

# The Current Status of Sago Production in South Sulawesi: Its Market and Challenge as a New Food-Industry Source

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## Abstract

This paper gathers information on the current status of sago production in South Sulawesi (Indonesia) including its market and the challenge as a new food-industry source. A case study approach was used for this study. The case studies are a producer of dried sago in Palopo City and a *Kapurung* (sago processed food) Restaurant in Makassar City. In-depth interviews, observation and sales data collection were conducted for this study. The results show that even though sago production in South Sulawesi has decreased significantly by 86% within 8 years (2006-2013), demand of sago has increased. This is demonstrated by sales of dried sago which tends to increase by 25% as well as the number of sales spots has increased significantly within a year. Furthermore, the number of our case study's restaurant outlet has also increased from 1 outlet in 1999 to 4 outlets in 2011, yet, all of these outlets are located in Makassar City. These observations can be used as a parameter of sago demand, and it is predicted that demand will increase in the future. As a new food-industry source, the sustainability of sago supply as a raw material will be a challenge in the future.

**Keywords:** indonesia; local economies; new food; sago market; sago palm; sustainability.

## Abbreviations:

AFT	:	Al-Furqan Tribinatama
TSP	:	Tepung Sagu Palopo
ALKR	:	Aroma Luwu <i>Kapurung</i> Restaurant

## 1. Introduction

Sago is a starch obtained from the sago palm *Metroxylon spp* [1]. Sago palm is an ancient crop. However, there is no data that accurately reveals when it was first cultivated. Some experts suggest that sago cultivation in Southeast Asia and the Western Pacific are just as old as the utilization of date palms in Mesopotamia. Nevertheless, according to Ong [2], sago has been recognized since 1200 AD based on records in Chinese writings. Marco Polo, for instance, observed sago in 1298 in Sumatera, and sago factories in Malaka were noted in 1416 [2]. The cultivation areas of sago are spread over South Pacific islands up to India through Melanesia and Southeast Asia (see Figure 1). The sago palm mostly grows wild in the wetland areas of fresh water marsh lands with hydromorphic soils, generally scattered in the fan-lowland or in the boundary of sloping areas to the flat area [3], [4]. It is widely distributed in tropical rain forest climate zones, occurring at latitudes between 10° south and 10° north and up to an elevation of 700 m above sea level [5].

The first comprehensive report on Sago was by Steck (1757) in his dissertation written in Latin entitled: *De Sagu*. This is the earliest known scientific book that describes the history of the Sago palm, its starch extraction and utilization. In the beginning of 18<sup>th</sup> century, sago palm starch was very famous as a commercial product in Europe. Pigaveta, an Italian navigator who circumnavigated the earth at the beginning of the 16<sup>th</sup> century reported that in Ternate, Maluku, he discovered a delicious food called *Papeda* made from sago palm starch, and this starch was also used as a raw material for making bread [6].

It was previously reported by Karim in 2008 that current world sago palm production is not only of the wild or semi wild plant and only as a staple food for local people, but sago palm has become a commercial crop and an important source of starch for food and non-food industries [7]. Sago as a local food has a great potential to be developed because it contains a high concentration of carbohydrate [8]; its carbohydrate contents is up to 85 g per 100 g, which is higher than rice that contains only 80 g per 100 g [9].

A sago palm tree can produce up to 25 tons of starch per hectare per year; which is higher than rice (6 tons), corn (5.5 tons), wheat (5 tons) and tapioca (1.5 tons) [10]. Sago palm not only has high productivity, but it can also grow in swamps and wet land areas, which are not suitable for agricultural production, and it is tolerant to drought and floods [1].

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### 1.1 Sago situation in Indonesia

Sago palm is a native plant to Indonesia with a total area of about 1.28 million hectares or 51.3% of the total area of sago in the world [11]. Most of the sago area in Indonesia is categorized as sago palm forest where sago grows naturally without intensive external input during production [12]. These areas can be found in Sumatera, Kalimantan, Sulawesi, Maluku and Papua. Unfortunately, the total farming area in these areas is only 128,106 (2013) and none of these areas are categorized as government estate, only Riau, Sumatera has private estates (see Figure 2).

If all the sago areas are totally utilized, the national sago starch production could reach 12-18 million ton per hectare per year. But in fact, the total national sago production in 2013 was only about 10% of the national sago potential (see Figure 3).

Papua has the largest area with the highest genetic variety of sago palm naturally growing in a continuous forest. Papua has been considered as one of the centres of sago diversity [13]. However, there has been no significant development for establishing a sago-based industry in Papua. This is shown by the small area devoted to farming sago which was only 8,671 ha with 8,837 tons of sago production in 2013. In addition, all of these areas are farmed by smallholders [14].

In contrast, Sumatera has the highest sago production, yet its area is less than Papua. This is because its sago areas are not only farmed by smallholders but also farmed by the private sector accounting for 21% of the sago area. It is recorded that in 2013, the farmed area in Sumatera was 95,820 ha with 130,905 tons of sago produced of which 46.7% came from the private Sector [14].

In addition, the Meranti Regency in Riau Province, Sumatera, has a large contribution to sago production as most of the sago mills have been dominated by the local Chinese community. Nowadays, almost all the sago produced is delivered to Cirebon, West Java, to be sold for *Sohun* glass noodle manufacture. Although the government does not directly take part in sago farming, it provides support for developing sago in Meranti Regency. At the end of the 1980s, through national policy and Presidential Instruction on Village Development Program, villagers received 4 small sago mills with high capability, and a small diesel engine which can process 10-20 sago trunk/day and produce 20-30 ton of wet sago/night. This national support was extended by the local government of Meranti Regency which promoted sago as a main vehicle of growth and prosperity for the regency. The plan set out to expand the area of sago production to over 100,000 ha with an annual production of up to 400,000 tons of sago [15].

Compared to Papua and Sumatera, Sulawesi does not have sago areas as large as Papua, and also does not have significant sago development like Sumatera. In 2013, the sago farming area in Sulawesi was only 15,817 ha with 8,849 tons of sago produced. South Sulawesi has the second largest area of sago in Sulawesi [14] where it is distributed in 6 sago producing areas: Luwu Timur Regency, Luwu Utara

Regency, Palopo City, Luwu Regency, Bone Regency and Selayar Regency (see Figure 4). Luwu Utara is the largest producing area in South Sulawesi. For extracting sago, most villagers are still using small-scale technology, and conventional (micro-scale) technology of sago extraction can still be found [16]

Although the sago production area in Indonesia is huge, more than 95% of Indonesians consume rice as their staple food. According to the International Rice Research Institute (IRRI), in 2008 Indonesia had a high rice consumption; 139 kilograms per year per capita. Since WWII, the Indonesian government made agriculture a priority especially for rice production. Rice self-sufficiency was achieved in 1984 and Indonesia is now listed as the 3<sup>rd</sup> biggest rice producer in the world [17]. On the other hand, this high dependency on a single staple food occasionally means the national rice production is insufficient to feed Indonesian people; figures from the National Research Council of Indonesia show that the average imported rice volume during 16 years period (1990-2006) was 2 million tons/year. To reduce dependency on rice and its threat to national food security, it is important to diversify staple food production into non-rice staple food. Flach [18] recognized in the late 90s that dealing with food security in the long term in Indonesia could be achieved by increasing the utilization of the ample supplies of sago as an environmental-friendly high carbohydrate potential food stock.

In 2009, the government published two policies, Presidential Decree no. 22/2009 and Regulation of the Minister of Agriculture No. 43/2009 on Acceleration of Food Consumption Diversification Based on Local Resources. This was followed by the statement from the Ministry of Agriculture of the Republic of Indonesia in his speech in 2010 that sago has potential to be developed because it has a high carbohydrate content [16]. In 2012, the diversification program was started through the Local Food Diversification Program (MP3L) with a total budget of IDR 18.9 billion (see Table 1). The total budget from 2012 to 2014 for this program was less than 1% of the total state budget of the Food Security Agency Office of the Ministry of Agriculture [18]. Sago is only a small part of this program together with other crops such as Maize, Cassava and Taro.

As outlined above local people have the ability to acquire adequate sago as a staple food. In addition, it is found that there are many foods, snacks and beverages which can be made from sago. More than 63 sago-based food products are found in 21 of the 33 provinces in Indonesia and some of them have been produced by the commercial food industry [19]. The emergence of a sago-based food industry can be used as an indicator that sago demand exists. Further information related to sago demand, particularly in South Sulawesi will be explained in the result and discussion sections.

Sago is one of the natural resources of South Sulawesi. It has become a significant plantation crop alongside sugarcane, palm oil, nata de coco and hybrid coconut. Sago starch extraction practices in the eastern part of Indonesia, including Sulawesi, still use conventional (micro-scale) and

small-scale technology [23] as this conventional technology is widely used to make starch for family use. This technology is characterized by its simplicity and the equipment made from locally available materials and is easily transported.

In some areas of South Sulawesi, especially in Tana Luwu and in the eastern part of Indonesia, sago has a high social value as sago is the main food and income source for the local population. Although South Sulawesi has rice paddy as the primary food commodity, and the area given to sago cultivation has barely changed, new innovative products made from sago can be found in local markets and souvenir shops. The consumption of *Kapurung* (sago-based food) has also expanded to some areas which are not producing sago, Makassar (the capital city of South Sulawesi) is one such example. This paper is intended to gather information on the current status of sago production in South Sulawesi including its market and the challenge as a new food-industry source material.

## 2. Material and Methods

### 2.1 Study site

This study was conducted in two areas in South Sulawesi Province, Indonesia: in Palopo City and in Makassar city (see Figure 4, marked by red circle), on March 2014 and from July to August 2015.

Palopo has the third largest area of sago in South Sulawesi, yet, among sago producing areas, Palopo is the only area which has status as an administrative city. It covers an area of 258km<sup>2</sup> with a population of nearly 150,000 people in 2010, and sago is one of its biggest commodities besides cocoa, cloves, coconut and vanilla. In the past, Palopo was the capital city of Luwu Regency, then Luwu Regency was divided into 4 areas, consisting of Luwu Regency, Luwu Utara Regency, Luwu Timur Regency and Palopo City. Nowadays, the area once known as Luwu Regency is now known as Tana Luwu.

Makassar is the capital city of South Sulawesi Province. Makassar covers an area of around 176 km<sup>2</sup> with a population of about 1.3 million people. Makassar city is located in a strategic position at the intersection of traffic lines from north and south in Sulawesi, from western and eastern areas of Indonesia, and from northern and southern areas of Indonesia.

### 2.2 Data source and collection

Primary and secondary data were collected for this study. Primary data were obtained from two selected case studies through qualitative research by using in-depth interviews, and quantitative research by collecting sales data. Meanwhile, secondary data was only obtained through quantitative research by collecting numerical data such as sago area and its production at national, provincial and at regency level from the Ministry of Agriculture of Indonesia,

the Food Security Agency, the Department of Plantations of South Sulawesi Province, the Department of Forests and Plantations of Palopo City, and the Department of Forests and Plantations of Luwu Utara Regency.

Two case studies were chosen by using a purposive sampling technique, a type of sampling known as nonprobability sampling which uses certain cases based on specific purposes [20] associated with answering a question of the study, and primarily used in qualitative research [21].

The first case study was *Al-Furqan Tribinatama* (AFT), owned by Mr. Arman Said (43 years old), a producer of dried sago starch with the brand name *Tepung Sagu Palopo* (TSP). It was chosen as the first case study as TSP was identified as the first local product of dried sago starch in attractive modern plastic packaging which was found for the first time at one of the major souvenir shops in Makassar city. The location of AFT is *Jalan Tribina No.2* Palopo

The second case study was *Aroma Luwu Kapurung Restaurant* (ALKR), owned by Mr. Syahrir Lahrun (70 years old). It was chosen as ALKR has been identified as the pioneer of *Kapurung* Restaurant in Makassar City first established in 1999 and since 2011 ALKR has established 4 outlets (see Figure 5) in Makassar. The other reason for selecting this business is because geographically, the outlets of ALKR are dispersed throughout Makassar City; the first outlet is in the western part of the city located on *Jalan Rajawali*, the second outlet is in the eastern part of the city which is located on *Jalan Sultan Alauddin*, the third outlet is in the northern part of the city located on *Jalan Tamalanrea BTP*, and the fourth outlet is in the southern part of the city located on *Jalan Dg. Tata*. In addition, up to 2013, there are 26 *Kapurung* restaurant outlets established by 17 owners since 1999 [22], [16].

### 2.3 Data analysis

The collected data were analyzed by using mixed research design, adopted from Creswell [33], which is a procedure for collecting, analyzing and mixing both quantitative and qualitative research and methods to understand a research problem.

The quantitative data was used for statistical analysis to analyze the trends in sago area and its production from national to local level, to analyze how much of each product was sold by each case study during a certain time, so the trend in sago consumption in certain areas also can be determined. The qualitative data was used for descriptive analysis to explore the thinking and practices involved in each of the case studies related to the sago industry.

The advantages of this method are it is easy to describe and report, useful when unexpected results arise from a prior study and helpful in design and validating data.

### 3. Result and Discussion

#### 3.1 Sago production in South Sulawesi

Sago is used as a raw material for some sago-based food industries in South Sulawesi such as for making dried sago starch and *Kapurung* (a traditional food from Luwu). These sago-based industries will be discussed in the next section by using a case studies approach. Related to the availability of sago as an important raw material for the new food industries mentioned above, the condition of sago production and its area from 2006-2013 in South Sulawesi will be analyzed and discussed next.

Sago production in South Sulawesi is dominated by 6 areas (see Figure 4). The biggest sago contributing area at any time is not fixed with different areas dominating at different times. As figure 6 shows, sago production in South Sulawesi in 2006 was dominated by Luwu Regency (68%), and then the next largest production area was Palopo City, and Luwu Utara Regency. In 2008, it was dominated by Bone Regency (49%), followed by Luwu Utara Regency and Palopo City. In 2010, it was dominated by Luwu Regency (61%) followed by Luwu Utara Regency, and Luwu Timur Regency, and in 2013, it was dominated by Luwu Utara Regency, followed by Luwu Regency, and Luwu Timur Regency.

Sago production and area by Regency in South Sulawesi from 2006-2013 can be seen in table 2. The average sago production in this period is in the order: 1) Luwu Timur Regency with 155 tons/year, 2) Luwu Utara Regency with 594 tons/ year, 3) Palopo City with 430 tons/year, 4) Luwu Regency with 3,039 tons/ year, 5) Bone Regency with 479 tons/ year, 6) Selayar Regency with 1.7 tons/ year.

Inspection of Table 2 shows that the average sago production was greatest in Luwu Regency in 2006. Possibly this is because Luwu Regency at that time had a lot of mature stand to be harvested, 1,420 hectares produced 10,487 tons of sago, giving a productivity of 7.38 tons/ha. This is still below the value mentioned by Izhizaki in 2009, who states that sago palms can produce up to 25 tons per hectare per year [10]. However, production in this regency decreased significantly in 2008 to 125 tons, and production fluctuated for the next 5 years but it never returned to higher production levels until the year 2013. Although Luwu Regency had the highest production on average, Luwu Utara Regency had the largest area, which means its potential for sago production could be higher than that of Luwu Regency.

Sago area in Luwu Timur has increased by 133%, from 59 ha in 2006 to 137 ha in 2013, similarly in Palopo City, where the sago area has increased slightly by 8.7%, from 508 ha in 2006 to 552 ha in 2013. In contrast in Selayar Regency, the sago area decreased significantly by 76%, from 13 ha in 2006 to 3 ha in 2013. For Bone Regency, the sago area has barely changed. In Luwu Regency and Luwu Utara Regency, the sago area has fluctuated, but if we compare this to the area between 2006 and 2013, the area of sago has increased by

3.8% in Luwu Regency and 3.1% in Luwu Utara Regency. Furthermore, Figure 7 shows the proportion of area given over to sago in each of the regencies in South Sulawesi in 2006, 2008, 2010 and 2013. The sago area is consistently higher in Luwu Utara Regency.

Overall, according to the data from the Department of Plantations of South Sulawesi, over the last 8 years, sago production in South Sulawesi has decreased by 86% (see Figure 8). In 2006, production was 15,342 tons but in 2013 it was only 2,145 tons of sago. There is no reliable explanation why the production of sago has decreased, however, in our previous study in Luwu Utara Regency we suggested that the decreasing sago production was caused by shifting production from sago to other profitable crops such as citrus, cacao and maize [15]. Considering that those crops were highly profitable [16] compared to sago plants that can take 10 years to be harvested after first planted, and can be harvested from the same cluster every two years [15], [23]. Our latest study in 2016 showed that the decline of sago production in three major areas in South Sulawesi (Luwu Utara Regency, Palopo City and Luwu Regency) was caused not only by shifting production from sago to other profitable sectors but was also caused by a lack of support from the local government[24].

Furthermore, as well as sago production, sago land productivity has also decreased by 87%. In 2006, it was 3,970 kg/ha but in 2013 productivity was only 530 kg/ha. The average for sago land productivity is 1,100 kg/ha, meaning that the productivities in these provinces would be categorized as low and far from what Izhizaki [10] claims that sago palm can produce up to 25 tons per hectare per year.

Nevertheless, the total of sago production area has barely changed. It is recorded that sago production area in South Sulawesi was 3,860 ha in 2006 and 4,074 ha in 2013, a slight increase of 5.6%. Based on our previous study in Luwu Utara Regency, we suspect that the number of sago area has slowly increased because of an increased awareness and willingness to plant sago shown by local communities, in a campaign called "Kampung Sagu". The local farmers planted a total of 100 seedlings of sago at the start of the campaign, then this activity was followed by international collaboration activity between Ehime University, Hasanuddin University and the local community by planting a total of 200 seedlings of sago on an area of approximately 2 ha [16]. Another reason why the sago production area has increased slightly might be because the sago plant can reproduce vegetatively. Once it is planted, new suckers are continuously produced [25].

The trend line for the sago production area and its land productivity can be seen in figure 9. The sago production area is decreasing, and its land productivity is also tending to decrease. The low production of sago is considered a challenge for the future market, and sago production needs to be sustained and increased if it is to meet projected market needs. To find out more about the sago market in South Sulawesi, two case studies below will be elaborated.

### 3.2 Al-Furqan Tribinatama (AFT)

Case Study 1: AFT, a producer of dried sago starch marketed as TSP, owned by Arman Said (Male, 43 years old). Mr. Arman was born in Barru Regency, an area where sago does not exist. A simple reason led him to establish this business. When he was staying in Barru, he always went to Palopo City for business trips. Whenever he went there, his family often requested him to bring sago as a souvenir. Sometimes he felt that it was a burden because he does not like the smell of sago and it is difficult to handle. He hoped that someday he could bring dried sago starch without the annoying smell. From here, an idea was born. He thought if he produced the dried starch and then packed it into little containers it would be easier for people to bring sago to their home town. Mr. Arman moved to Palopo and became a manager in *Misi Pasaraya*, a kind of a mini market which has branches in many regencies and cities in South Sulawesi. With this position, it was not difficult for him to promote his products to other branches of *Misi Pasaraya*.

"*Tepung Sagu Palopo*" (TSP) which means "*Palopo sago starch*", is the brand of dried sago produced by AFT. Mr. Arman started his business in November 2011. Because his business is categorized as a home industry, having a certificate of food production for home industry (P-IRT) was a requirement before he could sell the product officially. He then followed food safety guidance in February 2012 and obtained P-IRT. In March 2012, he attended technical guidance in order to obtain a certificate for first star food safety, held by *Badan Pengawas Obat dan Makanan* (BPOM) or *The Food and Drug Supervisory Board* in Makassar City. The certificate of first star for food safety is a form of recognition from government that the practice of food safety has been implemented by the business receiving the award. He started to sell the product Sagu Palopo in November 2012, exactly a year after he started his business. In May 2013, he registered his business as an individual company, applied for business licenses, Nuisance Permit and promotion license at the Palopo City Office. TSP received recognition from the government of Luwu Regency as the first dried sago starch which is distributed in attractive plastic packaging.

Until January 2014, TSP was sold in only 7 sales spots which were spread in 5 areas. Then starting from February 2014, its market has gradually expanded not only inside but also outside of South Sulawesi. The TSP market successfully reached a further 7 sales spots which are spread over 6 areas. Since August 2015, TSP has 14 sales spots and has spread to 11 areas in total. TSP sales spots have increased by 100%, from 7 to 14 within 20 months (Jan 2014 – Aug 2015). These sales locations can be categorized into three types (see Figure 10).

a) Based on its distribution, TSP is sold by 6 branches of *Misi Pasaraya* (43%), which are in Palopo, Jeneponto, Makassar, Barru, Soppeng and Sidrap; by 6 resellers (43%) in Toraja Regency, Bulukumba Regency, Makassar City,

Kendari City, Surabaya City and Jakarta; and by 2 souvenir shops (14%) in Palopo City and in Makassar city.

b) Based on the classification as a sago producing area, from these 14 sales locations, only 2 are classified as sago producing area (14%) and both of them are located in Palopo City, the remaining (86%) are not located in sago producing areas.

c) Based on the location, TSP is mostly sold inside of South Sulawesi, there are 11 sales locations inside (79%), 2 in Palopo, 3 in Makassar, and 1 each in Barru, Sidrap, Jeneponto, Soppeng, Bulukumba, Toraja; and 3 spots outside of South Sulawesi (21%), these are in Jakarta (capital city of Indonesia), Surabaya (capital city of East Java) and Kendari (capital city of Southeast Sulawesi).

The sales growth of TSP in the 20 months from Jan 2014 – Aug 2015 on average was 25% or an increase of 20.4 kg per month. Figure 11 shows the sales of TSP from month to month. To compare the sales progression of TSP, these 20 months of sales data are divided into two periods. The first period is from January to October 2014, and the second period is from November 2014 to August 2015. The first period shows that average sales of TSP per month was 390 kg and the total value of the sales was 3.6 million Rupiah, while in the second period 843 kg was sold per month and the value of sales was 15.1 million Rupiah. The sales quantity of TSP increased by 116 % and the sale amount increased in value by 319%. This big difference in value was because the sales quantity in the 2<sup>nd</sup> period was higher than the 1<sup>st</sup> period, and 800 kg of starch was sold with the cheapest price in Oct 2014. Starch at this time was sold for IDR 4,400/kg while the normal price is IDR 10,700/kg. The reason for the lower price was because the quality of the starch's colour was not optimal at that time. The starch was becoming red during the drying process under sunlight. To avoid more losses, Mr Arman decided to sell the rough starch to a traditional cookie (*Bagea*) maker, who uses sago as a raw material. For them, colour does not matter because they add brown sugar in the process of making the cookies. The increase in the number of sales outlets and the number of areas in which sales occurred as well as the number of sales during this 20 month period can clearly be taken as an indicator that sago demand increased during that period.

Figure 11 shows that the highest quantity (926 kg) to be sold in the 1<sup>st</sup> period was in October 2014. However, the sale value was not high due to the colour problem affecting 800 kg of starch. The highest quantity to be sold in the 2<sup>nd</sup> period was in July 2015 when 2,021 kg of dried sago starch was sold. According to Mr. Arman, the high sales of TSP in July 2015 was influenced by preparation for *Idul Fitri* or *Eid al-Fitr* (the Islamic holiday after the fasting month) celebration.

The price of TSP is the same for all outlets that are branches of *Misi Pasaraya* (IDR 10,700/ kg). This is because Mr. Arman does not add storage and transportation fees to the price. He uses the transportation facility of the *Misi Pasaraya* Palopo Branch in distributing the products. However, the price for souvenir shops and resellers, and those who want to resell the product, is cheaper than the

price at *Misi Pasaraya* branches for promotional reasons. In addition, AFT does not have a special budget for TSP promotion. TSP is being promoted through social media such as Facebook.

For the raw material, AFT buys crude sago directly from some sago farmers in Luwu Utara Regency. The company searches for good quality sago at a good price. However, Mr. Arman did not reveal the exact location of his suppliers. In running his business, he is assisted by 4 people. One kg of crude sago can produce 0.7 kg of dried sago starch. This means that taking the average sales of TSP from the 2 periods outlined above is 616.5 kg per month. This means that AFT needs approximately 881 kg of crude sago per month or 10,572 kg/year.

AFT is a successfully developing business. In May 23<sup>rd</sup> 2014, the company received a courtesy call from Mr. Sunandar, the head of the food industry section of Palopo city Department of Trade and Industry, and in Dec 16<sup>th</sup> 2014 it received aid in the form of bag sealing equipment from the department. In Dec 20<sup>th</sup> 2014, as a continuation of its Halal label application, he welcomed Mr. Jamaluddin Saleh and team from *Majelis Ulama Indonesia* (MUI) or Indonesian Ulama Council of South Sulawesi Province. In Jan 9<sup>th</sup> 2015, AFT obtained permission to use the Halal label for the TSP product. Furthermore, in April 2015, the status of AFT changed from IRT (Industry Rumah Tangga or Household Industry) to become UD (Usaha Dagang or Trade Enterprises). With this new status of UD, AFT will put more effort into sales promotion of TSP through market expansion and increase the production of TSP because AFT predicts the demand of sago will increase in the future.

This kind of business is a new hope for farmers to become more involved in sago production. The farmers can take advantage of this business as the market has already opened and sago is accepted by people who live in non-producing sago areas. The market trend of TSP indicates this business has strong potential to survive in the future. However, since crude sago is an important raw material for this business, the sustainability of sago needs to be managed.

### 3.3 Aroma Luwu *Kapurung* Restaurant (ALKR)

Case Study 2: ALKR, is registered in the Ministry of Law and Human Rights for having a HAKI license (*Hak Atas Kekayaan Intelektual* or Intellectual property rights) no. IDM 000146574. ALKR is a food restaurant which sells *Kapurung*, a traditional food from Tana Luwu which uses sago as a raw material, as their main menu item. It is owned by Mr. H. Syahrir Lahrun (Male, 70 years old). He was a contractor and mostly involved with technical businesses and trades. In 1997 when the contractor business was impacted by the economic downturn, he established a restaurant in Makassar. At that time, the famous restaurant was RM Restaurant which sold fried chicken as their main menu item. He thought, if he wanted to establish a restaurant, he must make a unique restaurant unlike those already established in the city. Because of his Luwu

ancestry, and the traditional food of Luwu is *Kapurung*, he decided to establish a *Kapurung* restaurant, and luckily, at that time, there was no *Kapurung* restaurant in Makassar City. Apart from the economic reason, this business was established in order to revive the flavor of local food using simple raw materials and suitable for all ages. The proprietor saw that many potential food varieties can be developed from sago because besides being used for making *Kapurung*, it can also be used for making *Sinole*, *Cakko-cakko*, *Jepa*, *Dange*, *Bagea* and *Ongol-ongol*. However, at first, ALKR focused on one menu item only, *Kapurung*.

As a new business, it was not easy to attract customers as the offered menu was not an original food in Makassar city. From here, ALKR tried to offer additional dishes in order to increase customer motivation to adopt this local food. The additional dishes were *Dange* or *Ruji* (sago bread), *Barobbo* (porridge mix sago, corn, rice and vegetables) and *Lawa* (raw fish with banana flower and stir fried coconut). Besides these traditional side menu items, ALKR also provided a common menu which was especially suitable for Makassar people: rice with fried chicken and sour vegetable soup. This was to accommodate customers who were willing to come to ALKR to eat *Kapurung* with their friends, yet their friends do not like *Kapurung*.

In 2009, in order to improve its service to the customers, ALKR opened a 2<sup>nd</sup> outlet located in *Jalan Sultan Alaiddin* Makassar. A year after the 2<sup>nd</sup> outlet was opened, ALKR then opened a 3<sup>rd</sup> outlet in *Jalan Tamalanrea BTP* in 2010 and followed with a 4<sup>th</sup> outlet in *Jalan Dg. Tata* in 2011. In the first 9 years, the growth of outlets of ALKR was 0%, this increased sharply from 2009 to 2011, and an outlet was added for each existing outlet. The ALKR business has expanded, and all of its outlets are spread widely throughout Makassar City, making it easily reachable in the city. ALKR management promotes this business through mouth-to-mouth promotion, social media, and *Go-jek*; a kind of mobile application for transportation and food delivery by motorcycle [26]. These additional outlets since 2009 can be used as an indicator that sago demand has increased.

Until 2009, ALKR employed 30 people for the positions of manager, supervisor, cashier, waitress, chef, purchasing of raw material, and customer service, to help Mr. H. Syahrir Lahrun run this business. At that time, the daily income of ALKR was 3 to 4 million Rupiah per day. Now ALKR employs 50 people and the daily turnover is between 10 to 15 million Rupiah per day from the 4 outlets. The target is to attract customers at least 50 times per outlet, and in meeting this target ALKR can sell from 60 to 70 portions of *Kapurung* per day/ outlet on average. Moreover, ALKR received an accolade as the favorite *Kapurung* restaurant in Makassar in 2015 [27] (see Figure 12). This was awarded by *Makassar Terkini* magazine in Makassar.

ALKR hopes that this business can be more successful in the future, attract more customers, add more outlets and improve services to the customers.

There are 26 *kapurung* restaurants listed in Makassar in 2013, yet, in the previous year the number of *kapurung* restaurants was only 21; an increase of 24% within a year. In addition, the average restaurant growth during the last 14 years (1999-2013) was 29%, and it is predicted that this will increase in the future because the market of *kapurung* restaurants is promising [16]. Undeniable, this business potentially can survive in the future.

Currently, ALKR needs 1 *tumang* of crude sago (approx. 15kg/ *tumang*) per day for 4 outlets. This means, there should be approximately 450 kg of crude sago per month or 5,400 kg per year. This amount is just for ALKR's needs, so from this we can estimate how much sago is needed by all *kapurung* restaurants in Makassar. To keep this sago-based restaurant business running the sustainability of sago as an important raw material should be considered due to the potential increased need for sago by this industry.

#### 4. Conclusion

Government has issued regulations which emphasize reviving local resources for food consumption diversification to reduce the dependency on rice and the potential threat to national food security. Sago is one of the alternative local foods available for food diversification which is not inferior to rice because of its high carbohydrate content. In summarizing the result of this study, we return to the specific objectives formulated in the introduction. First, related to the current status of sago production in South Sulawesi, we find that the sago production is considered low, and to increase the production, potential sago palm areas should be cultivated. If it is utilized optimally, sago can be harvested at a yield of 20t/ha (assumption 5t/ha).

Second, related to the sago market as a new food-industry source in South Sulawesi, through 2 case studies we found that a sago market exists and the sales trend from each case study showed an increase. The dried sago starch TSP is mostly sold in areas which are not producing sago, which means sago has market potential outside of production areas and there is a possibility to expand the sago market to these areas. In addition, the network of *Misi Pasaraya* mini markets is a suitable vehicle for sago distribution in South Sulawesi and potentially *Misi Pasaraya* can become a partner for sago farmers to distribute sago in the future. The business of ALKR has expanded, as demonstrated by the additional outlets of ALKR, particularly from 2009 to 2011, an outlet increase every successive year. Sago based-food industries such as TSP and ALKR in Makassar are a new hope for the farmers involved in sago production as the market has already opened and looks promising.

Third is the challenge of sago as a new food-industry source in South Sulawesi. The availability of sago as an important raw material for sago-based food industries in the future may become a challenge as sago demand has increased and it is predicted the need for sago in South

Sulawesi will increase. The sustainability of sago will determine the existence of sago-based food industries in the future. What needs to be done is the optimization of sago potential, so sago production can be increased.

To help achieve this we recommend that to maintain the availability of sago, sustainable processes should be implemented, first by planting sago, in anticipation of the future needs of the sago market. However, for the farmers, planting sago is not an easy decision as sago competes with cash crops. Therefore, support from government is a must in the sustainability process. By planting sago, not only economic sustainability through providing sago as raw material for food can be achieved, but also social and environmental sustainability can be achieved. Considering that sago has a social value, and its production is not significantly influenced by climate [28], [29], the sago palm is an environmental-friendly crop that can contribute to the quality of the environment on a long-term basis [23]. It acts as an effective sink for carbon sequestration [30] and as a buffer zone for flood and water intrusion, it conserves soil and water, and it has characteristic of self-regeneration [31].

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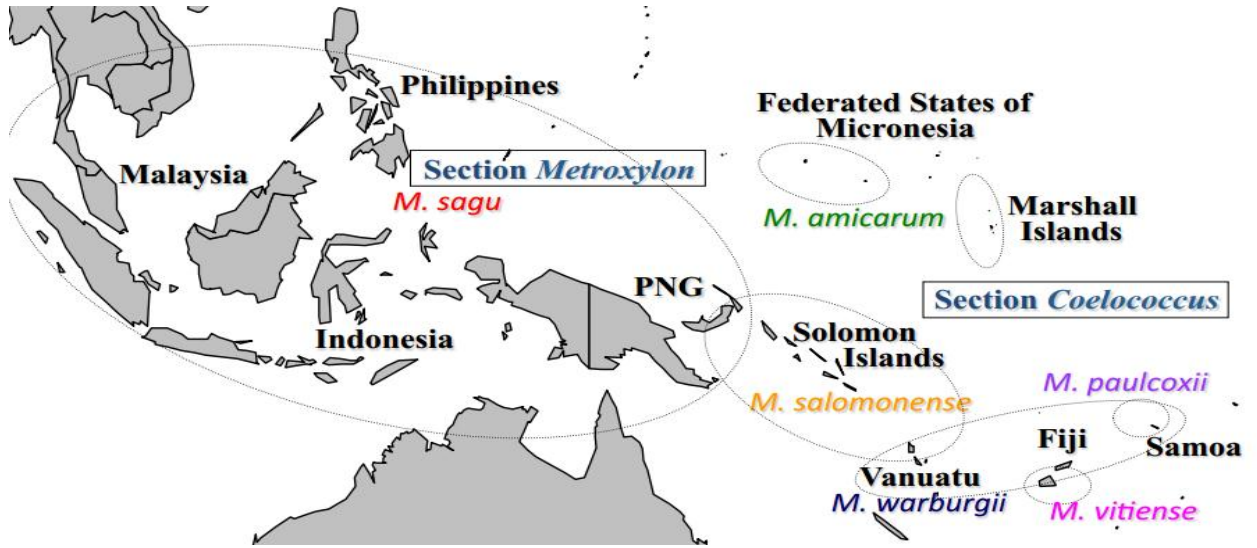
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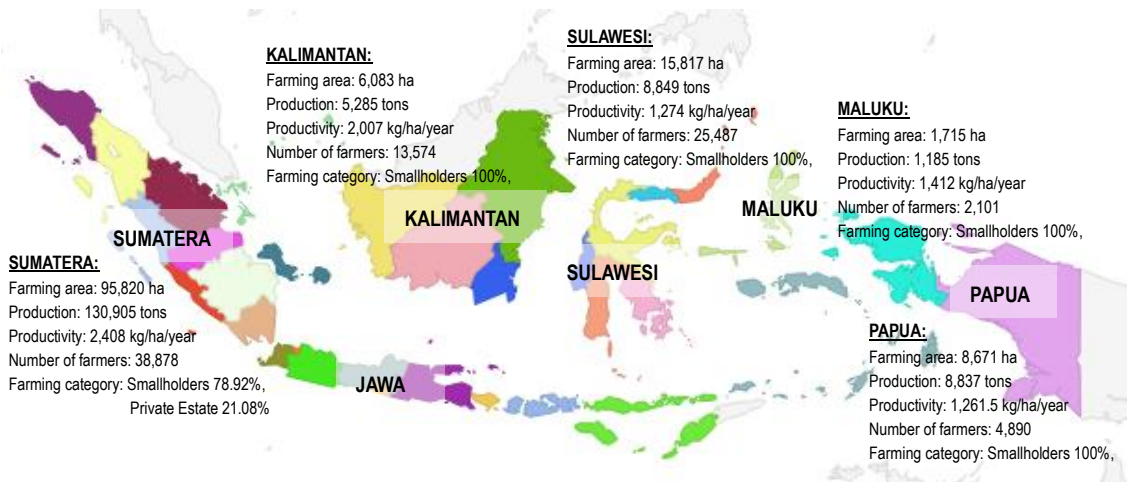


Figures



Source: Ehara, 2012 [34]

Figure 1 Distribution of sago (*Metroxylon* spp)



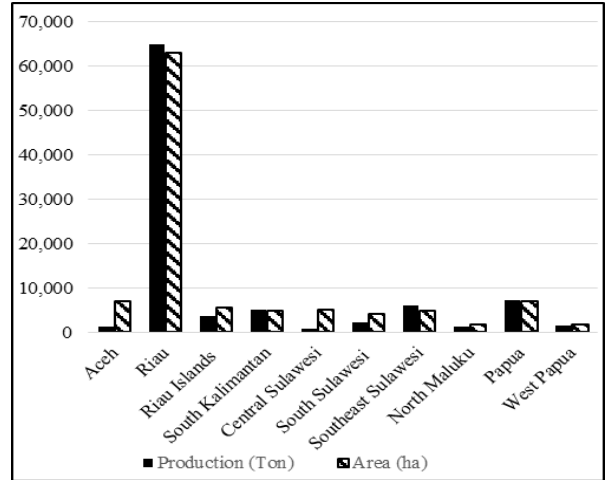
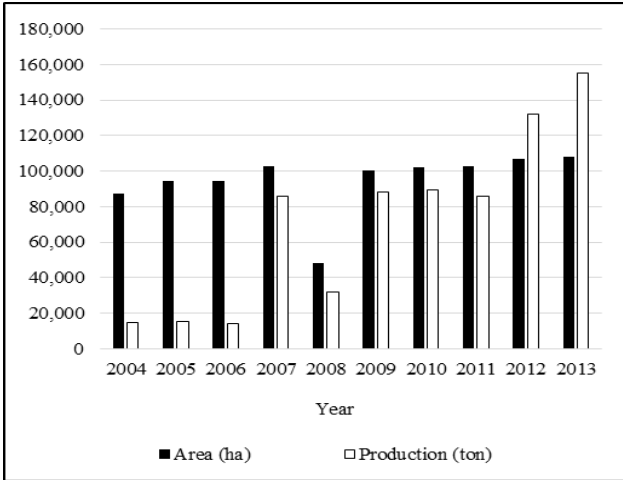
Data Source: Tree Crop Estate Statistic of Indonesia 2013-2015 [14]

Blank Map Source: peta-jalan.com [35]

Figure 2 Sago farmed area and its production in Indonesia

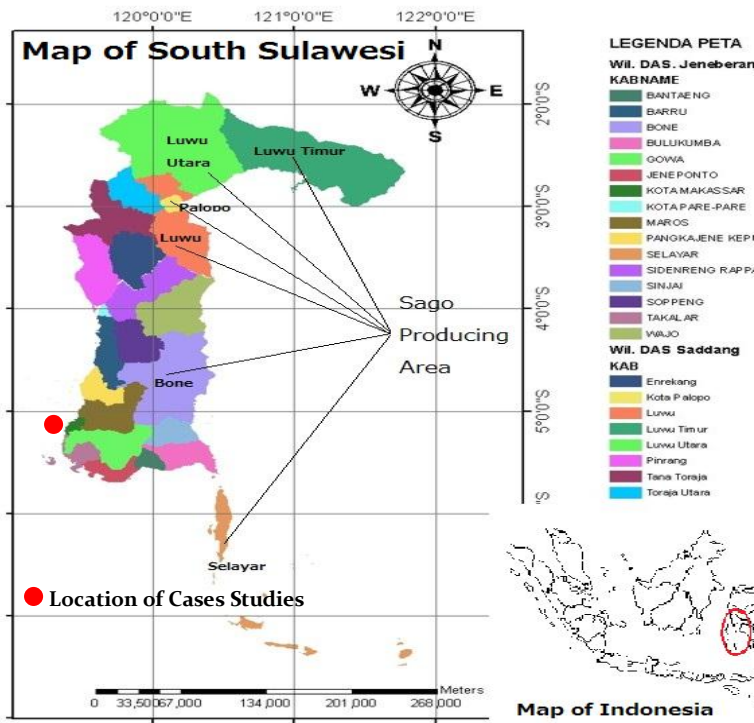
Sago area and production from 2004-2013

The production of sago from areas in Indonesia



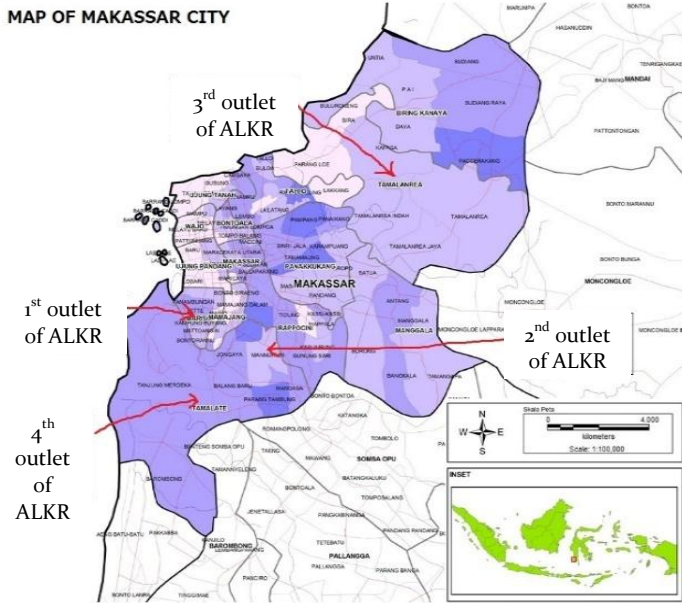
Source: Food security agency, 2012; Ministry of Agriculture, 2014

Figure 3 National sago area and production in Indonesia



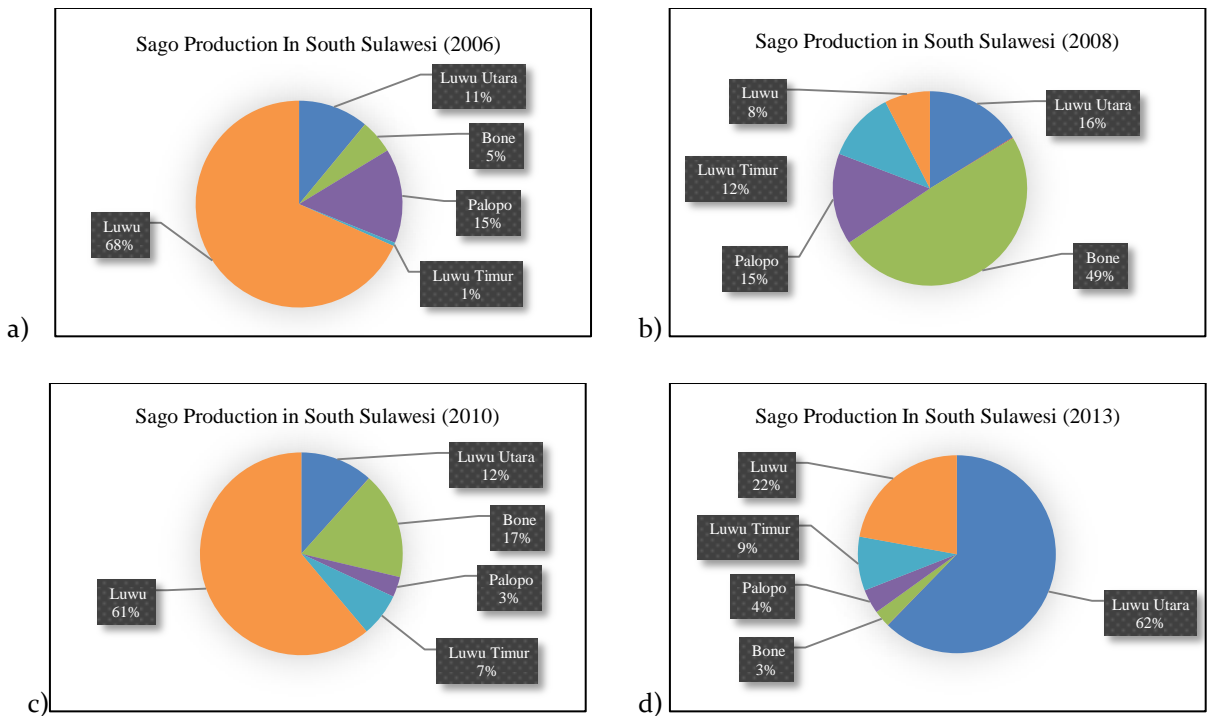
Map source: Forest Plant Seedling Office of Sulawesi [36]

Figure 4 Sago producing areas in South Sulawesi

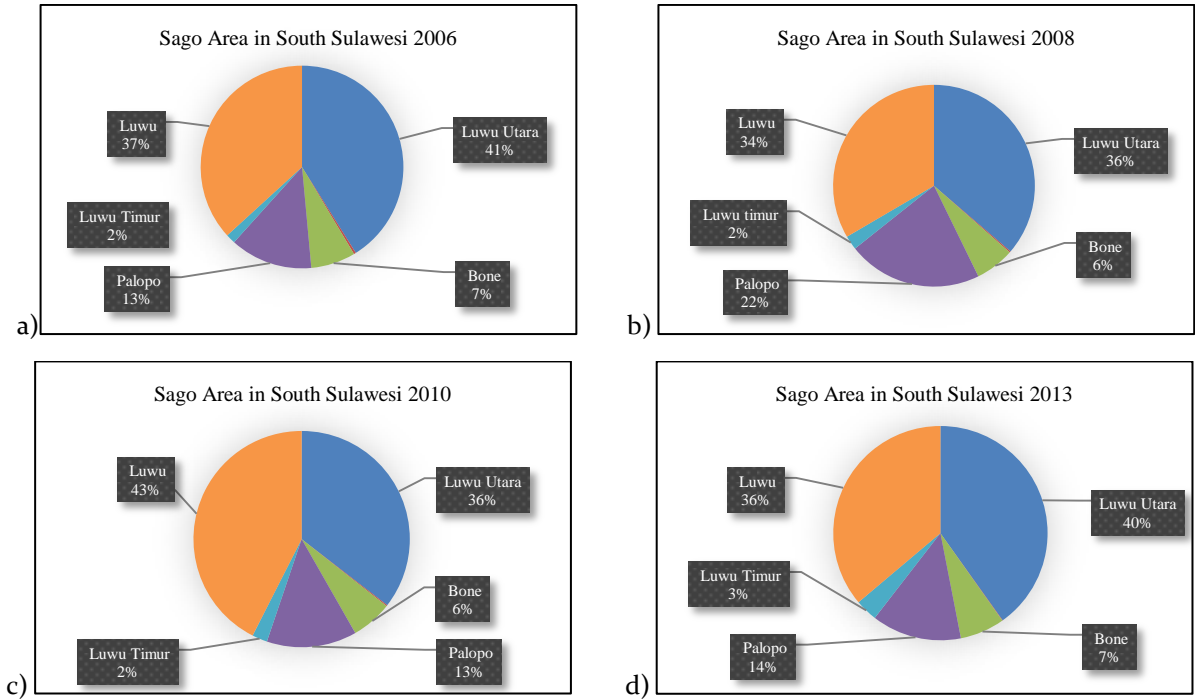


Map source: Ministry of Public Works [32]

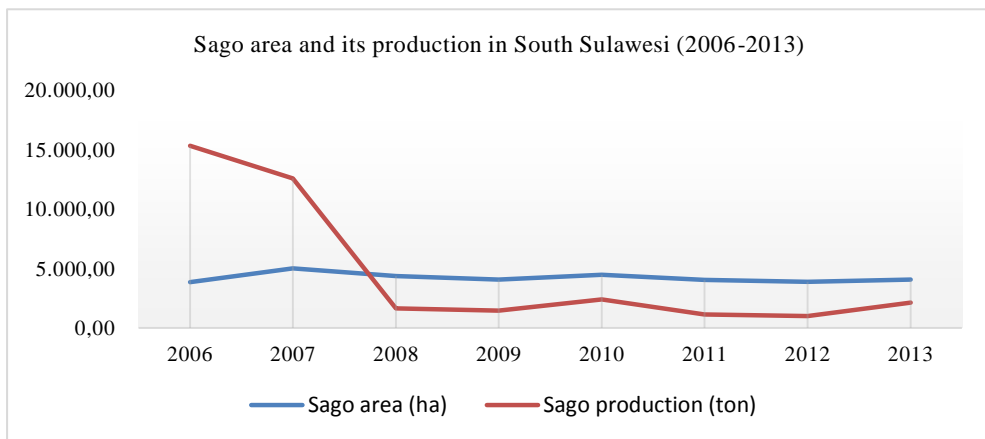
**Figure 5** Location of ALKR Outlets in Makassar City



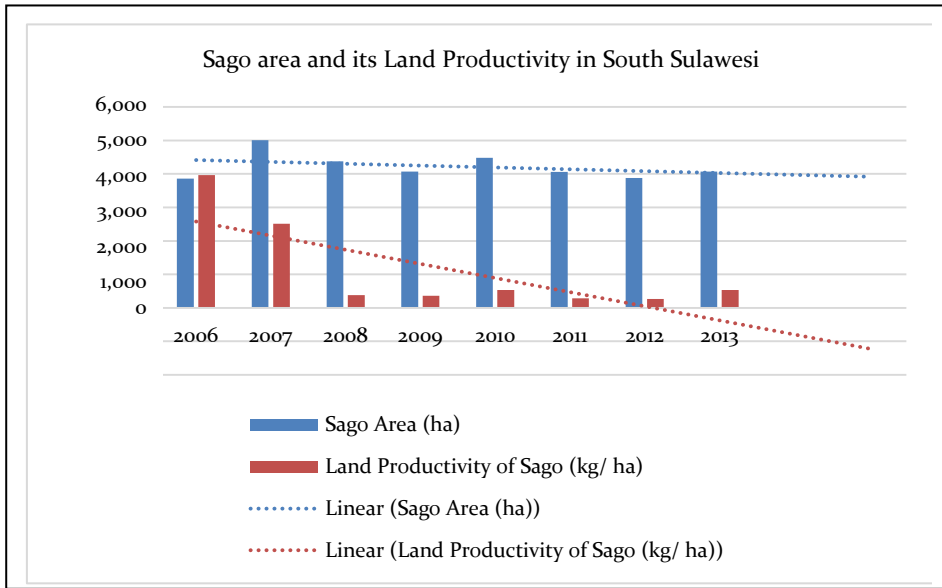
**Figure 6** Sago production in South Sulawesi by Regency (a) 2006; (b) 2008; (c) 2010; (d) 2013  
(Note: Selayar not shown for clarity as production was approximately zero in all years)



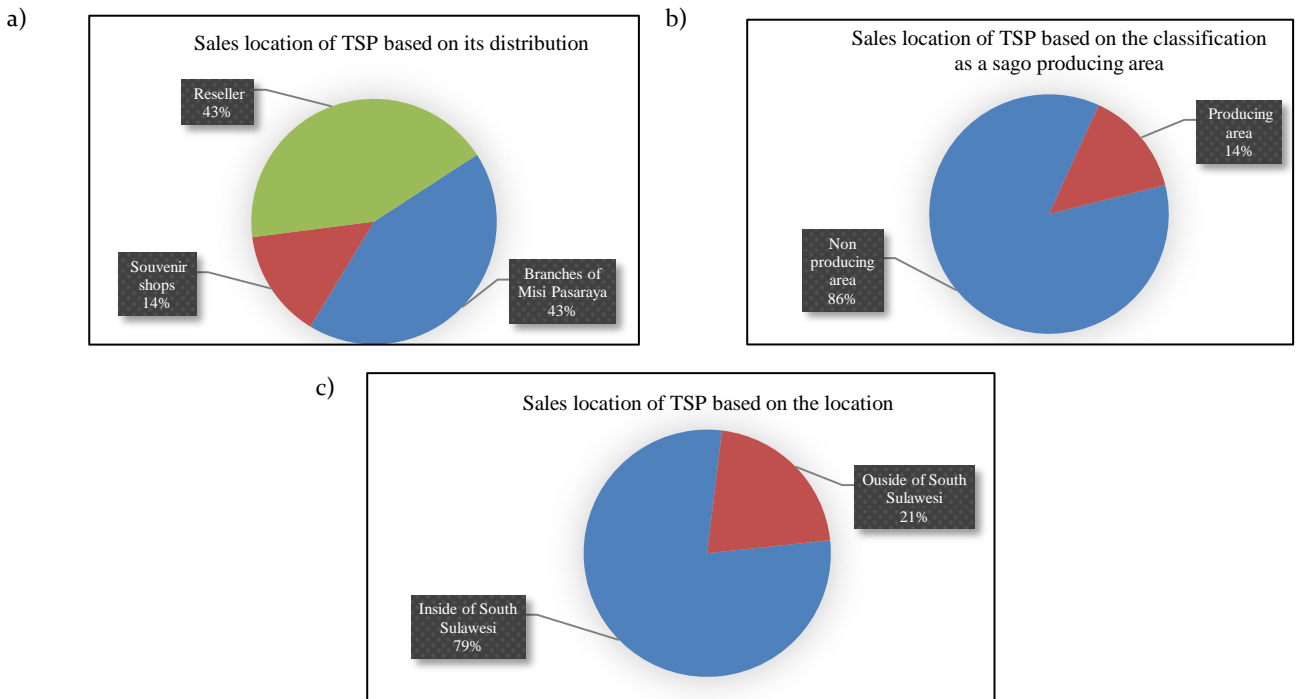
**Figure 7** Sago area in South Sulawesi by Regency (a) 2006; (b) 2008; (c) 2010; (d) 2013  
(Note: Selayar not shown for calrity as production was approximately zero in all years)



**Figure 8** Sago area and its production in South Sulawesi (2006-2013)



**Figure 9** Sago area and its Land Productivity in South Sulawesi



**Figure 10** Sales location of TSP (a) based on its distribution; (b) based on the classification as a sago producing area; (c) based on the location

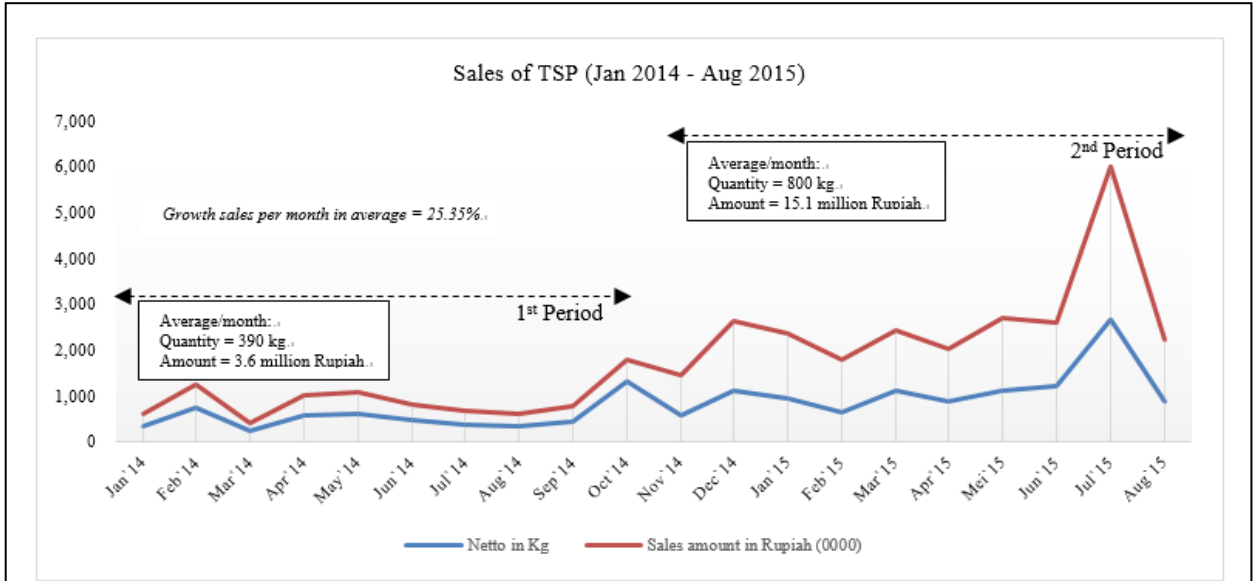
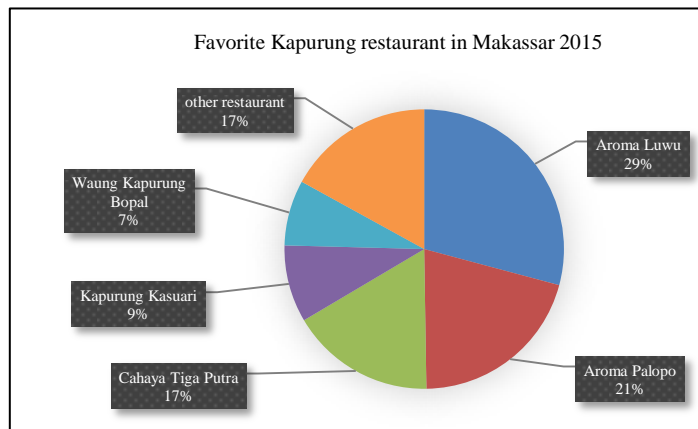


Figure 11 Sales of TSP for 20 months from Jan 2014 to Aug 2015



Source: Makassar Terkini Magazine in Facebook account of ALKR [27]

Figure 12 Favorit Kapurung restaurant in Makassar 2015 [33]

## Tables

**Table 1** Budget of Local Food Diversification Program (MP<sub>3</sub>L)

Crops	Budget in IDR Million			
	2012	2013	2014	2015
Sago	1,050	350	-	3,850
Maize	1,050	2,450	-	1,750
Cassava	1,750	2,450	1,400	2,450
Taro	-	-	-	350
<b>Total</b>	<b>3,850</b>	<b>5,250</b>	<b>1,400</b>	<b>8,400</b>
<b>Grand Total</b>	<b>18,870</b>			

Source: MA Trisia, 2015 [37]

**Table 2** Sago production and area by Regency in South Sulawesi (2006-2013)

Area Year	Luwu Timur Regency		Luwu Utara Regency		Palopo City		Luwu Regency		Bone Regency		Selayar Regency	
	Area (ha)	Prod. (ton)	Area (ha)	Prod. (ton)	Area (ha)	Prod. (ton)	Area (ha)	Prod. (ton)	Area (ha)	Prod. (ton)	Area (ha)	Prod. (ton)
2006	59	83	1,586	1,686	508	2,270	1,420	10,487	274	814	13	2.7
2007	99	158	1,836	361	942	131	1,840	11,116	274	814	13	2.3
2008	99	193	1,587	268	942	252	1,462	125	274	816	9	2.2
2009	101	175	1,589	267	634	440	1,462	164	274	408	7	1.1
2010	102	166	1,589	277	603	77	1,905	1,462	274	408	7	1.0
2011	136	196	1,589	277	592	90	1,462	151	274	408	6	1.0
2012	137	189	1,589	277	551	98	1,462	329	131	107	13	2.6
2013	137	83	1,635	1,336	552	85	1,473	475	274	59	3	1.0
<b>Average Production</b>	155 ons/year		594 tons/year		430 tons/year		3,039 tons/year		479 tons/year		1,7 tons/year	

Source: Department of Plantations, South Sulawesi, 2015