

The Potency of Sugar Palm (*Arenga pinnata*) in Pastap Julu Village around Batang Gadis National Park Area

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Abstract: Sugar palm (*Arenga pinnata*) is one of non-timber forest product that has long been known as a plant that has many benefits. Almost all physical parts of these plants can be utilized and have economic value, such as juice sap, palm fruit, leaves, palm fiber, and stems. Palm sugar plants are spread in almost regions in Indonesia, especially in humid areas both grow individually or in groups. This study aims to identify the potential of palm trees (*Arenga pinnata*) in Pastap Julu village around Batang Gadis National Park area. The method used in this research is the census method. This method was done by recording the entire of sugar palm in the research area with an area of 60 hectares. The result of this study indicates that the potency of sugar palm (*Arenga pinnata*) plants in the region is amount to 256 sugar palms with a density of 4.267 individuals /hectare, and the average height of 12 meters and average diameter of 53.08 cm.

1 INTRODUCTION

Forests have a variety of functions, roles, and benefits that are important for human life. Forest also produces various types of forest products that can be used in various needs. Forest products can be timber or non-timber forest products.

Palm sugar is a type of plant which has the opportunity to be cultivated and harvested to add economic benefit. Palm sugar is also a versatile plant that has long been known to produce many benefits. Almost all physical parts and production of these plants can be utilized and have economic value. The benefits of sugar palm can be enjoyed directly by the community around the forest through traditional way (Ferita et al., 2015).

Sugar palm (*Arenga pinnata*) is one species that belongs to the Arecaceae family. Sugar palm is an annual type of plant. It can grow to a diameter of 65 cm and a height of 15 m even reaching 20 m with a leaf canopy towering above the stem. The shape of the plant is not spiny and does not branch. This plant is almost similar to coconut, but coconut plants are clean trunk with old leaf midribs that are easily separated. The sugar palm tree has lush canopies. Young sugar palm leaves always stand upright on the tip of the stem, young leaves that are still rolled

soft like paper. The leaf midrib widens at the base and narrows towards the top.

Sugar palm plants are spread in almost all regions in Indonesia, especially in the area of humid hills both grow individually or in groups. Sugar palm plants often grow from an altitude of 50-1300 m above sea level. However, these plants prefer the altitude of 500-1200 m. Sugar palm also spread in the various country of the country which includes, India, Bangladesh, Burma, Thailand, Laos, Malaysia, Vietnam, Hawaii, Philippines, Guam, and various islands around the Pacific (Lasut, 2012).

Batang Gadis National Park (TNBG) is one of the conservation areas in Mandailing Natal District with high biodiversity. Batang Gadis National Park consists of protected forest areas, limited production forests, and permanent production forests. Batang Gadis National Park belongs to the type of tropical forest located at an altitude of 300 - 2145 meters above sea level with the highest point on Sorik Marapi Peak.

Almost all of the existing sugar palms come from uncultivated plantor accidentally planted by people which results in the uneven spread. Sugar palm can grow in any type of lands, resistant to disease, grow naturally in critical soils, are fire resistant and prevent erosion with tight roots. According to

Marito (2008), palm sugar plants do not need special soil conditions, so they can grow in clay, calcareous, and sandy soils. However, these plants cannot stand on soils with too high an acidic content. The best environmental temperature averages 25°C with an annual rainfall of 1.200 mm

Along with the increasing needs of the community, the use of sugar palm has become one of the people's focuses on developing non-timber forest products. However, the development of sugar palm still has many obstacles and several problems, such as traditional method, post-harvest handling of palm sugar plants that are still not well controlled, processing into other derivative product is still low, the quality of the product, and the marketing process is still obstructed. The potential of sugar palm in the TNBG area will be optimal if accompanied by the knowledge of the local community in utilizing sugar palm plants. Awareness in good practices cultivation, harvesting and processing of after harvest is a key to maintain the sustainability of sugar palm utilization

2 MATERIALS AND METHOD

This research was carried out in the protected forest area around the Batang Gadis National Park in Pastap Julu Village, Tambangan sub-district, Mandailing Natal district, North Sumatra Province.

The method used to take the data collection is by observation technique, which is a direct survey to the field with community assistance.

The data that collected in the field is a primary data such as the amount of sugar palm plants (*Arenga pinnata*) and the benefits of these plants. It also includes the socio-economic data covered identity of the respondent, which is a name, age, type of sex; livelihood; and education. Secondary data consist of on the general state of the research area and the data obtained from reliable sources such as relevant agencies and an institution as well as supporting research.

The local knowledge survey was also conducted to determine the potential of sugar palm (*Arenga pinnata*) in the protected forest area of Pastap Julu Village. The key informants chosen in this study were local field guides.

2.1 Techniques and Data Collection Stages

The retrieval of data is carried out directly in the field as follows:

- a. Observing and analyzing sugar palm (*Arenga pinnata*) to obtain information on potency.
- b. Analysis of vegetation plants (*Arenga pinnata*) in the study area.
- c. The interview and discussion using a questionnaire to those who are representative and also stakeholders in looking at the potential and utilization of *Arenga pinnata*.

2.2 Data Analysis

Retrieval of *Arenga pinnata* inventory data is carried out by using the census method. The method of data collection is done by recording all population elements and investigating one by one. The data obtained is in the form of census processing and is called true value, or often also called a parameter.

The retrieval of data of sugar palm samples is done by making a plot measuring 10 m x 10 m, which aims to facilitate data collection for each sugar palm that found in the protected forest area. The area used as a research area, namely a protected forest area with an area of 60 hectares.

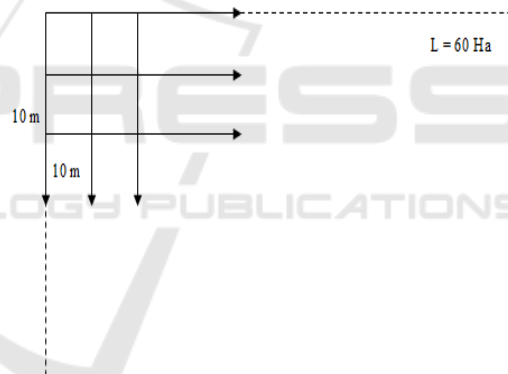


Figure 1: Sample plot of *Arenga pinnata* data collection.

The data obtained were analyzed by using the formula:

The density of a type (K)

$$K = \sum \text{individual type} / \text{sample plot area} \quad (1)$$

3 RESULT AND DISCUSSION

Sugar palm plants found in the vicinity of Batang Gadis National Park SPTN II Resort 3 in Pastap Julu Village, Tambangan Subdistrict, Mandailing Natal District is a naturally occurring plant. The sugar palm spreads in the protected forests in the back and forth items of Pastap Julu village, which borders directly with Batang Gadis National Park, as shown in Fig. 2.

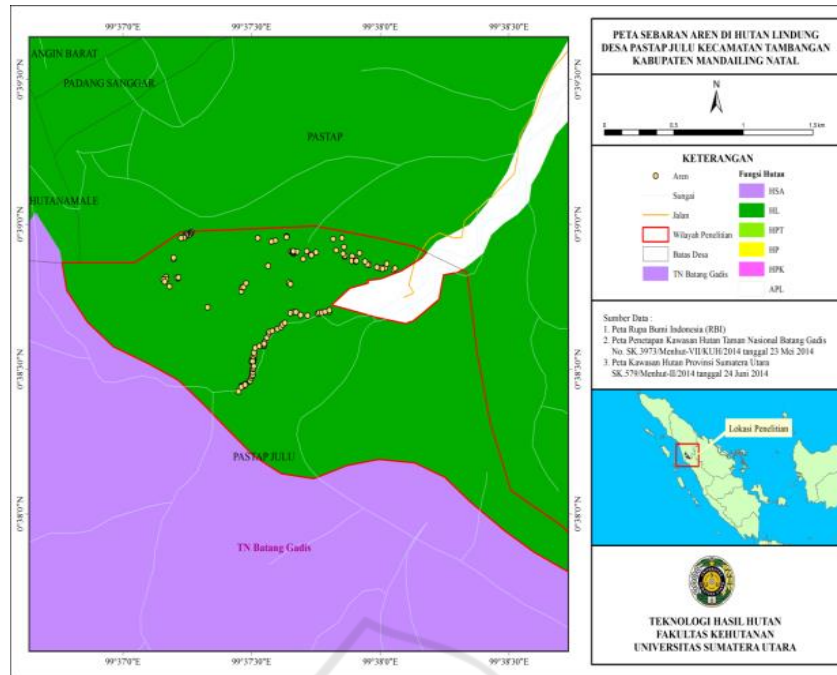


Figure 2: Distribution of Aren in Pastap Julu Village around Batang Gadis National Park.

Table 1: Data on potency of sugar palm in the protected forest of pastap julu village.

Immature sugar palm (individual)	Mature sugar palm (individual)	Average of height (cm)	Average of diameters (cm)	Density (individual/hectare)
1073	256	12	53,08	4,267

The potential of sugar palm plants in Pastap Julu Village is seen from the research locations that have been determined based on the location that is often used by the community to harvest sugar palm plants. Its potential can be seen from the development of the number of productive plants and products produced. This is seen based on the growth rate with high parameters of sugar palm plants, as presented in Table 1.

There are 256 individual mature plants with a density of 4.267 individuals /hectare, which means there are ± 4 individuals of sugar palm on every 1 hectare. Sugar palm at the seedling level is obtained by the number of 1073 individuals. Sugar palm at the level of the seed spreads around a large number of mature sugar palm usually occurs because the fruits of mature palm fall to the ground so that the saplings clump in one place. But not all of these saplings can grow into mature palm sugar due to the very large competition between the saplings.

The potency of productive sugar palm plants is also seen based on the number of male flowers and female flowers contained in one palm sugar stem. The average number of female flower bunches /fruit contained in one sugar palm stem, which is 3-5 bunches. This is by the statement of Lempang (2012) which states that sugar palm plants that have good growth can have 4-5 fruit bunches. Pollination of sugar palm is thought not to be carried out by wind but by insects. If the pollination process goes well, it will produce thick fruit.

The average male flower is found in one sugar palm stem, which is 3-4 bunches. According to Haryjanto (2010), the number of productive bunches is only 4-6 bunches with a period of 2-3 months. Juice sap is produced from tapping male flower bunches. If the female cob is tapped, it is often obtained by a sap which is not good in terms of quantity or quality. Male flowers are long round like a bright purple bullet at a young age and blackish purple after adulthood.

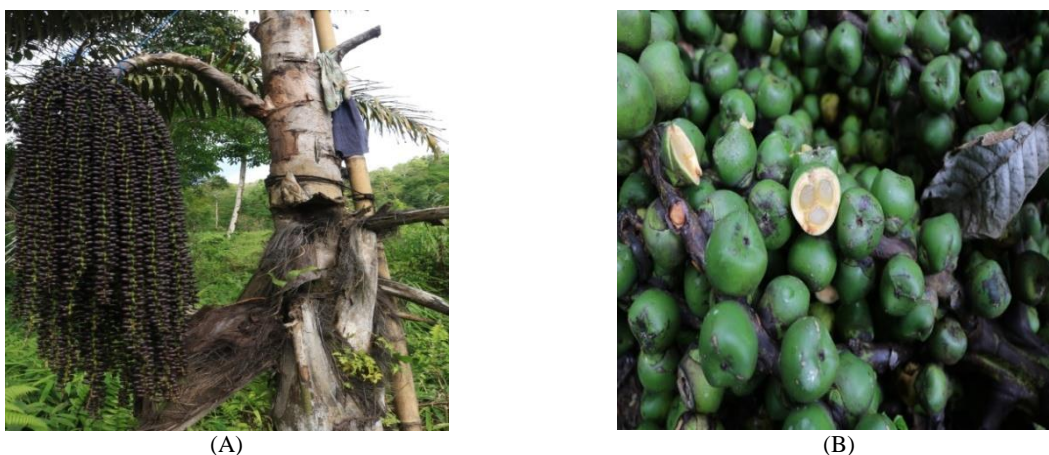


Figure 3: male flowers of sugar palm (A), female flowers of sugar palm (A).

The sugar palm plants found in the Pastap Julu protected forest area is spread unevenly, this is caused by the growth of wild or unintentionally planted sugar palm plants. This is by the statement of Marito (2008) which states that almost all of the existing palm trees originate from wild growth (accidentally planted by people) which results in uneven distribution. This is also in line with the results of interviews with communities around the area that the pattern of the spread of sugar palm plants in the study location is not influenced by humans but naturally which is also assisted by animals that are in the region.

4 CONCLUSIONS

Inventory of sugar palm plants (*Arenga pinnata*) in Pastap Julu Village around the Batang Gadis National Park Area was carried out by census method with result of 256 individual mature palm plants with a density of 4.267 individuals /hectare and an average height of 12 m and an average diameter of 53.08 cm. The potency of the sugar palm can be used as data to utilize palm trees in the area which are expected to increase the economic income of the community in the Pastap Julu Village.

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