INVESTIGATIONS OF KEY FACTORS AFFECTING MARKET CHANNEL CHOICE DECISION BY SABA BANANA FARMERS USING A MULTINOMIAL LOGISTIC MODEL

by Hamdani .

RESEARCH PAPER

Investigations of Key Factors Affecting Market Channel Choice Decision by Saba Banana Farmers Using A Multinomial Logistic Model

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Abstract

One of the essential roles in improving farmers' welfare is connecting small farmers to high-value markets. Therefore, it is urgent to focus on opening access to markets and selecting the proper marketing channels. This research provides knowledge of what factors to be addressed to help saba banana farmers in the study area, especially in determining marketing channels. Multinomial logistic regression has been used to determine the factors influencing the decision to select market outlets for Saba banana farmers in Sungai Bakau, Pematang Panjang, and Bangun Harja villages. 254 Saba banana farmers were used as respondents to obtain cross-sectional data, which were then analysed (descriptive statistics and econometric analysis) using the STATA 17 statistical package. The results reveal that, although saba banana farmers in the research locations most often deliver to collectors at the farm gate, differences in farmer characteristics and asset specificity increasingly encourage many farmers to choose other, more valuable marketing channels. The significant factors that influence the choice of market channels were: the level of education, farm size, quantity produced, own transportation, access to credit, and access to market information. The education level and quantity produced have a negative effect. Meanwhile, farm size, own transportation, access to credit, and access to market information positively affect the decision of saba banana farmers to choose the best market channel. This study highlights the need for future research to conduct a more in-depth investigation of the role of information and credit on the level of farmer's market participation.

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Introduction

Agricultural practices, particularly by small farmers, play a crucial role in providing food security and fulfilling local and global nutrition for the present and the future (Committee on World Food Security, 2016). In some rural and urban areas in developing countries, most people depend on local small farmers to meet their needs (Dioula et al., 2013). The same thing was also emphasised by (FAO and IFAD, 2019) that farming families may make a significant and indispensable contribution to global food production. Small farms contribute between 70 and 80 percent of total farmland and produce about 80 percent of the world's food (Lowder et al., 2019). But unfortunately, most smallholders are still subsistence, with a high level of food insecurity, especially in rural areas (Usman and Callo-Concha, 2021); (Dlamini-Mazibuko et al., 2019).

The primary focus of agricultural development is to push for efficient marketing of agricultural goods. Small-scale farmers, in particular, often face several barriers that limit them from maximising market opportunities (Fischer and Qaim, 2012). According to recent studies, smallholder farmers' overall goal in developing countries to achieve food security and a poverty reduction can be mitigated through increased marketing efforts (Barrett, 2001); (Donkor et al., 2018). Unfortunately, farmers often rely on intermediaries to distribute their crops to consumers, resulting in inefficient markets for farmers (Abebe et al., 2016). In contrast, access to efficient markets is considered an important tool to lift farmers out of poverty and improve food security in developing countries (Mgale and Yunxian, 2020); (Panda and Sreekumar, 2012); (Fafchamps and Hill, 2005).

The choice of marketing channels is one of the most critical choices a farmer must make since it significantly impacts agricultural income (Dube et al., 2021); (Fafchamps, 2005). Different marketing channels will provide distinct value chains and costs, allowing farmers to maximise revenues while mitigating risk (Lee et al., 2020) and impact farmers' welfare (Mmbando et al., 2017). In order to investigate the possibility of raising output, farm income, and investments, it is essential to analyse the various types of channels. As with direct-to-consumer marketing, it is considered the most profitable marketing channel for farmers (Govindasamy et al., 1999); (Gale, 1997). However, perfect market conditions almost do not exist in real life, especially in developing countries (Nxumalo et al., 2019). So there are still smallholder farmers in developing countries who use intermediaries to distribute their crops to consumers (Donkor et al., 2021); (Lee, 2020); (Pham et al., 2019).

As one of the agricultural commodities, bananas are an alternative food source and have become the mainstay of contributors to the economy through exports. Global banana exports hit a record high of around 22.2 million tonnes in 2020, an increase of 1.7 percent compared to 2019 (FAO, 2021). One of the varieties of several banana cultivars that are very important, especially in commercial production and trade, is the saba banana. Saba bananas are a triploid hybrid banana variety indigenous to the Philippines (De Castro and Arenillo, 2016), mainly bananas cooked by boiling, steaming, or frying (Lustre et al., 1976). Banana saba is also an alternative to rice or corn (Reginio et al., 2020). It is crucial in the agricultural industry because it is often processed into flour, chips, syrup, jam, sauce, vinegar, and candy (Lim, 2012).

In order to see farmers' choices among the saba banana marketing channels, it is necessary to systematically identify the factors that smallholders face in choosing marketing channels. Many academic studies, including those (Donkor, 2021); (Mwembe et al., 2021); (Degaga and Alamerie, 2020); (Endris et al., 2020); (Kassaw et al., 2019); (Pham, 2019), have assessed the determinants in choosing marketing channels by the producer of agricultural products. However, a dearth of information is related explicitly to the saba banana commodity. Such assessments are challenging to make decisions that can affect the effectiveness and efficiency of the marketing channel structure. Therefore, the current study will contribute

to empirical work by exploring factors influencing banana saba farmers to choose the best marketing channel.

Material and methods

This study was conducted in Bangun Harja, Pematang Panjang, and Sungai Bakau villages, Seruyan Regency, Central Kalimantan Province, Indonesia. It was located at 00 77' to 30 56' South Latitude and 1110 49' to 1120 84' East Longitude (Fig. 1). The three villages selected were the leading producers of saba bananas in the Seruyan Regency (BPS-Statistics Indonesia). Proportional random sampling was used to select samples from each village and was

determined using the sampling formula (Yamane, 1973).

$$n = \frac{N}{1 + N(e^2)}$$

Where n is the determined sample size, N denotes the total number of saba banana producers in the study area, and e defines the degree of precision. The needed sample size was calculated at 5% of precision. 254 banana kepok farmers were selected, including 89 from Bangun Harja, 70 from Pematang Panjang, and 95 from Sungai Bakau. This study collects relevant data from respondents using a structured questionnaire.
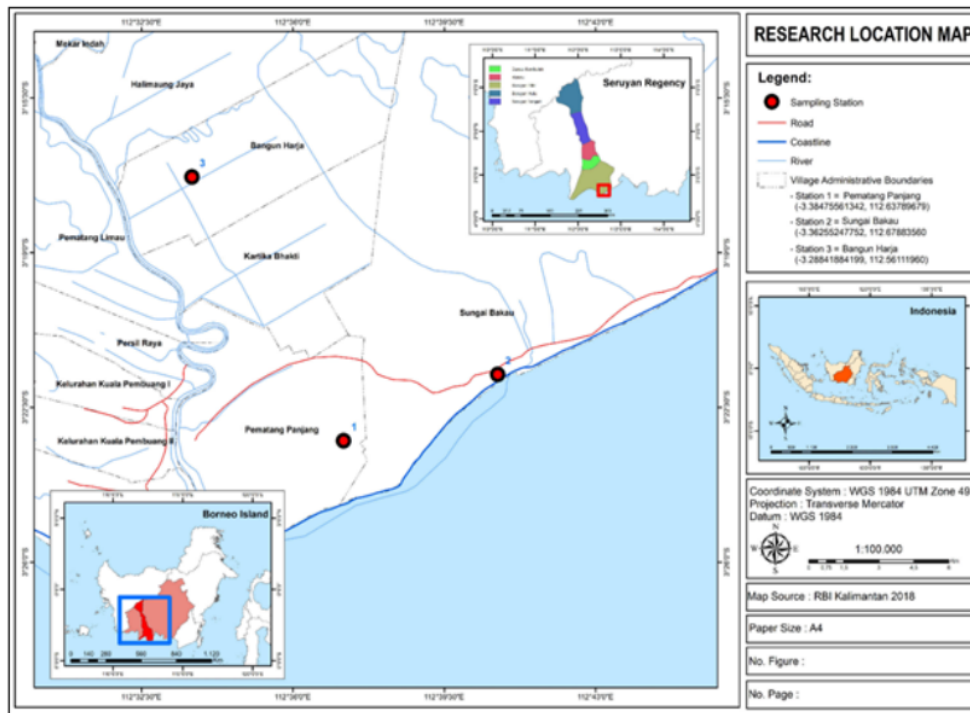

Fig 1. Map of the study area.

Descriptive statistics, including measures means, frequencies, standard deviation, and percentages, were used to assess the marketing channel chosen and the sociodemographic characteristics of saba banana farmers in the research area. This study employed a Multinomial Logistic Model (MNL) using the STATA 17 statistical package to evaluate factors of

market channel choices utilised by farmers. The MNL effectively handled and analysed the various data collected from respondents. This model is appropriate for use with one nominal or ordinal dependent variable that consists of more than two options (polytomous), regardless of whether the variable is nominal or ordinal.

The selection of different marketing channels is determined by assuming the desire of farmers to maximise their utility (profits) (Manski, 1977) and depends on internal and external factors (Hess *et al.*, 2018). Consider the ith saba banana farmer (i=1, 2, ..., n), facing a decision on whether to select the available market channel. Let U_o represent the utility obtained by the farmer by selecting one of the marketing channels, and U_j represents the farmer's utility by selecting the Jth market channel where J denotes alternative channel choices. The observed choice between the two reveals which one provides the greater utility. Therefore, the farmer chooses the Jth market channel based on the utility achieved and the highest profit obtained if $U_j > U_o$.

The utility that the farmer obtains from the marketing channel selected is expressed as:

$$U_n^1 = J_n^1 + \varepsilon_n^1$$

where U_n^1 is the utility achieved from the marketing channel selection, J_n^1 captures the various marketing channel alternatives, and ε_n^1 indicates the error term, representing the uncertainty surrounding the farmer's marketing channel selection.

The MNL estimates the probability of a farmer i having a set of independent variables like age, sex, education, experience, farm size, quantity produced, phone ownership, own transportation, credit access, and information access to choosing a market j such that $J = 1$; direct to consumers, $J = 2$; distributed to wholesalers, $J = 3$; distributed to retailers, and $J = 4$; distributed to collectors, as described in Table 1.

$$Probability(Qi = j) = \frac{\exp(\beta_j X_{ij})}{\sum_{j=1}^{j=n} \exp(\beta_j X_{ij})}$$

Where β_j is a vector, for the multinomial case, response probabilities are represented as :

$$Probability\ (Qi = J|X) = \frac{1}{1 + \sum_{j=1}^{j=n} \exp(\beta_j X_{ij})}$$

The maximum likelihood procedure can estimate the parameters as:

$$ln = \left[\frac{P_{ij}}{P_{i1}}\right] = \beta_j X_{ij}$$

The dependent variable is the log-odds that the saba banana farmers choose marketing channel j relative to the base category. The marginal effects are estimated to show the probability of the ranking between 1 and 4 for a given marketing channel by:

$$\frac{\partial p}{\partial x_i} = \frac{\partial}{\partial x_i}\left[\frac{\exp(\beta_j X_{ij})}{1 + \sum_{j=1}^{j=n} \exp(\beta_j X_{ij})}\right] = p(1-p)\frac{\partial x'\beta}{\partial x_i}$$

It should be noted that the base category determines simply the model's parameterisation, not the chance of farmer i choosing marketing channel type j. The empirical model for estimating the relationship between marketing channels and influencing factors was defined as follows:

$$Q_i = \beta_0 + \beta_1 Age + \beta_2 Sex + \beta_3 Edu + \beta_4 Exp + \beta_5 Fsize + \beta_6 Qprod + \beta_7 Pho + \beta_8 Trns + \beta_9 Cre$$

Where β_o is the constant and $\beta_{1,2,3,...,\ n}$ is the set of coefficients for each of the explanatory variables influencing an ith marketing channel choice of Q. ε_{ij} is the error term.

Results and discussion

Characteristics of saba banana farmers

Saba banana farmer respondents' characteristics are sociodemographic profiles of farmers engaged in the production and marketing of saba bananas at the study site. Demographic factors play a role in determining which marketing channels to use (Lee, 2020). Several demographic characteristics are gender and age. Gender has a role in determining farm productivity (Bello *et al.*, 2021).

The result presented in Table 2 and 3 indicated that 87.01 % of the saba banana farmers are male, 44.58 years old. These results may be linked to the fact that males are the head of the family and are responsible for their home, while farmers are at an economically active stage of life, allowing them to engage actively in production and economic activities. Educational backgrounds are significant factors influencing household heads' to increase their market involvement (Adeoti *et al.*, 2014) and outlet selection

(Degaga, 2020). On average, sampled saba banana farmers' years of schooling were 8.26 years in the study area, although some farmers do not take education. Indicates that the education of farmers is relatively low. This fact is supported by the 2013 Indonesian Agricultural Household Income Survey results, where most farmers are still low educated. Other demographic characteristics that are no less important are farming experience and farm size. More experienced farmers in production and marketing help the farmer adjust their marketing link and search for other alternative market outlets to increase market supply (Wosene *et al.*, 2018). On the other hand, farmers who have large farm sizes will prefer higher-value markets (Dlamini-Mazibuko, 2019). This condition implies that farmers who own large farms can generate high returns to cover high bargaining costs. Based on the results study, the sample farmers cultivate saba bananas with an average of 1.89 ha.

Table 1. Definition of explanatory variables used in the analysis.

Variables	Description	Measurement	Expected sign
Age (*Age*)	Age of the farmer	Years	-
Education (*Edu*)	Years of formal education of the farmer	Years	+
Experience (*Exp*)	Number of years in farming	Years	+
Farm size (*Fsize*)	Saba banana farm size	Hectares	+
Quantity produced (*Qprod*)	Quantity of saba banana production	Kilogram	+
Sex (*Sex*)	Sex of the farmer	1 = Male,	-
		0 = Female	
Phone ownership (*Pho*)	Own mobile phone	1 = Yes,	+
		0 = No	
Own transport (*Trans*)	Own transportation	1 = Yes,	+
		0 = No	
Credit access (*Cre*)	Access to credit	1 = Have access,	+
		0 = Have no access	
Information Access (*Info*)	Access to market information	1 = Have access,	+
		0 = Have no access	

The average production of saba bananas at the research site is 968.74 kg/ha. At the same time, the average number of years of experience that Saba banana farmers have is 7.13 years, which means that most of the farmers had more experience with saba banana production and channel choice. Access to market information is critical to determining the price of a product and its quantity demand (Slamet *et al.*, 2017). Based on the result, most respondents (201, or 79.1%) did not have access to market information, while the remaining (53, or 20.9%) did. In contrast, most respondents (235, or 92.5%) own a mobile phone that can be used to obtain market information. On the other hand, owning a means of transportation gives farmers the freedom to distribute their products anywhere.

Table 2. Summary descriptive statistics of continuous explanatory variables used in the analysis.

Variable	Consumers		Wholesalers		Retailers		Collectors		Total	
	n=17		n=14		n=12		n=211		n=254	
	Mean	Std. Dev	Mean	Std. Dev	Mean	Std. Dev	Mean	Std. Dev	Mean	Std. Dev
Age	38.47	12.93	50.71	11.47	43.42	12.97	44.74	11.81	44.58	12.05
Edu	9.18	2.90	8.14	2.74	8.50	3.09	8.18	3.05	8.26	3.02
Exp	4.88	1.97	8.07	4.01	8.17	6.63	7.19	4.70	7.13	4.66
Fsize	1.13	0.72	4.32	2.67	1.29	0.99	1.82	1.17	1.89	1.40
Qprod	423.53	443.75	2314.29	1981.88	490.83	524.71	950.57	866.04	968.74	989.98

Source: Own computation, 2022.

The study results found that only a few respondents (38 or 15%) had their means of own transportation. Interestingly, most respondents (up to 50%) can sell saba bananas to the market (directly to consumers or through wholesalers or retailers), have their means of transportation, and access information and credit.

Determinants the choice of the market channel in the study area

The research location has four marketing channels available for saba banana farmers. There is three-channel at the market (selling direct to consumers, wholesalers, and retailers) and one channel at the farm gate (selling to collectors). As shown in Fig. selling directly to consumers accounted for 6.7 % of total sales, followed by collectors, wholesalers, and retailers with total sales of 83,1 %, 5.5%, and 4.7%, respectively. It can be seen that most of the respondents sell their saba bananas to collectors compared to other marketing channels.

This result aligns with (Tarekegn *et al.*, 2020) that collectors play a critical role in transporting bananas from farmers to markets outside the area. Farmers, especially rural farmers, still depend on collectors due to limited transportation and costs (Pham, 2019).

Table 3. Summary descriptive statistics of categorical explanatory variables used in the analysis.

Variable	Categories	Consumers	Wholesallers	Retailer	Collectors	Total
Sex	1 = male,	82.35 (14)	100.00 (14)	75.00 (9)	87.20 (184)	87 (221)
	0 = female	17.65 (3)	0.00 (0)	25.00 (3)	12.80 (27)	13 (33)
Pho	1 = yes,	100.00 (17)	100.00 (14)	100.00 (12)	91.00 (192)	92.5 (235)
	0 = no	0.00 (0)	0.00 (0)	0.00 (0)	9.00 (19)	7.5 (19)
Trans	1 = yes,	58.82 (10)	78.57 (11)	66.67 (8)	4.27 (9)	15 (38)
	0 = no	41.18 (7)	21.43 (3)	33.33 (4)	95.73 (202)	85 (216)
Cre	1 = Have access,	88.24 (15)	78.57 (11)	66.67 (8)	18.01 (38)	28.3 (72)
	0 = Have No. access	11.76 (2)	21.43 (3)	33.33 (4)	81.99 (173)	71.7 (182)
Info	1 = Have access,	76.47 (13)	85.71 (12)	91.67 (11)	8.06 (17)	20.9 (53)
	0 = Have No. access	23.53 (4)	14.29 (2)	8.33 (1)	91.94 (194)	79.1 (201)

Source: Own computation, 2022.

As observed from the distribution volume of saba bananas, as shown in Table 4, sales through collectors are the largest compared to other marketing channels (81,513%), despite the lower price. This evidence indicates that there are other factors besides price that encourage farmers to decide to sell their saba bananas to collectors.

The farmer will select and consider several available external possibilities before engaging in any market channel. The marketing channel with the maximum utility will be the choice among the possibilities. After the identification process, they will choose where and to whom to sell their saba bananas based on their comparative advantage in bargaining and the accessibility of their marketing channels. Table 5 presents the empirical results of a multinomial logistic model study on the marketing decisions of saba banana producers through four marketing channels. We chose collectors as the basic option to compare it to the other three marketing channels. The collector was chosen because it represents the most common market channel chosen by small-scale saba banana farmers. This decision implies that the focus of the discussion of the results of this study is on the effect of explanatory variables on the marketing channels of consumers, wholesalers, and retailers relative to marketing channels through collectors (as the basic option). The findings show that the model fits well, with a pseudo R^2 of 0.7411, meaning that explanatory variables included in the model explain roughly 74.11 percent of the difference in market channel choices by saba banana farmers. Wald chi2 (30) of 240.59 was statistically significant ($P < 0.01$),

which implies that the regressions together explain marketing channel choice and suggest solid model predictive power. Marginal effects were estimated from multinomial logistic coefficients to analyse the effects of covariates on the probability of outcomes. The marginal effect indicates that each unit increase in the selected independent variable can increase or decrease the likelihood of adopting an alternative marketing channel.

As presented in Table 5. Indicate that the level of education, farm size, quantity produced, own transportation, access to credit, and access to market information, influence the decision of saba banana farmers in choosing the best market channel in the study area. However, the impact of each variable differs depending on the market channel. The

education level of the saba banana farmers is contrary to the a priori expectation. It has a negative and significant effect (P <0.05) on the choice of marketing channels direct to consumers compared to collectors.

The marginal effect of the education level of saba banana farmers signifies Ceteris paribus, a one-year increase in the education level. They tend to decrease the probability of selling their saba bananas directly to consumers with a 0.96% probability rate compared to selling to collectors. Farmers with higher education levels will be more market-oriented and know more about the market situation (Adeoti, 2014). Therefore, farmers with higher education consider several factors, such as product price, marketing cost, the quantity of demand, and the continuity of products that marketing agencies can purchase.

Table 4. Saba banana marketed volumes and average price by marketing channel.

Channels	Volume		Price
	Kg	%	IDR/Kg
Consumers	7,200	2.926	8,000.00
Wholesalers	32,400	13.168	6,216.67
Retailers	5,890	2.394	5,333.33
Collector	200,570	81.513	4,819.07

Source: Own computation, 2022.

The farm size has a positive and significant effect on the selection of marketing channels through wholesalers compared to collectors (P<0.05). The marginal effect of farm size shows that an increase of 1 hectare of farm size area will increase 2.03% the probability of farmers choosing wholesaler channels over collectors. According to (Dessie *et al.*, 2018), smallholder farmers with large farming sizes can produce a large amount of wheat and sell it to the market in bulk to reduce marketing costs. However, there is a negative and significant relationship between the number of saba bananas produced and the market channels of consumers, wholesalers, and retailers (P<0,05). It is found that an increase of one kilogram of saba bananas produced by a farmer reduces the probability of selling to consumers, wholesalers, and retailers by 0.01%, 0.001%, and 0.002%, respectively, relative to the collectors (other

things being held constant) base on marginal effect value. This situation can happen because collectors come to the farm gate to buy large quantities of saba bananas. When farmers' production is abundant, farmers who do not have their means of transportation tend to sell their crops to collectors at the farm gate rather than selling directly to consumers, wholesalers, or retailers. This result is in line with research (Chigusiwa *et al.*, 2013) that collectors will buy products in large volumes.

Ownership of market transport facilities variable affects positively and significantly accessing consumers, wholesalers, and retailers (P<0.05) Ownership of market transport facilities increases the likelihood of choosing consumers, wholesalers, and retailers by 8,96%, 7,27%, and 5,14%, respectively, compared to accessing collectors' market channels.

The result is consistent with the findings of (Magesa *et al.*, 2014) that ownership of transportation means can reduce transportation costs so that farmers can sell their products to the market.

Credit access significantly enhances access directly to consumers and retailers (P<0,01 and P<0,05). Suppose a farmer has accessed credit and the chance of selling directly to consumers and retailers increases. Findings show that access to credit of the saba banana farmer increases the average probability of direct selling to consumers and retailers by 10,14% and 0,47%, respectively. This result agrees with the findings of (Sekyi *et al.*, 2020) that farm credit access holds significant potential for stimulating higher levels of engagement in the market.

Table 5. Determinants of saba banana farmers' marketing channel choice.

Qi	Xi	Coeff	Std err	Z	P >|Z|	∂y/∂x
Consumers	*Age*	-0.0897	0.0671	-1.3400	0.1810	-0.0018
	Sex	2.7045	1.9771	1.3700	0.1710	-0.0120
	Edu	-0.6737**	0.2707	-2.4900	0.0130	-0.0096
	Exp	-0.1410	0.1996	-0.7100	0.4800	-0.0063
	Pho	17.0809	7130.0000	0.0000	0.9980	0.1443
	Fsize	0.5521	1.0410	0.5300	0.5960	-0.0049
	Qprod	-0.0045**	0.0019	-2.3700	0.0180	-0.0001
	Trans	9.1847***	2.5227	3.6400	0.0000	0.0896
	Cre	6.1768***	1.8502	3.3400	0.0010	0.1014
	Info	5.6670***	1.8723	3.0300	0.0020	-0.0041
	Constant	-17.8868	7127.8970	0.0000	0.9980	
Wholesalers	*Age*	0.0873	0.0723	1.2100	0.2270	0.0020
	Sex	19.4863	5613.9000	0.0000	0.9970	0.2868
	Edu	-0.2672	0.2950	-0.9100	0.3650	0.0009
	Exp	0.0158	0.1524	0.1000	0.9170	-0.0002
	Pho	18.1438	4584.2930	0.0000	0.9970	0.1303
	Fsize	1.7606**	0.7637	2.3100	0.0210	0.0203
	Qprod	-0.0028**	0.0013	-2.1400	0.0320	0.0000
	Trans	9.6334***	2.8735	3.3500	0.0010	0.0727
	Cre	2.3793	2.0898	1.1400	0.2550	-0.0042
	Info	8.3374***	2.6306	3.1700	0.0020	0.0621
	Constant	-51.7703	7247.8720	-0.0100	0.9940	
Retailers	*Age*	-0.0602	0.0669	-0.9000	0.3680	-0.0008
	Sex	1.7823	2.0689	0.8600	0.3890	-0.1011
	Edu	-0.5364	0.2703	-1.9800	0.0470	-0.0031
	Exp	0.1647	0.1251	1.3200	0.1880	0.0064
	Pho	18.0968	7376.2820	0.0000	0.9980	0.1343
	Fsize	0.9985	1.0528	0.9500	0.3430	0.0088
	Qprod	-0.0037**	0.0017	-2.1800	0.0300	0.0000
	Trans	8.9288***	2.5350	3.5200	0.0000	0.0514
	Cre	4.0281**	1.7277	2.3300	0.0200	0.0047
	Info	9.0941***	2.4592	3.7000	0.0000	0.1142
	Constant	-24.8346	7376.2840	0.0000	0.9970	
Collectors		(Base Outcome)				

Number of observation =254, Log pseudo likelihood = -42.015725***, Pseudo R2 = 0.7411, Wald chi -square (30) = 240.59, Prob > chi2 = 0, ***, ** and * are statistically significant at 1%, 5% and 10% respectively

Source: Own computation, 2022.

On the other side, access to market information was significant (P<0.01) and positively influenced the probability of farmers likely to sell their saba banana produce to the market (direct to consumers, wholesalers, or retailers). Access market information informs the farmer on the prevailing pricing condition and the number of saba banana demand.
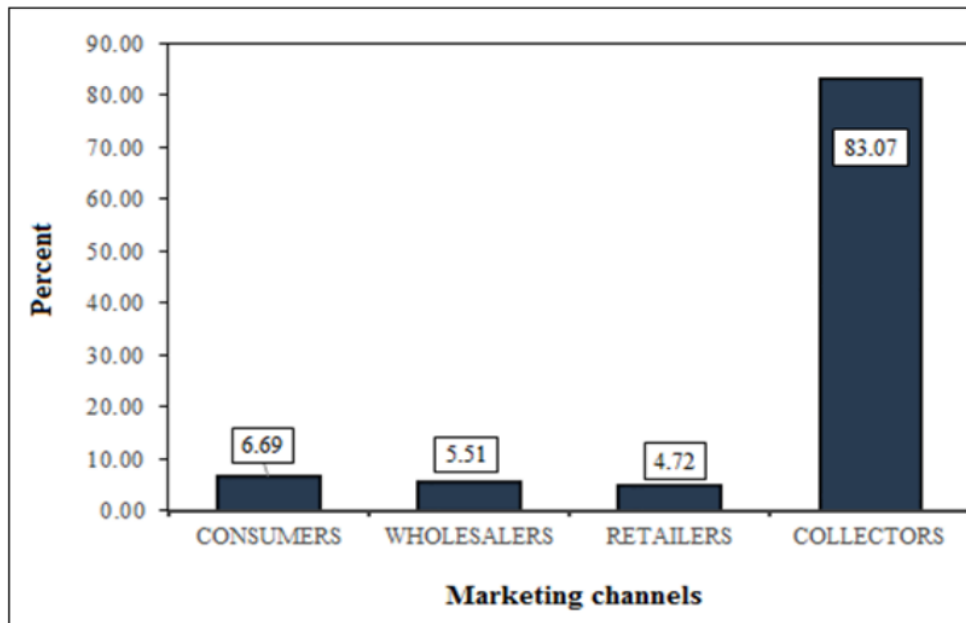
Fig. 2. The proportion of market channels chosen by Saba banana farmers' sample.

The marginal effect of the access information implies that a unit increase in the access information will result in the rise in choice of saba banana sales at the consumers, wholesalers, and retailers is 0,41%, 6,21%, 10,14%, respectively, compared to collectors.

The results of this study are supported by (Fan and Salas Garcia, 2018). When farmers can obtain information, they have a greater tendency to sell to the market than those who do not have access to information. It is also in line with (Nugroho, 2021) statement that access to market information positively impacts the market participant.

Conclusion

Factors influencing the decision to choose the best marketing channels were investigated in this study for saba banana farmers in three villages in the study area. The findings indicated that the level of education, farm size, quantity produced, own transportation, access to credit, and access to market information, influence the decision of saba banana farmers in choosing the best market channel in the study area with different impacts. Farmers with higher education tend to prefer collectors rather than

selling them directly to consumers. Likewise, with the production of more saba bananas, farmers tend to sell them to collectors rather than directly to consumers, wholesalers, or retailers. The view is contrary to the size of agricultural land, ownership of means of transportation, access to credit, and access to market information. When banana saba farmers have a larger farm size, have their means of transportation, and can access credit and market information, they are more likely to sell directly to consumers, wholesalers, and retailers. The results of this study have important implications for farmers and policymakers, especially in terms of marketing agricultural products and setting prices. It is urgent to formulate a policy to increase farmers' access to markets and improve their marketing efficiency. It is necessary to strengthen agricultural institutions (such as farmer groups or cooperatives) to accommodate their products and distribute them to consumers at high prices. Financial institutions need to increase their outreach to smallholders to reduce their dependence on credit from collectors. In addition, information disclosure is also essential to developing an integrated market information system to reduce information asymmetry between farmers and traders.

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