

## Factors Influencing Cocoa Farmers' Decision-Making in Choosing Marketing Channels

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Cocoa is one of the leading sector commodities in Polewali Mandar Regency and can contribute to the Gross Regional Domestic Product (GRDP). Luyo Sub-district consistently contributes to cocoa production in this Regency. However, this consistency is not accompanied by cocoa farmers' income, which is still classified as very low; one of the causes is suspected to be price differences in each marketing channel. This causes farmers to have considerations in determining marketing institutions or choosing marketing channels. The purpose of this study is to analyze the decision-making patterns of farmers when choosing marketing channels and the factors that influence cocoa farmers' decisions when choosing marketing channels. The descriptive analysis method is used to determine the pattern of farmers' decision-making, while the binary logistic regression analysis method is used to determine the factors that influence farmers' decision-making in choosing marketing channels. The results showed that the role of the wife dominates farmers' decision-making patterns in choosing marketing channels. Meanwhile, factors that significantly influence cocoa farmers' decision-making in choosing marketing channels are age, number of family members, total production, farmer group membership, other sources of income, frequency of attending extension activities, and capital attachment to marketing institutions.

**Keywords:** Decision factor, cocoa farmer, binary regression logistik, marketing channels, decision making.

### INTRODUCTION

Cocoa is one of the primary commodities that significantly affects Indonesia's economy. The economic value obtained from cocoa plantations includes providing employment and a source of income for the community (Ardiansyah, 2021; Arsyad *et al.*, 2011; Bulkis *et al.*, 2020; Salman *et al.*, 2021). In addition, cocoa is a source of foreign exchange. It can be relied upon in realizing the welfare of local farming communities and accelerating sustainable agricultural development programs (Asman *et al.*, 2020). Indonesian cocoa plantations are spread across Sulawesi, Sumatra, Java, West Nusa Tenggara, Bali, Kalimantan, Maluku, and Papua (Indriani *et al.*, 2023). It is important to note that while the Sulawesi region is the primary production center, eastern Indonesia also significantly contributes to the national cocoa production (Depparaba and Karim, 2018; Dilana *et al.*, 2013). Based on data from the Directorate General of Plantations, a reputable and authoritative source in the cocoa industry, in 2021, the area of cocoa plantations in the Sulawesi region

reached 871,693 hectares with a total production of 411,857 tonnes. The highest productivity is on the island of Sumatra, with an average production of 839/ha/year. However, Sulawesi Island plays a vital role in developing cocoa plantations. This is evident from the prevalence of smallholder plantations, which make up a staggering 99% (Direktorat Jendral Perkebunan, 2023). This is further supported by the significant contribution of cocoa production in this region, which accounts for 59.8% of the total national cocoa production.

West Sulawesi is one of the regions located on the island of Sulawesi. It makes cocoa commodities a superior plantation product because it can contribute to the Gross Regional Domestic Product (GRDP) (Adha, 2017). This is supported by the potential cocoa plantation area of 141,572.85 ha with a total production of 71,194.25 tonnes (BPS West Sulawesi Province, 2022).

One of the cocoa plantation development areas in West Sulawesi Province that makes cocoa a superior plantation product is the Polewali Mandar Regency (Rahmaniah *et al.*,

2022). In terms of area, it reached 48,929.50 Ha with a total production of 36,126.54 tonnes. Cocoa is cultivated in almost all sub-districts in Polewali Mandar Regency, where eight (8) sub-districts are cocoa crop production centers, namely Tubbi Taramanu, Bulu, Mapilli, Tapango, Matangnga, Binuang, Anreapi, and Luyo sub-districts (BPS Polewali Mandar Regency, 2022). Luyo sub-district is a potential area for cocoa plantation development and consistently contributes to cocoa production in the Polewali Mandar Regency. Based on the Indonesian Central Bureau of Statistics in 2021, this area has a land area of 5,583.15 hectares with a total production of 4,586.35 tonnes spread across eleven villages (BPS West Sulawesi Province, 2022).

Looking at the potential of cocoa plantations in the Luyo Sub-district, we see that challenges, opportunities, and problems are linked to future world supply and demand development. Thus, efforts to manage cocoa are needed to improve the welfare of farmers. The cocoa agribusiness development policy aims to realize effective and efficient cocoa agribusiness to increase farmers' income through improved cocoa marketing and institutional strengthening at the farm level (Dewi, 2012). The cocoa bean marketing system can potentially cause problems affecting producers. This is because the marketing pattern that occurs tends to be inefficient. After all, it involves several marketing actors with different interests (Abubakar *et al.*, 2016).

The involvement of marketing institutions in each cocoa bean marketing channel causes price differences at the farm and exporter levels. In line with what (Arwan *et al.*, 2023) state, price differences occur due to the marketing institutions involved in the marketing channel. The involvement of marketing institutions will form marketing costs, which will be considered in determining the price of a product given by marketing institutions to farmers as producers. In addition, the involvement of institutions in the cocoa bean marketing system results in long and extensive marketing channels that affect farmers' income (Sianturi *et al.*, 2020). This happens commonly to cocoa producers in Luyo Subdistrict, Polewali Mandar Regency. Farmers must make marketing channel decisions. When selling crops, farmer households must choose a marketing channel because it greatly affects revenue (Abate *et al.*, 2019). Because each marketing channel has various returns, costs, risks, and needs (Soe *et al.*, 2015). Several studies have shown that farming experience, age, and education level influence farmers' marketing channel choices. This study adds socioeconomic factors like other sources of income, family size, farmer group membership, capital attachment to marketing institutions, and extension activity frequency to farmers' marketing channel choices, unlike previous studies (Arwan *et al.*, 2023; Dewi, 2012; Putri *et al.*, 2018; Wardani and Fauziyah, 2022).

Developing cocoa production in Luyo Sub-district, Polewali Mandar Regency requires farmers to make decisions. One is decision-making in determining marketing institutions that

impact farmer household income. Therefore, this study aims to determine farmers' decision-making patterns when choosing marketing channels and analyze the factors influencing farmers' decisions when choosing cocoa marketing channels.

## MATERIALS AND METHODS

**Location and time of research:** This research was conducted in Luyo Sub-district, Polewali Mandar Regency. The research location was determined purposively based on the consideration that the Luyo Sub-district is one of the areas that is the center of cocoa crop production in Polewali Mandar Regency. The research time and data collection were carried out for 4 months, from June 2023 to September 2023.

**Population and sample:** The population in this study is all cocoa farmers in Luyo Subdistrict, Polewali Mandar Regency; there is a total of 2,860 cocoa farmers. Sampling in this study was conducted using a simple random sampling technique using the Slovin formula with an error tolerance limit of 10%. Thus the number of samples used in this study was 97 cocoa farmer respondents. The snowball sampling technique was used to determine marketing institution respondents, involving one company, one district-level trader, two subdistrict-level traders, four village-level traders and three farmer groups.

**Data sources and data collection techniques:** The data sources in this study are primary data and secondary data. Primary data was obtained directly from the field through structured interviews using a questionnaire. Meanwhile, secondary data was obtained from literature studies, literature reviews and several previous studies.

**Data analysis:** Descriptive analysis describes respondents' characteristics and cocoa farmers' decision-making patterns when choosing marketing channels. At the same time, the binary logistic regression analysis method is used to analyse what factors influence farmers in choosing marketing channels. Logistic regression analysis is a form of statistical analysis that can be used to observe the relationship between several predictor variables and one dichotomous explanatory variable (Situngkir and Sembiring, 2023). The logit model equation is as follows:

$$Y = \ln\left(\frac{p}{1-p}\right) = \beta_0 + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \beta_4X_4 + \beta_5X_5 + \beta_6X_6 + \beta_7X_7 + \beta_8X_8 + \beta_9X_9 + \beta_{10}X_{10} + \beta_{11}X_{11} + \beta_{12}X_{12} + \varepsilon.$$

Where : Y = Farmers' decisions in choosing marketing channels; P = 1 = If the farmer sells to a formal marketing organization (farmer group or company); 1-p = 0 = If the farmer sells to informal marketing institutions (collectors/middlemen);  $\beta_0$  = Constant;  $\beta_1$ -  $\beta_{12}$  = Regression coefficient; X1 = Age (Ratio); X2 = Farming experience (Ratio); X3 = Length of formal education (Ratio); X4 = Family size (Ratio); X5 = Land Area (Ratio); X6 = Quantity of production (Ratio); X7 = Farmer group membership



(Dummy) (1 = Member, 0 = Non-member); X8 = Other sources of income (Dummy); (1 = Existing, 0 = None); X9 = Frequency of attending extension activities (Likert scale); (1 = Never, 2 = 1-2 times, 3 = 3-6 times, 4 = 7-10 times).; X10 = Getting information on prices (Dummy); (1 = Yes, 0 = No); X11 = Capital attachment to marketing institutions (Dummy); (1 = tied, 0 = not tied) ; X12 = Number of Trees (Ratio); E = Variable random

Parameter estimation in binary logistic regression is done using the Maximum Likelihood Estimation (MLE) method. This method is used to estimate unknown parameters. The technique provides the estimated value of  $\beta$  to maximize the likelihood function (Tampil *et al.*, 2017). Testing the suitability of the model formed using chi-square statistics with the hypothesis :

- H<sub>0</sub> : There is no difference between the model and the observed data
- H<sub>1</sub> : There is a difference between the model and the observed data.

The simultaneous significance test is used to test the effect of  $\beta_i$  in the model obtained. The test results will show whether a predictor variable is worth entering the model. So, the G test statistic is used with the decision-making criteria:

- H<sub>0</sub> :  $\beta_i = 0$ , meaning the model is meaningless
- H<sub>1</sub> : At least one  $\beta_i \neq 0$ ;  $i = 1, 2, 3, \dots, i$ , meaning the model means

Furthermore, the Wald test determines whether the predictor variables included in the model have an individual (partial) effect. So, the Wald test statistics are used with the following decision-making criteria:

- H<sub>0</sub> :  $\beta_i = 0$ , meaning that the independent variable has no partial effect on the dependent variable.
- H<sub>1</sub> :  $\beta_i \neq 0$ , means that the independent variable partially affects the dependent variable.

Then, the odds ratio value is used to see how much the tendency and opportunity of the predictor variable on the response variable  $Y = 1$  in the condition  $x = 1$  is exp (ai) times compared to  $x = 0$  (Tampil *et al.*, 2017).

**RESULTS**

**Decision-making patterns of farmers in choosing marketing channels:** Decision-making patterns are used to determine the dominance between husbands and wives in determining marketing institutions or channels Table 1.

**Table 1. Decision-making patterns of farmers in choosing marketing channels.**

No.	Decision-Making Patterns	Number of Farmers			
		Formal		Informal	
		(People)	(%)	(People)	(%)
1.	Dominant wife	31	70.45	43	81.13
2.	Dominant husband	6	13.64	7	13.21

3. Husband - Wife	7	15.91	3	5.66
Jumlah	44	100.0	53	100.0

Patterns of decision-making farmers in choosing formal marketing institutions dominated by the role of the wife with a percentage of 70.5% or as many as 31 people, the dominance of the role of the husband in decision-making by 13.6% or as many as six people and decision-making jointly between husband and wife by 15.9% or as many as seven people. Then, the pattern of decision-making farmers in choosing informal marketing institutions dominated by the role of the wife 81.1% or as many as 43 people, the dominance of the role of the husband by 13.2% or as many as seven people, and decision-making jointly between husband and wife by 5.7% or as many as three people Table 1.

**Factors influencing farmers' decision-making in choosing marketing channels:** The model used to analyses the factors influencing farmers' decisions in choosing marketing channels is a binary logistic regression model with a categorical response variable. It is 1 if the farmer chooses a formal marketing institution (farmer group or company) and 0 if the farmer chooses an informal marketing channel (collector/middleman). In binary logistic regression analysis, a thorough analysis is required using several statistical tests to assess the model's accuracy. The G-test determines whether the explanatory variables jointly affect the response variable. The likelihood test assesses the model's accuracy in predicting the parameters used. The Goodness of Fit (R<sup>2</sup>) model feasibility test evaluates the model as a whole, knowing how much explanatory variables can explain the response variable. The Wald test is used to determine partially the effect of explanatory variables on the response variable.

**Test G:** Table 2 shows the result of a significance value of  $0.000 < 0.05$ . This result means that all variables in the binary logistic regression model have a simultaneous effect and can explain the influence of the variables of age, farming experience, years of formal education, number of family dependents, Land Area, total production, farmer group membership, other sources of income, frequency of attending extension activities, getting information about prices, capital attachment to marketing institutions and number of trees on cocoa farmers' decisions in choosing marketing channels.



**Table 2. G Test results.**

		Chi-Square	Df	Sig.
Step 1 <sup>a</sup>	Step	72.136	12	.000
	Block	72.136	12	.000
	Model	72.136	12	.000

**The Log-likelihood test:** The result of the Log-likelihood value at block number 0 is 133.634 and this value is greater than the log-likelihood value at block number 1 of 61.449. Thus, the model can be said to be good in predicting farmers' decisions to choose marketing channels Table 3.

**Table 3. Log Likelihood test results.**

Block	Log Likelihood
Block Number 0	133.634
Block Number 1	61.499

**Goodness of Fit Model Test (R<sup>2</sup>):** The goodness of fit (R<sup>2</sup>) test analysis results show that the Nagelkerke R Square value is 0.702. This means that 70.2% of farmers' decisions in choosing marketing channels can be explained by the variables of age, farming experience, length of formal education, number of family dependents, land area, total production, farmer group membership, other sources of income, frequency of attending extension activities, getting information about prices, capital attachment to marketing institutions and the number of trees (Table 4.) 29.8% of other factors outside of the model explain the dependent variable.

**Table 4. Goodness of Fit Model test results (R<sup>2</sup>).**

Step	-2 Log Likelihood	Cox and Snell R Square	Nagelkerke R Square
1	61.499 <sup>a</sup>	.525	.702

**The Wald test:** The results of the Wald test can be seen in Table 5 where the variables of farming experience, years of education, land area, information about cocoa prices, and

**Table 5. Wald test results.**

Variable	Koefisien (B)	S.E	Wald	Df	Sig.	Exp (Y)	
Step	Age	-0.144	0.069	4.388	1	0.036*	0.866
1a	Farming Experience	0.077	0.061	1.592	1	0.207	1.080
	Length of Formal Education	-0.112	0.114	0.951	1	0.330	0.894
	Family Size	0.657	0.328	4.011	1	0.045*	1.930
	Land Area	-0.854	1.278	0.447	1	0.504	0.426
	Quantity of production	0.037	0.016	5.335	1	0.021*	1.038
	Farmer Group Membership	3.449	1.082	10.156	1	0.001*	31.476
	Other Sources of Income	3.003	1.323	5.152	1	0.023*	20.146
	Frequency of Attending Extension Activities	1.672	0.759	4.855	1	0.028*	5.323
	Getting Information on Prices	-2.738	2.024	1.830	1	0.176	0.065
	Capital Attachment to Marketing Institutions	-1.807	0.735	6.042	1	0.014*	0.164
	Number of Trees	0.001	0.002	0.487	1	0.485	1.001
	Constant	-3.776	3.251	1.349	1	0.245	0.023

number of trees do not significantly influence farmers' decisions in choosing marketing channels. This is because the sig significance value > 0.05. In contrast, the variables of age, number of family members, total production, farmer group membership, other sources of income, frequency of attending extension activities, getting information about cocoa prices, and attachment to marketing institutions have a significant effect on farmers' decisions in choosing marketing channels with a significance value of sig < 0.05.

**DISCUSSION**

**Decision-making patterns of farmers in choosing marketing channels:** Cocoa cultivation by the farming community in Luyo Subdistrict, Polewali Mandar Regency has involved the participation of all family members, including the farmer's wife and other family members. According to [Rahmaniah et al. \(2022\)](#), the role of wives in managing cocoa farming, such as nursery, harvest, post-harvest, and marketing activities are included in the high category of activities involving the role and participation of a wife, for the medium category includes land cultivation and fertilization activities. Activities such as planting, grafting (side grafting or shoot grafting), pruning, and pest and disease control are in the low category in women's roles. The involvement of women or farmers' wives in cocoa farming reduces the cost of cocoa farming expenses and increases household income ([Hastuty, 2016](#)). Therefore, in the marketing stage of cocoa beans, the role or participation of a wife is needed to sell the cocoa harvest because she considers anything related to finance to be the right of a wife ([Rahmaniah et al., 2022](#)). The results of the research findings (Table 3.1) show that the decision-making pattern of cocoa harvest sales is dominated by the role of a wife in determining marketing institutions. The decision-making is due to the wife's role as a housewife who can quickly fulfill daily needs. So, most of the husbands give full responsibility to the wife to sell cocoa crops. According to [Wati et al. \(2019\)](#) the role





of women starts to appear at the harvest marketing stage. Intentionally or not, women have an influence in determining the time and place of selling cocoa beans. The fulfillment of primary household needs is the main factor that encourages women to play a role at this stage. In addition, wives' involvement in the cocoa bean marketing process can utilize the social capital built among women to obtain information, expand market networks, and get potential buyers. In line with the findings of research conducted by (Tao and Rosmalah, 2023) full involvement of women (100%) can be seen in the marketing of products. Women generally do marketing of field farming through neighbors or if they have to sell to the market conventionally.

#### **Factors influencing farmers' decision to choose marketing channels**

**Age:** The age variable negatively affects the decision-making of farmers in choosing marketing channels in Luyo District, Polewali Mandar Regency, with an odds ratio value of 0.866, which means that every 1 year of increasing age will reduce the chances of farmers choosing marketing channels through formal marketing institutions (farmer groups or companies) by 0.866 times smaller than farmers choosing marketing channels through informal marketing institutions (collectors/middlemen). With increasing age, the likelihood of farmers' decision to choose marketing channels through formal marketing institutions (farmer groups or companies) decreases. This is because as farmers get older, they will have a negative relationship with traders with a wider scope or large traders. Therefore, there is a tendency to sell their crops to village intermediary traders. In contrast to younger farmers, they are more active and accept new technology such as the use of mobile phones to facilitate finding information and communicating with traders with a wider scope or large traders (Putri *et al.*, 2018). According to Dilana *et al.* (2013), age negatively impacts farmers' marketing channel choices. Older farmers prefer village-level intermediate traders versus traders with wider coverage when selling cocoa beans.

**Farming experience:** Farm experience with a 0.207 > 0.05 significance value, exceeding alpha. Thus, agricultural experience does not affect farmers' selling channel choices in Luyo District, Polewali Mandar Regency. This is because farmers who use official marketing channels (farmer groups or firms) and informal marketing channels (collectors/middlemen) have similar farming experiences. According to field study, farmers who sell to formal marketing institutions (farmer groups or firms) have an average 25 years of farming experience, while farmers who sell to collectors/middlemen have 26 years. According to Andriani *et al.* (2019), mango growers choose marketing channels regardless of their farming experience. Pratama *et al.* (2023) found that farmers' chrysanthemum cut flower marketing channel choices are unaffected by farming length. Because experienced farmers focus on improving farming, they may not have access to more market information.

**Length of formal education:** The length of schooling variable has a significance value of 0.330 > 0.05, exceeding alpha. If H0 is accepted, H1 is rejected. In Luyo Subdistrict, Polewali Mandar Regency, cocoa producers choose marketing channels regardless of education level. This is because farmers who use official marketing channels (farmer groups or companies) and informal marketing channels (collectors/middlemen) have similar education levels. According to field research, farmers who sell to farmer groups or companies have an average education of 7.5 years, whereas those who sell to collectors/middlemen have 6.5 years. According to the research (Arwan *et al.*, 2023; Harahap *et al.*, 2018; Wardani and Fauziyah, 2022), farmers' marketing channel selection is unaffected by their formal education. Farmers with high or low education might choose marketing outlets.

**Family size:** The variable number of family members positively influences cocoa farmers' decision to choose marketing channels in Luyo Subdistrict, Polewali Mandar Regency with a significance value of 0.045 < 0.05 which is smaller than alpha and an odds ratio value of 1.930. So it can be concluded that with every increase of one family member, the child increases the chances of farmers choosing marketing channels through formal marketing institutions (farmer groups or companies) by 1.930 times greater than farmers who choose marketing channels through informal marketing institutions (collectors/middlemen). This is because, with the increase in the number of family members, the dependence of farmers on agricultural products also increases and requires money to meet the daily needs of farm households (Ardelia *et al.*, 2020).

**Land area:** Land area with a significance value of 0.504 > 0.05 which indicates greater than alpha. Where the decision received H0 is accepted and H1 is rejected, it can be concluded that the variable land area has no effect on farmers' decisions in choosing marketing channels. In other words, farmers who have large and narrow land have the same opportunity to determine marketing institutions. In line with the findings of the research, Harahap *et al.* (2018) state that the variable land area has no effect on farmers' decisions in choosing marketing channels. Farmers consider the amount of production more than the land area factor in choosing marketing channels.

**Quantity of production:** Variable production significantly affects farmers' decision-making in choosing marketing channels in Luyo District Polewali Mandar, with an odds ratio of 1.038. This means that every 100 kg increase in production will increase farmers' chance to choose marketing channels through formal marketing institutions (farmer groups or companies) by 1.038 times greater than the decision of farmers to choose marketing channels through informal marketing institutions (collectors/middlemen). This indicates that the greater the amount of cocoa production by farmers, the tendency of farmers to choose traders whose coverage is



wider than selling to intermediary traders. As argued by [Pratama et al. \(2023\)](#) if the volume of production increases, farmers tend to sell their crops to traders with a wider scope/large traders who provide a greater profit margin than collecting traders. The research findings of [Kusmaria et al. \(2016\)](#) revealed that the amount of production positively affects farmers' decisions in choosing marketing channels.

**Farmer group membership:** Variable group membership significantly positively affects farmers' decisions in choosing marketing channels in Luyo District Polewali Mandar Regency, with an odds ratio of 31.476. This means that farmers who are members of farmer groups will increase the chances of farmers choosing marketing channels through formal marketing institutions (farmer groups or companies) by 31.476 times greater than farmers who choose marketing channels through informal marketing institutions (collectors/middlemen). With the participation of farmers to become members of farmer groups, the opportunity for farmers to decide to choose marketing channels through formal marketing institutions (farmer groups or companies) is greater than selling to traders, collectors/middlemen. As the opinion of [Effendy and Apriani \(2018\)](#) farmer groups have a role as a vehicle for learning for farmers and as a medium for establishing communication and exchanging information among farmers in improving the effectiveness and efficiency of the process of adoption of agricultural technology that can improve human resources so that it is expected to develop profitable agricultural businesses. In line with the findings of research conducted by [Ayyona et al. \(2020\)](#), the participation of group membership has a positive effect on the decision of farmers in choosing marketing channels. Farmers who collectively market their products to the market tend to incur lower marketing costs.

**Other sources of income:** Variable other sources of income have a significant positive effect on farmers' decisions in choosing marketing channels in Luyo District Polewali Mandar District with an odds ratio of 20.146, which means that every 1 unit increase in other sources of income will increase the chances of farmers to choose marketing channels through formal marketing institutions (farmer groups or companies) by 20.146 times greater than farmers choose marketing channels through informal marketing institutions (collectors/middlemen). This indicates that farmers with other sources of income tend to sell their crops to traders with a wider scope/larger trader than selling to collectors/middlemen. From the findings in the field, farmers with other sources of income tend not to find it difficult to decide to sell their crops to farmer groups or companies, considering that they still have other sources of income that can fulfill the economic needs of their households. In contrast, farmers who do not have other sources of income tend to choose to sell to intermediary traders/middlemen, considering that farmers can quickly fulfill the household's daily needs. As argued by [Honja et al. \(2017\)](#) farmers who have access to

non-agricultural income or other sources of income are not quick enough to sell their crops to meet household needs because farmers can get the income needed for basic household needs.

**Frequency of attending counseling activities:** The frequency of attending extension activities has a real positive effect on farmers' decisions in choosing marketing channels, with an odds ratio of 5.323. This shows that farmers who often follow extension activities will increase the chances of farmers choosing marketing channels through formal marketing institutions (farmer groups or companies) by 5.323 times greater than choosing marketing channels through informal marketing institutions (collectors/middlemen). By following extension activities, farmers' chances of choosing marketing channels through formal marketing institutions (farmer groups or companies) are greater than choosing informal marketing channels (collectors/middlemen). This is because extension activities can motivate to increase the capacity of farmers and increase the institutional capacity of farmers to be able to be independent in finding markets and information according to their needs ([Anantanyu, 2011](#)). Although some farmers do not participate in extension activities, they still believe that by participating in extension activities, they will gain knowledge and skills regarding cultivation techniques and obtain market information that will help farmers meet market needs ([Andriani et al., 2019](#)). In line with the research findings of [Endris et al. \(2020\)](#) who explained that the variable frequency of extension activities has a positive effect on farmers' decisions in choosing marketing channels, where farmers who often make contact with extension agents can obtain more information related to markets that offer higher prices.

**Get information about prices:** Getting information about prices with a significance value of  $0.176 > 0.05$  which indicates greater than alpha. Where the decision received  $H_0$  is rejected and  $H_1$  is accepted, it can be concluded that the variable getting information about prices has no effect on farmers' decisions in choosing marketing channels. Based on research findings in the field, 97% of farmers obtained information about cocoa prices. This shows that farmers who get information and do not get information about prices have the same opportunity to choose marketing channels. In line with the findings of the research, [Andriani et al. \(2019\)](#) explain that the variable of obtaining information about prices has no influence on farmers' decisions in choosing marketing channels.

**Capital attachment to marketing institutions:** Attachment of capital to marketing institutions has a real negative effect on the decision of farmers in choosing marketing channels in Luyo District Polewali Mandar with an odds ratio of 0.164, which means that farmers who have capital attachment to marketing institutions will reduce the chances of farmers to choose marketing channels through formal marketing institutions (farmer groups or companies) smaller 0.164 times



than choosing marketing channels through informal marketing institutions (collectors/ middlemen). This shows that farmers who have capital attachment to marketing institutions tend to choose marketing institutions through informal marketing institutions (collectors/middlemen) rather than using marketing channels through formal marketing institutions (farmer groups or companies). Based on the research findings in the field, most of the farmers obtained capital from marketing institutions to continue their farming. According to Dewi, (2012) who revealed that farmers have a fairly high dependence on intermediary traders in terms of borrowing capital/money to meet the needs of farming and household needs, the condition of attachment causes farmers to have no other choice to sell their crops. Farmers who have an attachment to capital financing sources in the form of production facilities must sell their crops to the capital provider (Andriani *et al.*, 2019). These results are in line with the research findings of Kusmaria *et al.* (2016) who explained that the capital attachment variable has a negative influence on farmers' decisions in choosing marketing channels.

**Number of trees:** The number of trees with a significance value of  $0.485 > 0.05$  which indicates greater than alpha. Where the decision taken  $H_0$  is accepted and  $H_1$  is rejected, it can be said that the variable number of trees has no effect on farmers' decisions in choosing marketing channels with an odds ratio value of 1.001. This is because the number of trees cultivated by farmers who sell to formal marketing institutions and farmers who sell to informal marketing institutions has no significant difference. So farmers who sell to formal marketing institutions and those who sell to informal marketing institutions have the same opportunity to choose marketing channels. In line with Andriani *et al.* (2019) research findings, the variable number of trees does not significantly affect the decision of mango farmers in choosing marketing channels. Farmers consider production factors more than the number of trees cultivated.

**Conclusion:** Farmers' wives dominate cocoa farmers' decision-making patterns in choosing marketing channels. This dominance can be seen in the sale of crops through formal marketing institutions (farmer groups or companies) for as many as 31 people or 70.5%. Meanwhile, farmers who sell to informal marketing institutions (collectors/middlemen) are also dominated by the role of their wives, namely 43 people or 81.13%. The dominance of the wife in making decisions in determining marketing institutions is due to the role of a wife as a housewife, so that it can quickly meet the needs of the day. The factors that significantly influence the decision-making of farmers in choosing marketing channels are age, the number of family dependents, the amount of production, other sources of income, farmer group membership, the frequency of following extension activities, and capital attachment to marketing institutions.

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**SDG's Addressed:** No Poverty, Zero Hunger, Decent Work and Economic Growth, Responsible Consumption and Production, Life on Land

## REFERENCES

- Abate, T. M., T.M. Mekie and A.B Dessie. 2019. Determinants of market outlet choices by smallholder teff farmers in Dera district, South Gondar Zone, Amhara National Regional State, Ethiopia: a multivariate probit approach. *Journal of Economic Structures* 8:1-14.
- Abubakar, I., D.B. Hakim and R.W. Asmarantaka. 2016. Structure, Behavior and Performance of Cocoa Bean Marketing in Parigi Moutong Regency, Central Sulawesi Province. *Agribusiness Forum* 6:1-20.
- Adha, W.M. 2017. Supply Chain Integration on Cocoa Performance and Competitiveness. *Jurnal Bisnis Darmajaya* 3:146-162.
- Anantanyu, S. 2011. Kelembagaan Petani: Its Role and Capacity Building Strategy 7:102-109.
- Andriani, R., E. Rasmikayati. G.W. Mukti and S. Fatimah. 2019. Factors Influencing the Decision of Mango Farmers in Market Selection in Indramayu Regency. *Jurnal Penyuluhan* 15:286-298.
- Ardelia, R., O. Anwarudin and N. Nazaruddin. 2020. Access to Information Technology through Electronic Media for KRPL Farmers. *Jurnal Triton* 11:24-36.
- Ardiansyah, I. 2021. Marketing Study of Cocoa Beans on Smallholder Plantations in Panyabungan District,



- Mandailing Natal. *Jurnal Ilmiah Mahasiswa Pertanian* 1:1-13.
- Arsyad, M., B.M. Sinaga and S. Yusuf. 2011. Analysis of the Impact of Export Tax and Price Subsidy Policies on Indonesian Cocoa Exports and Production Post-Uruguay Round. *Jurnal Sosial Ekonomi Pertanian* 8:63-70.
- Arwan, A., N. Tinaprilla and B. Burhanuddin. 2023. Factors Influencing the Choice of Fresh Fruit Bunch Marketing Channels on Smallholder Plantations. *Jurnal Agribisnis Indonesia* 11:39-47.
- Asman, A., A. Rosmana and Z. Zainal. 2020. Farmer Assistance Through Community Empowerment Learning to Increase Cocoa Productivity in Bantaeng Regency. *Jurnal Dinamika Pengabdian* 5:2528-3219.
- Ayyona, M., M. Bati and T. Kaso. 2020. Determinant of Milk Market Outlet Choices: The Case of Kofele District, West Arsi Zone, Oromia, Ethiopia. *Journal of Biology, Agriculture and Healthcare* 10:36-44.
- BPS Polewali Mandar Regency. 2022. Polewali Mandar Regency in Figures.
- BPS West Sulawesi Province. 2022. West Sulawesi Province in Figures.
- Bulkis, S., M.H. Jamil., N. Lanuhu and F. Italiani. 2020. Gender roles in cocoa sustainability programs. *IOP Conference Series: Earth and Environmental Science* 575:1-9.
- Depparaba, F. and H.A. Karim. 2018. National Cocoa Prospects from a Policy Perspective. *Jurnal Ilmu Pertanian Universitas Al Asyariah Mandar* 3:14-17.
- Dewi, N. 2012. Analysis of Opportunities for Cocoa Marketing Institutional Options in Central Sulawesi Province. *Indonesian Journal of Agricultural Economics* 3:1-12.
- Dilana, I.A., R. Nurmawati and R. Amzu. 2013. Marketing and Value-Added of Cocoa Beans in Madiun Regency, East Java. *Prosiding Simposium Nasional Ekonomi Kakao* 204-213.
- Direktorat Jendral Perkebunan. 2023. *Handbook of Indonesian Plantation Development Statistics 2023*.
- Effendy, L. and Y. Apriani. 2018. Motivation of Farmer Group Members in Improving Group Function. *Jurnal Ekonomi Pembangunan* 4:10-24.
- Endris, E., J. Haji and B. Tegegne. 2020. Factors Affecting Vegetable Producers Market Outlet Choice in Case of Habru District, North Wollo Zone, Ethiopia. *European Business and Management* 6:1-9.
- Harahap, J., S. Sriyoto and E. Yulianti. 2018. Factors Influencing Salak Farmers' Decision Making in Choosing Marketing Channels. *Jurnal AGRISEP* 17:95-106.
- Hastuty, S. 2016. Factors Influencing Participation of Housewives in Cocoa Farming Business in Padang Kamburi Village, Buton Sub-District, Luwu Regency. *Jurnal Perspektif* 1:82-89.
- Rahmaniah, H.M., R. Darma., N. Nasaruddin and M. Arsyad. 2022. Women's Participation and Role as an Inclusivity in Cocoa Farming. *Agroland: Jurnal Ilmu-Ilmu Pertanian* 29:1-12.
- Honja, T., E. Geta and A. Mitiku. 2017. Determinants of Market Outlet Choice of the Smallholder Mango Producers: The Case of Boloso Bombe Woreda, Wolaita Zone, Southern Ethiopia: A Multivariate Probit Approach. Type: Double Blind Peer Reviewed International Research Journal Publisher: Global Journals Incorporated 17:23-30.
- Indriani, I., R. Rosmawaty and F.N. Sadimantara. 2023. Effect of Post-Harvest Technology on Cocoa Bean Quality in Benua Village, Benua Sub-district, South Konawe Regency. *Jurnal Pertanian Berkelanjutan* 11:364-377.
- Kusmaria, K., W.R. Asmarantaka and H. Harianto. 2016. Analysis of Rafaction Determination and Influence on Marketing Channel Choice of Cassava Farmers in Central Lampung Regency. *Jurnal Forum Agribisnis* 6:129-144.
- Pratama, W.A., N. Rita and R. Nia. 2023. Determinants Affecting the Selection of Chrysanthemum Cut Flower Marketing Channels in Cianjur Regency. *Forum Agribisnis* 13:86-94.
- Putri, R.K., R. Nurmawati and B. Burhanuddin. 2018. Efficiency Analysis and Factors Affecting Marketing Channel Choice. *MIX: Jurnal Ilmiah Manajemen* 8:109-135.
- Salman, D., M. Mahyuddin, I. Summase, L. Fudjaja, D.N. Tiring Rusmidin and Rayuddin. 2021. Productivity and income analysis of certified cacao farmers (UTZ Certified) and non-certified cacao farmers. *IOP Conference Series: Earth and Environmental Science* 681:1-6.
- Sianturi, A., Z. Lubis and T.H.S. Siregar. 2020. Analysis of Farming and Marketing Channels of Cocoa Beans in Jahur Subdistrict, Karo Regency, North Sumatra Province. *Jurnal Ilmiah Magister Agribisnis* 2:181-193.
- Situngkir, R.H. and P. Sembiring. 2023. Logistic Regression Analysis to Determine the Factors Affecting the Welfare of Regency / City Communities on Nias Island. *Jurnal Matematika Dan Pendidikan Matematika* 6:25-31.
- Soe, W.P.P., M. Moritakaand and S. Fukuda. 2015. An analysis of the factors influencing marketing channel choice by paddy rice farmers in Myanmar. *Journal of the Faculty of Agriculture, Kyushu University*.60(2): 535–542.
- Tampil, Y., H. Komalig and Y. Langi. 2017. Logistic Regression Analysis to Determine Factors Affecting Grade Point Average (GPA) of FMIPA Students of Sam Ratulangi University Manado 6:56-62.
- Tao, H. and S. Rosmalah. 2023. Contribution of women's roles to field rice farming in North Kulisusu District,





- North Buton Regency. Composite: Jurnal Ilmu Pertanian 5:59-66.
- Wardani, T.E. and E. Fauziah. 2022. Factors Influencing Farmers' Decision to Sell Vegetables to Ngoro Agribusiness Sub Terminal. JURNAL AGRICA 15:34-144.
- Wati, R. I., A.B Raya, A. Widiastuti, F. Rohmah and D. Utami. 2019. Potential of Women in Supporting Cocoa Bean Marketing to Realize Household Food Security (Study in Nglengkong Hamlet, Giripurwo Village, Girimulyo District, Kulon Progo Regency, Central Java). Jurnal Ketahanan Nasional 25:253-276.

