

Analysis Of Marketing Functions And Factors Influencing Soybean Marketing In Bantul Regency

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ABSTRACT

Soybeans are one of the grains rich in vegetable fat and protein that have become one of the staples for the people of Indonesia. Indonesia has an important role in soybean production, which is an important commodity for food security and the country's economy. Indonesia is the largest soybean market in Asia by importing 1.96 million tons of domestic soybean needs. While the rest is produced through domestic soybean production. The purpose of this study was to analyze the function of soybean marketing and see what factors influence the selection of soybean marketing channels in Bantul Regency. The data analysis method was carried out using a qualitative descriptive analysis method to see the function of soybean marketing, and quantitative to see the factors that influence soybean marketing which were analyzed using multinominal logit. Farmers carry out marketing functions of purchasing, selling, transporting, milling, sorting, loading and unloading, packaging, drying, market information and risk. For the physical functions carried out by farmers are the functions of selling, transporting, milling, sorting, packaging, drying, market information, and risk. Marketing institutions also perform marketing functions including, 1) exchange function, namely purchase and sale function, 2) physical function, namely transportation, sorting, loading and unloading, and packaging, 3) facility function, namely market and risk information. Factors that influence farmers in choosing soybean marketing channels in Bantul Regency are farming experience, production volume, price, capital, land area, and rainy and dry seasons.

Keywords: *marketing function analysis, multinominal logit, soybeans*

BACKGROUND

Soybeans are the main source of nutrition for the community because of their low price and high protein content. Indonesia currently still imports 70% of its national soybean needs from other countries. In 2022, soybean production in Bantul Regency will decline while demand for soybeans in Indonesia will increase. This increase in demand must be adjusted to the increase in production. Soybean problems often occur in Indonesia, the high demand for soybeans in the market is not comparable to Indonesia's local soybean production capacity, so importing soybeans is the shortcut of choice. BPS Indonesia released figures for soybean imports in Indonesia in 2022 of 2.32 million tons. Domestic soybean production is

still far from sufficient, but behind this shortage lies a great opportunity for soybean farmers in Bantul Regency to take advantage of market opportunities.

Marketing of agricultural commodities begins when farmers plan their production to meet market demand. An efficient agricultural commodity marketing system must meet 2 requirements, namely: 1) being able to deliver agricultural products from producers to consumers at the lowest possible cost, and 2) being able to provide a fair distribution of rewards from the total final consumer price to all parties involved in the production and marketing activities of the agricultural commodity (Ezekiel et al., 2020). Fair distribution in this context is the distribution of rewards for marketing functions according to the contribution of each marketing institution that plays a role (Vermana et al., 2019).

The types of soybean transportation costs depend on the distance, infrastructure conditions, and the type of transportation used. These transportation costs include: 1) farmer-to-collector shipping costs, where farmers typically face costs to transport soybeans from their fields to the local collection center or market. These costs include fuel costs, labor costs, and costs for maintenance and repair of transportation equipment, 2) wholesale distribution costs, which include the cost of transporting soybeans using trucks or other vehicles, as well as related operating costs such as driver expenses and fuel, 3) retail distribution costs, which include local distribution costs, shipping to stores or retail agents, and often involve costs for temporary storage or stock management, and 4) logistics and handling costs, which include warehousing costs, cargo insurance costs, administrative costs related to arranging and documenting transportation, and costs to comply with international trade regulations and requirements. Each of these types of transportation costs can vary depending on local factors and market conditions. Efficient transportation cost management is an important part of efforts to improve profitability in the soybean supply chain (Prabowo & Pudjianto, 2023).

Selecting the right soybean marketing channel requires an in-depth evaluation of these factors to maximize efficiency, minimize costs, and best meet market and consumer needs. According to (Arwan *et al.* (2022) In his research, there are seven factors that influence marketing channels, namely: age, education, farming experience, production volume, price, land area, and payment system. In marketing activities, older farmers tend to choose to market their products to marketing institutions with a smaller scope, namely through village collectors (Dilana et al., 2013), In marketing activities, farmers who have more experience tend to choose to market using large traders (Sari et al., 2021). The area of land owned by farmers has an influence on marketing activities. This is stated in the research of (Saleh et al., 2023) that farmers who have large land choose to market to marketing institutions with a large scope. In line with the research of (Adow et al., 2023) that the area of land owned by farmers influences the choice of marketing channels. According to Wu et al., (2024) in their research on the analysis of the technical efficiency of soybean production, it was found that increasing the level of education, expanding the area of soybean planting, increasing the level of mechanisms, and expanding soybean sales channels can increase the technical efficiency of soybean production. However, the increasing volatility of soybean prices makes it increasingly difficult to obtain accurate soybean market information. In addition, inappropriate soybean subsidy policies can reduce the technical efficiency of soybean production, considering that ineffective or untargeted subsidies can disrupt market mechanisms and reduce incentives for farmers to produce efficiently.

According to Arriyadul et al., (2021) in Bangladesh found that farmer education, farming experience, ownership of agricultural assets, and non-farm income all have a positive effect on soybean marketing channels. This finding suggests that factors such as education

and farming experience play an important role in improving market access and soybean marketing efficiency, which in turn can support the improvement of overall technical efficiency of production. The results of Zhai et al., (2023) showed that farmer age, farm income, land topography, and ease of selling are the main factors influencing farmer behavior. in their research also found that there are significant differences between commercial farmers and subsistence farmers. This study also highlights significant differences between commercial farmers and subsistence farmers in terms of marketing strategies and adaptation to environmental conditions. This underscores the importance of understanding the differences in characteristics and needs between farmer groups in order to design more effective policies and strategies.

RESEARCH METHODS

This research was conducted in Bantul Regency, Special Region of Yogyakarta. Bantul Regency is one of the soybeans production centers in the Special Region of Yogyakarta. The determination of the research area was carried out intentionally (purposive method) with the consideration that the research location is in accordance with the topic to be analyzed, namely soybean efficiency. Data collection was carried out from September to November 2024.

The data used in this study consisted of primary data and secondary data. Primary data used in this study was carried out through observation to observe market conditions, interviews with questionnaire respondents covering soybean prices, sales processes, sales institutions, costs and profits carried out by each marketing institution. Primary data collection follows the marketing flow from farmers as producers to the consumer level. Secondary data was obtained from related research results, research topic articles, data from the Bantul Regency Food Crops Agriculture Service, data from the Bantul Regency Agricultural Extension Agency, and data from the Bantul Regency Central Statistics Agency (BPS).

The sample in this study were soybean farmers who were engaged in soybean farming. The determination of the number of samples was obtained using the census sampling technique, namely the entire population of soybean farmers in Bantul Regency (Pradana, 2023). The sampling method used for farmer samples was the census technique where information we collected the data from each individual in the entire population being studied. Data analysis to identify marketing functions using qualitative descriptive analysis methods and data analysis to see factors that influence marketing channels using quantitative descriptive analysis methods multinominal logit.

Table 1. Variables Influencing the Choice of Soybean Marketing Channels in Bantul Regency, Special Region of Yogyakarta

Variabel	Uraian	Pengukuran	Referensi
X1	Age	Year	(Pratama et al., 2023)
X2	Farming experience	Year	(Pratama et al., 2023)
X3	Production volume	Ton	(Arwan et al., 2022)
X4	Price	IDR	(Arwan et al., 2022)
X5	Capital	there or no	(Pratama et al., 2023)
X6	Land area	Ha	(Arwan et al., 2022)
X7	Rainy and dry seasons	Mm & hPa	(Saleh et al., 2023)
X8	Payment system	Cash or non-cash	(Arwan et al., 2022)
X9	Extension activities	There or not	(Rajanna et al., 2017)

X10

distance

Km²

(Rajanna et al., 2017)

a. Model Suitability Test

The model suitability test in this study is used to determine the suitability or degree of freedom of the model that has been used. The suitability test used is the deviance test, where this test follows the chi-square distribution with degrees of freedom $J-p-1$. Where J is the number of samples used in the study, p is the number of parameters to be tested. The rejection area of H_0 is if the value of the calculated χ^2 test statistic $\geq \chi^2 (j-p-1)$ or the significance value $\leq \alpha$.

b. Parameter Testing

Parameter testing is an important part of model validation. Parameter testing in the logit model is important because it is used to see and assess whether the variables used in the multinomial logit model contribute significantly to the predicted categorical results. By testing the statistical significance of each parameter, we can determine whether the variable needs to be retained in the model or not. Through parameter submission, we can evaluate the direction and significance of the effect of each independent variable on the possibility of predicted results.

c. Likelihood Ratio Test

The likelihood test or G statistic test is a statistical test to compare two competing statistical models, usually a simpler model with a more complex one. This test is based on the difference in log-likelihood values between the two models being tested, and is commonly used in the context of comparing models with each other. The statistic for the G test is distributed according to a χ^2 (chi-square) distribution with degrees of freedom (Hosmer & Lemeshow, 2000). The general formula for the G-test is:

$$G = -2 \ln[L_0/L_1]$$

Where:

L_0 = Likelihood without independent variables

L_1 = likelihood with independent variables Hypothesis:

$H_0 = \beta_1 = \beta_2 = \dots = \beta_n = 0$

H_1 = there is at least one value of $\beta_j \neq 0$, for $j = 1, 2, 3, \dots, n$

This likelihood ratio test statistic follows Chi-square with degrees of freedom p , where p is the number of parameters in the model. The decision can be taken by rejecting H_0 if the G value is greater than the chi-square table value at α ($G > \chi^2_{n(\alpha)}$), which means that the variables used influence the rubber farmers' decisions in choosing marketing channels. Conversely, accept H_0 if G is smaller than the chi-square table value at α ($G > \chi^2_{n(\alpha)}$), which means that the variables used do not influence the rubber farmers' decisions in choosing marketing channels.

d. Wald Test

The Wald test in this study is used to test each variable individually. The results of individual testing will indicate whether an explanatory variable is worthy of being included in the model or not. The Wald test can be formulated as follows:

$$W_j = (\beta_i) / (Se(\beta))$$

Description:

β_i = regression coefficient

Se (β_i) = standard error of β (error error of β) Hypothesis:

$H_0 : \beta_i = 0$ $H_1 : \beta_i \neq 0$, for $i=1,2,\dots,n$

The Wald test provides a systematic way to evaluate whether independent variables have a significant contribution to the multinomial logit model. The decision-making criteria are to reject H_0 if the value of the two-tailed p value $< \alpha$ or $P(|Z| > W_j)$ which means that the j th independent variable partially affects the dependent variable. Conversely, accept H_0 if the value of the two-tailed p value $< \alpha$.

RESULT AND DISCUSSION

Characteristics of soybean farmer respondents in Bantul Regency

Gender significantly influences agricultural management especially in relation to soybean production. The characteristics of farmer respondents can be understood through several aspects, including their roles in agricultural activities, decision making, and involvement in the distribution chain. Table 1 shows that the majority of farmer respondents in this study were male with a percentage of 96%. This shows that male respondents play an important role as heads of families and farm leaders. They are responsible for managing the entire agricultural process, from planting to marketing the harvest.

Table 2. Characteristics of Soybean Farmer Respondents in Bantul Regency

No	Respondent Characteristics	Number (of people)	Precentage (%)
1	Gender		
	a. Male	89	96
	b. Female	4	4
2	Age Group (years)		
	a. < 40	5	5
	b. 40 – 44	6	6
	c. 45 – 49	24	26
	d. 50 – 55	19	20
	e. > 55	39	42
3	Education Level		
	a. SD	1	1
	b. SMP	16	17
	c. SMA	62	67
	d. College	14	15
4	Farming Experience		
	a. < 10	2	2
	b. 10 – 20	45	48
	c. 21 – 30	30	32
	d. > 30	16	17
5	Number of family dependents		
	a. 0	0	0
	b. 1 – 5	92	99

	c. > 5	1	1
6	Land Area (Ha)		
	a. < 0,5	1	1
	b. 0,5 – 1	83	89
	c. > 1	9	10

Source: Primary Data, 2024

Age is one of the factors that significantly influences soybean farming in Bantul Regency. Age is related to the way farmers think in managing their farming properly. The productive age of soybean farmers in the age range of 1-4 years is considered as an unproductive group, 15-64 years as a productive age group, and 64 years and over as an unproductive group (Wuri *et al.*, 2021). The largest number of farmer respondents were in the age range > 55 years with a percentage of 39%. Productive age is one of the factors for success in farming activities (Mujiburrahmad, 2020). According to (Prasetyo, 2021), farmers of productive age will work better and more optimally when compared to non-productive ones. Research from (Amalia, 2024) and (Pradana, 2023) shows that farmer respondents have a productive age in managing their farming businesses. They have in-depth local knowledge regarding planting patterns, land management, seed selection, and pest and disease control strategies in the plants they produce. Respondent farmers of productive age understand local soil conditions, climate, and weather patterns, as well as how these factors affect production. The last level of education of the largest respondents was high school with a total of 62 people with a percentage of 62%. According to (Mosher, 2014) education has an important role in business productivity and is a facilitating factor in business production, because farmer education introduces knowledge, skills and new ways to carry out their farming activities. Farming experience of farmer respondents in Bantul Regency , the majority have 10 -20 years of business experience, totaling 45 people with a percentage of 48%. The type of work managing a farm is repetitive and physical work. So the longer the farmer's experience in doing the job, it is hoped that the farmer will be more competent in carrying out soybean production. The success of farming is not only supported by formal education factors but there are other factors that support the success of farming, namely the length of time a person does the farming. The more often farmers do farming, the greater the opportunity to achieve success in the next farming (Irwandi et al., 2015).

The number of dependents of the majority of farmers is in the range of 1 -5 people, totaling 92 respondents with a percentage of 99%. Based on the norm of a happy and prosperous small family (NKKBS) which is the reference for the National Family Planning Program, the ideal family consists of a father, mother and a maximum of two children. However, in one family, it is possible that there are other family members who are the burden of responsibility of the head of the family, in this case farmers.

The majority of farmer respondents have a land area of 0.5 - 1 ha, totaling 83 people with a percentage of 89%. The land area in this study is the total land area cultivated by farmer respondents. Having a higher production capacity will have a more stable and diverse income, and be better able to face market fluctuations. Overall, the characteristics of farmer respondents

based on land area show significant differences in economic, social, and potential aspects of farming business development. Larger land allows farmers to be more innovative, access more resources, and develop their businesses, while farmers with small land face limitations that require more creative survival strategies.

Analysis Marketing Function

The marketing function is carried out by institutions involved in marketing, then forming marketing channels. The marketing function is carried out to overcome problems faced by producers with the aim of satisfying consumers as effectively and efficiently as possible. The marketing functions carried out by marketing institutions in Bantul Regency are presented in Table 3.

Table 3. Soybean Marketing Functions in Bantul Regency, Special Region of Yogyakarta

No	Marketing Function	Farmer's	Collectors	Wholesalers	JAP	Unilever	Retailers
1	Purchasing	-	√	√	√	√	√
2	Sales	√	√	√	√	√	√
3	Transportation	√	√	√	√	√	-
4	Milling	√	-	-	-	-	-
5	Sorting	√	√	√	-	-	-
6	Loading and unloading	-	-	√	√	√	√
7	Packaging	√	√	√	√	√	√
8	Drying	√	-	-	-	-	-
9	Market information	√	√	√	√	√	√
10	Risk	√	√	√	√	√	√

Source: Primary Data, 2024

a. Marketing Function at the farmer level

Farmers are the main producers who produce soybeans as raw materials. The main function in marketing is the sale of soybean harvests, farmers are also responsible for transporting soybeans from the fields to market locations or to collecting traders, farmers in Bantul Regency themselves must rent vehicles to transport their crops, which adds to operational costs.

b. Marketing Function at the trader collector level

The marketing function at the collector level plays an important role in the soybean supply chain, especially as a bridge between farmers and large traders. The soybean marketing function in Bantul Regency at the collector level carries out several important marketing functions, namely: purchasing, selling, transporting, sorting, packaging, market information and risk. Collectors have the main function as buyers of soybeans from farmers. Collectors collect the harvest from small farmers in Bantul Regency and buy soybeans in small quantities which will then be sold in large quantities.

c. Marketing Function at the Wholesaler Level

The marketing function at the wholesaler level is very important in understanding the

strategic role in the supply chain. Wholesalers are the link or intermediary between farmers to retailers and to end consumers. The marketing function at the wholesaler level in Bantul Regency is the exchange function for both purchases and sales, carrying out physical functions such as transportation, loading and unloading, packaging, market information and risk.

d. Marketing Function at the JAP (Java Agro Prima) Processing Company Level

The JAP (Java Agro Prima) processing company plays an important role, especially in processing soybeans into products that will be distributed to the market. The marketing function at the Java Agro Prima (JAP) processing company level is to carry out exchange functions, both purchases and sales. Sales made by the JAP processing company are in the form of soy milk and dry soybeans or soybean seeds. The physical functions carried out by the JAP processing company are transportation, sorting, loading and unloading, packaging, market information, and risk. The JAP processing company purchases raw materials (soybeans) from wholesalers, then the soybeans are processed into soy milk which is packaged in small plastic bags ready to be sold to the market or other small traders.

e. Marketing Function at the Unilever Processing Company Level

Unilever's processing company that produces sweet soy sauce has a structured marketing function and covers several aspects from processing raw materials to becoming sweet soy sauce products that will be distributed to end consumers. The marketing function at the Unilever processing company level is purchasing and selling, physical functions are loading and unloading, packaging, market information and risk. The JAP processing company cooperates with wholesalers in Bantul Regency to purchase black soybeans in Dlingo District, Bantul Regency.

f. Marketing Function at the Retailers Level

Retailers in this study are the last party in the distribution chain before the product reaches the consumer. They play an important role in ensuring that goods produced and distributed by collectors, wholesalers, retailers, and processing companies JAP and Unilever are available to end consumers. The marketing functions carried out by the retailer level are purchasing and selling, the physical functions carried out are loading and unloading, packaging, market information and risk.

Analysis of determinants of soybean marketing channels in Bantul Regency

The statistical method used to determine the factors influencing the selection of soybean marketing channels in Bantul Regency, Special Region of Yogyakarta is multinominal logit regression.

Table 4. Estimation Parameter and Odds Ratio

Marketing Channel	Variable	B	Wald	Sig.	Exp (B)
Channel 4 and 1	<i>Intercept</i>	83.768	1.209	0.109	
	Age	0.231	0.029	0.789	1.019
	Farming	5.537	2.578	0.047*	1.307
	Experience	-36.597	3.764	0.000*	0.998
	Production	5.979	0.109	0.037*	0.041

	Volume Price	1.012	0.002	0.982	1.957
	Capital	0.393	0.201	0.010*	1.017
	Land	-0.058	0.300	0.078*	0.084
	Area	0.699	0.000	0.989	1.792
	Rainy and dry	41.207	0.000	0.972	0.978
	Seasons Payment	3.976	0.000	0.998	1.368
	System Ectention activities distance				
Marketing Channel	Variable	B	Wald	Sig.	Exp (B)
Chanel					
4 and	Age	0.866	1.072	0.172	1.138
2	Farming	-3.291	0.000	0.993	0.419
	Experience	0.013	0.009	0.018*	0.398
	Production	37.476	0.010	0.057*	0.449
	Volume Price	-0.189	0.000	0.998	0.673
	Capital	1.896	0.000	0.013*	0.629
	Land	0.148	0.002	0.029*	5.365
	Area	-1.878	0.000	0.996	1.298
	Rainy and dry	1.687	0.009	0.047*	1.520
	Seasons Payment	1.979	0.000	0.995	0.792
	System Ectention activities Distance				

Table 5. Estimation Parameter and Odds Ratio (Advanced)

Channel 4 and 3					
	Age	-44.751	0.927	0.758	1.013
	Farming Experience	1.151	0.000	0.995	1.208
	Production Volume	-38.759	3.674	0.000*	0.898
	Price	3.240	2.762	0.018*	1.183
	Capital	1.012	0.002	0.982	1.957
	Land Area	0.393	0.201	0.218	1.278
	Rainy and dry	0.121	2.639	0.004*	0.348
	Seasons				
	Payment System	0.012	3.139	0.976	3.524
	Ectention activities	5.952	0.537	0.216	0.153
	distance	-0.100	2.371	0.889	0.990

Description: * = Real at a significance level of 5%

Source: Primary Data, 2024

The variables that influence soybean marketing channels in Bantul Regency, Special

Region of Yogyakarta are farming experience, production volume, price, capital, land area, rainy and dry seasons, and extension activities. All of the variables above play an important role so that we can see what factors influence the marketing channels in Bantul Regency, Special Region of Yogyakarta.

Based on Table 4, it is known that the p-value of the deviance test of the model is greater than α (0.05). This indicates that the resulting model is appropriate. The R-square value in the test referring to the Nagelkerke value is .893, which means that variations in the selection of marketing channels in selling soybeans in Bantul Regency can be explained by age, farming experience, production volume, price, capital, land area, rainy and dry seasons, payment systems, extension activities and distance by 89.3% and the remaining 11.7% is explained by other factors outside the model. It is known that the p-value of the likelihood ratio test of the model is smaller than α (0.05). This shows that there is at least one independent variable in choosing a soybean marketing channel in Bantul Regency. To see the independent variables that affect marketing channels, the next step is to conduct a Wald test. The Wald test statistic follows a normal distribution with a rejection criterion if $W \geq Z_{1-\alpha/2}$ or with a significance value $\leq \alpha$.

CONCLUSION AND SUGGESTION

Conclusion

Marketing institutions involved in the soybean marketing channel in Bantul Regency carry out marketing functions. Where farmers carry out marketing functions of purchasing, selling, transporting, milling, sorting, loading and unloading, packaging, drying, market information, and risk. For physical functions carried out by farmers are sales, transportation, milling, sorting, packaging, drying, market information, and risk. Marketing institutions also carry out marketing functions including, 1) Exchange function, namely purchasing and selling functions, 2) Physical function, namely transporting, sorting, loading and unloading, and packaging, 3) Facility function, namely market information and risk. Factors that influence farmers in choosing soybean marketing channels in Bantul Regency, namely the amount of production obtained odds ratio values in the comparison of marketing channels 4 and 1 of 0.998, channels 4 and 3 0.398, and marketing channels 4 and 3 of 0.898. Price variables with odds ratio values in channels 4 and 1 of 0.041, channels 4 and 2 of 0.449, and channels 4 and 3 of 1.183, which means that every increase in soybean prices, the opportunity for farmers to sell to efficient marketing channels is 0.041, 0.449, and 1.183 times smaller than the opportunity to choose efficient marketing channels, and the variables of the rainy and dry seasons.

Suggestion

High marketing costs in farmer marketing need to cut marketing costs by reducing several marketing functions such as expenses in loading and unloading and sorting. In addition

to reducing several marketing functions, farmers must also be more active in seeking opportunities for cooperation that allow products to be sold directly to end consumers or directly to soybean processing companies, so that they can cut distribution costs and increase profits. With this, farmers will be more careful in choosing more efficient and profitable distribution channels. Optimizing government policies such as subsidies, price regulation, or farmer support programs. The government needs to develop a market information system that is transparent and easily accessible to farmers. This system must include current price information, market needs, and demand predictions that can help farmers make better decisions regarding soybean marketing. This can have a major impact on soybean marketing in Bantul Regency.

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