The Role of Added Value and Marketing Efficiency of Sago Starch on the Sago Processing Farmers' Income in Konawe Regency, Southeast Sulawesi, Indonesia

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Abstract— This study aims to analyze the role of added value and marketing efficiency variables on the sago processing farmers' income. The location of the study was determined purposively and the sampling method used snowball technique on sago processing farmers in Konawe District. The number of sago processing farmers was obtained through census which are 26 sago processing farmers. The data analysis used was multiple regression analysis tool. The analysis shows that the average net income of sago processing farmers in Konawe Regency, Southeast Sulawesi Province is IDR1,452,000/month. Based on the results of the multiple regression analysis, the role of added value is 347.06 and the marketing efficiency is 16,348.78 and it has a significant effect.

Key-Word: Added value, efficiency, marketing, income, processing, sago

1. Introduction

The current global economic condition of agriculture has changed as a result of increasing demand and the desire for farmers to gain benefit from a growing market. Farmers are not enough just as commodity providers who get small share. Farmers are encouraged to produce high-value commodities and directly involved in various activities to obtain value-adding in the forms of yield processing or agro-industry activities. Konuma et al (2012) [1], Konuma (2014) [2], Konuma (2018) [3], stated that one of the original underutilized food crops which obtains very little attention and research in the past but has added value potential is sago. Indonesia is one of the world's main commercial sago producers along with Malaysia (Jong, 2018) [4]. Sago industry also has an important role to exploit underutilized sago starch in sago forests. In addition, the existing sago industry is financially feasible in short term even though it may not be sustainable in the long term (Girsang, 2018) [5].

Irwan (2018) [6] in sago symposium in Pekanbaru, Riau Province in 2018, gave recommendation to the sago producing countries in the ASEAN region, provincial representatives, and sago-producing districts in Indonesia that sago should be able to become a host that can support national food security. According to Suyastri et al (2018) [7], increasing food security and independence can be done through optimization of processed sago products so that sago such as cassava which is processed into cassava as local food can contribute positively to the status of community food security (Saediman et al, 2016 [8], Saediman et al, 2019 [9]). Hirao et al. (2018) [10] further stated that sago starch was found to be similar to potatoes, cassava, and sweet potato starch.

Metaragakusuma et al (2016) [11], Limi et al (2018) [12] stated that local institutions (farmer groups and agricultural extension agents) play a role in increasing food production capacity and the wider use of sago can be a catalyst for the development of rural industries. The development of sago processing business groups to develop local sago food products is very strategic considering the commodity of sago for some people of Southeast Sulawesi Province, especially the Tolaki-Mekongga ethnicity who uses sago as their main food since ancient times and pride in local food commodities because sago is still a staple food, and sago is used not only consumed as a food source but also for various purposes, such as straw ingredients (Toyoda, 2018) [13]. Wardis (2014) [14] showed that household expenditure for sago consumption in villages in Maluku is the highest at 5.4%. Further Taridala et al (2013) [15], Pasolon (2017) [16] mentioned that sago is a world commodity, healthy food (carbohydrate source), raw material for sago-based agroindustry, protector of the earth and has local cultural values in the Southeast Sulawesi community structure as well as one of the potential commodities for food and bioenergy in bioindustry systems. Thus, according to Metaragakusuma et al (2016) [11] future sago demand will increase and sago will become an important industrial raw material.

Sago commodities in Konawe Regency develop naturally (hereditary) both the plant population and the way it is processed and delivered from generation to generation (Hirao et al, 2018) [10]. Metaragakusuma et al (2016) [11] state that processing skills are inherited from ancestors and passed down to the next generation continuously. The process of obtaining sago starch in Konawe Regency was

carried out by groups with a profit-sharing system between the owners of the sago family and members of the sago management. The processing to get sago starch with simple equipment, such as machetes or axes. The sago stem is cleaned and cut into pieces for 1-2 meters and then cut in half. Floured pith stems are crushed with a device called *Nanni*, and the work of destroying the sago pith is called the old way of smelling and the dissolution of new ways. It can be said that sago flour is made from the sago stem core, the stages of the process of making sago flour, in general, include tree felling, cutting, and processing, staining or dissolving, squeezing, filtering, settling, and packaging. Nishimura (2018) [17] stated that the processing of sago was done by destroying the original shape of the pith using an ax (cutting with an ax while sitting and a long ax while standing). Furthermore Darma (2018) [18] the traditional method for extracting sago starch is a time-consuming and energy-consuming process and the most difficult stage is the disintegration of pith which is done using a tool such as a hammer called a pounder followed by washing and filtering starch so that mechanization is needed. Nishimura (2018) [17] states that mechanization has been introduced, such as using rasp for gratings and pumps for washing pith). The use of mechanical processing equipment saves time and energy so that the production of sago flour increases, both in quantity and quality (Darma, 2018) [18], but the use of sago processing production factors which includes the number of processed sago stems, labor force and fuel use as production factors has not efficient (Nursalam, 2018) [19].

According to Konuma (2014) [2] sago trees produce high starch (150-400 kg of dry starch per plant) and the commercial value of sago starch is affected by the quality and the color of the starch (with higher values for whiter colors). Further, Jong (2018) [4] explained that sago processing is mostly carried out in small factories with capacities ranging from 50 to 200 mt/month. Sago commodities are sold in local markets in bulk, the price of which grows following the increase in prices of other commodities, such as sago prices in 1999 at an average price of IDR470.32/kg. The price of bulk sago in 2006-2007 was IDR2,000/kg, in 2014 it was IDR 3,500/kg, whilethe current bulk sago price is IDR5,000/kg (Surni et al. 2016) [20]. In meeting the urgent need of sago, sago farmers sell sago in the form of trees which are ready to be processed with prices between IDR25,000 - IDR35,000 per tree (an average of IDR29,000 per tree), while processing it can produce 85.25 kg of wet sago starch with the average price is IDR2,000/kg (IDR 170,500). There is a difference (added value) of IDR 141,500 (Surni et al. 2012) [21]. Hamidi and Elida (2018) [22] stated that processing sago stems into sago flour creates higher added value (IDR826.20/kg with a value-added ratio of 69.09%) and the profit obtained by businessmen of sago flour is around 129.74% and labor increased by 29.60%.

The amount of added value is affected by the production capacity, the number of raw materials used, prices of raw materials used, labor used, labor wages, output prices, and other input costs (Wiyono et al. 2015 [23], Thoriq et al. 2017 [24], Nuzuliyah, 2018) [25]. Taridala et al. 2013 [26], Putri et al. 2018 [27] stated that marketing efficiency is indicated by the part of the price the producer receives (farmer's share) and affected by market size, products sold percentage, number of traders, population, distance, and time period. The added value variable and farmers' share share variable then become independent variables that affect the income as the dependent variable.

The relationship between the dependent and independent variables is based on the results of the research by Surni et al (2015) [28], Surni et al (2019) [29] that at $\alpha = 0.1$ all independent variables namely production capacity, amount of raw material used, price of raw materials used, labor used, labor wages, price of output, and other input costs simultaneously shows a real effect on added value variables as the dependent variable. The production capacity and raw material variables partially affect the added value, while variables of labor, output prices, labor wages, and other inputs are not significant.

In this study, the effect of the independent variable (x) on the dependent variable (Y) was applied to the added value and the price portion received by the farmer's share which shows marketing efficiency, where the two dependent variables become independent variables (variable X1 and variable X2) to the net income (income) of sago processing farmers as the dependent variable (Y).

To review the description above, this research is expected to produce a new breakthrough in developing sago starch products supporting the national priority programs on food security. Reviving the economy of local communities at the rural level in Southeast Sulawesi Province on food fulfillment supports a diversification program for consumption. Based on this, the purpose of this study is to find out how the role of Added Value and the Marketing Efficiency of Starch Sago on Sago Processing Farmers' income in Konawe Regency, Southeast Sulawesi Province"

2 Problem Formulation

This research was conducted in Konawe Regency, Southeast Sulawesi Province with the basic method used was a descriptive method with survey techniques. The survey stage was carried out to retrieve data by questionnaire filled by the respondents. The determination of research area was carried out by purposive (intentional), while the sampling methods used the census method. The consideration of determining the location because Konawe

Regency is geographically viewed directly adjacent to Kendari City, passed by the Trans Sulawesi axis state road through the city of Unaaha, the capital of Konawe Regency, to the Province of South Sulawesi. Judging from the development of sago commodities, the percentage of production based on regencies in Southeast Sulawesi, Konawe Regency sago production amounted to 29.23%, the second to East Kolaka Regency.

The population in this study is the sago starch processing business group in Konawe Regency, Southeast Sulawesi Province. Sago processing farmers or sago processing groups became the source of data information that can provide information on other sago processing farmers. So that farmers' sampling was determined in Snowball, where samples of sago processing farmers through the first "source" of sago processing farmers reveal the second sago processing farmers and so on, census determination of 26 people. Data analysis used multiple regression analysis with the following model:

$$I = b0 + b1\ VA + b2\ FS + Ei, \quad (1)$$

Where:

I = Income (net income) (IDR)
VA = Added Value (IDR)
FS = Farmer's share, the percentage of the price received by producers is greater (> 50%), indicating that commodity marketing is running efficiently (%)
bo = constant,
b1, b2 = regression coefficient which is a number that shows the amount of change in the dependent variable for each change in one unit on the independent variable.
Ei = Error term, there is no correlation between confounding errors and any independent variables included in the regression equation.

3 Problem Solution

3.1. Effect of Added Value and Marketing Efficiency on Income

Added value is a production process by increasing the treatment of agricultural products into products that are relatively competitive so that prices increase. Increasing the income of sago processing farmers can be done by providing understanding to farmers so that at the time of harvest, the commodities produced are not directly sold, but first the crops are processed and then sold and the waste from sago processing can be used as a local resource potentially used as an energy source on supplementary feed for beef cattle (Tiro et al. 2018) [30]. Furthermore, Chong et al (2018) [31] optimally stated that sago value chain through the conversion of sago waste into value-added products or sago waste can be processed into value-added organic fertilizer (Elton et al, 2014) [32].

Marketing efficiency (farmer's share) is the part of the price received by producers so that it can increase the farmers' income. The greater the price portion received by the producers shows that the marketing of agricultural commodities is increasingly efficient. The portion of the price the producer receives (farmer's share) was determined primarily by the price or part of the price in perfect competition. In a perfectly competitive market, farmers have the potential to increase farmers' income. The income of sago processing farmers, the added value of sago processing and the efficiency of sago marketing can be seen in Table 1.

Table 1. Income, value-added and farmer sago shares

No	Income	Value Added	Farmer's Share
1.	1.300.000	1.126.50	76,88
2.	1.350.000	950.29	81,58
3.	1.400.000	910.53	81,82
4.	1.450.000	1.068.69	78,85
5.	1.500.000	1.048.30	81,11
6.	1.475.000	849.00	81,58
7.	1.480.000	1.010.79	73,75
8.	1.490.000	1.044.80	81,84
9.	1.500.000	1.082.50	82,05
10.	1.650.000	1.230.00	84,62
11.	1.600.000	1.220,50	85,06
12.	1.550.000	1.142.00	75,00
13.	1.475.000	1.124.00	81,50
14.	1.350.000	1.105.75	79,63
15.	1.325.000	1.107.50	77,27
16.	1.310.000	1.145.00	74,68
17.	1.360.000	1.011.53	78,31
18.	1.400.000	1.103.79	76,83
19.	1.450.000	1.080.30	78,05
20.	1.500.000	1.108.80	81,48
21.	1.530.000	1.047.81	83,33
22.	1.575.000	1.152.29	82,14
23.	1.645.000	1.222.00	85,32
24.	1.375.000	1.101.00	80,00
25.	1.360.000	1.138.50	71,74
26.	1.350.000	975.00	73,68
Average	1.452.000	1.080,85	79,54

Metaragakusuma et al (2016) [11] stated that most sago-based food industries occur naturally without an integrated comprehensive plan so that their income is relatively small. The income of sago processing farmers in Konawe Regency is relatively the same or lower than the income of food commodities and other commodities. Sago processing farmers' income in Konawe Regency amounted to an average of IDR1,452,000/month (lowest IDR1,300,000/month and the highest IDR1,650,000/month)

lower than the average monthly income of semi-mechanical sago processors in East Kolaka Regency amounting to IDR6,881,524/month (Nursalam, 2018) [19]. When it is compared to the average income of Indonesian farmers in 2013 and 2017 amounting to IDR1,030,000/month and IDR1,000,000/month, respectively (Lumaksono, 2014) [33], (Abdullah, 2017) [34] the average income of sago processing farmers in Konawe District is still higher. When it is compared to the average income of Indonesian farmers in 2016 of IDR1,600,000/month (Karimabdullah, 2016) [35], the income of sago processing farmers is still low but higher than the average net income of members of the 2016 Bajo Indah Business Group of IDR1,241,000/month (La Ola et al, 2016) [36].

The results of the regression analysis of the effect of added value and marketing efficiency on the income of sago processing farmers in Konawe Regency can be seen in Table 2.

Table 2. Results of regression analysis of variable value added and efficiency of sago marketing on the income of sago processing farmers

No.	Independent Variables	Regression Coefficient	t	Sig	
1.	Constant	-	-	0,527	ns
2.	Value Added	223684,203	0,64	0,046	s
3.	*Farmer's Share*	347,060	2	0,001	s
		16348,777	2,10		
			5		
			4,01		
			4		
Adjusted R^2				0,459	
R (Correlation Coefficient)				0,709	
F				11,611	
Sig				0,000	

Information:

s = Significant at the 95% confidence level (α = 0.05)

ns = Not significant

In Table 2, it is known that the value of the added value variable and the farmer's share variable affects the income of sago processing farmers in Konawe Regency. The results of the regression analysis show that it simultaneously has a real relationship indicated by the value of F statistics at the level of α = 0.05 (F=11.611 with a significant level of 0,000). This means that the two added value variable and farmer share variable simultaneously show a significant effect on the income of sago processing farmers.

In Table 2, it is known that the value of added value and Farmer Share variables affect the income of sago processing farmers in Konawe District. The results of the analysis show that the adjusted R2 value is 0.459 which indicates that 45.90% of the dependent variable variation, namely income can be explained by added value and Farmer's Share as independent variables. Meanwhile, the remaining 54.10% is explained by other variables outside the model. The value of the correlation coefficient (R) of 0.709 is positively close to one, meaning that the dependent variable Income is closely related to the independent variables of value added and Farmer's Share.

Based on the results of the analysis, it was obtained a significant t-test value of 0,000 (<0.05), which means that the independent variables of added value and farmer's share individually have a significant effect on the dependent variable, namely income. The two independent variables partially have a significant effect on the income of sago processing farmers in Konawe District at a 95% confidence level.

Data from the research results in Table 2 are written in the form of a regression equation as follows:

I = -223684.203 + 347,060 VA + 16348,777 FS (2)

3.2. Value-added

The regression coefficient of added value is 347,060 with a significance of 0.046 (<α = 0.05). So that when the added value increases, it will increase the income of sago processing farmers. The estimated parameter of added value of 347,060 implies that if the added value of sago starch increases by one rupiah, the income of the sago processing farmer increases by IDR 347.06. This is if every addition of IDR1,000.00 the added value of sago starch would increase the income of the sago processing farmer by IDR347,060 at the processing farmer level and would be even higher at the processing plant level. This is in accordance with the results of the study conducted by Taridala et al (2013) [26], Jong (2018) [4] that the highest added value of sago processing was found in processing plants such as vermicelli for IDR3,843.61/kg of sago starch. This figure shows that the importance of efforts to create added value of the agricultural products for food commodities. Increasing the added value of sago products can increase farmers' income. This is in accordance with the results of research by Hamidi and Elida (2018) [22] who stated that processing sago stems can increase added value and increase the profits of sago processing farmers. In addition, the increase in added value of sago can encourage an increase in the income of sago processing farmers through price changes, also encouraging the development of the overall domestic economy. Ibrahim and Liu (2018) [37] also stated that added value can be beneficial to income. Further Suyastri et al (2018) [7] stated that increased sago processed products by making them superior products that can compete in national and global markets.

Based on the analysis, it is known that the increase in added value can increases the income of sago processing farmers, so the government needs an active role to accelerate the increase of sago added value through the

modernization of the sago industry. (Girsang, 2018) [5] stated that the modern sago industry is 25 times higher in investment and operating costs but 15 times higher in production, up to 4 times higher in employment, and 5 times higher in profit compared to semi-modern industrial technology. Although the modern sago industry also has disadvantages such as the difficulty of surviving due to high raw material prices, uncertain market demand, fragile institutional development, and uncertainty over the sustainability of sago forests on these islands because logging of sago trees occurs about 15 times faster than conventional technology. Girsang (2018) [5] states that the sustainable sago industry for food security requires adaptive technology to increase added value and reduce operational costs and is small but intensive and efficient so it is necessary to provide mechanical equipment that is suitable and easy to use by ordinary farmers (Darma, 2018) [18].

3.3. Marketing efficiency (farmer's share)

The farmer's regression coefficient share is 16348,777 with a significance of 0.001 ($<\alpha = 0.05$). So when the percentage of farmer 's share increases, it will increase the income of the sago processing farmers. The value of the farmer variable shares the results of a regression analysis of 16348,777 which means that if the farmer's share increases by one percent, the income of the sago processing farmer increases by IDR16,348.78. A relatively large value, because farmer's share shows the marketing of a product to be efficient when it approaches 100%. This is greatly influenced by farmer's supporting facilities so that the marketing margin for sago starch is relatively small. The result of the research on the marketing margin of sago starch is at an average of IDR828.46/kg. This value makes the marketing of sago starch products more efficient and the income of sago starch processing farmers in Konawe Regency increased. According to Limi (2014) [38], Metaragakusuma et al (2016) [11] demand for sago in the future will increase, because sago is the main food consumed by most people so that the larger portion of the proceeds received by sago processing farmers will increase the income of processing farmers, but currently marketing of sago flour is mainly limited to meeting domestic demand in Indonesia (Jong, 2018) [4].

Padangaran et al (2019) [39] stated that increasing the price of sago flour to increase the income of farmers and processors can be done further by improving the quality of sago flour, attractive packaging, and introducing market standards as a basis for sorting and assessing. Based on the results of the analysis, it is known that the constant results of the regression analysis are -223684,203, which means that processing sago is the main source of income for sago processing farmers so that if they do not process and sell sago for a month their income will decrease by IDR22,684.20.

4 Conclusion

The average income of sago processing farmers in Konawe Regency, Southeast Sulawesi Province is IDR1,452,000/month higher than the average income of Indonesian farmers in 2017 of IDR1,000,000/month but lower than the average income of Indonesian farmers in 2016 of IDR1.600,000/month. Sago processing income is caused by the results of treatment or form changes through the process of adding value and marketing efficiency of sago starch products. Based on the results of multiple regression analysis, the role of added value is 347.06 and marketing efficiency is 16,348.78 and has a significant effect.

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