



# The Inventory and Mapping of Sukun/Breadfruit (*Artocarpus altilis* (Parkinson) Fosberg) Distribution on Maitara Island, Tidore Kepulauan

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**Abstract** – Fundamental research about breadfruit/sukun (*Artocarpus altilis* (Parkinson) Fosberg) was accomplished on Maitara island. The main goal of the research is for providing data about breadfruit tree distribution in the island. Explorer survey method was done in four months and then it was combined with the interview data of local inhabitants. The new discovery shows that 235 trees of breadfruit were noted on the Island. The trees are spread in 15 population area. There are three local varieties namely Biasa breadfruit; Batu breadfruit; and Telur breadfruit. The density of breadfruit population is 83 trees/km<sup>2</sup>. The complete result and comprehensive information were transformed into a thematic map of breadfruit on Maitara

**Keywords** – *Artocarpus Altilis*, Breadfruit, Maitara, Mapping.

## I. INTRODUCTION

Indonesia is a country that is located on equator line and has two general seasons that are dry and rainy seasons. The country has fertile land with much hummus on it. It is also a habitat for huge plant biodiversity. Indonesia has more than a thousand islands and one of them is Maitara Island, a small island that is located in North Moluccas is well known because the picture of the island is used in on one side of Indonesia paper currency namely Rp1000,- (a thousand rupiah) that is produced in 2009.

The island is wedged between two islands that are Ternate and Tidore island. Based on the information, there is no fresh water on the island. So the inhabitant consumes the fresh water from Tidore island or they intercept and retain from rain. The island has many species of plants. One of them is sukun or it is more known as breadfruit in international. Breadfruit is a member of Moraceae family. That originates from South-East Asia. The breadfruit plant is a tree with many woods, as character classes of dicotyledons. The scientific name for breadfruit is *Artocarpus altilis* (Parkinson) Fosberg [1], [2]. The tree reaching up to 15-20 meter high [3] or some of them can up to 25 meters [4].

Sukun or breadfruit is called breadfruit from bread and fruit. This is because the part of fruit looks like bread. In Indonesia, the fruit has been known since 1920 as an alternative staple food. In the beginning, there were not many people who care to the plant but today it becomes very popular and can be made to a variety of food. The easier one is fried breadfruit and the other are getuk (traditional food from cassava), kolak or breadfruit sweet

soup, sukun cake, sukun flour [5] and also fermented food from breadfruit [6].

The information from breadfruit observation on Maitara Island, that breadfruit in Maitara is called as “Amo” and it still lacks attention from the local farmer. People there only cook breadfruit as fried breadfruit and kolak of breadfruit. The other sell them in the traditional market. Basically, breadfruit plant has many advantages. Not only the fruit that can be cooked to staple food but also the other part of the plant can be used for many purposes. Root, flower, leaf, stem, and secret are can be used in human life especially in human health.

Leaf of breadfruit is believed can be used in medicine to recover heart attack, high blood pressure, liver attack, diabetes, and asthma [7]. Leaf extractions of *Artocarpus altilis* contain lot of Methanol, etil acetate, petroleum ether, steroid, pitosterol, and resin. On the other information, leaf extractions also contain 72, 5% of amino acid, fat acid 68, 2% dan 81, 4% carbohydrate. Wet height of breadfruit starch is 15, 52 gr/100 gr. Breadfruit also contains specific essential amino acid like Cysteine, Arginine, histidine, leucine, lysine, methionine, threonine, tryptophan, sucrose, fatty acid and ellagic acid also [8]. Breadfruit, in some research publications, is an awesome cultivated plant that has potential power in food security in produce new alternative food for international market access especially for Europe. The plant also can supply food stock material from continuing agriculture in dealing with global growth population [9]. Moreover, Breadfruit can be alternative food product for any area in food security that suffers from food crisis and starvation.

In Indonesia, there are some variations of breadfruit. The differentiation between one to another region is usually used to give a name for that type of local variety, with the result that the breadfruits are known as the area or origin. For example, cultivar *Cilacap breadfruit*, *Pulau Seribu breadfruit*, *Bawean breadfruit*, *Bone breadfruit*, *Sorong breadfruit and others* [10]. Based on the size and character of breadfruit are known also as *Emprit* (small) *breadfruit*, *Putih* (white) *breadfruit*, *Mentega* (butter), *Menir* (albino) *breadfruit*, *Gundul* (bare) *breadfruit* and *Kuning* (yellow) *breadfruit*. On Maitara are predicted some local varieties that spread on four villages.

## II. MATERIALS AND METHODS

This research is descriptive research that describes the total population of breadfruit on Maitara island. The result



is drawn on a thematic map about breadfruit distribution on Maitara Island.

The research is part of the breadfruit inventory in three islands there are Ternate, Tidore and Maitara. A

method for taking data is an explorer survey method with documentation. The information about type and location is recorded.

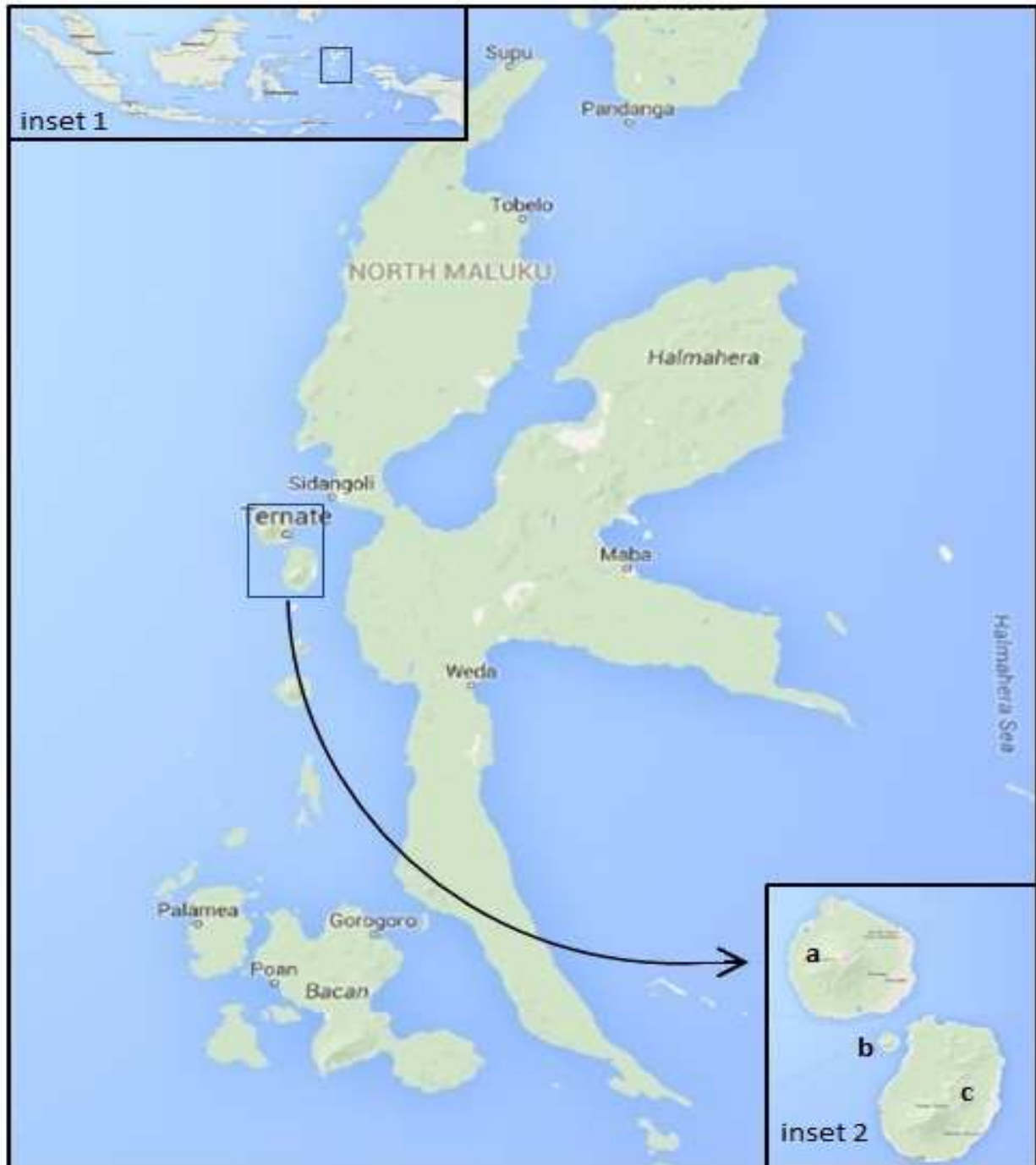


Fig 1. Map of research location. Inset 1 : Indonesiaan archipelago; Inset 2 : a. Ternate Island, b. Maitara Island, c. Tidore Island.

The location of Maitara is  $0^{\circ}43'56.000''$  North Latitude and  $127^{\circ}22'16.000$  East Longitude. Large of the island is about  $\pm 2,821 \text{ km}^2$ . This island has coastline about 6,336 km and it is a part of the North Moluccas archipelago. Picture of Maitara Island is in Fig 1.

The recording result about breadfruit population than is made on a table and is drawn on breadfruit distribution

map. The map shows the location and amount of tree of breadfruit there on their population. All dates were taken from January to April 2016, all the trees that noted, are all the trees that have tall more than one meter and it grows near the local inhabitant and can be accessed by the public.



### III. RESULT

Census, survey result and interview result show that 235 trees of breadfruit exist on Maitara island. Some trees grow naturally and others are cultivated by human or local civilization. In daily life, local people call breadfruit as *amo*. There are three types of local varieties that are noted.

That are Amo biasa, Amo Tolor, and Amo Batu. Comprehensive data of breadfruit population On Maitara are in table 1.

235 trees are spread on four villages namely : Maitara Induk, Maitara Tengah, Maitara Utara and Maitara Selatan.

Table 1. Distribution of breadfruit population/distribution on Maitara Island

No	Coordinate point (Alt; Lat; Long)	Village	Number of breadfruit tree in population
1.	13 m; 0,740974°N; 127, 371598° E	MaitaraInduk	10
2.	14 m; 0,739409°N; 127,366974°E	MaitaraInduk	14
3.	14 m; 0,739409°N; 127, 366974°E	Maitara Utara	25
4.	12 m;0,740506°N; 127, 373393°E	Maitara Utara	20
5.	12 m ;0,740506°N; 127, 373393°E	Maitara Utara	18
6.	6 m; 0,73688°N; 127,377123°E	Maitara Utara	18
7.	5 m; 0,736172°N; 127, 377812°E	Maitara Tengah	8
8.	5 m; 0,736172°N; 127, 377812°E	Maitara Tengah	34
9.	12 m;0,731486°N;127,377571 °E	Maitara Tengah	11
10.	9 m;0,729737°N; 127, 377303°E	Maitara Tengah	6
11.	9 m;0,729737°N; 127, 377303°E	Maitara Selatan	14
12.	13 m; 0,727121°N; 127,375305°E	Maitara Selatan	32
13.	8 m; 0,725749°N; 127,373628°E	Maitara Selatan	10
14.	12 m; 0,724469°N; 127,37047°E	Maitara Selatan	13
15.	12 m; 0,724425°N; 127,370346°E	Maitara Selatan	2
The total amount of breadfruit			235

### IV. DISCUSSION

Every village in Maitara has a different amount of breadfruit tree and population. The table shows that Maitara Induk has 24 trees in two population, in Maitara tengah there are 59 trees, in Maitara Selatan there are 71 trees and in Maitara Utara there is the most populated village with 81 trees in four population.

A total amount of the breadfruit tree on Maitara Island is relatively high, which is 235 trees from 15 populations. Wide of Maitara island is 2,821 km<sup>2</sup>, so the density of breadfruit population is 83 trees per km square. It is absolutely higher than breadfruit density in Ternate, with only 11 trees per km square in average [11].

The density of breadfruit tree in every village is totally different. It is caused by the difference of amount and the wide area of every village. The density of Maitara Induk is 55 trees per km<sup>2</sup>; Maitara Utara is 145 trees per km<sup>2</sup>; Maitara Tengah is 123 trees per km<sup>2</sup>; and Maitara Selatan is 136 trees per km<sup>2</sup>. So, Maitara Induk is the least densely village of other villages. On the other hand, Maitara Utara is the densest village.

The spread of Breadfruit population on a Maitara island in detail can be seen in Fig 2. On the picture, it is shown that a wide percentage of MaitaraUtara is relatively smaller than any other village, but it has many trees, which

is 81 trees. It means that the density in the village is absolutely the most densely of any other village.

An additional information in an interview reveals that on Maitara Island there are three types of local varieties of breadfruit, namely : Amo biasa, Amo Batu and Amo Tolor (Telur). The variety name is taken from size and form. Amo Batu means stone, that is a little hard like a stone; the other is amo telor means egg because the form is likely oval like a chicken egg. Batu and telur breadfruit are on two villages that are Maitara Utara Village and Maitara Tengah village, while the biasa breadfruit is spread on all village.

Local people describe the characteristic of telur breadfruit is small, a bit bare and oval like a chicken egg. On the other hand, the batu breadfruit is smaller than general breadfruit and the texture is hard. Most of the people consume breadfruit in a simple way for example fried, or make a kolak (soup with sugar and the taste is sweet), some of them also sell the breadfruit in a local market or they sell to a bigger market in Ternate.

People consume the breadfruit is dependent on the season and harvest time. It is consumed no more than other carbohydrate sources like banana or sago. Sago and banana are very popular in Maitara generally in North Moluccas as a staple food. For banana, they make it a simple snack and also save them to the sack or sell them as a snack. For sago, they use it as staple food more than others. Some of them still use it as same as rice.

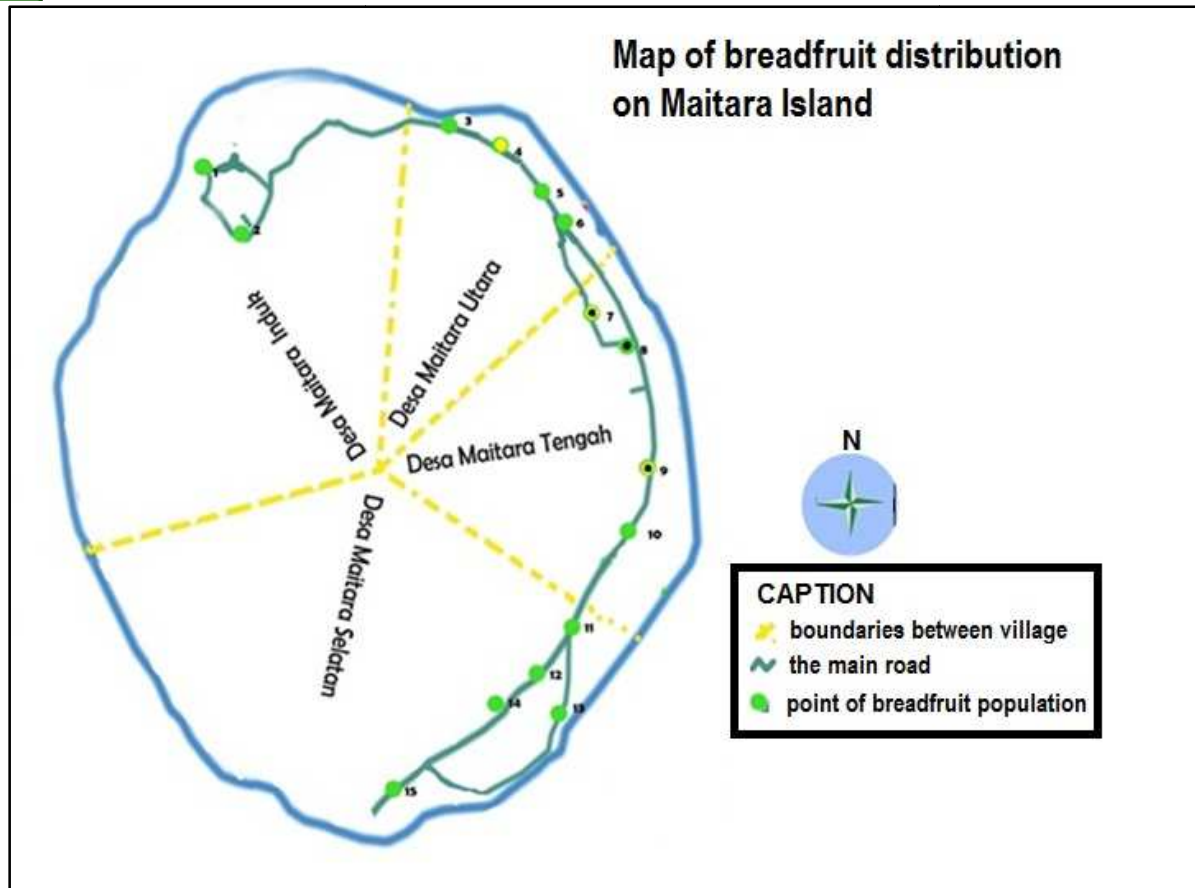


Fig. 2. Map of breadfruit distribution on Maitara Island.

Breadfruit production in Tidore City is generally high. For all areas, there are 110.96 tones from 18,44 Hectare (Ha) area of breadfruit harvested. It is more than a half of the area for breadfruit planted that is 23,40 Ha [12]. Especially of breadfruit production for Tidore Utara, where Maitara Island is located, is 7,20 Tones from 10,20 Ha planted area that harvested. Based on real observation, breadfruit from Maitara is relatively same as breadfruit from Ternate. But, specifically, based on calculation to morphometry by morphometric index. Reveal that breadfruit from Maitara is closer in kinship to breadfruit from Takome district in Ternate. It is proved by the previous research in Breadfruit from Maitara and Ternate [13].

The distribution of breadfruit on Maitara Island and Ternate are influenced by human migration. The origin of the breadfruit is unknown exactly. It is predicted from an unspecific place in South-East Asia [14]. The map that they made, describes the breadfruit origin, show that the location is about Philippine and Indonesia, specifically North Moluccas and it may be Ternate. That information is a little bit different from Orwa description in the Agroforestry database [2]. He drew that breadfruit origin is from Malaysia and Philippine.

Taxonomically, breadfruit is a variation of other species. And it is also assumed as breadfruit result of *Artocarpus camansi* and *A. mariannensis* [14]. The other opinion explains that it is selection result by a human to yield a special seedless fruit from *Artocarpus*.

## V. CONCLUSION

There are 235 trees of breadfruit plant that is noted on Maitara Island. It is distributed to four villages. Three local varieties that exist on the Island are breadfruit *Biasa breadfruit*, *Batu breadfruit* and *Telur breadfruit*. The most populated Island is Maitara Utara, which is 81 trees, and it is also the densest village which is 145 trees per km<sup>2</sup>. For all the breadfruit density on Maitara island is 83 trees per km<sup>2</sup>.

## ACKNOWLEDGMENT

The research was conducted by the Breadfruit Tim Research in Ternate, Maitara and Tidore of Khairun University. The funding is given by DRPM of Higher Education Director of Ministry of Research, Technology, and Higher Education via competitive grants scheme 2015-2016.

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