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Economic Study of Non-Rice Consumption in Supporting Food Security (Study in Muna Regency of Southeast Sulawesi, Indonesia)

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Abstract: ***Goals to be achieved in this study are: (1) identify alternative consumption utilized by the community as a staple food that is hygienic and economical, (2) assess the economic consumption of non-rice (corn, tubers, etc.). This is an alternative in support of food security as a staple food in Muna South East Sulawesi Province. The expected benefits of this research: that is for the people, can be useful to find and exploit the non-consumption of rice as an alternative food that is hygienic and economical. For the government benefits that can be obtained as a basis for decisions or policies in support of food security. As for scientists to be useful as an application of economic theory in connection with the discovery of non - rice consumption. The method used in this study is a participatory approach and FGD (Focus Group Discussion) with people who use non-rice consumption. While analysis tools used is descriptive qualitative and quantitative. Include a qualitative descriptive study/picture of the condition of the people who use/non – rice foods are hygienic and economical (saving). While the quantitative study of the idea of the dependent variables and independent of factors that affect the public in non-rice eating (other than rice). The results showed that the strategic crops other than rice as an alternative consumption are cassava, sweet potato, taro, corn and plant gamily. Based on the economic perspective that the production, price, nutritional content and marketing of alternative foods (cassava, sweet potato, taro plant, corn, and gembili) has a difference compared to rice. Sufficient quantity abundant, the price is quite low, contain high levels of healthy nutrition for health and extensive marketing network, so that these plants need to be preserved which in turn can further support the Indonesian national food security.***

Keywords: Non-Rice Consumption, Food Security

1. Introduction

As a country with large population and a very wide area, food security is an important agenda in Indonesian economic development. The occurrences of insecurity food become a very sensitive issue toward the dynamics of social and political life in Indonesia.

Development of food security in Indonesia confirmed in the Food Act No. 7 of 1995 on Food and PP number 68 of 2002 on Food Security. Food security is a condition for the household food needs are reflected in the availability of adequate food, good quantity and quality, safe, equitable and affordable (BBKP, 2003). Martianto and Ariani (2004) showed that the proportion of household food energy deficit in each province is still high. Related to it, diversification became one of the main pillars in achieving food security.

To reduce the current consumption of rice has increased the price from year to year, one of the alternatives that do, especially people in Muna South East Sulawesi province by relying on local commodities such as tubers, corn, and other. This is supported by Palimbong (2010) state that basically carbohydrate, protein, nutrients, and minerals contained in the chemistry of cassava, corn, breadfruit and yams. Especially for cassava not only used the tubers, but is leaves also have excellent benefits as veggies.

In the middle of conditions that has described above, it becomes very interesting if there is an area that has been successful independent on the rice. Community in Muna is one area that has a level of productivity of corn and cassava (kahitela and Kabuto), the largest in Southeast Sulawesi. Thus, it is necessary to learn how the local conditions, especially the attitude of the community to serve as examples or consideration in the application of food diversification in other areas. This research examine how patterns of consumption in Muna Southeast Sulawesi province toward rice that had been considered as a staple food of Indonesian society in general and corn (kahitela) and cassava (kabuto) which became the staple food of some people in Muna Southeast Sulawesi Province.

2. Literature Review

Legal Basis of Food Security

Some of the legal bases on which become the base efforts on creating national food security are:

1. The law of the Republic Indonesia in 1945 mandating to the state organized to be able to provide assurance to the people to survive in physical and spiritual prosperity. The mandate of which are reflected in Article 28 A, paragraph 1 of the Republic of Indonesia Constitution in 1945, the second Amendment and Article 34 of Republic of Indonesia Constitution 1945.
2. The Law number: 29 of 1999 on Human, article 9, paragraph 1
3. The Law No. 7 of 1996 about Food.
4. International Convention which Indonesia is one of country that affirms its commitment to the development of food, nutrition and health.

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The Definition of Food Security Systems

Definition of food security by PP No. 68 in 2002: the fulfillment of food conditions for households which is reflected in the availability of food in adequate of quantity and quality, safe, equitable and affordable. From the above it appears that the unit goal of food security is the household (including individuals). Not only quantity aspect that need to note, however other aspects such as food quality, availability and affordability of continuity are also considered. In terms of economics, continuity and affordability (price aspects) may mean that the concept of food security to contain the contents of justice. The mandate that include on the terms of proficiency level is good food to be available on an ongoing basis up to all levels of society.

Rice

Rice (*Oryza sativa*) is a part of grain which has been separated from it husks. Husk (Indonesia: *Sekam*) are anatomically called 'palea' (part that covered) and 'lemma' (part of the cover). Rice mainly used for processing into rice, the most important staple food in the world. Rice also used as an ingredient in a wide variety of food and pastries that are primarily derived from glutinous, including to be tape (*tape*). In addition, rice also as an important component for kencur medicinal rice and *param*. The popular beverage derived from rice is wine and *rainw*ater. In food industry, the rice is processed into rice flour. Siobhan of rice (aleuronic layer), which has a high nutritional content, processed into bran flour (*rice bran*). The part of it embryos also processed become food supplement that called as floor of rice eye. Rice flour is used as a source of gluten-free food in the form of pop corn to the diet. Indonesia achieved self-sufficiency in rice in 1984.

3. Research Method

This research will be conducted in Muna which includes 33 sub-districts in Muna Regency. The Selection of this study based on purposive sampling method with the consideration that the region is a potential farms and plantations.

The type of data that required on this study consists of secondary and primary data.

1. The secondary data collection and observations obtained through the documents results of the research, legislation, village and district documents, BPS, Agriculture Department, and the relevant agencies.
2. The primary data obtained through direct observation of the research object in the field to get an idea of the natural environment and agricultural community condition.
3. Interview to the farming community as respondents of primary data to determine the conditions of socio-economic and it problems. Respondents who will be involved in decision-making are the competent stakeholders in decision-making, regarding the governance of natural resources. The type of data and information needed in every region around the village of mining areas, among others:
4. The potential of land resources and their utilization in rural areas of agriculture, plantations.
5. The variety of socio-economic and demographic village, the data includes: age, gender, livelihood, education level, and income level of the family, ownership and use of land, the land area under cultivation, production levels, the use of production tools, labor and it problems in the agricultural business.
6. The potential of local institutions and legislation related to regional development policy.
7. The response of all stakeholders and the public on the governance and land use around the farm area.

To determine the potential villages that may include on the subject of research, so that, researcher use Participatory Rural Appraisal (PRA) method that is a technique to indentify agricultural commodities non-rice that are operational in development at the village level to develop the resource potential of the land area around the farm.

Respondent determined based on purposive sampling method that based on the determination to the respondent certain considerations in accordance to the purpose of research (Juanda, 2009). The target population of this study is the farming community in Muna. While respondents who plays a determinant of policy or decision is determined based on the interests and objectives of the research. The number of respondents in the socio-economic community data collections based on population size and diversity of the population nature. According to Juanda (2009), 30 respondents is the minimum number especially when using a statistical calculation. Based on these opinions, the social data collection in each district conducted in-depth interviews with respondents propulsive taken based on the purpose of research is the development of land use in non-rice agricultural commodities.

Analyzer that used in this research is descriptive qualitative and quantitative. Qualititative descriptive is scientific studies /practical qualitatively about quantitative descriptive of non-rice commodities in Muna Regency. Quantitative methods in this study were based on statistical or mathematical formulation of non-rice commodities in Regency Muna. This quantitative descriptive also can create models or statistical formulations (mathematics) concerning the development of agricultural sector and the plantation subsector of horticulture in Muna Regency.

4. Results and Discussion

Based on the observation relate to the variety of foods as substitution to non-rice consumption in Muna Regency of South East Sulawesi province societies, it can be described as follows:

4.1 Cassava (*Manihot Esculenta)*

Production

One of crops that planted by societies in Muna Regency of South East Sulawesi Province is cassava. Cassava is one of commodity beside rice in Muna Regency South East Sulawesi Province. Generally, harvested area and production

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of cassava crops from year to year experience fluctuations. More details can be seen in the following Table 1.

Table 1: Harvest Area and Cassava Production

Category	Years				
	2009	2010	2011	2012	2013
Harvest Area (Ha)	1.892	1.599	1.505	1.445	1.400
Production (ton)	36.430	27.303	27.221	26.321	25.350

Source: BPS (Muna Regency, 2014)

Based on the table above, it shows that the size and number of cassava production has decreased. This is because the area (land) of cassava is used as a residential area of the community, so that getting decrease from year to year.

Price

The prices of cassava commodity in Muna Regency South East Sulawesi Province is rise high enough, along with the increasing needs of cassava flour as raw material in various factories in Indonesia. The request of cassava from some factory is very much, it caused the price is getting increase and average trader can send to the factory up to tens of tons per day from Muna Regency of South East Sulawesi Province. Based on Central Statistics Agency (BPS), the price of cassava factory standard quality at Rp. 863.00/kg, which was originally Rp.780/kg. Then, the price of cassava at random traders is Rp. 855/kg, which previously Rp. 765/per kg. The increase of the cassava price is quite high ranging between Rp. 800-Rp. 1,000/kg.

Nutrient content and health benefits

Cassava is one of tuber crops which have several names such as manioc. The Latin name Cassava, or manioc is *manihot utilisima* from *Euphorbiaceous* tribe. Cassava is a staple food that known as an alternative source carbohydrates other than rice. The leaf of cassava commonly used as vegetable or *lalapan*. Beside as a good source of carbohydrates, cassava also contains high fiber.

Cassava commercially grown in Indonesia (then the Dutch East Indies) at about 1810, having previously introduced the Portuguese in the 16th century to the archipelago of Brasil. Several of food preparations with a basis of cassava began to appear, such as *tape*, chips and bread. Here is the nutritional content of cassava and its benefits for the health of our bodies.

Table 2: Nutrient Content of Cassava (Per 100 Gram)

No.	Substance	Nutrition
1	Energy	146 Kal
2	Carbohydrates	34,7 g
3	Protein	1,2 g
4	Fat	0,3 g
5	Iron	0,7 mg
6	Calcium	33 mg
7	Phosphorus	40 mg
8	Vitamin C	30 mg
9	Vitamin B	0,06 mg
10	Water	62,50 g

Source: List of Substances content Nutrition Food, 2014

Marketing

The cassava products in Muna Regency South East Sulawesi (Sulawesi), are now beginning to go the between regions market, especially Buton, Bau-Bau and Kendari to meet one of the basic needs of the people in South East Sulawesi. In addition to the regional marketing of South East Sulawesi, also can be sold on inter province in Sulawesi, even in Java, where cassava can be processed into starch.

The situation regarding to the cassava image in Muna Regency South East Sulawesi can be seen in the following Picture 1.



Picture 1: Cassava (Latin: *Manihot Esculenta*)
(Local Muna: *Mafusau)*

4.2 Sweet Potato Plant (*Ipomoea Batatas)*

Production

Sweet potatoes food is one of commodities instead of rice that consumed in Muna Regency South East Sulawesi province and include on one of the mainstays food in Regency Muna South East Sulawesi Province. Generally, harvested area and production of sweet potato from year to year also experience the fluctuations. It can be seen in the following Table 3.

Table 3: Harvest Area and Sweet Potato Production

Category	Years				
	2009	2010	2011	2012	2013
Harvest Area (Ha)	1.018	1.124	786	1.112	870
Production (ton)	7.923	9.430	6.462	8.320	6.750

Source: BPS (Muna Regency, 2014)

Based on the table above, it appears that the land area (harvest) and the production of sweet potato crops in Muna is fluctuate, even declining. This happens because of the increasing number of land that used for settlements.

Price

Commodity Futures Trading Regulatory Agency (Bappepti) Ministry of Commerce noted the close of trading on the CBOT (Chicago Board of Trade) sweet potato futures prices getting rise. In the analysis of price developments, Bappeti released sweet potato prices for delivery in July 2013 closed higher by 4.4 points, or at the level price of 736.4 US dollars per bushel.

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The price of Potatoes increases affected a US Department of Agriculture report that lowers production estimates and reserves due to the influence of US Potato weather. While, farmers in South East Sulawesi has not enjoyed to the sweet potato prices because they bought at low prices.

Beppeti report states that the price of sweet potatoes at harvest just bought at Rp 1,500 - Rp 1,700 per kilogram by the merchants. Whereas the price recorded in the market is sold average Rp 3,500 - Rp 3,700 per kilogram. Farmers forced to sell sweet potatoes at low prices because they have to cover a number of production facilities and households. Meanwhile, the price of sweet potatoes at the retailers' level in Muna Regency South East Sulawesi (Sulawesi) remained stable around Rp 4,000 per kilogram. While the sweet potato in wholesale inventories still enough (informant Muna Regency Southeast Sulawesi Province, 2013).

Nutrient content and health benefits

Ingredients Nutrition and sweet potatoes include on one of kind of plant that popular in Asia and Afrika. A sweet potato tree glacially resembles to kale tree, but it grows in dry soils which also have flowers and roots form a tuber. Various foods can be made with sweet potato, in which one of the popular ones is sweet potatoes chips. A sweet potato chip has many benefits and nutritional value such as carbohydrates that can be as a source of energy, vitamin A (beta carotene), vitamin C, vitamin B1 and B2. The content of beta-carotene (vitamin A) on sweet potato including quite high compared to the other food ingredients, vitamin A is good for the health of the retina of eyes.

Marketing

Sweet potato products in Muna Regency South East Sulawesi (Sulawesi), are now beginning to go the between regions market, especially Buton, Bau-Bau and Kendari to fulfill one of the basic needs of people in South East Sulawesi. In addition, some are sent to Makassar and partly sold away to Java Island.

The situation regarding sweet potato images in Muna Regency of South East Sulawesi Province can be seen in the following Picture 2.



Picture 2: Sweet Potato (Latin: *Ipomoea Batatas*) (Local Muna: *Medawa)*

4.3 Taro Plant (*Caladium Sp)*

Production

Taro is one of the tubers that live in South East Sulawesi, especially in Muna Regency South East Sulawesi Province. This plant is one of the ingredients for public consumption of Society in Muna Regency. Besides that, taro also include on a rice substitute commodity in Muna Regency. Generally, harvested area and production of taro plant from year to year also experience the fluctuations. This condition can be seen on the following Table 4.

Table 4: Harvest Area and Taro Plant Production

Category	Years				
	2009	2010	2011	2012	2013
Harvest Area (Ha)	282	235	163	185	172
Production (ton)	222	269	171	179	167

Source: BPS (Muna Regency, 2014)

Price

A commodity price of taro in Muna Regency of South East Sulawesi Province is still low. Based on data in BPS the price of taro for factory standard quality at Rp. 630/kg, which originally Rp780/kg. Then, the price of taro at the merchant level has increased by Rp 855 / kg, which is Rp 765 / kg. The increase of taro price is low enough it range at Rp70-Rp100/kg, so the price, can penetrate up to Rp1.200/kg.

Nutrient Content and Health Benefits

Taro is one plant that has much content of nutrient. The nutrient content can be seen on the following table 5.

Table 5: Nutrient Content of Taro (Per 100 Gram)

No.	Component	Content
1	Water (g)	24
2	Calorie (cal)	307
3	Protein (g)	7.9
4	Fat (g)	3.4
5	Carbohydrate (g)	63.6
6	Ca (mg)	9
7	P (mg)	148
8	Fe (mg)	2.1
9	Vitamin A (SI)	0
10	Vitamin B1 (mg)	0.33
11	Vitamin C (mg)	0

Source: Data from national nutritional content, 2014

Marketing

Taro products in Muna Regency South East Sulawesi Province are now beginning to go in between regions market, especially Buton, Bau-Bau and Kendari to fulfill one of the basic needs of people in South East Sulawesi. Besides that, some are sent to Makassar and partly sold away to Java Island. The situation regarding to taro plant images in Muna Regency of South East Province can be seen in the following Picture 3.

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Picture 3: Taro Plant (Latin: *Caladium Sp*)
(Local Muna: *Tonea)*

4.4 Corn (*Zea Mays)*

South East Sulawesi is one of the corns producing areas that considerable potential. One of corn planting area in South East Sulawesi is Muna Regency with productivity about 2.15 ha (Department of Agriculture Muna, 2014). The low of productivity partly caused by soil fertility problems, the low of improved varieties using and crop management also the environment that have not been carried out intensively through available technology (Muliadi A. 2003).

Production

Corn production in Muna Regency South East Sulawesi Provinces is one of mainstay food and include on one of icon after paddy. Generally, harvested area and production of corn plant from year to year also experience the fluctuations. This condition can be seen on the following Table 6.

Table 6: Harvest Area and Corn Production

Category	Years				
	2009	2010	2011	2012	2013
Harvest Area (Ha)	13.698	19.532	14.021	17.312	13.175
Production (ton)	35.541	49.263	32.679	42.017	30.272

Source: BPS (Muna Regency, 2014)

Based on the table above, it shows that the number of corn crop production experience the fluctuations. This is caused the decreasing of corn crop in harvested area in which in 2010 amounted to 19.532 hectares decrease to 14.021 hectares in 2011. Additionally in 2013 also experience the decreasing because most of the land for corn planting was settled by community. The highest growth of food production in Muna is corn that approximately 48.06 percent of corn production in South East Sulawesi.

Price

Commodity Futures Trading Supervisory Board, Thursday (15/9/2011) reported trading price of corn in CBOT (*Chicago Board of Trade*) is closed in a position to rise. The price increase is influenced by their predictions about the amount of corn production in 2011 issued Agriculture Department of US, states that US corn production this year will be decrease 57 million bushels (1 bushel = 35.239 liters) to 12.497 billion bushels, compared to last year's production.

In addition, the increase of corn price also caused by the impact of crude oil prices rising, which sparked speculation the increasing of corn need as ethanol feedstock. Corn futures for September 2011 delivery closed at 713 dollars per bushel or higher 3.6 points. Meanwhile, corn prices at the retail level in Kendari, Southeast Sulawesi stable at Rp 4,000 / kg. Dry corn is still supplied from Muna as the center of corn producer in South East Sulawesi.

The supplies of corn local production are not enough to meet demand of milling and livestock in this area, and only able to meet the individual needs to be consumed, so it must be supplied from outside the South East Sulawesi.

The Nutrient Content and Health Benefits

In Indonesia, there are two varieties of corn that have been planted in general, ie yellow and white corn. The substances content of yellow and white corn are presented in the following Table 7.

Table 7: Nutrient Content New Harvest Yellow Corn (100g)

No.	Component	Content
1	Water (g)	24
2	Calorie (cal)	307
3	Protein (g)	7.9
4	Fat (g)	3.4
5	Carbohydrate (g)	63.6
6	Ca (mg)	9
7	P (mg)	148
8	Fe (mg)	2.1
9	Vitamin A (SI)	440
10	Vitamin B1 (mg)	0.33
11	Vitamin C (mg)	0

Source: Data from national nutritional content, 2014

The part of corn that rich in carbohydrates are the seeds. Most carbohydrates are in endows premium. Carbohydrates content can reach 80% of the dry seeds. Carbohydrates generally in the form of starch a mixture of amylase and amilopektin. In corn glutinous, most or all of the starch is amyl pectin.

Corn plants are very useful for human and animal life. In Indonesia, corn is the second most important food after rice. In Madura, corns are used as main food. Recently the use of corn plant is getting increase. All of corn crop are pointless, because almost all parts of the plant can be used for various purposes, among others:

a. Young stems and leaves: fodder
b. The old (after harvest) of Stems and leaves: green manure or compost
c. Dry stem and leaf: firewood
d. Corn stalks: trellis (pillar)
e. Corn stalks: pulp (paper material)
f. Fruit corn (putren, Jw): vegetables, barged, fry sauce
g. Old corn kernels: a substitute for rice, morning, popcorn, corn bread, flour, rice noodles, a mixture of ground coffee, biscuits, pastries, fodder, raw materials of beer industry, pharmaceutical industry, dextrin, adhesives, textile industry.

So beside as a source of carbohydrates, corn is also grown as fodder (forage and cob), extracted oil (from seed), made of

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flour (from seed, known as cornmeal or cornstarch), and raw materials industrial (from seed flour and cob flour). In addition, some studies show that the chemical compounds that contained in corn is beneficial for health, among others:

a. *Energy Giver Substance or Nutritional energetic Substances*
   Energy giver substances consist of carbohydrates, fats and proteins. Three of reviews these substances the oxidation process in the body that produce energy in the form of heat. The body will convert heat into mechanical energy or motion. The energy that generated is expressed in caloric units. Energy converted by the body into energy for muscle activity.
b. *Substance of Body tissues Shaper Cell or Plastic*
   Nutrients forming cells of body tissues consist of protein, minerals, protein and water. Although including energetic group, principally the function is to form the tissue cells.
c. *Substances of Nutritional as Regulatory Function and Biochemical Reactions in the body or substance of stimulant Nutrition*
   The content of nutrients/vitamins in corn functions similarly to the hormone. The different function is, hormone made in the body, while vitamins should be taken from food. Corn has a lot of energy content, vitamins, minerals and protein. The content of these substances can be used to build muscle cells and bone, build brain cells and the nerve system, prevents constipation, lowers risk of cancer and heart disease, and prevent hole tooth. The fiber of corn also can help the digestion.

According to other literature sources, corn is also believed to be a drug. The corn used is corn that can be found in traditional markets and supermarkets. Here are some types of diseases that can be addressed by corn, such as:

1. Launched of Urine, amount 50 g fresh corn hair washed boiled with 1 liter of water until the water a half. The potions drink twice daily.
2. Hypertension, handful of corn hair washed, boiled with 1 liter of water. The boiled water is to drink twice daily. After the blood pressure is decrease, this herb is still drunk once in a day.
3. Diabetes, a total of 50g of corn hair washed, boiled with 2 cups of water. Cooking water taken twice daily.
4. Mother's Milk Smoothing, some parents roasted corn kernels to crack and crisp. Eat as a snack, or the corn boiled alone.
5. Used as Smallpox Scars, amount 10 pieces of young corn shredded and bandage to Smallpox scars. Repeat for a few days.
6. Diarrhea, corn cobs washed and ground into powder. Pour into 1 cup of water. Then herb taken twice every day. The research result that conducted by Sukensri Hardianto, 1989. Faculty of Pharmacy, UGM on the effect of infusion of young corn cobs to the solubility of calcium kidney stones in vitro studies suggest that there is an influence of the infusion and potassium levels were dissolved in the solution, and calcium kidney stones has solubility greatest in young corn cob infusion with 5% levels. At higher levels of infusion solubility decreased. The part of corn that used is hair and young cobs, which can be used to treat: gallstones, kidney stones, dropsy in renal inflammation, abdominal edema, hepatitis, diabetes, gall bladder inflammation, cirrhosis, and high blood pressure. Here are the ingredients and measuring.
7. Empe Stone, remedy: 5 cobs of young corn, 5 grams of fresh cat's whiskers herbs, and 110 ml water. Directions: made infusion. How to use: Drink 1 time in a day as many as 100 ml. Duration of treatment: repeated for 14 days.
8. Kidney Stones, remedy: 4 cobs of young corn, 1 handheld of corn hair, 8 strands of porcelain Keji fresh leaves, and 110 ml of water. Direction: made infusion. How to use: drink 100 ml 1 time in a day. Duration of treatment: repeated for 14 days. After the stone out, either in the form of pebbles, granules or froth treatment is stopped, and then forwarded to drink herbs and Meniran of Cats Whisker.
9. High Blood Pressure, remedy: 5-7 cobs of young corn, 1 handheld hair of corn, and 110 ml of water. Directions: made infusion. How to use: drink 100 ml 1 time in a day. Duration of treatment: repeated for 7 days. Beware on the use of corn hair carefully because blood pressure can decrease quickly.

Corn cob can also be used as a basic ingredient of making xylitol. Xylitol is an intermediate in the metabolism of carbohydrates in the human body with a speed of between 5 to 15 grams per day. The chemical formula of xylitol expressed as CH_2OH $(CHOH)$ $_3CH_2OH$ with a molecular weight of 152.1. Xylitol can absorb into the body more slowly than glucose. Thus, the rise in blood glucose can suddenly block. Because of this reason, xylitol is also often used as a sucrose substitute for diabetics.

Another interesting thing of corn for health benefits is the presence of several studies that show that by consuming sweet corn that has been cooked can reduce the risk of suffering from heart disease and cancer. Expert medical experts from Cornell University have proven that eating sweet corn can increase the levels of antioxidants, although the level of vitamin C in the corn is reduced. The rate of oxidation is measured by its ability to ward off free radicals that cause damage to the body. Sweet corn can also increase the levels of ferule acid, which can prevent cancer.

Marketing

Corn Products in Muna Regency South East Sulawesi Province, are now beginning to enter the inter-island market of Java, especially in Surabaya and Bali to fulfill one of the corn flour manufacturing industry raw materials needs and also animal feed.

As early scarce, people in District Kabangka already conducted the inter island marketing of yellow corn by Tondasi ferry port to Makassar (South Sulawesi) and then send to Surabaya. In the presence of Tondasi ferry port, farmers who had only send their commodity in Buton and Kendari through a port in the city of Raha, but now by the presence of transportation can directly outside the region of Muna island such as Makassar and Surabaya.

During the Tondasi ferry port enabled, almost all agricultural products, plantation, fishery an immediate farms can be marketed through the port which is only not more than 20

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kilometers from Raha city. The condition regarding to corn in Muna Regency of South East Sulawesi Province can be seen in the following Picture 4.



Picture 4: Corn (Latin: *Zea Mays*)
(Local Muna: *Kahetela)*

4.5 Gembili (*Dioscorea Esculenta*)

Production

Gembili (*dioscorea esculenta*) is one kind of tubers that life in South East Sulawesi, especially in Muna Regency. This plant is one of public consumption ingredients. Besides that, is also a rice substitute commodity in Muna Regency? Generally, harvested area and plant production of Gembili (dioscorea esculenta) from year to year also experienced the fluctuations that can be shows in the following Table 8.

Table 8: Harvest Area and Gembili Production

Category	Years				
	2009	2010	2011	2012	2013
Harvest Area (Ha)	187	168	145	157	149
Production (ton)	176	189	171	175	163

Source: BPS (Muna Regency, 2014)

Price

The price of Gembili (dioscorea esculenta) crop commodity in Muna Regency South East Sulawesi Province is still low. Based on BPS data, the price of Gembili (dioscorea esculenta) plant for factory standard quality at Rp 530.00 /kg, from Rp 770/kg. Then, the price of Gembili (dioscorea esculent) in random stall level (traders) Rp 790/kg, which was previously Rp 760/kg. The increase of Gembili price is low enough, ranging from Rp 600- Rp 900/kg, so the price can penetrate up to Rp1. 100/kg.

Nutrient Content and Health Benefits

Gembili (dioscorea esculenta) is commonly consumed as foods by Indonesian people. Gembili (dioscorea esculenta) is one of plant tha has much nutritional content. The nutrient content of Gembili (dioscorea esculenta) can be described on the following Table 9.

Table 9: Gembili Nutrient Content (100 gram)

No.	Component	Content
1	Energy (cal)	95
2	Protein (g)	1.5
3	Carbohydrate(g)	22.4
4	Fat (g)	0.1
5	Calcium (mg)	14
6	Phosphor (mg)	49
7	Ze (mg)	1
8	Vitamin A (SI)	0
9	Vitamin B1 (mg)	0.05
10	Vitamin C (mg)	4

Source: Data from national nutritional content, 2014

Marketing

Gembili (dioscorea esculenta) products in Muna Regency South East Sulawesi Province are now beginning to go in between regions market, especially Buton, Bau-Bau and Kendari to fulfill one of the basic needs of people in South East Sulawesi. Besides that, some are sent to Makassar and partly sold away to Java Island.

The condition of Gembili in Muna Regency of South East Sulawesi can be seen in the following Picture 5.



Picture 5: Gembili (Latin: *Dioscorea Esculenta*)
(Local Muna: *Ghova)*

5. Conclusion

Economically, plants that cultivated by people in Muna Regency South East Sulawesi province in the form of cassava, sweet potato, taro, corn and Gembili (dioscorea esculenta) that beneficial for alternative to non-rice consumption in the context of national food security.

Economic studies on the consumption of non-rice alternative form of production, price, nutritional content and marketing experience the fluctuation. However, the situation of abundant production and the price is quite cheaper compared to rice, so that the reach of the community are fulfill.

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