use of female labor outside the family in coconut farming
- TTLK = The total use of labor outside the family in coconut farming
- TPNP = The use of male labor in the family in non-agricultural activities
- TWNP = The use of female labor in the family in non-agricultural activities
- PTUK = Coconut farming income
- TBUK = Total cost of coconut farming
- JPUT = Total income from farming activities
- JPNP = Total income from non-agricultural activities
- TPRT = Total household income
- KOPG = Food consumption
- KNPG = Non-food consumption
- TKON = Total consumption
- PKES = Health expenses
- PPEN = Education expenditure
- TRAN = Total expenses
- TABP = Savings
- INVES = Business investment
- JBKP = Number of productive coconut stems
- LHKP = Coconut land area
- UMPK = Farmer's age
- PEIS = Wife's Education
- PELK = Husband's Education
- LUTK = Old Coconut Farming Business
- UTLK = Male labor wages for farming activities
- HUGM = Price of salt
- HHBS = Herbicide prices
- JASE = Number of school children
- JMAK= Number of family members.

3.2. Model Identification

The coconut farmer household economic model in this study consists of 17 equations (G) with details of 13 structural equations and 4 identity equations. The model consists of 17 endogenous variables and 25 exogenous variables so that the total variables are 42 variables (K). The maximum number of variables in the equation is 8 variables (M). If (K-M) is greater than (G-1), the excess identified equation is said to be over-identified and can be estimated using 2SLS or 3SLS (Koutsoyiannis, 1977). It can be concluded that all structural equations are over identified. Based on the terms of the order condition, the model is over-identified, so the method used is the two-stage least squares method (2SLS). Data processing used Statistical Analysis System/Econometric Time Series (SAS/ETS) software version 9.3.

4. RESULTS AND DISCUSSION

The characteristics of respondents in this study consisted of age, education, experience in coconut farming, and coconut land area which are presented in Table 1. Based on the results of interviews with 200 farmers, the age of coconut farmers is mostly in the age group 41-50 years and 51-60 years. with each percentage of 31.00 percent. In addition, there are 10 percent of farmers who are under the age group of 30 years, this shows that coconut farming is still in demand by young people. Furthermore, education for coconut farmers is mostly between 1 year and 6 years or equivalent to elementary school (33.00 percent). However, there are still farmers who do not get formal education (6.00 percent) and some have even educated up to tertiary education (2.00 percent). Meanwhile, the experience of coconut farming shows that the majority of coconut farmers in Seruyan Regency have experience in farming coconuts between 11 and 20 years, amounting to 38.00 percent. In addition, there are 21.00 percent of farmers with less than 10 years of coconut farming experience. The last characteristic is the area of coconut land, where land is the most important natural resource in agricultural cultivation. Based on the area of land tenure, in the research area the area of land cultivated for coconut farming is 2.8 hectares on average. Where most coconut farmers (38.00 percent) cultivate land more than 2 hectares or classified as large land.

Table 1: Characteristics of coconut farmers in Seruyan Regency in 2020

No	Characteristics of farmers	Number of farmers	Percentage
1	Age of farmer (year)		
	≤30	20	10.00
	31-40	45	22.50
	41-50	62	31.00
	51-60	62	31.00
	>60	11	5.50
2	Level of education		
	Did not finish elementary school	12	6.00
	Elementary school	66	33.00
	Junior high school	57	28.50
	Senior High School	61	30.50
	College	4	2.00
3	Coconut farming experience (year)		
	≤10	42	21.00
	11-20	76	38.00
	21-30	44	22.00
	31-40	27	13.50
	41-50	11	5.50
4	Coconut land area (ha)		
	≤1.0	60	30.00
	1.01-2.0	64	32.00
	>2.0	76	38.00

Source: Primary Data Processed, 2021

4.1. The Influence of Production Risk and Coconut Price on Economic Behavior of Coconut Farmers Household

Coconut farmer household economic behavior in this study is approached by simultaneous equations. The estimation results of the coconut farmer household economic model are presented in Table 2. In terms of criteria economy, the estimated parameter sign in the two equations is in accordance with the proposed hypothesis. The coefficient of determination (R2) ranges from 0.08512 to 0.93499. This shows that the existence of exogenous variables in the equation behavior is able to explain endogenous variables well.

Based on Table 2, it is known that the coconut productivity equation (PROD) is significantly influenced by the use of herbicides (HBSA), the number of productive coconut stems (JBKP), the total labor outside the family (TTLK) and the length of coconut farming (LUTK). The amount of herbicide use has a positive effect on coconut productivity, which means that the more herbicides used, the coconut productivity will increase. Furthermore, the number of productive coconut stems also has a positive effect on coconut productivity. The results of research by Muyengi et al. (2015), Wulandari et al. (2018) show that the number of productive coconut stems will increase coconut production. The same thing is also shown by the effect of the total use of labor outside of work which also has a positive effect. Increasing the number of workers will increase the maintenance of the coconut plantation area owned by farmers, so that the production results obtained are also more and more.

The salt use equation (PUGM) shows that the number of productive coconut stems (JBKP), age of coconut farmers (UMPK), and coconut production expectations (EXPK) have a significant effect on the use of salt in coconut farming. The effect of changes in the number of productive coconut stems on the use of salt has a positive sign. This is in accordance with the production theory, where the need for salt will increase along with the increase in the number of productive coconut stems. In addition, production expectations also have a positive effect, where if coconut production expectations increase, it will increase the use of salt. and the characteristics of coconut business, namely the number of productive coconut stems.

The use of herbicides (HBSA) by coconut farmer households shows farmer household demand for herbicides for coconut farming. The estimation results of the herbicide use equation show that the area of coconut land (LHKP), the total use of outside labor (TTLK) and the risk of coconut production (SDPK) significantly influence the use of herbicides with positive signs. Coconut farmer household behavior in using herbicides is very much determined by farming characteristics such as the area of coconut land. Increasing coconut land area will encourage farmer households to increase the use of herbicides. The average use of herbicides in coconut farmer households is 4.66 l/ha/

Table 2: Estimation results of coconut farmers household economic model

Equation	Parameters	Estimate parameters	t-Value	Pr>|t|
Production				
PROD	Intercept	6994.042**	2.58	0.0105
R^2=0.27606	PUGM	–19.8174	–1.29	0.1977
F Value=9.10	HBSA	–1165.15***	–4.21	<0.0001
D-W=1.802844	JBKP	17.32798*	1.75	0.0818
	TPDK	7.917620	0.88	0.3805
	TWDK	137.4638	1.58	0.1168
	TTLK	68.79406***	7.04	<.0001
	LUTK	64.13696*	1.66	0.0978
Input Usage				
HUGM	Intercept	–45.6304	–0.97	0.3345
R^2=0.87491	JBKP	0.496588***	12.71	<0.0001
F Value=224.98	HUGM	0.002023	0.24	0.8078
D-W=1.958383	UMPK	0.718098*	1.82	0.0706
	TBUK	–1.12E–6	–1.29	0.1970
	SDPK	0.003870	1.10	0.2716
	EXPK	0.007205**	2.51	0.0131
HBSA	Intercept	–1.54584	–0.48	0.6293
R^2=0.88228	HHBS	–0.00001	–0.84	0.3996
F Value=241.07	LHKP	3.295079***	11.18	<0.0001
D-W=1.529866	TTDK	0.008922	1.52	0.1291
	TTLK	0.017245***	2.86	0.0047
	SDPK	0.000456**	2.46	0.0148
	EXHK	0.000826	0.54	0.5879
Use of Labors				
TPDK	Intercept	185.7037	4.61	<0.0001
R^2=0.38703	TBUK	–2.24E–7	–0.57	0.5672
F Value=24.50	TPNP	–0.45607***	–10.56	<0.0001
D-W=1.945637	EXHK	0.007735	0.33	0.7399
	EXPK	0.000804	0.33	0.7385
	SDPK	–0.00934***	–3.18	0.0017
TWDK	Intercept	8.624100	1.16	0.2481
R^2=0.23950	TBUK	–1.57E–7**	–2.25	0.0258
F Value=12.22	TWNP	–0.00368	–0.47	0.6362
D-W=1.947348	EXHK	0.005754	1.37	0.1720
	EXPK	0.002264***	5.20	<0.0001
	SDPK	0.000737	1.36	0.1748
TPLK	Intercept	21.55124	0.41	0.6818
R^2=0.93499	JBKP	0.100554***	7.59	<0.0001
F Value=462.67	UTLK	–0.00003	–0.07	0.9468
D-W=1.627376	PTUK	1.96E–6***	15.52	<0.0001
	TPDK	–0.06441	–1.35	0.1783
	EXPK	0.002831**	2.34	0.0202
	SDPK	0.007130***	4.63	<0.0001
TWLK	Intercept	–1.72187	–0.83	0.4059
R^2=0.56327	LHKP	3.216899***	3.96	0.0001
F Value=62.87	TPLK	0.017960	1.05	0.2969
D-W=1.979295	EXPK	0.001314***	3.13	0.0020
	SDHK	–0.01197*	–1.74	0.0833
Spending				
KOPG	Intercept	178.6705	6.17	<0.0001
R^2=0.18555	JMAK	14.05849***	4.11	<0.0001
F Value=8.84	TPRT	4.061E–7**	2.26	0.0247
D-W=1.534995	EXPK	0.000563	0.28	0.7812
	UMPK	–0.97853**	–2.62	0.0094
	TTDK	–0.18031*	–1.84	0.0680
KNPG	Intercept	80.64460	1.81	0.0712
R^2=0.09621	KOPG	–0.62915***	–4.03	<0.0001
F Value=4.13	TBUK	–3.72E–7	–1.54	0.1242
D-W=2.076586	EXHK	0.009876	0.47	0.6422
	SDHK	–0.030010	–0.90	0.3714
PKES	Intercept	29.72724	3.56	0.0005
R^2=0.08512	JMAK	0.096584	0.06	0.9507
F Value=3.61	TPRT	1.233E–7*	1.78	0.0765
D-W=1.8912	PEIS	0.236364	0.40	0.6884
	SDPK	–0.00235**	–2.20	0.0289
	PPEN	–0.123050**	–2.11	0.0364
PPEND	Intercept	–140.379	–3.16	0.0018
R^2=0.15665	JASE	2.830980	0.40	0.6922
F Value=4.43	PELK	1.571150	0.91	0.3664
D-W=2.009437	EXPK	0.008371***	2.71	0.0074
	SDHK	–0.03058	–0.60	0.5497
	SDPK	–0.00742*	–1.80	0.0736
	TPRT	9.615E–8	0.39	0.6947
	JMAK	8.540021*	1.75	0.0822
	TKON	–0.415267**	–2.49	0.0137
TABP	Intercept	–144.751	–1.79	0.0743
R^2=0.26058	TRAN	0.148523*	1.69	0.0929
F Value=13.67	TPRT	1.309E–6***	4.98	<0.0001
D-W=1.712227	PEIS	2.948420	1.39	0.1647
	EXHK	0.086809**	2.27	0.0244
	SDPK	–0.00321	–0.81	0.4161
INVES	Intercept	–183.877	–1.19	0.2340
R^2=0.65672	TABP	–1.10186*	–1.70	0.0906
F Value=52.47	JPNP	0.691828***	6.22	<0.0001
D-W=1.893637	JPUT	7.994E–6***	6.44	<0.0001
	PEIS	0.480156	0.12	0.9067
	EXHK	0.055406	0.68	0.4997
	EXPK	0.001500	0.27	0.7849
	SDHK	–0.11600	–1.04	0.2986

Source: Primary Data Processed, 2021. ***Significant α 1%. **Significant α 5%. *Significant α 10%

year. The coconut production risk variable (SDPK) also has a positive effect on the use of herbicides. This shows that the behavior of coconut farmer households in using herbicides is also very much determined by the level of risk in coconut production faced by farmers. The risk of increasing coconut production will encourage farmer households to increase the use of herbicides. Increased use of herbicides is a form of risk management carried out by farmers. By increasing the use of herbicides, it is hoped that it can reduce weeds that disturb coconut plants so that it will be able to increase coconut production.

The similarity in the use of male labor in the family in coconut farming (TPDK) is significantly influenced by the use of male labor in the family for non-agricultural activities (TPNP) and the risk of coconut production (SDPK). The use of male labor in the family in coconut farming is very responsive to changes in the use of male labor in non-agricultural activities. Coconut farmer household decision making in allocating male labor to coconut farming activities is largely determined by the use of male labor in non-agricultural activities. Coconut farmer households will reduce the use of male labor in the family in coconut farming activities if the use of male labor in non-agricultural activities increases. This result is almost the same as the research result of Nurhayati et al. (2012) stated that an increase in the outpouring of work outside of farming will reduce the time spent on farming activities. Furthermore, the risk of coconut production (SDPK) which has a

negative effect on the use of male labor in the family in coconut farming (TPDK). This shows that if there is an increase in the risk of coconut production faced by the kelepa farmer household, it will cause a decrease in the number of male workers in the family used in coconut farming. The results of this study are the same as the results of research conducted by Jufri et al. (2018) that an increase in the risk of production will reduce the outpouring of male labor in the family.

The use of the results of the estimation of the equality of the use of female labor in the family in coconut farming (TWDK) shows that the total cost of coconut farming (TBUK) has a negative effect on the use of female labor in the family in coconut farming activities and the real level is less than 5%. This shows that the increase in coconut farming costs causes the use of female labor in the family on potato farming to decrease. Tzouvelekas (2011) states that an increase in production costs will reduce farm income so that it will increase farmers' time spent working outside of agriculture. Furthermore, coconut production expectations (EXPK) have a positive and real effect on the use of female labor in the family in coconut farming activities. Coconut production expectations encourage coconut farmer households to increase coconut farming activities. so that the use of female labor in the family in coconut farming activities will increase. The use of female labor in the family in coconut farming activities is very responsive to changes in coconut production expectations. Furthermore, Tzouvelekas (2011) states that an increase in the price of an agricultural commodity will increase farmers' incentives. so that it will increase the use of terja from within the family for farming activities.

Based on the estimation of the parameters of the equality of the use of male labor outside the family in coconut farming (TPLK), it shows that the number of productive coconut stems (JBKP). Coconut farming income (PTUK), coconut production expectations (EXPK) and the risk of coconut production (SDPK) have a significant effect on the use of male labor outside the family in coconut farming (TPLK). The number of productive coconut stems which has a positive effect indicates an increase in the use of male labor outside the family which increases due to the increase in the number of productive coconut stems. This is due to the increasing need for male workers to care for productive coconut plants such as weeding coconut trees. fertilization. spraying as well as harvesting and gathering crops. This is in line with the results of research by Asmarantaka et al. (2017) that an increase in land area will increase the use of labor from outside the family. Furthermore, the coconut farming income variable (PTUK) has a positive effect because the increase in coconut farming income will increase the ability of farmers to pay workers who come from outside the family. This is in accordance with the results of research by Adevia et al. (2017) which shows that an increase in income from coconut farming will increase the use of labor that comes from outside the family. In addition, the coconut production expectation variable (EXPK) also has a positive effect on TPLK. The increase in production expectations causes an increase in the expectations of farmers to produce high products which will certainly have an impact on the income of coconut farming that will be received. So that if the price increases, the farmer's ability to pay for the hired labor will be even greater. The results of this study are in line with the results of Pamusu's (2019) research that production expectations will increase the use of male labor from outside the family.

The results of the estimation of the equation parameters for the use of female labor outside the family in coconut farming (TWLK) are significantly influenced by the area of coconut land (LHKP) and coconut production expectations (EXPK) have a significant effect on the use of female labor outside the family in coconut farming (TWLK). The increase in the use of female labor outside the family, which is getting higher due to the addition of coconut land area, is due to the increasing need for labor to care for coconut plants. In the research location, female workers in coconut farming are widely used in maintenance activities such as weeding coconut trees and fertilizing. The results of research by Fariyanti et al. (2007) and Pamusu (2019) show that the area of arable land has a significant effect on the use of female labor outside the family. The wider the land cultivated by farmers, the more female workers outside the family are used. According to Kusnadi (2005) the use of labor outside the family is complementary to the area of land. The higher the land area of the farmers, the more use of labor outside the family. Furthermore, the effect of changes in coconut production expectations (EXPK) also has a positive effect on TWLK. The increase in production expected by farmers has a potential effect on expectations of income to be received. So that the increase in income will increase the use of female labor from outside the family. This is in line with the research of Mariyanto et al. (2015) that income from farming will increase the use of labor from outside the family. Furthermore, the price risk has a negative effect on the use of female labor outside the family. This is in accordance with Tzouvelekas (2011) which states that an increase in price risk will reduce the use of labor from outside the family. This is because the increased risk of price will reduce the level of farm income.

Furthermore, in the expenditure block, the food consumption equation (KOPG) is significantly influenced by the number of family members (JMAK). total household income (TPRT). age of coconut farmers (UMPK). as well as the total use of labor in the family (TTDK). The number of family members has a positive influence on household food consumption of coconut farmers. This shows that there are more and more family members in coconut farmer households. it will increase household food needs so that expenditure for food consumption will increase. This is in accordance with the results of research by Babatunde et al. (2019) and Wantasen et al. (2012) stated that the more the number of household members, the greater the amount of expenditure for food consumption. Asngari et al. (2020) states that the greater the number of family members, the more rice consumption will also increase. This is because rice is the staple food of the Indonesian population. Furthermore, total household income also has a positive effect on expenditure for food consumption. Faharuddin et al. (2019). Ningsih et al. (2021). Achmad and Diniyati (2018) state that an increase in household income will have an impact on increasing household expenditure for food consumption.

Furthermore, non-food consumption in coconut farmer households (NPC) is significantly influenced by food consumption (KOPG).

while other variables are like the total cost of coconut farming (TBUK). coconut price expectation (EXHK) and coconut price risk (SDHK) have no significant effect. Food consumption has a negative effect on non-food consumption in coconut households in Seruyan Regency. This shows the higher the expenditure for food consumption. Coconut farmer households will reduce non-food consumption expenditure. This condition shows that there is a trade off between spending on food consumption and non-food consumption.

The health expenditure equation (PKES) of coconut farmer households shows that the total household income (TPRT). the risk of coconut production (SDPK) and education expenditure have a significant effect on health spending. Household income volume (TPRT) has a positive effect on health expenditures. An increase in household income will have an impact on the level of awareness and attention of households towards the health of family members. This can be seen from the increasing use of health insurance with higher premiums and health care activities. This is supported by the results of the research by Sen and Rout (2007) that household income is very influential on the level of household health expenditure. The higher the household income, the greater the household health expenditure. Furthermore, the coconut production risk variable (SDPK) has a negative effect on health expenditure. Where the higher the production risk faced by coconut farmers, the health expenditure will decrease. The results of research by Fariyanti et al. (2007b) support the results of this study. that the increased risk of cabbage production and the risk of potato production have a negative effect on household health expenditures. Furthermore, the education expenditure variable (PPEN) also has a negative effect on health expenditure. The higher the education expenditure. household will reduce health expenditures. This condition shows that there is a trade off between spending on health and education.

Education expenditure (PPEN) is significantly influenced by coconut production expectations (EXPK). coconut production risk (SDPK). Number of family members (JMAK). and total consumption (TKON). The coconut production expectation variable (EXPK) has a positive effect on coconut household education expenditure. This means that increased production expectations will encourage coconut farmer households to allocate more education expenditures. The risk of coconut production (SDPK) has a negative effect on health spending. The higher the risk of coconut production faced by farmer households, the lower the health expenditure. The same thing also happens to total consumption (TKON) which has a negative effect on education expenditure. An increase in total consumption (food and non-food consumption) by households will reduce the allocation for education expenditure.

The estimation results on the household economic behavior of coconut farmers show that the coconut farmer household savings (TABP) is significantly influenced by the total household expenditure (TRAN). total household income (TPRT) and coconut production expectations (EXPK). Total household expenditure has a negative effect. This means that the greater the household expenditure (expenditure for food consumption, non-food consumption, health and education), the less income the household can use as savings. Furthermore, the total household income variable has a positive effect on coconut farmer household savings. This illustrates that not all coconut farmer household income is spent on consumption. but also used for saving. Savings used by coconut farmers in several forms. like cattle. routine social gathering. Savings and loan cooperatives and bank accounts that can be used for time to meet daily needs as well as urgent needs such as the cost of children's education. wedding party. and other necessities. The results of this study are supported by the research results of Wantasen et al. (2012), Nwibo and Mbam (2013), Abebe (2017) where the higher the household income, the greater the allocation for savings.

The last equation is business investment (INVES). where the variable that has a significant effect is savings (TABP). total income from non-agriculture (JPNP) and total income from coconut farming (JPUT). The savings variable has a negative effect on business investment. meaning there is a trade off between saving and investment. The greater the income used for savings, the smaller the amount of business investment will be. Furthermore, the amount of income from non-agriculture (JPNP) and the amount of income from coconut farming (JPUT) have a positive effect on investment. Increased income from coconut farming and non-agricultural activities will increase the household income surplus after it is used to meet daily needs. This is in line with the results of research by Nwibo and Mbam (2013). that the increase in income received by households will increase the surplus income that can be used for investment.

5. CONCLUSION AND RECOMMENDATION

The results showed that there was a simultaneous relationship between production, consumption, investment and savings in conditions of production risk and price faced by coconut farmer households. Coconut farmer households will respond to an increase in production risk by increasing the use of input in the form of herbicides. On the labor use side, the increased risk of production will lead to a reduction in the allocation of time to use male labor in the family for coconut farming, but will increase the use of male labor from outside the family who is used to improve coconut tree care. Meanwhile, on the consumption side, the response to increasing risk is by reducing the allocation of health expenditures to households, reducing spending on education, and reducing household savings. In addition, there is a risk that prices will reduce the use of female labor from outside the family. On the expenditure side, there is a risk that prices will have an impact on decreasing household income so that it is responded by reducing non-food consumption, education expenditure and decreasing business investment.

The existence of production risks and prices faced by coconut farmer households will have an impact on the level of income received by farmer households. Therefore it is necessary to diversify the land used for coconut farming. such as the use of between coconut plants with other farms that do not interfere with coconut growth. In addition, to reduce the level of price risk due to simultaneous harvests, it is necessary to do joint marketing,

to increase the bargaining position of farmers so that the price received is not too low.

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