Reducing Risks Of Income Of The Small Dry Land Maize Farmers In East Nusa Tenggara Province, Indonesia

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Abstract
Maize is an important staple food for small dry land farmers in the East Nusa Tenggara (NTT) Province, Indonesia. This research was conducted to investigate factors influencing maize farmer's income, level and source of income risk; and recommended strategies to reduce the risk involving 170 small farmers. Data were analyzed quantitatively using income and risk analysis, variation covariance, and multiple regressions, applying the revenue function and error component model. The results showed that the income of maize farmers was low, and all income risk factors are categorized as low-risk. Furthermore, all the income factors significantly affected the farmers' income, but production and selling prices were the most important income factors. Other income factors, such as the costs of seeds, fertilizers, pesticides, labor and land area caused no effect on the farmers' income. The main source of income risk in dry land maize farming was high labor costs, which caused low productivity and profitability. Therefore, improving land productivity through the use of appropriate and intensive modern technology and improving the skills of workers are the main strategies to reduce the income risk and to increase the income of small farmers in dry land areas.

Keywords: dry land, income risk, maize, small farmers

1. INTRODUCTION

The increase in food demand nowadays is caused by the increased population, increased demand for bio-energy, and changes in human consumption patterns. Food commodity development becomes one of the strategic priorities to execute to fulfill the food demand by food consumption diversification and nutritional improvement. Besides, food crops are potential and highly prospective commodities to be developed with an agribusiness approach. Maize is the second main staple food commodity, after rice, in Indonesia due to its high carbohydrate content. Maize becomes the main food for Eastern Indonesian inhabitants for its higher nutrient content than other staple food crops. The key point to achieving the success of agriculture development is to have accurate information regarding field resources database and agro ecological characteristics. Soemarno (2011) states that comprehension of field agro ecological characteristics is basic knowledge to achieve food commodity development success in particular and agricultural main development goal in general. This kind of knowledge will also help maintain a sustainable agricultural growth policy. Agro ecological characteristics identification focuses on assessing potential factors found in a particular area in the agricultural sector development and evaluating issues that may impede optimal efforts to keep food commodity growth. In the dry land-dominated province of East Nusa Tenggara (NTT), maize becomes the main staple food, more specifically for the rural community. NTT Province is listed as the fifth maize producer in Indonesia (BPS NTT 2018a) with three zones of production centers (Dinas Pertanian dan Perkebunan NTT 2014), i.e., Timor zone covering Kupang, South Center Timor, and Belu Regencies; Flores zone with two clusters, West Manggarai representing West Flores and Nagekeo for East Flores; and Sumba zone with Southeast Sumba as the production center.

In 2017, maize production was targeted to reach 1.016.500 tons; however, the actual production was only 809.830 tons. In 2015, maize production was 685.638 tons from 250.393 Ha harvesting field, and in 2016 the total maize production was 685.886 tons harvested from a total area of 250.823 Ha (BPS NTT 2018a). Kupang Regency is included in zone III in Timor Island. The regency was the main production center of maize during 2014 - 17. Department of Agriculture and Plantations of East Nusa Tenggara (NTT) Province targeted the regency to produce 75.557 tons of maize in 2014, but the actual harvest was only 50.538 tons (BPS NTT 2018a). In 2015, the maize production was 49.701 tons from 11.201 Ha land areas, and in 2016, 49.707 tons of maize was produced from 11.314 Ha of harvested areas. The maize production increased in 2017 to 60.538,00 tons from 32.689 Ha of harvested area.

Kupang Regency has ten sub-districts, whose areas are mostly dry land including the West Kupang sub-district. Maize production data record for West Kupang sub-district shows fluctuation during 2015-18. The production in 2016 was 1.744 tons from the 653 Ha harvested areas; meanwhile, in 2017, the production increased to 2.162,50 tons from 921 Ha harvesting field. In 2018, the production decreased to 1.529 tons of 1.325 Ha of total harvesting field (BPS NTT 2018b).

The decreasing maize production was caused by several factors, including lower production inputs and pests and disease infestations. These risks are considered high and may discourage the farmers in planting maize, and instead, they may likely prefer cultivating other crops with lower income risks. Therefore, it is necessary to analyze income risks and strategies to reduce the risks for the dry land maize farmers.

This research aimed at elucidating 1) the level of maize farming income; 2) the risk level of maize farming income; 3) factors that affect maize farming income; 4) risk sources of maize farming income; and 5) strategic recommendations for reducing risks in order to increase maize farming income of small dry land maize farmers.

2. METHODS

2.1 Research location and sampling methods

This research was done involving small dry land maize farmers in Kupang Regency, East Nusa Tenggara (NTT) Province as respondents. The research location was determined using a purposive sampling method with two criteria; 1) it is part of the dry land farming development area, and 2) it is situated in the maize production center. Based on those criteria, two villages were selected, i.e., Oenesu and Tesabela Villages, both are located in West Kupang Sub-district of Kupang Regency, NTT Province, Indonesia.

The sampling was done by employing a simple random sampling which provides equal opportunity for every population member. The sampling technique used was withdrawing, in which the sample was determined based on the formula of Slovin (1990). One hundred seventy maize farmers were included as the respondents. Data collection was conducted through a survey equipped with a questionnaire as the research instrument. Prior to its use, the questionnaire had been verified for its validity and reliability. Data collected included both primary and secondary data. Several stages of data analysis included data transfer, editing, data processing, and data analysis. Descriptive quantitative was applied in analyzing the data by scrutinizing income, analyzing risks and factors that affect maize farming income, and risk sources by applying multiple regression of income function and error component model.

2.2 Analysis of dry land maize farming income

Income is the difference between revenue and total cost of production. To calculate income, it is necessary to recognize production costs. The cost is divided into fixed cost (FC) and variable cost (VC). The following formula w used to know total cost (TC):

$$\mathbf{TC = TVC + TFC} \qquad \ldots\ldots\ldots\ldots \qquad \mathbf{(1)}$$

(TC: Total Cost; TVC: Total Variable Cost; TFC: Total Fixed Cost). The next step after recognizing production cost is to calculate the revenue using mathematical formula as follow:

$$\mathbf{R = PxQ} \qquad \ldots\ldots\ldots\ldots \qquad \mathbf{(2)}$$

(R: Revenue; Px: maize price x; Q: Total production). To know the income, we use the following formula:

$$\boldsymbol{\pi} \mathbf{= TR - TC} \qquad \ldots\ldots\ldots\ldots \qquad \mathbf{(3)}$$

(π: income; TR: Total Revenue; TC: Total Cost).

2.3 Analysis of Risk Level of Dry land Maize Farming Income

Total risk of income is determined using coefficient of variation (CV). CV is a relative measurement obtained by dividing standard deviation and expected value (PAPPAS and HIRSCHEY, 1995). The value of standard deviation must be obtained before having value of coefficient of variation (CV) by using the following formula:

$$\boldsymbol{\delta = \frac{\sum(x-\bar{x})^2}{n}} \qquad \ldots\ldots\ldots\ldots \qquad \mathbf{(4)}$$

(σ: standard deviation of risk factor; $\boldsymbol{\bar{x}}$: average of all risk factors; n : samples). The next step after obtaining standard deviation is to determine the value of coefficient of variation with the following formula:

$$\boldsymbol{CV = \frac{\delta}{\bar{Y}} x\ 100}\% \qquad \ldots\ldots\ldots\ldots \qquad \mathbf{(5)}$$

(CV: coefficient of variation; **σ**: standard deviation; $\boldsymbol{\bar{Y}}$: average of income).

2.4 Analysis of factors that affect maize farming income

To investigate factors that affect maize farming income in West Timor more specifically in Kupang Regency, it is necessary to analyze income function model with the following model:

$$\mathbf{Ln\ Y = ln\ \beta0 + \beta1\ ln\ X1 + \beta2\ ln\ X2 + \beta3\ ln\ X3 + \beta4\ ln\ X4 + \beta5\ ln\ X5 + \beta6\ ln\ X6 + \beta7\ ln\ X7 + Ui \ldots(6)}$$

(Y: income (Rp/Ha); β0: intercept; X1: seed cost; X2: fertilizer cost; X3: pesticide cost; X4: labor cost; X5: farming area; X6: production; X7: selling price; β1- β7: coefficient of regression of X1-X7; e: natural number (2,718); Ui: confounding variable).

2.5 Analysis of risk sources of maize farming income

Maize farming Risk source of income for every farmer is known as residual function of quadrate income (Ui2). To have Ui2 it is necessary to determine value of potential income (conjecture) ($\hat{Y}$) shown by the following equation:

$$\hat{Y}= b0+b1X1+b2X2+b3X3+b4X4+b5X5+b6X6+b7X7 \quad \ldots\ldots\ldots\ldots.. \quad (7)$$

The next step after determining the value of $\hat{Y}$ is to obtain residual value of income function (Ui) which is as quarrel of actual income (Y) and potential income ($\hat{Y}$) as shown in the following formula of equation:

$$Ui = Y - \hat{Y} \quad \ldots\ldots\ldots\ldots.. \quad (8)$$

Therefore, it is easy to obtain residual value of the square of income function (Ui2) by using the equation formula bellow:

$$Ui2=b0+b1lnX1+b2lnX2+b3lnX3+b4lnX4+b5lnX5+b6lnX6+b7lnX7Ui\ldots\ldots\ldots \quad (9)$$

(Y: actual income; $\hat{Y}$: potential income; Ui: residual value of income function; Ui2: residual value of the square of income function; b0: intercept; X1: seed cost; X2: fertilizer cost; X3: pesticide cost; X4: labor cost; X5: farming area; X6: production; X7: selling price; β1- β7: coefficient of regression of X1-X7; Ui: confounding variable).

Coefficient of determination (R^2) is a rate that becomes a criterion to assess suitability of regression model or portion of varied dependent variable that can be described by independent variable. The following is formula to determine coefficient of determination by Gujarati (2007):

$$R^2 = \frac{ESS}{TSS} \quad \ldots\ldots\ldots\ldots\ldots. \quad (10)$$

(ESS = Explained Sum of Squares; TSS = Total Sum of Squares).

This research hypotheses are (1) factors that affect the income of maize farming in West Timor are Seed cost(X1), Fertilizer Cost (X2), Pesticide Cost (X3), Labor Cost (X4), Farming Area (X5), Production (X6) and Selling Price (X7); (2) Risk sources of maize farming income are Seed cost (X1), Fertilizer Cost (X2), Pesticide Cost (X3), Labor Cost (X4), Farming Area (X5), Production (X6) and Selling Price (X7). To examine the hypotheses, it is necessary to do T test and F test.

F test is done to examine significance of the effect of independent variables to dependent variables (Gujarati, 2007) starting by finding F value as shown in the following formula:

$$F_{calculated} = \frac{R^2(k-1)}{(1-R^3)/(n-k)} \quad \ldots\ldots\ldots\ldots\ldots.. \quad (11)$$

(R2: coefficient of determination; k: number of parameters; n: number respondents).

If $F_{calculated} > F_{table}$, regression model of independent variable entirely influences dependent variable (reject H0).

If value of $F_{calculated} < F_{table}$ independent variable does not influence dependent variable (acceptH0).

T test is done to examine whether or not independent variable partially influences dependent variable by using the following mathematical equation:

$$T_{calculated} = \frac{bi-\beta i}{Sbi} = \frac{bi-0}{Sbi} \quad \ldots\ldots\ldots \quad (12)$$

(bi: estimated coefficient of regression -i; Sbi: standard deviation of estimated coefficient of regression -i). To have decision on the test it is necessary to compare value of t-calculated and t-table.

If $t_{calculated} > t_{table}$, independent variable individually influences dependent variable.

If $t_{calculated} < t_{table}$, independent variable individually does not influence dependent variable.

In order to determine strategy for decreasing maize farming income risks, we used wide system analysis based on result of analysis of multiple regression and error component model.

3. RESULTS AND DISCUSSION

3.1 Characteristics of respondents

The characteristic of the respondents of farmers (Table 1) is very crucial in determining the capability of farmers in finding a strategy to decrease the risk of maize farming income. Most of the interviewed farmers (64.85 per cent) were 35-55 years old (23 y.o. at minimum and 75 y.o. at maximum with 52.47 y.o. on average), so most of them are in the productive age. Most of the farmers (79.44 per cent) had an elementary school level; 87 per cent of them have taken part in maize farming socialization and or training 0.50 times (0-2 times in range). They have average experience in maize farming for 8.02 years (1-30 years of range). Fifty one per cent of farmers have 3-5 members, with an average of 4 members per family. Gender composition data shows an almost equal percentage of males (46 per cent) and females (54 per cent). Most of the family members (57 per cent) are ≥ 14 years old, and the rest (43 per cent) are < 14 years old. Twenty one per cent of family members have completed > 9 years of education, and 79 per cent have completed ≤ 9 years of education. Fifty per cent of farmers admitted that they had consulted agricultural extension field staff (PPL) or other agricultural instructors. Eighty six per cent of the respondents also joins farmers organization.

Table 1. Characteristics of farmer respondents.

Characteristic	Aver.	Min.	Max.
Age (year)	52.47	23.00	75.00
Education Level (year)	6.56	0.00	15.00
Σ Family member*:	4.55	1.00	9.00
Σ Fam. member 0 – 5 person/family (%)	75.81	1.00	5.00
Σ Fam. member 6 – 10 person/family (%)	24.19	6.00	9.00
Σ Fam. member in age of < 15 year (%)	17.77	1.00	4.00
Σ Fam. member in age of 15-30 year (%)	16.73	1.00	4.00
Σ Fam. member in age of 31-45 year (%)	16.76	1.00	3.00
Σ Fam. member in age of 46-55 year (%)	17.86	1.00	2.00
Σ Fam. member in age of 56-60 year (%)	16.88	1.00	2.00
Σ Fam. member in age of > 60 year (%)	14.00	1.00	2.00
Side job (person)*:			
a. Farmers who have side job (%)	27.42	0.00	17.00
b. Farmers who do not have side job (%)	72.58	0.00	45.00
Land Ownership Status*:			
a. Freehold title (%)	90.32	0.00	56.00
b. Cultivating rights (%)	9.68	0.00	6.00
c. Traditional Communal Rights (%)	0.00	0.00	0.00
Training (score)	0.5	0.00	2.00
Maize farming experience (year)	30.19	9.00	50.00
Land area (in Ha)	0.46	0.05	1.50

Note: * Min and Max in persons

3.2 Level of maize farming income

Income is the difference between revenue and total cost of production. Results of income analysis are presented in Table 2, showing that the average production of maize in Oenesu and Tesabela villages, West Kupang sub-district, Kupang Regency was 1,214.80 Kg ha-1. The average seed cost reached IDR. 280.542,99 ha-1, fertilizer cost was IDR 107,554.95 ha-1, pesticide cost was IDR 407.662,26 ha-1, and labor cost was IDR 3,754,792.18 ha-1. The total cost needed by the farmers for maize farming was IDR 4,078,551.49 ha-1. The average total revenue obtained by maize farmers was IDR 11,680,723.90 ha-1 with an average income of IDR 7,602,172.41 ha-1 (IDR 2,470,569.53/Ha at minimum and IDR 29.072.581,36 ha-1 at maximum). The income of farmers in the research locations (Oenesu and Tesabela Villages) was much lower than the targets of the Department of Agriculture and Plantation of NTT Province (IDR 40,000,000 ha-1).

Table 2. Maize farming income (per Ha).

No	Component	Average	Minimum	Maximum	Standard Deviation
A	Production (Kg/Ha)	1,214.80	461.54	3,750.00	772.15
B	Cost (IDR/Ha)				
	a. Seed	280,542.99	48,076.92	576,923.08	147,606.15
	b. Fertilizer	107,554.95	28,846.15	240,384.62	73,109.36
	c. Pesticide	407.662,26	76,923.08	750,000.00	190,250.55
	d. Labor	3,754,792.18	846,057.69	17,461,634.62	2,654,330.18
Total Cost		4,078,551.49	846,057.69	18,519,326.92	2,843,317.39
C	REVENUE (IDR /Ha)				
Total Revenue		11,680,723.90	4,437,869.82	36,057,692.31	7,424,473.26
D	INCOME (IDR /Ha)				
Total Income		7,602,172.41	247,0569.53	29,072,581.36	5,542,102.37

Note: IDR: Indonesian Rupiah (the Indonesian Currency)

3.3 Risk level of maize farming income

Assessment of risk level was based on the calculated coefficient of variation (CV) presented in Table 3. The risk levels of maize farming income (Table 4) show that risk factors of maize farming income in West Timor were categorized low, indicating that seed cost, fertilizer cost, pesticide cost, labor cost, field area, production, and selling price did not cause high risk to the income of maize farming in the research locations.

Table 3. Assessment criteria for risk level based on value of Coefficient of Variation (CV).

Value of CV	Risk Level
CV ≤ 1%	Low Risk
1% < CV ≤ 2%	Medium Risk
2% < CV ≤ 5%	High Risk
CV > 5%	Extreme High Risk

Source: (Sufya 2012).

Table 4. Risk Level of Maize Farming Income in West Timor.

Risk Factor	Mean	SD	CV(%)	Risk Level
Seed Cost (X1)	35.76	0.58	0.04	Low Risk
Fertilizer Cost (X2)	37.62	0.61	0.05	Low Risk
Pesticide Cost (X3)	73.48	1.19	0.09	Low Risk
Labor Cost (X4)	198.65	3.20	0.24	Low Risk
Field Area (X5)	1.17	0.02	0.00	Low Risk
Production (X6)	38.43	0.62	0.05	Low Risk
Selling Price (X7)	70.11	1.13	0.09	Low Risk

Factors that affect income of maize farming

Table 5 shows the influence of some factors on the maize farming income. Those factors are farming input cost, maize production cost, and the market price of dry shelled maize.

The result of analysis in table 5 proves that R2 value was 0.835 meaning that 83.5 per cent of independent variable entirely affected the income while the remaining 16.5 per cent was affected by other factors that were not the concern of the research. It also shows that regression model applied in analyzing data of the research is appropriate to estimate factors that affected the income of maize farming.

F test shown in Table 5 depicts that F-cal. was 39.029 > F-table (1.88) at the confidence level of $\alpha = 5$ per cent (hypothesis is accepted). This proves that all the proposed income factors influenced maize farming income in the research sites. Furthermore, t-test was performed to gain information regarding individual factor that determines changes of income of maize farming in dry land. A positive coefficient value shows that addition of income use factor will cause an increase of income. In contrast, a negative coefficient value indicates that the addition of income use factor will decrease maize farming income. The result of partial test proves that there were three important factors that affected the income of maize farmers. They are labor cost, production cost, and dry grain maize selling price.

The determining factor for income of maize farming was labor cost (X4). This factor had a significant effect on income of maize farming in the research locations. The result of the test shows the level of significance of effect at $\alpha = 0.01$. Where t-cal. (-12.404) < t-table (1.67) proving that H0 is accepted and H1 is rejected. Coefficient of regression value of labor cost was -2.399. This means that an increase of one unit of labor number will decrease 2.399 unit of the income. The decrease of income is also affected by three estimated factors. They are educational background, age, and capability of the farmers. 85 per cent of small maize dry land farmers in NTT completed only basic education level and even attended no any education level at all. This automatically renders the farmers to lack the capability of utilizing the modern agricultural technologies such as the use of high quality seeds, appropriate dose and kind of fertilizer, and effective and efficient ways of controlling maize pests and diseases. The study results also revealed that the average age of farmers was 56.5 years which is categorized as non-productive age. Meanwhile, 70 per cent of the youth in the research location refused to take part in agricultural sector because they have low capacity level in agricultural investment, and investment in this sector takes time with much lower profit.

Table 5. Result of Regression Analysis of Income Function of Small Maize Farmers.

Variable	Coefficient	Std. Error	t-cal.	Sig.
Constant	-51.605	21.025	-2.454**	0.017
Nl Seed cost (X1)	0.004	0.013	0.310**	0.758
Nl Fertilizer cost (X2)	-0.013	0.012	-1.031**	0.307
Nl Pesticide Cost (X3)	-0.022	0.012	-1.821**	0.074
Nl Labor cost (X4)	-2.399	0.193	-12.404**	0.000
Nl Field area (X5)	0.134	0.216	0.621**	0.537
Nl Production (X6)	3.024	0.264	11.436**	0.000
Nl Selling price (X7)	9.456	2.507	3.772**	0.000
R2 = 0.835	F-cal. = 39.029	Sig. F-cal. = 0.001*		

* = significant at 0.01 and ** = significant at 0.1

The second determining factor for income of maize farming is production (X6). Result of the analysis in Table 5 indicates that variable of maize production significantly affected the income. The result of test shows α = 0.01 with t-cal. (11.436) > t-table (1.67), which means that H1 is accepted and H0 is rejected. The value of coefficient of regression of production was 3.024. This means that one unit increase in maize production will increase 3.024 unit of income. The result also shows that productivity of dry land where the maize is planted is still low. It only reaches 2.6 tons/Ha or 33 per cent of the potential productivity and is lower than the national average production which reaches 5 tons/Ha (BPS, 2018)

The result of partial analysis of selling price (X7) indicates that the selling price had a significant effect on the income of maize farming. The t-cal. for the selling price was 1.67 (α = 0.01), so, t-cal. > t-table (accepts H1 and rejects H0). Coefficient of regression of selling price variable indicates a positive level of 9.456, which means that selling price contributes to the increase of maize farming income of up to 9.456 per cent. There are two main factors that caused the low level of income from the selling price of maize point of view. Firstly, the farmers only take part as price takers. Further, most of the farmers are categorized as non-productive age (period). In addition, most of youth in the research locations refused to take part in agricultural sector because of low control in agricultural investment, and it takes time with much lower profit to invest in agriculture sector. Thus, the youth opted to take part in the off-farm sectors. The relationship between cartel and farmers weakens the bargaining position of the small maize farmers. A study by Flewelling et al. (2013) proved that the cartel controls more than 90 per cent of the value chain. This causes only a small part of maize farmers in Eats Nusa Tenggara who can make use the value chain in maize farming.

3.4 Risk sources of maize farming income

Maize farming risk source of income for every farmer is known as residual function of square of income (Ui2). The result shows that the potential income of maize farming in the research sites was Ŷ= 819.15 and the factual income of maize farming was Y= 821.31. The analysis indicates that the value of Ui= 2.17 which resulted to function value of quadrate income of Ui2= 12.34.

The result of partial test of risk sources of income proves that significant risk source towards income of maize farming is labor cost, where coefficient of regression of labor cost variable was positive and the t-cal. was 3.051 > t-table (1.67) (accepts H1 and rejects H0) (Table 6). The coefficient of regression was 0.396, which means that the increase of one unit labor cost will increase 0.396 unit of risk income at α = 1 percent. In other side, seed cost variable had no significant effect in income risk, however, the value of coefficient of regression of both seed cost and labor cost were positive. This proves that costs of seed and labor are potential to increase income risk of maize farming. The result of the analysis of this variable was found at significant level of α = 0.01, which means the increase of income risk is affected by seed cost meanwhile the value of coefficient of regression of pesticide cost variable was 0.011 meaning that one unit increase on pesticide cost will increase 0.011 unit of income risk, where the value of t-cal. was 1.299 < t-table (1.67) (H0 accepted and H1 rejected). The test is proven at α = 10per cent which means that the increase of income risk of maize farming is affected by pesticide cost.

Table 6. Analysis Results of Risk Source of Maize Farming Income.

Variable	Coefficient	Std. Error	t-cal.	Sig.
Constant	15.125	14.127	1.071**	0.289
Nl Seed cost (X1)	0.011	0.008	1.322**	0.192
Nl Fertilizer cost (X2)	-0.001	0.008	-0.113**	0.911
Nl Pesticide cost (X3)	0.010	0.008	1.299**	0.200
Nl Labor cost (X4)	0.396	0.130	3.051**	0.004
Nl Farming area (X5)	-0.162	0.145	-1.117**	0.269
Nl Production cost???(X6)	-0.018	0.178	-0.100**	0.921
Nl Selling price (X7)	-3.435	1.684	-2.040**	0.052
	F-cal. = 3.279		Sig. F-cal. = 0.006*	

* = significant at 1%, and ** = significant at 5%

The result of analysis illustrates that risk sources of income risk like fertilizer cost, farming area, production cost, and selling price may contribute to the decrease of income risk of maize farming with negative coefficient regression value for every variable. Coefficient of regression value of fertilizer cost was -0.001 meaning that the increase of one unit of fertilizer cost may decrease income risk at 0.001 with t-cal. of -0.113 < t-table of 1.67. The value of coefficient of regression for farming area variable was -0.162, which means that one unit increase on farming area will reduce 0.162 unit of income risk. The value of t-cal. was -1.117 < of t-table (1.67). Farming area is not a variable that may cause increase of income risk of maize farming in the fields of research but it serves as a variable to reduce income risk. The value of coefficient of regression of production variable was -0.018 which means the increase of one unit production cost will decrease the income risk at 0.018 with t-cal. of 0.100 < t-table (1.67). The value of coefficient of regression of selling price was -2.435 meaning that one unit increase on selling price will reduce 2.435 unit of risk income with t-count -1.446 < t-table 1.67.

4. CONCLUSION

Based on the research results and discussion, four concluding points are drawn as follows Maize farming income (per Ha) in West Timor is categorized as low compared to the achieved targeted income of maize farming (per Ha) in NTT Province, Indonesia. All risk factors of maize farming income in West Timor (seed cost, fertilizer cost, pesticide cost, labor cost, farming area, production cost, and selling price) are categorized as low risk (except the labor cost). Altogether, all income factors (seed cost, fertilizer cost, pesticide cost, labor cost, farming area, production cost, and selling price) significantly affected the income of maize farming in West Timor as shown by ANOVA while the partial t-test shows that production cost and selling price impacted the income while other income factors (seed cost, fertilizer cost, pesticide cost, labor cost, and farming area) had no significant effect on the income of maize farming.

All sources of income risk (seed cost, fertilizer cost, pesticide cost, labor cost, farming area, production cost, and selling price) had impact on risk income of maize farming in West Timor indicated by F-test at $\alpha = 0.1$. The partial t-test shows that labor cost affected the increase of income risk while other income risk sources (seed cost, fertilizer cost, pesticide cost, labor cost, farming area, production, and selling price) had no significant effect on income risk of maize farming in West Timor.

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