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Supply Chain in Sago Agribusiness

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Abstract: Sago starch is one of staple foods that provides important source of carbohydrate for the communities in Southeast Sulawesi, in addition to becoming an important raw material for sago based agro industry. The objectives of this paper are two-folds, namely to evaluate the sago supply chain and to examine value added at each point in the primary supply chain. This study employed a qualitative-descriptive analysis. An added value obtained at each point of supply chain was calculated using the Hayami Method. Results showed that the participants in the supply chain of sago agribusiness in South Konawe district consist of sago farmer-processors (PS), village collector (PPD), sub-district collector (PPK), large trader (PB) or inter-insular trade (PAP), *sohun* (silver noodle) factory and consumers. Of all participants in the primary supply chains of sago agribusiness, the highest value added is found at *sohun* factory amounting to Rp 3843.61 per kg of sago starch. It can be suggested that future business actors or participants in sago agribusines should actively seek for more information relating to both processings and product qualities in order to meet with their consumer satisfactions. In addition, the local goverment should also assist to support the increasingly developed sago based agroindustries in the rural area to improve the community's current poor standard of living.

Key words: Agribusiness · Supply chain · Sago · *Sohun (silver noodle)*

INTRODUCTION

Agribusiness as a product is a system that consists of sub-systems, to which the sub-system should actively work together in harmony and integratedly for the purpose of a maximally developed products. In sago agribusiness, the whole activities in the overall production processes performed by all participant within the supply chain units may cover various activities beginning from the supply of tools of production, sago cultivation, on going and post harvesting treatments, processing, distribution, as well as product marketing, up to institutional supports expected coming from the financial institutions, universities and colleges, agricultural instructors, local goverment and research institutions. Agroindustry, however, is an integral part of the agribusiness's system that may have activities including the supply and distribution of those agricultural inputs till activities taken by industries that will use agricultural products as their primary raw materials. Since the agroindustry uses agricultural products for their major raw material in their production process, then it hard to be developing significantly if the supply of those raw materials may not be served on a regular basis as well as the quantity and quality of products that may not be in line with the consumer's demand and standards set forth.

The above mentioned, however, is in consistent with Soekartawi's point of views who argued that the Indonesia's agroindustry is currently facing with a serious problem in terms of low production factors and supplies, production process and product processing and marketing [1]. The development of agroindustry in the

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rural area has so far been stagnant due to several causing factors among others: the lack of supply of raw materials, lack of market and low performance in the production process, insignificant relationships and the lack of interrelated relationships among the upstreams and downstream's actors.

In the current year, the above problem is also facing with sago (*Metroxilon sp.*) based industries. Sago starch is a major commodity produced by the sago farmer across the villages, whereas their consumer covers not only rural communities but also people scattered through out the urban areas. As it is well known that the consumers living in the urban area are considered to be the temporary user and the end consumers are those wishing to have good quality of a product consistently.Thus, it requires a strategy that is strongly able to anticipate with the problems concerning the complexities and uncertainties that might be occured in the supply chain units of business called for a sound management.

Supply chain unit is also defined as a network of a firm or any other industry and entities that should actively and intimately work together in the production process and marketing of products for the end consumers. In general, there has been three flows in the supply chains that are manageable: the flow of goods arising from the up-streams to the down-stream's participants, the flow of money and the flow of information [2]. In other side, supply chain management is about a process that pursues an added values in goods and services by focusing on the eficiency and efectivity of the stocks, flow of money and the flow of information [3].

There are two primary functions of supply chain management: a function that represents to physical costs including costs for buying materials, storage costs and transportations [4]. Another one is a function that acts as a media of market that may cover costs to be imposed on the market inteligences, product designs and other costs that cause in more less-consumer 's aspirations for having products. In term of sago, the most essential product that can be produced from the sago palm steams is that about sago starch and with its abundantly amount has so far been used for many kind of purposes [5]. In a remote town of Salem in Tamil Nadu, India, sago industry has become the major economy producer for the rural community [6]. In Southeast Sulawesi Province, the need for sago has become more important to people, for reason that it has multiple functions both as a source of their major staple foods (instead of rice) and as raw material to be used for sago agroindustry.

Sago starch as staple foods being a source of carbohydrate has also attracted more interest to people in Southeast Sulawesi. One of the indicator used is that the increasingly numbered restaurants available for serving this kind of foods, whereas in 2012 it has reached to 20 restaurants. As a matter of fact, the consumer has so far more realized that eating sago (as their primary staple food) is meaning to as a healthy way of consume. When consuming *"sinonggi"* (local name for sago-*sinonggi* is the indegenous Tolakineze's people terminology on sago's product) then it must be served traditionally with supplemental foods like meat, fish or with green vegetables producing vitamin and minerals and also with any other delicious supplemental foods as well. In addition, sago starch is being extracted from the palm steams that it stands for the organic plant (without any treatment with fertilizers and pesticides). The positive image of the organic foods is an essential component that affects on the consumer's preferences to choose a product [7]. However, in relation to the use of pesticide, it has been argued that there must be a serious risk for human's health to those who prefer to consume that kind of products [8].

A production in sago starch should be done on regular basis for rural community as an effors of meeting with their basic need of foods and it is also used for raw material by any agroindustry whose products need to be based on sago starch around the urban areas in general. The production activity that is being part of the supply chain units in sago agribusiness must be prepared in the efficiently and effectively manners in order that the primary supplier (sago farmer) may have significant earnings from running their activities. It is indeed, sago based cultivation should have both sustainable economy and environmental outputs for dealing with their lack of agricultural inputs sourcing from the other unidentified farming sources. The use of any fertilizer with a higher cost may not be sustainably economical as reported in the Sasakawa-Global Program 2000 [9]. This program was applied by both Ethiopia and Mozambique's goverments, which has had already a *High-Eksternal-Input-Technologies* (HEIT).

Any agroindustry as a user for sago starch is then being expected to expand their added values they have made before, which is at the end, having an affect on local community 's income. A developed agroindustry would also have an affect on reduced unemployment leading for the upcoming above highly job opportunities. Since all activities being performed within the supply chain

units of business, from the upsteam to the downstream, thus it is necessary to be working cooperatively in order that any product demanded by consumer should be available on time as requested and is in line with what quality and quantity they prefer. All partcipants or business actors involved in sago agribusiness can be assessed on their own business performance by calculating the added values made by each supply chain unit. Therefore, the objective of the paper is to examine on the supply chain's mechanism and calculate the added values made by each primary supply chain in sago agribusiness.

MATERIALS AND METHODS

Times and Description of the Study Area: The study was carried out in November-December 2012, located in Konda Sub-District (with three villages of samples) as well as Ranomeeto Barat Sub-District (with six villages of samples), South Konawe District, Southeast Sulawesi Province. Whereas both Sub-districts of Konda and Ranomeeto Barat are the primary producers for sago starch in South Konawe.

Data Collection and Data Analysis: The data used in the study was that a primary data collected through direct observation on the mechanism of supply chain and the supply of goods, the in-dept interview with the local sago farmers, with the marketing institutions involved and with the end consumers. The selection of those interviewed respondents has already been performed by using a census method, is that the collection of the total population of the farmers who owned the sago-grating machines existed in the whole sampling villages, thus it accumulates the total respondents became 27 persons (the owner acted as "group leader") for Ranomeeto Barat Sub-District. As for Konda Sub-District, there 15 persons acting as "group leaders" were being selected as well. The selection of the sampling traders has been done on *purposive* basis by using *snowball sampling method*. In order to achieve the study's goals regarding the mechanism of supply chain in sago agribusiness, then it requires to use a descriptive-qualititative methods of analysis. In addditon, to response to the second objective concerning the added values received by each primary supply chain unit then it uses Hayami method. A form to be used for examining the added values are shown in Table 1.

Table 1: Calculation of the added values by using Hayami's Method

No.	Variables	Values
	Outputs, Inputs and prices	
1	Output (kg/month)	A
2	Sago starch (kg/month)	B
3	Hired employee (day work/month)	C
4	Converting factors	D = A/B
5	Employee's coeficients	E = C/B
6	Costs of output	F
7	Average wage rates (Rp/day work)	G
	Income and Profit (Rp/kg)	
8	Sago's prices	H
9	Other inputs	I
10	Costs of output	J = D x F
11a	Added values	K = J-I-H
11b	Added value rasios	L% = (K/L) x 100%
12a	Compensation given for employee	M = E x G
12b	Shares given for employee	N% = (O/K) x 100 %
13a	Profits	O = K - M
13b	Profit'svalues	P% = (O/K) x 100 %
	Compensations given for each production's factor	
14	Margins	Q% = (J-H) x 100 %
A	Compensation given for employee	R% = (M-Q) x 100 %
B	Other inputs	S% = (I-Q) x 100 %
C	Profit's values	T% = (O-Q) x 100 %

Source: Hayami (1987)

RESULTS AND DISCUSSION

There were two findings arising from the study, are that the primary supply chains and their participants in sago agribusiness in South Konawe. In here, each supply chain covers three flows to be taken into consideration : First, the flow of goods coming from the upstream's particpants to the downstream's participants, secondly, the flow of money coming from the upstream's paticipants to the downstream's participants and thirdly, the flow of information that may be distributed from the upstream's participants up to the downstream's participants or on the contrary. Any supply chain's structure should contain participants involved in sago agrobusiness as well as their roles to play, flow of information, flows of money and products in the supply chain units [10]. The scheme of supply chain can be shown in Figure 1.

Figure 1 shows that there only two flows were found in the supply chain units in South Konawe, one is that the sago starch supplied directly from the sago farmer dan another one is a flow of money. The supply of sago starch from the farmer (PS) then being purchased respectively by the village collectors (PPD), sub-district collectors (PPK) and the large traders (PB) producing the flow of money for the farmers (PS). No significant information for the participants was available as well.

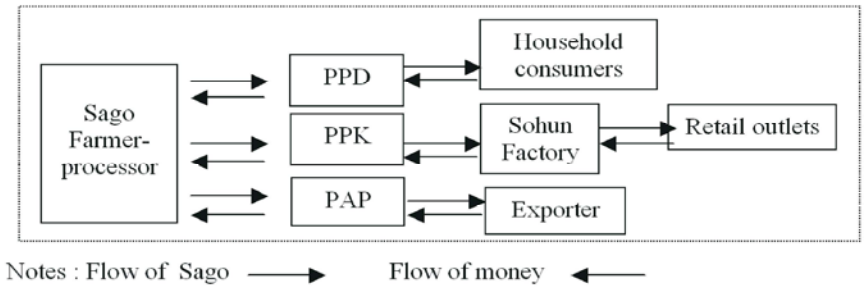

Fig. 1: The Scheme of Flow in the Supply Chain Management for Sago Agribusiness in South Konawe District

Table 2: The Added Values Made by Each Supply Chain Unit in Sago Agribusiness in South Konawe, 2012

No	Buying prices (Rp/kg)	Total cost` (Rp/kg)	Selling prices (Rp/kg)	Added values (Rp/kg)
		PPD		
1	1.350	55,16	1.600	194,84
		PPK		
2	1.504,76	180,33	1.700	14,91
		PAP		
3	1.550	622,96	3.200	1.027,04

The added value reflects a change in values arising from any treatment made by the supply chain that affects on an inputs given in a production process. A rate of the added values in the agricultural products may be earned in each supply chain unit beginning from the farmer acting as supplier for the end consumer. The added values earned in both each supply chain unit and their participants are differential from one to another group depending on an input given on it and the way of treatment they used. Information provided in Table 2 indicates the added values received in each supply chain and its participant in South Konawe. The rate of the added value mostly depends on buying price, marketing costs and selling price offered by each supply chain.

Comparing with two studies conducted in Ranomeeto Barat Sub-District [11, 12], the present scenario of sago farmers and agribusiness in South Konawe has already reached a critical condition. The current study indicated only 32 sago farmers are involved compared to 50 farmers in 2006 which leads to the reducing numbers of sago traders. In relation to sago cultivation, it still remains stagnant in terms of low performance in their farming system shown by the sago palm tree owning-farmers. The local farmers have little ideas as to re-plant or rehabilitate with sago palm on the used farm land for recovery. Consequently, this causes in reduced sago palm trees. Moreover, no appropriate techniques has been used on new sago cultivating system for a maximum production that leads to a serious impact on the increasingly reduced sago starchs and its stocks in the future. Despite the situation, the road and transportation system in the region has been improved, particularly in the Ranomeeto Barat Sub-District [12].

Primary participant reflects all strategic business units that conduct both operational and managerial activities in a production process designed for setting up a certain output for consumer or markets. In other words, the primary participants are those who have directly been involved in the suply chain's activities. The participants considered to be primary actors in the supply chains in South Konawe, are that sago farmers-processor (PS) Village collectors (PPD), Sub-District Collectors (PPK), large traders (PB)/Inter-Island traders(PAP), Noodle Factory and the end consumer.

The development of sago based industries in Southeast Sulawesi has still become limited on the use of sago starch just as for raw materials used for some of local traditional foods. Comparing to another neighboring country Malaysia, sago based industries has become a booming business due to the hi-tech sago production machines for a broader purposes (not only used for daily foods) in order to create more added values[13] and other secondary outputs [14] with more significant products. In Indonesia for example, the country has a various sago contained foods. In Riau, for example, there is a sago contained traditional food *mie sagu,* a noodle based sago giving more added values [15]. Despite it is not a traditional food, but in South Konawe there is also a sago based agroindustry namely the sohun factory which provides the highest added value earned by PAP amounting to Rp 1,207.04/kg, while the lowest added values earned by PPK was 14.91/kg. The amount of the value made by PAP is due to PAP has marketed their products directly to Surabaya with a highly competitive prices of Rp 3.200/kg. In marketing their products, the total costs consist of shipping, loading and unloading, depreciation and salaries amounting to Rp 622,96/kg.

Table 3: Calculation of the added values made in sohun agroindustry in South Konawe 2012

No	Variables	Values added
	Outputs, Inputs and prices	
1	Outputs (kg/month)	9000
2	Sago starch (kg/month)	18 000
3	Hired employee (day work/month)	180
4	Converting factors	0.5
5	Employee's coeficients	0.01
6	Prices of output (Rp/kg)	10 800
7	Avarage wage rates (Rp/day work)	30 000
	Income and Profit	
8	Sago's prices (Rp/kg)	1 500
9	Other inputs (Rp/kg)	56.39
10	Output' s values (Rp/kg)	5 400
11	a. Added values (Rp/kg)	3 843.61
	b. Added value ratios (%)	71.18
12	a. Compensations given for employee (Rp/kg)	300
	b. Shares given for employee (%)	7.81
13	a. Profits (Rp/kg)	3 543.61
	b. Profit values (%)	65.62

Table 2 above also shows that the added value made by PPD in the marketing of sago is Rp 194,84/kg. This number is lower than what PAP has made, but higher than PPK's added values. This is because of the buying price for sago coming from the farmer is lower than the marketing costs. The marketing costs spent by PPD is for local round trip transportation only, where they rented local car to load the sago starch from the farmer's storage and unload it to the PPD's residences which are still in the same village. The selling price by PPD is lower than the two PAP's prices and PPK's prices of Rp1.600/kg with a lower spending costs than the added value.

The added values earned by the three participants namely PPD, PPK and PAP are different to the above noodle factory's added values. The added value made by the factory was that about a change in values arising from a certain treatment in the making process of the products. The processings means that the sago starch has changed into *sohun* (silver noodle). All analytical components have being examined and then set up into one kilogram of sago starch. This has been purposely done to identify the values that may be added in one kilogram from starch. The processing takes an assumption on daily and monthly (30 days) basis. Table 3 presents the added values made by the noodle factory.

Table 3 showed that the value of outputs (*sohun*) produced by the factory being a 9,000 kg/month. This figure has been created as result of the former processed sago starchs of about 18,000 kg/month and by using labor with 180 day works/month. Based on the comparisons of the finished sohun and processed sago starchs, then it indentified a converting factor of 0.5. That physical convertion's 0.5 reflects that each 0.5 kg of sohun had been finished from 1 kg processed sago starch, or in order word that to produce 1 kg finished sohun needs to process on 2 kg sago starchs. This converting factor reflects that in order to produce 1 kg sohun then it should have much more raw material of sago starch. This is for the reason that the processing of sago starch had only used the natural dye and fresh water being the mixture's components of the raw material (sago starch) that after drying treatment it produces the finished sohun with more lower weights than its raw material's weights.

The compensation given to the hired employees was the result of multiflying the employee's coeficients with the average wage rates per day work. The compensation given by the noodle factory to the employees was amounting of Rp300. This rate means that each processed 1 kg of sago starch will provide each farmer with a Rp 300. The total profit earned from operating the factory was amounting of Rp3543.61, representing that each 1 kg sago starch has produced the profit of about Rp3543.61 or there was a rate of profit with 65.62%. These figures showed that the noodle factory has so far been well managed for a highly significant income and profits.

CONCLUSION

It can be concluded that the primary supply chain units in sago agribusiness in South Konawe mainly involved local farmers (PS), village collectors (PPD), sub-district collectors (PPK), large traders (PB)/inter-island traders (PAP), noodle factory of sohun and the consumers.No significant information was obtained in both the upstreams and downstream actors. In terms of supply chain units in sago agribusiness, the most profit earned from the added values come from the *sohun* (noodle) factory amounting to Rp3,843.61 per kg of sago starch. It can be recommended that future studies should be emphasized on the quality of sago starch production with some kind of special assistance from the local government to develop more sago entrepreneurs and agroindustries. This will bring result in the support of a

widely job opportunities in order to increase the standards of living and income for the people of South Konawe.

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