Decision level of farmers in processing sago in North Luwu

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Abstract. Sago (Metroxylon spp) is a food commodity that contains a lot of carbohydrates, so sago is a staple food ingredient for several regions in Indonesia such as Maluku, Irian Jaya, Riau and Sulawesi. Sago plants have important social, economic and ecological roles for some communities. This study aims to measure the level of decision of sago farmers in terms of external factors in the West Malangke District. The results showed that during the period studied, from March to April 2019, the level of decisions of farmers in West Malangke District was in the high category with an average value of 30.85 and there were three factors that influenced the level of farmer's decisions in managing sago, namely the food need factor, economic factors and ecological factors.

1. Introduction
As the largest sago producing country in the world, Indonesia produced 585,093 tons and a planted area of 1,843,287 hectares in 2014[1]. Based on the national sago statistics, it is stated that about 80% of the national sago is in Papua, 5% in Maluku, 3% in Sulawesi, 4.5% in Kalimantan, 7.2% in Sumatra, and the rest is in Java[2].

Sago (Metroxylon spp) is a food commodity that contains a lot of carbohydrates, so sago is a staple food ingredient for several regions in Indonesia such as Maluku, Irian Jaya, Riau and Sulawesi[3]. Sago can grow in swampy areas or marginal lands (abandoned) where other carbohydrate-producing crops are difficult to grow naturally [4]. Sago has the potential to be developed as an alternative food material for Indonesians besides rice. The use of sago for food security is very potential because sago has a starch calorific value that is not inferior when compared to other carbohydrate producers such as rice, corn, cassava and sweet potato[5].

Sago has an important social, economic and ecological role for some people. Culturally, local people consume sago as a staple food from generation to generation from their ancestors. Consumption of sago as a staple food, including in the form of traditional foods such as papeda, kapurung, dange, bagea, sinole, cendol and grilled sago. The use of sago in the form of leaves and midrib can be used as building materials, stem fiber for the paper industry, starch for the production of various foodstuffs, the chemical and pharmaceutical industries, and dregs for animal feed. The core of the stem (pith) is the part that is most widely used because of its high starch content so that it can be processed into raw materials for various food industries or their derivative products [6].

In 2017, North Luwu Regency produced 2,021,58 tons of sago plants. Districts that produce sago are Sabbang 140.98 tons, Baebunta 45.85 tons, Malangke 214.8 tons, West Malangke 1,198.59 tons, Sukamaju 22.15 tons, Bone-Bone 29.96 tons, Tanalili 64.26 tons, Masamba 196.58 tons.
Mappedeceng 100.90 tons, Rampi 1.60 tons and Rongkong 5.91 tons [7]. The largest potential for sago in North Luwu Regency, namely West Malangke District, with an area of sago plantations in 2017 of 1,061.95 ha and the production obtained is 1,198.59 tons. Several villages are the centers for sago production in West Malangke District, namely Pengkajoang Village, Waelawi Village, Pembuniang Village, Cenning Village and Wara Village[8].

West Malangke District is the largest producer of sago in North Luwu Regency, South Sulawesi. Sago processing in West Malangke District is still very traditional and has not been managed intensively by the government so that in West Malangke District, many sago plantations have been converted. This is in accordance with the opinion of Alfons & Rivaie (2011) which states that the direction of Indonesian food policy is still centered on staple foods such as rice, so that non-rice food products receive less attention and have an impact on sago land which is converted to other agricultural land. Therefore, research needed on farmer’s decisions in choosing to manage sago and its affecting factors in Malangke Barat District, North Luwu Regency [5].

2. Research methods

The research was conducted from March to April 2019 in West Malangke District, North Luwu Regency, South Sulawesi Province. The areas which are the centers of sago production are Pengkajoang Village, Waelawi Village, Pembuniang Village, Cenning Village and Wara Village. Determination of the sample was carried out by random sampling, namely the village community who carried out sago management such as farmers or sago land owners with the number of respondents as much as 20% or 60 farmers out of 300 populations.

The type of data used in this research is primary data and secondary data. The primary data source is an object or original document or raw material of the perpetrator which is called "first-hand information". Data collected from the actual situation when an event occurs is called primary data[9]. Secondary data sources are data collected second-hand or from other sources that were available before the research was carried out. Secondary sources include comments, interpretations, or discussion of the original material [9]. Data collection techniques in this study are observation, questionnaires and interviews. To analyze the level of decision of sago farmers in West Malangke District used descriptive statistical analysis and frequency distribution.

3. Results and discussion

3.1 Decision level of farmers in processing sago

To find out the farmer’s decisions in processing sago in West Malangke Subdistrict, North Luwu Regency, was done by distributing questionnaires to respondents, namely farmers who manage sago in West Malangke District with a sample of 60 people. The technique of collecting data from the questionnaire uses a Likert scale where the alternative answers to the value of 5 are positive to 1. The scoring is done on the answer to questions about external factors in processing sago. The number of respondents in this study was 60 respondents and the questionnaire consisted of 8 questions divided into 3 questions, namely the first part regarding food consumption factors with 2 questions, the second part regarding economic factors with 4 questions and the third part regarding ecological factors with 2 questions.
Table 1. Number of respondents based on sago consumed as staple food in West Malangke District.

| Category   | Total (people) | Percentage (%) |
|------------|----------------|----------------|
| Very high  | 2              | 3              |
| High       | 41             | 68             |
| Medium     | 16             | 27             |
| Low        | 1              | 2              |
| Very low   | 0              | 0              |
| Total      | 60             | 100            |

Based on Table 1, it can be seen that the largest percentage value is in the high category with 68% that the dominant respondent farmers consume sago every day. For the medium category with a percentage of 27% of the respondent farmers consume sago sometimes. In the very high category, only 3% of the respondents consume sago every meal hour, meaning three times a day. Meanwhile, in the low category, only 2% of respondents consumed sago less than once per month. This means that respondents in West Malangke District use sago as a staple food because the people of West Malangke in their daily life and in an event, be it a wedding party and others, consume sago.

Table 2. Number of respondents based on sago consumed as additional food in West Malangke District.

| Category   | Total (people) | Percentage (%) |
|------------|----------------|----------------|
| Very high  | 1              | 2              |
| High       | 56             | 93             |
| Medium     | 3              | 5              |
| Low        | 0              | 0              |
| Very low   | 0              | 0              |
| Total      | 60             | 100            |

Based on Table 2, it can be seen that sago is consumed as an additional food to complement the meal menu. It can be seen that the largest percentage is in the high category of 93%. Furthermore, a large percentage is in the medium category of 5% that the respondents consume sago sometimes. Meanwhile, for the very high category, only 2% of respondents consume sago every meal hour for an additional menu to complement the meal menu.

Table 3. Number of respondents based on sago can sufficient household needs in West Malangke District.

| Category   | Total (people) | Percentage (%) |
|------------|----------------|----------------|
| Very high  | 6              | 10             |
| High       | 45             | 75             |
| Medium     | 0              | 0              |
| Low        | 9              | 15             |
| Very low   | 0              | 0              |
| Total      | 60             | 100            |

Based on Table 3, it can be seen that the largest percentage is in the high category 75% that sago can meet 80-60% of farmer household needs. The next percentage is in the low category, which is 15% of respondents who can only meet 40-20% of the needs of their household. Meanwhile, in the very high category, 10% of farmers are able to meet 100-80% of their household needs. So, it can be concluded that the respondent farmers are able to meet 80-60% of the needs of each family member, be it food, clothing and other costs.
Table 4. Number of respondents based on sago management can absorb labor in West Malangke District.

| Category     | Total (People) | Percentage (%) |
|--------------|----------------|----------------|
| Very high    | 10             | 17             |
| High         | 48             | 80             |
| Medium       | 1              | 2              |
| Low          | 1              | 2              |
| Very low     | 0              | 0              |
| **Total**    | **60**         | **100**        |

Based on table 4, it can be seen that 80% of the high category sago management can absorb large numbers of labor. Furthermore, the percentage of 17% of the very high category is able to absorb a very large number of labor. Whereas in the medium category and the low category there are 2% each, which means that sago management absorbs a low number of labor. From this it can be concluded that the management of sago is able to absorb a large number of labor so that it can reduce unemployment.

Table 5. Number of respondents based on sago’s low production costs in West Malangke District.

| Category   | Total (People) | Percentage (%) |
|------------|----------------|----------------|
| Very high  | 2              | 3              |
| High       | 53             | 88             |
| Medium     | 0              | 0              |
| Low        | 5              | 8              |
| Very low   | 0              | 0              |
| **Total**  | **60**         | **100**        |

Based on table 5, it can be seen that 88% of the high category, respondents carried out production activities at low costs. From 8% of respondents use high production costs. Meanwhile, for the very low production costs, only 3% of respondents. So, it can be concluded that the costs for sago production in West Malangke District use low costs, this is because the respondent farmers do not do planting and maintenance, thereby reducing production costs.

Table 6. Number of respondents based on marketable sago in West Malangke District.

| Category   | Total (People) | Percentage (%) |
|------------|----------------|----------------|
| Very high  | 9              | 15             |
| High       | 48             | 80             |
| Medium     | 1              | 2              |
| Low        | 2              | 3              |
| Very low   | 0              | 0              |
| **Total**  | **60**         | **100**        |

Based on Table 6, it can be seen that 80% of the respondent farmers are able to market their sago harvest which the market can accommodate. At a percentage of 15% sago can always be accommodated by the market. Meanwhile, in the medium category, there were 3% of respondents who marketed their sago very difficult for the market to accommodate. At 2% the sago is not always accommodated by the market. So, from this it can be concluded that the respondent farmers are able to market their crops easily. The harvest is usually sold to the surrounding community and to collectors, then collectors who will sell sago to Makassar City who have collaborated with companies in Makassar City.
Table 7. Number of respondents based on sago can prevent flooding in West Malangke District.

| Category     | Total (People) | Percentage (%) |
|--------------|----------------|----------------|
| Very high    | 1              | 2              |
| High         | 40             | 67             |
| Medium       | 18             | 30             |
| Low          | 1              | 2              |
| Very low     | 0              | 0              |
| **Total**    | **60**         | **100**        |

Based on table 7, it can be seen that the largest percentage is in the high category of 67% that the sago vegetation is good at preventing flooding. Furthermore, it is 30% in the medium category, that the sago vegetation is rather good in preventing flooding. There are 2% of respondents who say that sago is very good at preventing flooding. Whereas in the low category, 2% of respondents said that the sago vegetation was not good enough to prevent flooding.

Table 8. Number of Respondents based on Good Sago for Soil Fertility in West Malangke District.

| Category     | Total (People) | Percentage (%) |
|--------------|----------------|----------------|
| Very high    | 3              | 5              |
| High         | 37             | 62             |
| Medium       | 15             | 25             |
| Low          | 4              | 7              |
| Very low     | 1              | 2              |
| **Total**    | **60**         | **100**        |

Based on table 8, it can be seen that the largest percentage is 62% in the high category, that sago is good for soil fertility. A percentage of 25% of respondent farmers said that sago was not good for soil fertility. In the low category, only 7% of respondent farmers said that sago was not suitable for soil fertility. Meanwhile, in the very high category, 5% of farmers said that sago was very good for soil fertility. Furthermore, 2% of the 60 respondents said that sago was not very suitable for soil fertility.

To analyze the respondent's responses to these factors, the data will be analyzed based on the list of questions that have been asked in the questionnaire. The process of analyzing the answers starts with the frequency distribution analysis using SPSS to determine the level of farmer's preference in managing sago. Further analysis using spearman rank to determine the relationship between the socio-economic characteristics of the respondents with their answers regarding preferences for managing sago in West Malangke District.

Descriptive statistical analysis and frequency tabulation are used to obtain the level of community preference in utilizing and managing sago can be seen in table 9.
Table 9. Distribution of respondent's answers into SPSS.

|        | P1  | P2  | P3  | P4  | P5  | P6  | P7  | P8  |
|--------|-----|-----|-----|-----|-----|-----|-----|-----|
| N      | 60  | 60  | 60  | 60  | 60  | 60  | 60  | 60  |
| Missing| 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   |
| Mean   | 3.733 | 3.9667 | 3.8000 | 4.1167 | 3.8667 | 4.0667 | 3.6833 | 3.6167 |
| Median | 4.0000 | 4.0000 | 4.0000 | 4.0000 | 4.0000 | 4.0000 | 4.0000 | 4.0000 |
| Mode   | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 |
| Std. Deviation | .54824 | .25820 | .81926 | .49030 | .59565 | .54824 | .53652 | .76117 |
| Minimum | 2.00 | 3.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 1.00 |
| Maximum | 5.00 | 5.00 | 5.00 | 5.00 | 5.00 | 5.00 | 5.00 | 5.00 |
| Sum    | 224.00 | 238.00 | 228.00 | 247.00 | 232.00 | 244.00 | 221.00 | 217.00 |

Table 10. Preference Levels of farmers in managing sago in West Malangke District.

|         | Minimum | Maximum | Mean   | Std.Deviation |
|---------|---------|---------|--------|---------------|
| Valid N | 60      | 60      | 60     | 60            |
| Preference Levels | 25.00 | 40.00 | 30.85 | 2.44135 |

Based on table 10, it can be seen that the decisions obtained from the answers of 60 respondents can be seen that the level of decisions in processing sago in West Malangke District is in the high category with an average value of 30.85. There are three factors that influence the level of preference for farmers in managing sago in West Malangke District, namely food needs, economic factors and ecological factors. Based on the three factors that have been analyzed, it can be seen that the most influential factor in managing sago is economic factors, followed by food needs and ecological factors.

In terms of each sub-criterion, it is known that the low cost of managing sago, especially in the farming sector, has the largest percentage, namely 92.06%, which is a pull factor in sago management, followed by support for the farmer household economy with a total percentage of 78.94%.

3.2 External factors

3.2.1 Economic factors. Sago farmers in West Malangke Subdistrict are still interested in managing sago because the processing costs for sago are low and sago farming can meet the needs of farmer households. Farmers consider that sago has high economic value, does not require large business capital, can be used as a main or secondary source of income and has high market certainty.

In accordance with the growing nature of sago, which can grow naturally in waterlogged places, most of the sago cultivated by farmers in West Malangke District was grown naturally. Then the farmer takes care and regulates the number of clumps of tillers so that they can grow optimally. Sago processing starts from the farming sub-sector to the processing and marketing sector. The routine activity carried out by sago farmers is the maintenance of sago plants by cleaning dead leaves. The equipment used is also minimal, such as machetes. Even according to Sipahutar & Supriadi (2009), sago plants can produce without maintenance. So that under these circumstances, sago farming is still considered attractive to farmers[10].

Sago stems that are traded are those aged 8-10 years or more. In one sago clump, four to eight sago stalks can be obtained per year, however in general farmers only get one or two stalks from each clump every year. The height of the sago stems is 20 meters which produces 25-30 pieces with a size of 60 cm. The price of sago stems at the farmer level is determined from the size of the sago trunks, one sago tree costs IDR 100,000- IDR 150,000.

From the industrial aspect, sago farming can meet the needs of the wet sago processing industry and can accommodate a number of labors. The price of wet sago, which is sold by farmers in West Malangke District, is IDR 120,000 per 50 kg bag.
3.2.2 Food need factor. Public interest in cultivating sago is due to the reason that food needs are in second place after economic factors. This is because sago is the staple food consumed every day by people in West Malangke District. Consumption of sago by the people of West Malangke is processed into traditional foods such as *lanye’, *kapurung, *dange and *sinole’. Currently, sago consumption is starting to increase again, marked by the habit of the people of West Malangke who often consume sago even though there is rice as the staple food. Processed sago, such as *kapurung, is a food that cannot be separated from the people's menu in various events and menus when breaking the fast.

3.2.3 Ecological factors. Ecological factors of sago farmers’ interest in managing sago are low. This is because the sago in West Malangke District can no longer prevent flooding and river abrasion. As happened recently, the river overflows which has caused some areas in the West Malangke District to be flooded, as happened in Waelawi Village. This contradicts the results of research by Ruhukail (2012) which states that sago land is a flood buffer area[11]. The ability of sago trees to control flooding can be seen from the nature of the sago trees that reproduce and produce fast, clumps of growth.

4. Conclusion
The level of farmer preference in West Malangke District is in the high category with an average value of 30.85. There are three factors that influence the level of preference of farmers in managing sago in West Malangke District, namely food needs, economic factors and ecological factors..

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