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## **Sago Utilization and Its Relation to Capacity of Sago Producers in Central Maluku Indonesia**

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### **Abstract**

Commercial utilization of sago is still an income source for majority household in Maluku, especially in villages with high potential of sago. In addition to cover economic household needs, utilization of sago also has important role to support food security through local food, but in fact sago producers has not been able to take advantage of sago optimally. The objective of research was to analyze level of sago utilization in relation with capacity level of sago producers. Research was conducted in Central Maluku District as one of sago production centers in Maluku, Indonesia. There were seven villages represented two selected sub-district. Sample as respondents were 172 sago producers represented 300 sago producers as population. Data were analyzed using Spearman correlation. Results showed that capacity of sago producers correlated positively and significantly with sago utilization. That's why capacity of sago producers in Central Maluku is very important to improve.

**Keywords:** capacity; sago producers; sago utilization

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## 1. Introduction

Sago is a multipurpose plant, not only as a source of food carbohydrates [1, 2], glucose syrup [3, 4], but also can be used as industrial materials, renewable energy materials and fodder [2]. In addition to the sago starch, other parts of sago plant can also be used, such as sago leaves with strong structure can be used for roofs, bags, baskets, rope and other products such as worm sago [3]. In more detail, Abd-Aziz [3] describes the utilization of sago starch as presented in Table 1.

**Table 1:** Utilization of sago starch and the residue

Sago palm part	Usage/utilization
Refined sago starch	An ingredient of noodles, vermicelli (bee-hoon), Kuah-Tiau, biscuits, and many other foods.
	Used industrially in products such as monosodium glutamate, glucose, caramel (color milk), fructose, syrups, etc.
Sago fiber	Provides bulk for rumen fermentation
Sago pitch	Used as an animal feedstuff and in the livestock industry
Sago fronds	Used in the pulp and paper industries

Source: [3]

Sago farm in Maluku is a way of life and source of life, namely as a source of main food (traditional carbohydrate source). As a source of food, sago had proven capable to overcome the problem of local food in the Maluku in the past besides corn and tubers [5]. Besides as a food, the other parts of sago are used for many things, such as sago leaves for roofing and basket known as “kamboti” and “tumang”; the midrib of plant called “gaba-gaba” for walls and attic house, the base of the midrib called “sahani” for crushing a pith, skin of trunk called “waa” for flooring and firewood, the whole of trunk skin called “goti” as one of sago processing tools, the logged for sago worm growth, and waste of pith called “ela” used as a medium for mushroom growth called “ela” mushroom [6]. Until now, people still use “tumang”, “sahani” and “goti” for processing sago starch, but another utilization of sago plant such as home building materials, medium for sago worm and mushroom is getting less. Utilization of sago as fuel and industrial materials have not been done in Maluku included Central Maluku.

The ability of sago producers to increase sago utilization need good capacity to process sago, develop sago marketing, identify and solve the problems, and maintain the sustainability of sago resource. In other words, capacity of sago producers is a supporting factor to find and implement new innovations in managing sago business. That’s why it is interesting to analyze the tendency of decreasing sago utilization in relation with capacity of sago producers. There are two research questions in this study, namely: (1) How is sago utilization in Central Maluku? (2) What is the relationship between sago utilization and capacity of sago producers? Based on the research questions, the objectives of the research were to: (1) analyze sago utilization in Central Maluku district, and (2) analyze the relationship between sago utilization and capacity of sago producers.

## **2. Methods**

The research was limited only to the sago producers who processed sago pith to get sago wet starch. Seven villages in Central Maluku District were selected as representation of two sub-districts elected, namely Sub-district of Saparua and Salahutu as areas of sago development in Maluku. The villages selected were Ihamahu, Mahu, Tuhaha, Siri Sori Amalatu, Tulehu, Waai and Liang. Data were collected from June 2013 to September 2013.

The population was 300 sago producers who has at least five years experiences in utilizing sago. The number of sample was determined using the Slovin formula [7] with degree of error 5%, thus, the number of respondents were 172 sago producers. Distribution of respondent in each research village was determined proportionally to make representation of sago producers in each village. Respondents were determined randomly using name list of sago producers from offices of research villages.

Primary data consist of sago utilization by sago producers and capacity of sago producers with four capacity indicators, namely: (1) capacity to processing sago, (2) capacity to develop marketing, (3) capacity to identify and solve problems, and (4) capacity to maintain sago resource. Primary data was collected directly from respondents through interviews with questionnaire guide. Secondary data was obtained from the offices of each selected village, sub-district and district; office of Maluku Province Government; and community leaders such as traditional leaders who know the history of sago in Maluku. Direct observation was done and field diaries were made to complete data.

Before used, validity and reliability of questionnaire were tested to 30 sago producers in Nolloth, a village in Saparua district of Central Maluku that had resemblance with respondents. Using Pearson correlation, validity test result showed that questionnaire had the  $r$  values (0.479 to 0.961) greater than  $r$  table ( $\alpha$  0.05) = 0.361. Cronbach-Alpha method was used to test reliability of questionnaire and showed the interval of reliability coefficient value was 0.664 to 0.751 greater than  $r$  table ( $\alpha$  0.05). It meant that questionnaire were valid and reliable. Data were analyzed using descriptive analysis and Spearman correlation as inferential statistics. The Statistical Product and Service Solutions (SPSS) program version 22 was used to analyze data.

## **3. Result and Discussion**

### ***3.1. Sago utilization in Central Maluku***

People in Maluku use sago especially for food and building materials, but day by day sago utilization is decreasing. Sago demand as staple food in Maluku especially in the urban areas relatively decreased. It is contrary with rice because the longer the time the greater the amount of people in Maluku left sago and other local food behind and consume rice as staple food. Some reasons behind this change are practicality aspect in rice consumption compared with sago and a perception for some people that eating rice more "respectable" than eating sago as a staple food. Some reasons behind this change are practicality aspect in rice consumption compared with sago and a perception for some people that eating rice more "respectable" than eating sago as a staple food.

The average production of wet sago starch is 7,482 kgs per year and only 5 percent (374 kgs per year) was consumed by household, the rest (95% or 7,108 kgs per year) for sale to the market with an average income US\$ 967 per year or US\$ 81 per month and the money is used to meet the household needs include to buy rice. Not only as food, utilization of sago as building material also decrease. Now, only a few people in rural community use parts of sago as building materials. People prefer to use stone and board.

### 3.2. The Relationship Between Sago Utilization and Capacity of Sago Producers

One of the reasons for revitalizing sago in Maluku is sago utilization that getting decline. In fact, sago producers facing many problems in producing sago to meet consumer's taste especially in quality. Consumer's taste always change, that's why sago producers must have good capacity in order to know what products of sago have to produce and how to produce. Result showed that capacity of sago producer correlated positively and significantly with sago utilization, especially to increase product marketing, quality of product and income of sago producers, but do not have relationship with sago consumption in household of sago producers as seen in Table 2.

**Table 2:** The Relationship Between Capacity of Sago Producers and Sago Utilization

Sago utilization	Capacity indicators of sago producers				Total capacity
	Processing sago	Expanding marketing	Identifying and solving problems	Maintaining sago resource	
Consumption	0.137	0.137	0.036	0.166*	0.143
Market	0.176*	0.269**	0.092	0.143	0.211**
Quantity	0.138	0.051	0.094	0.036	0.119
Quality	0.155*	0.197**	0.188*	0.168*	0.239**
Income	0.313**	0.208**	0.170*	0.200**	0.292**

\*\* : Significant at level  $\alpha = 0.01$ ; \* : \*: Significant at level  $\alpha = 0.05$

Only the ability to maintain sago resource as one of four capacity's indicators of sago producers positively and significantly related to sago consumption in their household. It means sago stock as family food is determined by the availability of sago resource that family owned, therefore the ability to maintain sago resource of family need to improve especially in correlation with land fragmentation and conversion. In addition to the availability of sago land, rejuvenation of sago plant also rarely or even never done by sago producers. Sago grows naturally. If families do not have sago land, tendency to buy rice as food family becomes higher. In this case, there are several aspects to be consideration of public to prefer rice, namely the perception that eating rice is better than eating sago and rice has a higher status or prestige than sago. That is a challenge to increase the consumption of sago in the family as an effort to support food diversification based on local food. Food diversification should an alternative attempt to increase the contribution of other food commodities than rice to achieve food self-sufficiency towards the realization of national food security [8, 9]. Accordingly, maintain and repair the staple food consumption patterns based sago is one of the things that need to be considered to

strengthen food security through the utilization of sago [10].

Capacity of sago producers totally and partially through sago processing capability and expanding marketing related positively and significantly with the number of products sold in the market (Table 2). The higher the capacity of sago managers, the higher the quality of the product being produced. This situation is in response to consumer's taste that take quality aspect for consideration in buying sago products, so that products that have better quality would be more desirable. As it goes, the income will also increase. On the other hand, [11] found that small-scale producers have limited knowledge, information, and resources to meet the quality standards and specifications provided by the market. This condition makes producers only focus to work as daily routine, whereas according to [12], producers have to focus products on consumers so that products be more competitive. In connection with sago, the main question is how to improve the competitiveness of sago products with small-scale producers of sago.

Table 2 also showed that the capacity of sago producers is not related to the quantity of products. It is caused business of sago processing has been doing from generation to generation and has been attached to the life of the community, so ability to produce from quantity aspect is not different from the others, but difference of capacity will make difference of product quality. It means that the higher capacity of sago producers, the higher quality of product that being produced as mention above.

Capacity of sago producers with all the indicators related positively and significantly with income of sago processing business (Table 2). It proved that the capacity of sago producers plays an important role to improve their business income, so they are expected to increase their capacity, either through independent efforts or through the involvement of various stakeholders. It is necessary to do because their income from sago processing business only \$US 81 per month that is not enough to meet their family's needs. In addition, potency of sago still enable for increasing sago utilization if supported by capacity sago producers that is steadily improving. Thus, support for the strengthening of local food not only to increase the utilization of the food itself, but also to boost the local economy [13].

Capacity of sago producers be important in the development of sago producers because sago producers are decision makers in their business. A decision maker will always seek to create opportunities that allow to meet motivation on life [14], but as decision makers in sago processing they don't have to work hard for finding decision because they only do habits passed down from generation to generation. According to [14], over time, farmers tend to increase personal ability by increasing capital and other physical resources, enthusiasm, skills and competencies. It is done through improving knowledge related to various external components. About consumer, [15] explained that the food industry led and responsive to the preferences and needs of customers which include food security, health, good quality, price that consumers are willing to pay, environmental factors that are maintained, and business sustainability. Things like this have not been found in sago processing in Central Maluku and Maluku as a whole also. Therefore, efforts to encourage sago producers increasing their capacity are needed. These efforts are supported by potency of sago land and characteristic of sago producers. Central Maluku has sago resource that potential to utilize, but in long range has to maintain. About characteristics, 64% of sago producers are in the productive age group (26-53 years old), 43% have good

experience in processing sago (16-26 years' experience), 70% have high motivation to develop sago business, and more than 60% still appreciate social and cultural functions of sago. Altogether are supporting factors that available to improve capacity of sago producers.

#### **4. Conclusions**

Increasing sago utilization can be done through expanding products marketing, increasing product quality and production scale which associated with capacity of sago producers. It means that increasing capacity of sago producers is a key to develop sago in Maluku, particularly in Central Maluku. Increasing capacity of sago producers has no relationship with sago consumption of their family, only capacity indicator namely the ability to maintain and to manage sago resource positively related with sago consumption. For sago producers, sago processing not only important to get income, but also to provide household food.

#### **5. Recommendations**

Increasing capacity of sago producers have multi impacts not only for sago producers and local community, but also for the local and national government; therefore all related activities need cooperation and coordination between the Government of Maluku Province and Central Maluku District Government also all relevant parties in order to make all activities success. It is also necessary to increase public awareness in order to still appreciate sago as local food so that sago consumption will increase and the dependence on rice will reduce.

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