Utilization of mocaf flour (modified cassava flour) for revitalization of the use tapioca flour in communities for empowering hulu-hilir human resources in wonogiri regency

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Abstract: Mocaf flour is a flour made from cassava or cassava which is modified by using microbial fermentation techniques. Mocaf flour has characteristics that are good enough to substitute or replace 100% use of wheat flour. Compared with unfermented cassava flour or cassava flour, mocaf flour has a better quality, which is whiter and the cassava aroma is lost. In cassava flour products without fermentation or cassava, the color is less white (blackish brown) and often musty odor is very strong so that when applied to the product, the performance of the product is less attractive and there is still a distinctive aroma of cassava. This often makes the food processing industry which is made from cassava or cassava flour becomes less satisfied. The findings of modified cassava flour (mocaf) in which the characteristics of mocaf flour are whiter and the aroma of cassava has been lost so that substituting flour does not reduce the quality of the product if the proportion of its use is in accordance with the type of product.

1. Introduction

Cassava is a plant that is easy to grow, besides the risk of harvest failure is very small. Unless the plant is damaged because of external factors (other than pests). Nevertheless production and productivity are low, even often low-income cassava farmers. Cassava farmers as producers who cannot determine market prices. Cassava farming conditions in Indonesia are currently declining, even Indonesia as an agrarian country is now the largest importer of tapioca flour in the world, whereas the Indonesian Government has targeted cassava farming to increase to 30 million tons by 2025 (Government Regulation No.5 / 2006). Production of 1.1 million tons per year. This achievement should be a representation that the welfare of farmers is also increasing, but this achievement is not balanced with an increase in the economic value of the commodity, the high production is precisely accompanied by a decline in prices on the market. As a gaplek center area in Central Java, with production reaching more than 2.5 million 13 tons per year. Cassava as a food source for carbohydrates replacing rice, processed through industrial development with a process of dehydration. Industry with hydrolysis process depends on hot weather (Karyanto and Triharyanto, 2015), it takes 3 days for drying. The quality of gaplek is indicated by the color of the white meat is clean and crisp white.

The quantity and quality of dried cassava is influenced by the availability of cassava, generally the cassava crafter is a member of the farm family. Marketing is done by selling to collectors or middlemen. Food processed products made from cassava are Tiwul rice. Currently dried cassava flour including the items (most wanted) most sought number two after wheat flour. About 60% of the market cannot be fulfilled by producers of cassava flour. Plant cassava (cassava) for the majority of the people of Wonogiri Regency is the main crop other than rice. Worth it if Wonogiri is known as the City of Cassava (dry cassava) considering the cassava production potential is so large. The Wonogiri Regency Government gave priority to its development. The policy taken was to empower cassava farmers with the help of superior seeds, training in cassava cultivation and in assisting with time patterns that matched the rainfall data released by BMKG (the Meteorology, Climatology and Geophysics Agency). It is hoped that this step
will increase cassava production from 16 tons / ha to 90-100 tons / ha. Based on the research, the content of cassava starch produced from Wonogiri Regency is quite high, reaching 35% with a dryness rate of 14%. Thus, cassava plants are indeed feasible to be developed as one solution to the alleviation of the Wonogiri people from poverty (2009 Wonogiri Regency BPS Data).

Administratively, Wonogiri Regency is divided into 25 sub-districts with 251 villages and 43 villages and 2,306 hamlets / neighborhoods. The location of the farthest sub-district is Paranggupito Subdistrict from the Regency capital as far as 68 km, the closest sub-district to the Regency capital is Selogiri District. Sub-district 13 Puhpelem which has an area of 3,162 ha is the sub-district that is the narrowest of its territory, while the most extensive sub-district is the Sub-district of Pracimantoro with an area of 14,214.3 ha. While Karangtengah Subdistrict is the highest sub-district located at an altitude of 600 m above sea level and the lowest is Selogiri District which is at an altitude of 106 meters above sea level.

2. Methods
This research is survey research. According to Fraenkel and Wallen, 1990 survey research is research that collects information from samples by asking through questionnaires or interviews so that later describes various aspects of the population. Siregar (2013) argues that population is used to describe a group of objects that are subject to research. The population of the study was the area (cassava field) and tapioca industry. Then, the sample is a data collection procedure where only a portion of the population is taken and used to determine the desired characteristics and characteristics of a population (Siregar, 2013).

This study uses sampling techniques from cassava clusters and simple random sampling in tapioca industry. This study uses descriptive quantitative data analysis techniques, and spatial analysis. For survey locations conducted in Wonogiri District for the highest productivity cassava plantations are in the sub-district. It is one of the sub-districts to the south of Gajah Mungkur Reservoir which has a flat topography compared to other Wonogiri regions. This causes the highest area of cassava plantations in Pracimantoro Subdistrict among the other Subdistricts. broadly in 2016 that is 6,566 hectares, and the same in the previous year. so there are not too many changes to the land area of cassava plants in Pracimantoro District. However, in terms of productivity, it is not too big because in Pracimantoro the area is famous for being barren and dry. So that cassava plants cannot grow optimally.

3. Results and Discussion

3.1 Spatial Analys
Frank Debenham (1950) argues that geography is a field of science that has the task of conducting interpretations about the distribution of facts, finding relationships between human life and the physical environment, and explaining the power of interaction between humans and nature so that it is necessary for human life with nature because Geography is Natural science Spatial analysis is a technique or process that involves a number of calculating functions and evaluating mathematical logic that is carried out on spatial data in order to get extraction, added value, or new information which is also spatially based, because of its wide scope.

Many topics can be This is also the case with ArcGIS which is rich in spatial functions. In reviewing these aspects, a geographer is very concerned about the factors of location, distribution (distribution), interrelations and their interactions. One example of a spatial approach is an expensive piece of land because the land is fertile and is located on the side of the road. In this example, the first is to assess land based on agricultural productivity, while the second assesses land based on the value of its space, which is a strategic location.

3.2 Spatial Distribution Pattern
The definition of location is the location, place or placement of an object, the state on the surface of the earth. Location is a place where ordinary people visit. The location in relation to marketing is a special and unique place where it can be used to shop. So it can be concluded that the intended allocation is a fixed location or place where people can visit to shop, the place is a shopping area or a bark stand or
counter in inside or outside the building. Strategic location affects a person in creating a desire to make a purchase because of its strategic location, located in the flow of business, and so on. According to Teguh Astriyanto, a more pragmatic way of choosing a location uses the following three rarities: First, choosing a region (region) in general. For this there are five factors as a basis, namely (1) close to the market, (2) close to raw materials, (3) availability of transportation facilities, (4) guaranteed public services such as electricity, water, fuel and (5) climatic conditions and pleasant environment. Second, choose a particular community in the area chosen at the first level election. The choice is based on six factors: (1) the availability of sufficient labor in the number and type of skills needed, (2) cheaper wage rates, (3) the existence of supplementary or complementary companies in terms of raw materials, production, labor and the required power, (4) good cooperation between existing companies, (5) supporting regional regulations, and (6) pleasant conditions of community life. Third, choose a particular location. The main consideration in this step is the matter of land. Is there enough land loose for buildings, courtyards, parking lots and should not be forgotten about the possibility of expansion.

3.3 Cassava Distribution in Wonogiri Regency

The quality and quantity of cassava sweet potato productivity is influenced by many things, ranging from geographical conditions, land area, soil type, fertilization, and pests and diseases. Cassava can be attacked by nematode pests and cause diseases that cause plants to become damaged. As for being able to maximize optimal production of cassava, rainfall is 150 to 200 mm at the age or age of 1 to 3 months, 250-300 mm at the age of 4 to 7 months, and 100-150 mm in the phase before and during harvest (Wargiono, 2006; Banowati, et al., 2016; 2017).

Pracimantoro Subdistrict is one of the Subdistricts located south of Gajah Mungkur Reservoir which has a flat topography compared to other Wonogiri regions. This causes the highest area of cassava plantations in Pracimantoro Subdistrict among the other Subdistricts. broadly in 2016 that is 6,566 hectares, and the same in the previous year. so there are not too many changes to the land area of cassava plantations in Pracimantoro. However, in terms of productivity, it is not too big because in Pracimantoro the area is famous for being barren and dry. So that cassava plants cannot grow optimally. For the height in the District of Pracimantoro ranges from 200-400 masl and with a flat relief. The productivity of cassava plants in Pracimantoro District is 112 -177 Quintal / hectare of data from 2012-2017 and is fluctuating.In terms of productivity, it is also classified as an intermediate condition compared.

![Figure 1. The Extent of Land for Cassava Harvest in Wonogiri Regency in 2017](image-url)
The district of Jatipurno in 2017 has the ability to produce cassava which is lowest compared to other districts. This sub-district is topographically located on the slopes of Mount Lawu on the south side. So the altitude is very varied between 500-1500 masl. In quality, it can be calculated that each hectare of cassava is only able to produce around 145 quintals / hectare. This is because the land planted with cassava is rather steep so the quality of cassava production is also low. In this case the District of Jatipurno as a whole does not have the ability to produce cassava according to data for 2017. Nadirojo sub-district has the highest ability to produce cassava in Wonogiri Regency in 2017 with 252 quintal / hectare.

3.4 Process of making mocaf flour (Modified Cassava Flour)

1. How to make mocaf flour easily, peel the cassava from the skin.
2. Clean cassava using clean water and make sure the mucus that is between the skin and the tuber meat is also clean. Cleaning can be done by brushing the surface of cassavatubers.
3. Cut pieces of cassava as thin as possible, this is intended to speed up the drying process later.
4. Soak cassava in clean water for a minimum of 2 days 2 nights, this process will produce tapioca flour deposits. Separate the flour and dry it for the next purpose.
5. During the immersion process, water must be replaced at least once every 24 hours or better 12 hours, if no flour will leave a smell like the smell of submerged rotten cassava.
6. Lift cassava from the marinade and dry it until it is completely dry with a moisture content of approximately 10%, the characteristics of cassava begin to decay / brittle
7. It's time for the grinding process, if there is no grinding tool we can also pound it using mortar, but the process is longer.
8. Mashed cassava sifted with flour sieve, this tool is widely sold in shops where household appliances are sold. The rest of the sieve can be ground again until completely smooth.
9. Combine sieve flour with tapioca flour obtained from soaking and drying it again until it is completely dry
10. MOCAF flour is ready to use, if not used directly store in tightly closed containers / plastic.

3.5 Characteristics of mocaf production in wonogiri district

Wonogiri is one of the regions chosen by the central government to develop cassava or cassava. This is realized in the form of food processing equipment for processing four types of products with cassava raw materials, namely mocaf flour (modification of cassava flour), dry noodles, rice, and macaroni. Of the four types of products, only mocaf flour is still in demand by the community while dry noodles, rice and macaroni products are too expensive and inefficient.

At the household level, farmers in Wonogiri chose to plant cassava because of the suitability of the existing land with the condition of growing cassava. The second reason is the ease of technology in planting cassava, which is only with stem cuttings, not requiring special seeds. The next reason is the ease of access to marketing, namely by direct sales to the factory. The main problem of cassava cultivation is uret and termite pests. This pest will attack the roots so that the plant cannot grow properly and production is not optimal.

3.6 The upstream-downstream industry pattern for cassava farmers in Wonogiri district

Simply put, the marketing channels that are formed are as follows:
Channel 1: farmers → mocaf flour processing companies → food companies → retailers → consumers
Channel 2: farmers → collecting traders → processed mocaf flour → food companies → retailers → consumers. In general there are still some problems in marketing cassava, including: 1) production of farmers' cassava is not continuous. This problem is faced by companies where the production of farmers is only available in the dry season while in the rainy season the production of cassava is low so the company finally buys cassava production from the areas of Ponorogo and Pati, 2) storage facilities are less than optimal. Poor storage at the farm level causes low quality cassava, so the selling price is low. The same thing is also experienced by traders. As for the company, the problem of storage is a small warehouse so that it cannot store the entire harvest of cassava from farmers, 3) standardization is not going well.
The problem of product standardization at the level of farmers and traders actually becomes a demand from the company. But in reality, the two marketers pay less attention so sometimes the cassava that enters the company is still in a state of high water content. Whereas in the company, sorting is done quickly, that is, only seeing the levels of aci in cassava.

4. Conclusion
In the various problems that can be concluded that for the production of Mocaf flour (Modified Casava Flour) there are still many things that must be considered, among others, regarding the pattern of Mocaf production which is very dependent on raw materials. Because most cassava farmers in Wonogiri Regency plant cassava at the same time or during the rainy season and they harvest also in the dry season. For their assumption that because in terms of harvesting them together at the same time when they use cassava, the price will decrease due to the abundant production stocks on the market. For the superiority of mocaf flour itself Mocaf flour has a different nutrient content with wheat flour. The difference in the basic nutrient content is, that mocaf flour does not contain gluten-substances that only exist in flour that determines food elasticity. Therefore, it is necessary to pay attention to the percentage of the use of mocaf flour to substitute flour according to the type of product, so as not to change the quality of the product. Mocaf flour has little protein while wheat flour is rich in protein. Mocaf flour is richer in carbohydrates and has a lower gelation than wheat flour.

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References
[1] Banowati Eva dkk 2017 Revitalisasi Industri Tapioka Terintegrasi Pemberdayaan SDM Hulu-Hilir Untuk Realisasi Swasembada Pangan Laporan Kemajuan Penelitian MP3EI Semarang LP2M UNNES
[2] BPS 2016 Tanaman Pangan Wonogiri BPS
[3] Daryanto Arif 2004 Keunggulan Daya Saing dan Teknik Identifikasi Komoditas Unggulan dalam Mengembangkan Potensi Ekonomi Regional. Agrimedia Volume 9 No 2 ISSN: 0853-8464
[4] Hanggara Dwiyudha Nugraha, Agus Suryanto dan Agung Nugroho 2015 Kajian Potensi Produktivitas Ubikayu (Manihot esculenta Crant.) di Kabupaten Pati. Jurnal Produksi Tanaman Volume 3 Nomor 8 Desember 2015 hlm 673-682
[5] Muta"ali Lutfi 2015 Teknik Analisis Regional Untuk Perencanaan Wilayah Tata Ruang dan Lingkungan Yogyakarta BPFG Universitas Gajah Mada
[6] Sunyoto dkk 2014 Pemberdayaan Masyarakat Kec. Gunungpati Melalui Peningkatan Produktivitas Kualitas dan Diversifikasi Produk Pasca Panen Laporan Pengabdian Masyarakat Semarang LP2M UNN