

Local Wisdom of Sustainable Food Security at Binongko Island (A Study On Community Adaptation Strategies at Coastal Area and Small Islands)

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Abstract: - The study was motivated by the fact that Binongko as a region of coastal areas and small islands tend to have limited agricultural resources and access to food from outside. The limited problem that forced people to commit acts of adjustment so that the food needs can be met sustainably. Therefore, the research was conducted with the aim to analyze Binongko island community adaptation strategies for ensuring the sustainable food security systems. This study designed qualitatively using the phenomenological approach. Data collected through the study of literature, orientation, observation, interviews, and focus group discussions. Interviews were conducted at the informants who determined by *purposive* use the snowball system. Collected data were analyzed using the method of historical analysis. The results showed that the adaptation strategies of society in the food production system namely the amount of cultivated land of farmers is more than one place and processed in a relatively different. Farming activities carried by upholding the principles of local wisdom advantageous economic, social, cultural and ecological namely *pohamba-hamba*. In the food distribution system, adaptation measures do with differentiation of livelihoods through mechanisms time distribution, resulting in the stability of the flow of food supplies, both of in and outside the area. While the consumption system known presence of some adaptation measures such as habituation eat twice a day, side dishes substitution between fish and vegetables as well as techniques of food storage to remain durable. Based on these results, it can be concluded that the adaptation strategy by Binongko island community in ensuring food security in a sustainable system includes a system of agricultural production, distribution and consumption of food.

Keywords: - Resilience, Food, Strategy, Adaptation, and Binongko Island

1 Preliminary

Binongko island is one of the four important islands in Wakatobi archipelago of Southeast Sulawesi Province, Indonesia. Island with an area of 156 km²[1] included as the small island by Act No. 1 of 2014 which states that small island is an island with an area of less than or equal to 2,000 km² along with the unity of its ecosystem. Based on the geological map sheet Islands Iron Works Southeast Sulawesi scale 1: 25,000 in 1994 showed that the geological formations Wakatobi including Binongko island, grouped in geological formations

QPL namely mainland with the parent material types of coral and limestone rock that dominated the old latosol or podzolic soil. This condition generally indicates poor soil fertility due to low pH and organic matter, so it is not worth as farmland.

In such conditions mentioned above, Binongko Islands can still be referred to as an agricultural area for more than 50 percent of the population still works in agriculture today. The ratio of agricultural land and farmers in the 2010-2014 have average of 0.13 ha/farmer, which means that each farmer manages approximately 0.13 hectares of land. They cultivate food crops such as cassava, maize, sweet

potatoes, and peanuts. Production is determined by climate so that is not always there every year. Subsistence agriculture implemented at *kollo*¹ or on the sidelines of the rocks with the limited land of rock ruins results or plant litter which deliberately dumped by farmers. The system relies on rainwater watering plants with average rainfall over the last 10 years is 0.4 to 288.2 mm/year[2]. In east season, rainfall intensity is so low that agricultural activities not be optimally implemented. In certain seasons, sea waves and it is difficult for Binongko island communities obtain marine products or access foodstuffs from outside the area.

Based on this phenomenon, and refers to a theories about the limitations of agricultural resources in coastal areas and small islands, Binongko society should have no difficulty to ensuring the sustainable of security food. In fact, Binongko Island community still sufficient in food, and statistically was not found that people who suffer from malnutrition or starvation. With regard to this situation, the formulation of the problem in this research that how Binongko island community adaptation strategies for ensuring the sustainable food security?

This study was held with the aim to analyze Binongko island community adaptation strategies for ensuring the sustainable food security systems. Theoretically, the results of this study are expected to enrich the knowledge about community development, adaptation strategies, and food security in coastal areas and small islands. Results of the research is also expected to contribute ideas about the concept, theory or new variables related to adaptation strategies the community, whether its complement or refute earlier theories. In practical terms, the research is expected to provide benefits to the community, environmentalists and regional as well as for the government in formulating public policy development in coastal areas and small islands.

In order to achieve the research objectives, this research using qualitative design with phenomenological approach, which took place in August 2015 until August 2016. The data collected from literature study, orientation, observation, interviews, and focus group discussions. Interviews

were *purposively* obtained and through snowball approach. Collected data were analyzed using the method of historical analysis.

2 Adaptation Strategies for Sustainable Food Security in Binongko Island

Related to unravel the forms of adaptation community in Binongko Island, then used the theory of adaptation to the ecological approach cultural (*Cultural Ecologi*) by Julian Steward (1955), which is also supported by the explanation concept of cultural adaptation expressed by Hardestry (1977), Geertz (1983), John Bannet (1996) and several other expert views. Theories have been due to the creation of food security is a society adaptation process to the environment, which is backed by the indigenous people as a cultural community at Binongko Island.

The basic assumption of the adaptation theory evolved from an understanding that is evolutionary which regards the human effort to adjust the surrounding natural environment, both biologically/genetically and culturally [3], Steward (1955) explains that human beings as living things adapt themselves to geographic environment [4]. Binongko as coastal areas and small islands have a natural environment (geography) challenging. The challenges due to the high seas marine area which in certain seasons have high waves are difficult to access. Land condition with barren land and rock dominated also a challenge. Therefore, the local community seeks to adaptation measures at natural environment. The self adaptation process can be a behavior modification in order to maintain the existing conditions, coping with certain risks in a new condition, or improvising on the existing conditions.

The change of human behavior as a result of the environment adjustment process has spawned a change of civilization or culture thus giving birth cultural adaptation cumulative. Geertz said that interpret the cultural adaptation as the interrelationships of culture based in the system of culture (system of ideas) and technology [5]. An Adaptation cultural include all inventions that are tailored to the environment [6], where culture includes all human habits that help populations survive in a period, including

¹Valley landed among the rocks of the hill. There are several *Kollo* which is central to the cultivation of Binongko community namely TanoMeha *Kollo*, Bulawa *Kollo*, Waloindi *Kollo* and others

economic systems, family systems, and the interests of socialization [7].

The impact of environmental stress depends on the adaptation or response that allows the organism environment adaptation. In this connection KielHofner defines adaptation as a desire to satisfy personal needs and meet the reasonable expectations of the environment where the located of person [8]. Adaptation is something that is done by the system in which a person's life to do something more than to defend themselves, to have a desire for mastery of self or environment and a desire to self-determination [9]. The substance of the definition is then going in this study, where adaptation is placed on something related to community efforts have adapt to its environment in order to achieve food security in a sustainable manner.

It should be emphasized that in this context, the sustainable food defined as the condition of food availability² and affordability³ in economic, social, cultural and ecological. In economic means sufficient quantity and quality of food available and affordable to the public. Social and cultural meaning of food available and affordable to the public in accordance with local tradition. Ecologically mean the mechanism of supply and affordability of food upholds the preservation of the environment.

Furthermore, adaptation strategy by Binongko communities in sustainable food security system can be described in detail through the three components, namely the agricultural Production system, production, distribution and consumption of food.

1.1 Agricultural Production Systems

The production system is referred to in this study are agriculture as a special arrangement of farming activities that are managed by the ability of the physical environment, biological, and social, economic as well as the goals, capabilities, and resources are owned by farmers who manage them take advantage of the climate elements [10]. Physical and biological, agricultural produce in Binongko island strongly influenced by the characteristics of the land territory of the coastal and

island dominated rock. In connection with this condition, then the local people perform adaptation actions, among others:

- a. Each head of the family has a agriculture land more than one place at a time clearings are relatively different. However, the type of crops cultivated are the same relatively, covering crops and plantation crops. Some land can open in the east, while others land on the west season. This meant that when the land has been completed in the crop, there was still no land more ready for harvest. More than ownership a typical farm was also intended as a form of inventory and effort in situation case of food shortages, particularly in case of attack pest on a typical farm. In addition, land ownership is more than one place is also a strategy of farmers to face agricultural land resources limited. Binongko farmer's has average a land area of 0.13 ha and is generally located in *kollo* or the expanse of rock with a bit of ground. The narrowness of control over land has fueled farmer's to multiply the amount of lands;
- b. Mechanical cultivation is done by upholding the values of local wisdom as adaptation strategies in the preservation and sustainability of natural resources. It can be seen among others from land clearing mechanism, which despite doing most of slash and burn. However, these activities carried out by certain means⁴ so as not to cause fires by leaving vegetation or trees. Vegetation in the form of woody trees should be left to grow and not cut down, even if the need to cut down then just cut down to half only. Trees are cut down half usually functioned as pole climbing (*kacinae*). *Uwi* (*Dioscorea, sp*) plants and nuts as well bird perches in order to eat and remove waste as fertilizer on farmland around. Furthermore, for the maintenance of the plant for example fertilization does not use chemical fertilizers, but the use of plant litter collected on the plant roots around the base of the stem (*katambari*). Similarly to the crop pest management techniques that only use

²This means that the food was in sufficient quantity and quality to meet the needs of the community [11] or the food was in a reasonable condition and evenly [12]

³ This means that every people have ability to obtain food, both in terms of price, time and place [13]

⁴Slash and burn is done by collecting the grass has been cut down or removed in certain places and made line (*ilaran*) to ensure that the fire did not spread to other land. Combustion also take into account conditions season and wind direction as well as not to burn around woody trees.

rituals⁵ and abiding by the terms (*Homali*)⁶ which is believed to be the farmer.

From the social aspect, one form of community adaptation strategies related to the efforts ensuring food security in a sustainable manner by the maintenance of local wisdom that mutual cooperation (*pohamba-hamba*) in agricultural systems. *pohamba-hamba* executed by 5 to 10 members. According Wa Aniru (interview, February 13, 2016) that the first of these activities normally carried out with family or others outside the family, but in recent years have only implemented among families because it has begun to apply the wage system in the open field. *Pohamba-hamba* took place when weeding or clearing land and harvesting, as well as a rotation from one field to the other members [14].

Pohamba-hamba as local wisdom provide space for the whole community to be able to manage the farm, although they have in terms of numbers of manpower and financially. At the stage of heavy work such as clearing and harvest they may be assisted by other community members. The family that works a little amount of energy, widows or wives who left sailed by her husband can stay on the land and planting various types of crops to meet their needs. As such, agricultural products and continually assured its availability.

Economically, agricultural yields are only sold when the family consumption needs are met. At the stage of heavy work such as clearing and harvest they may be assisted by other community members. Minimization of the sale of agricultural products is one form of adaptation strategies for speculative or guard. Farmers prefer to save their crops rather than sell because they are worry will be

⁵Example of a ritual to avoid pests in the transition season (northerly/*napa*) ie by planting coconut palm on the four sides of the garden and spells prayers/incantations (La Halibu, interview, March 12, 2016), Impaired mice (rat) avoided by calling mice as 'oputa' (Rapia, interview, March 10, 2016) or by flushing the entire side of the garden with a water solution of rat droppings while spells prayers/incantations (La Rabu Mbaru, interview, March 14, 2016).

⁶Pemali or taboo in Indonesian, namely a prohibition or a strong social prohibition against words, objects, actions, or those who are considered undesirable by a group, culture, or society (<http://kbbi.web.id/implementasi> accessed on February 20, 2016), for example, so that farmland is not attacked rat, then it should not eat and drink while strolling in the garden (La Halibu, interview, March 12, 2016) or children should not be walking around in the house at night day while carrying a lit lamp (La Wednesday Mbaru, interview, March 14, 2016).

a shortage of food, they perform acts of preservation of foodstuffs that have been harvested, for example storing cassava and corn dry above the kitchen fireplace, and immerse *uwi* (*Dioscorea sp*) into the soil after the harvest.

1.2 Food Distribution System

As said above that the commercial designation for crop farmers is not a priority because of the pattern of subsistence farming, but it is undeniable that along with the development of human civilization, the farming product then economic value. Therefore, the distribution process of agricultural products in internal and external become a demand to be acted by every farmer, especially for those who have excess harvest for consumption.

Adaptation strategies in the food distribution system have differentiation livelihoods characterized by certain time-sharing system. In addition to work as farmers, Binongko island residents also became the gob or inter-island traders, blacksmiths, and only a small proportion become civil servants. In east monsoon rainfall intensity is very low, making it difficult for cultivated agricultural activities and people opt for a more intense shipping activity. In the spring of western society will conduct farming activities and those that remain shipping. The cruise is done by men, while women do a lot of crops are grown. But in the period of resting from shipping activities, many of the men who choose to manage the farm because it is considered as the granary which nearest food for the families who sailing leaved.

The differentiation livelihood has opened the scope of food distribution. Since the 1960s there has been a distribution of food, both inside and outside the Binongko island. In the Binongko island, the current food distribution generally move From Cia-Cia⁷ community who live in the Village Mayor, Desa Jaya Makmur, Lagongga village, village-Kampo Kampo, Village Oihu, Waloindi Village, and Village Haka; go to Kaumbeda⁸ communities at Rukuwa Village, Village Palahidu,

⁷One of the communities that inhabit the island Binongko. The founder of the kingdom named Sumahil Tahim Wali Alam derived from Cia-Cia (local South Buton) [15]. Community Cia-Cia massively dating to Binongko Island since around the end of the 17th century

⁸Are also communities that inhabit the island Binongko that ethnographically an original community Wakatobi[13]

Village Taipabu, Village Makoro, Palahidu West Village, Village and Village Popalia Sowa. Community of Cia-Cia occupies most locations fertile farmland at Binongko Island. They are known sustaining life in dry land [16] and many of them work as farmers (La Rabu Mbaru, interview, March 14, 2016). The results of the Cia-Cia communities agricultural more than sold to Kaumbeda communities because (1)The number of farmers in the Kaumbeda relatively small, many of them working as a blacksmith, a gob or inter-island traders; (2)Kaumbeda region occupies relatively less fertile agricultural land, so that even though they cultivate crops, but the results are not the same as Cia-Cia (La Halibu, interview, March 12, 2016; Ibrahim interview, March 8, 2016).

Externally, agricultural products Binongko Island communities were also distributed to the surrounding islands. Twice a week, namely on the market day in Tomia, agricultural yields of food crops such as *opi*⁹ and various types of *uwi* and vegetables. Beginning, the transportation of agriculture product is transported to Tomia Island by sailboat. However, since the 2000 year star use a motor boat.

Meanwhile, the flow of goods from outside the Binongko island move of the surrounding islands, both of the islands are still included in the group of Tukang Besi archipelago, Sulawesi Island, Nusa Tenggara archipelago, Maluku, Java and Sumatra. Nusa Tenggara Archipelago many supply of foodstuffs such as corn can be processed into a variety of carbohydrates food sources as rice corn (*katebha /bingkoro*). In addition to corn, the islands of Nusa Tenggara and Maluku were also plenty of dry cassava supply (*konokau kofungo /kalla*), while the rice is generally brought from Java or from Bau-Bau South East Sulawesi.

The mechanism of food distribution on the Nusa Tenggara islands, Maluku, Java and other islands is largely determined by the community shipping schedule. At the end of the season the west which is about a month from April to May, sailors will be

heading to the eastern part of Indonesia (region Maluku islands and surrounding). There, sailors would buy natural products such as various spices and copra for sale to the eastern part of Indonesia (Java) and even abroad (Malaysia, Singapore, the Philippines and others). When returning from the eastern region of that, the voyagers brought foodstuffs such as rice, corn, dried cassava, and various vegetables are durable (pumpkin and cabbage).

For sailors, foodstuffs from outside is a source of basic foodstuffs, and are usually purchased in large numbers by considering its availability during the season cruise (approximately one year). Almost every house in Binongko island there are barns such as rice, maize and dried cassava, while results farm is used as an addition to or support of such food ingredients. In contrast, for the farmers, agriculture products are the main source of food, and foodstuffs from outside is an addition to or supporting their agricultural products. Usually the farmers to buy food from outside after selling their crops or to exchange the results of the farm with food brought by sailors

2.3 Food Consumption System

Food consumption systems referred to in this study include the composition of the diet and daily food menu. Binongko Island communities have diets and the food menu settings system as a form of adaptation strategy in sustainable food supply. Under normal conditions, the community mealtime is twice a day (morning and afternoon) and those that three times a day (morning, afternoon and evening). Generally it is twice a day as an attempt to save the amount of food consumption and habituation in the event of food shortages. Efforts Even this gave birth to the stigma in society, especially for children that dinner was *homali* because it can make mice very much at home and can beat people (La Ari, interview, March 10, 2016), inviting the evil intentions of others as a result of sound kitchen appliances (Wa Niru, interview, March 11, 2016). In addition, the activities of eating at night tend to be avoided because of a dark atmosphere, especially in areas that have not commercial power. Citizens are also usually sleep early in the evening in order to wake up more quickly because

⁹Raw foods derived from cassava processing by making *ie* after cassava is harvested, then peeled, washed, dried, shredded, packed in plastic bags and hard press with a special tool so that the water content in it trickled out. After drying, *opi* packaged using banana leaves, plastic bags or sacks. The *opi* selling price start from Rp20.000,- to 120.000,- depending on its size. *Opi* is used to make *soami* is one of the Wakatobi tradisional food.

they start activities, such as going to farmland since the early days.

In connection with the composition of the diet, then the Binongko society developed a system of substitution of groceries. For food sources of carbohydrates are interchangeable between rice, rice, corn, *Soami*¹⁰ sago, boiled breadfruit, *uwi* and taro. One type just provided was sufficient, and as a side dish was only vegetables or meat fish/eggs alone or vegetables with a little destruction of grilled fish. When there vegetables, then there should be no fish/eggs and vice versa.

One of the unique food menu is bananas are eaten with salt. This menu can be eaten during the morning or afternoon as a main meal or snack and much-loved community. That's why, in a few places on the island Binongko, banana plants cultivated intensely sour.

In addition to setting patterns and diet, people also perform several actions related to its efforts in maintaining the food supply. When the amount of the catch is reduced due to the high sea waves season, then when the tide is low, many people especially mothers who go out to sea looking for a variety of shellfish and marine life that can be consumed. In addition, almost every house has a fireplace as a place to cook, there are grilled fish hanging on or in the vicinity. Smoke fire is believed can protect the grilled fish of the damage, so it is stored for a long time. These fish are usually consumed little by little and mixed with vegetables or cooked with a sauce (water or coconut head) a lot. However, when the number of fishermen is abundant, the society make dry fish that can also last a long time and can be taken when there is a shortage of fish. Thus, the price and quantity of fish consumption by the Binongko society tend to be stable, and it is society's civilizing fixed 'skimp' although in a state of abundance, and it society empowers to remain 'downsize' though in a state of abundance.

3 Conclusions

Based on these results, it can be concluded that the adaptation strategy by Binongko Island

community in ensuring sustainable food security system at looks in agricultural production systems, distribution and food consumption. Every action adaptation is a form of response by the society members towards the environment. Over the years, every action and even then become a tradition or culture that is rooted as a local wisdom.

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¹⁰One type of Wakatobi staple/main food made from crushed *opi* then steamed in a particular pot using a mold of woven at conical coconut palm leaves.