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The extrinsic motivation of underlying traditional agricultural techniques for coastal and small islands communities in Southeast Sulawesi

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ABSTRACT

Communities in coastal areas and small islands such as Wakatobi archipelago carry out traditional farming. Farming is rainfed system on sub-optimal land which has theoretically low productivity. Even so, farmers continue to carry out farming activities because of the motivation that extrinsically affects their farming techniques. The productivity can relatively meet their needs. This study aims to find and explain the extrinsic motivation inherent in the traditional farming techniques of coastal and small islands communities. The research was conducted from June 2019 to February 2020 with a case study location on Binongko Island, Wakatobi Regency, South east Sulawesi Province, Indonesia. Data were collected through observation, interviews and literature study using the triangulation method. The research informants were determined purposively with a chain information collection system. The results showed that the extrinsic motivations underlying the community's traditional farming techniques were (1) obtaining social rights; (2) obtaining agricultural products economically, socially and ecologically; and (3) support from the government. This motivation has encouraged farmers to apply local wisdom techniques to mixed farming systems on more than one farm. These local wisdom techniques are implemented starting from land preparation and clearing, planting, maintenance, harvesting and post-harvesting.

Keywords: Binongko, extrinsic, motivation, traditional, coastal

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INTRODUCTION

Agricultural activities on small islands are limited by land availability(van der Velde et al., 2007). Small islands have an area smaller than or equal to 2,000 km2 (Law of the Republic of Indonesia, Number 1 of 2014). Limited land is

exacerbated by the lack of availability of water resources (Hidrawati et al., 2016), so agriculture can only be implemented with a rainfed system. Coastal areas and small islands such as Binongko Island have sub-optimal agricultural land (Kandari et al., 2017) which is categorized as dry land with dry climate. Binongko Island has a land area of 156 km^2 with land grouped in the geological formation. Transportation routes between islands are usually only by sea. In certain weather conditions there can be high waves, making it difficult to access this area. This situation forces people to continue to do food crop farming. Agricultural activities are believed to be the only source of food storage amid difficulties in accessing food resources from the surrounding area.

Agriculture is a way of life for the Wakatobi people. Being a farmer and a fisherman are two livelihoods that are generally by a family head. This activity is carried out with a certain time division. They will go to the farm site in the morning and look for seafood in the afternoon or at night. This time division is determined by weather conditions, such as rain or heat, tides, and sea wave conditions. Agriculture is traditionally and is subsistence in nature. The agricultural land is dominated by rocks so that optimization of farming productivity is difficult to achieve. Plants are cultivated in the sidelines of rocks with limited soil from the results of rock decay, and plant litter that are deliberately buried or decomposed by farmers. Various plant cultivation techniques are used by farmers to manipulate land conditions in order to remain productive. It is assumed that a number of these agricultural cultivation techniques are based on motivation within the farmer. This motivation makes them survive by farming activities to support their food availability independently and sustainably.

Food is a basic human need so that everyone always tries to fulfill it. Needs that have been met are motivation, and efforts to meet needs are also motivation (Kadji, 2012). Motivation is the reason underlying an action performed by an individual (dan Judge and Timothy, 2008), and most importantly the reason for fulfilling needs. Motivation theory was born and developed along with the level of human needs fulfillment. Motivation is divided into intrinsic motivation that comes from within the individual, and extrinsic motivation that comes from outside the individual (Sansone and Harackiewicz, 2000). This study seeks to reveal extrinsic motivation that comes from outside the individual farmer. This motivation drives them to take various technical actions in managing their farming.

Research related to this study includes discussing the motivation of farmers in adopting agricultural technology (Herath, 2010, Ingram et al., 2013). The form of motivation can be in the form of income and life satisfaction (del Mar Salinas-Jiménez et al., 2010) which is part of a person's ultimate goal in carrying out a job. Motivation is also associated with the management of agricultural environmental resources (Bopp et al., 2018, Jambo et al., 2019). The use of labor and other production factors (Lalani et al., 2016). This study focuses on the extrinsic motivation that underlies farmers in determining the appropriate farming techniques on their farms. The research aims to discover and explain the extrinsic motivations that underlie traditional community farming techniques. The results of the research are expected to provide benefits for farmers, society and government in developing agriculture in coastal areas and small islands.

MATERIAL AND METHOD

This research is a qualitative type with a case study design. The research was conducted from June 2019 to February 2020 with a case study location on Binongko Island, Wakatobi Regency, South east Sulawesi Province, Indonesia. The determination of Binongko Islands as the case studi location based on the consideration that there was no study related to this research in the area. Binongko Island is unique among other islands in Wakatobi. This island is identified with an area that is difficult to access due to high sea waves (Hamid, 2016) and farming activities are carried out on soiled stone land(Rudi, 2016). On a representative basis, Binongko Island is able to represent the geographical conditions and traditional farming techniques of coastal communities and small islands in Wakatobi Regency.

The research data were collected using the triangulation method through observation, interviews and literature study. The informants in this study were determined purposively and carried out by means of chain information gathering techniques or rolling like a snowball. Determination of informants begins with determining key informants, and then leads to the

selection of a number of key informants and supporting informants. The criteria for key informants are having extensive knowledge of various sectors in society, and being able to direct researchers to find other informants who are experts in the subject matter that the researcher wants to know. The main informants are a number of people who know and are experts in the culture of the local community consisting of village officials, traditional leaders, youth leaders, and farmers. Furthermore, to add or clarify the data and information obtained, supporting informants were determined whose numbers were adjusted to the needs of the researcher.

The research data were analyzed qualitatively by describing the research report which contains quotations from observations, interviews, and those from literature studies. Data were analyzed by making meanings or interpretations, classifying and presenting descriptively using the phenomenological method. Phenomena are explained based on emotional and ethical views, resulting in generalizations of discussion in accordance with the research objectives.

RESULT DAN DISCUSSION

3.1. Extrinsic Motivation Underlying Traditional Agricultural Techniques

Extrinsically, the main motive of the Binongko people is to obtain social rights. In the form of recognition and appreciation as members of society who have high social status. People who get the results of commerce and shipping, which are also supported by their activities in agriculture and fisheries, will appear socially as wealthy individuals. Many of them later made the pilgrimage to Mecca, or paid for their families to continue their education to a higher level. Hajj and those who are educated are considered social beings while have high positions in society. They will usually get different social recognition and treatment because it marks a person's social and economic well-being, so that they are given rights or dignity in society.

Apart from obtaining social rights, the extrinsic motive underlying the community's traditional agricultural techniques is the production of agricultural with economic, socio-cultural and ecological values. Economic value can be seen from the value of the product both in money and non-money. Initially, a farmer only cultivated the land to meet the needs of himself and his family. Over time, their human instincts encourage them to share with neighbors or people around them. From sharing with neighbors, farmer gets social benefits such as gratitude and better family relationships. Farmers can also get money (financial benefits) from their farming because they sell them to people in the village or in the market. These social and financial benefits are the motives that move the mind and body of a farmer to develop their farming techniques.

Theoretically, agricultural business results have been a positive consequence that tends to be repeated. Reinforcement motivation theory views that human behavior is determined by the consequences provided by its environment. This theory is based on Thorndike's law of effect(dan Judge and Timothy, 2008), which is that behavior that produces pleasant outcomes will tend to be repeated, while behavior that produces unpleasant outcomes will tend not to be repeated. Actions in order to provide food needs in positive farming activities are always maintained and even enhanced by the community.

Furthermore, government policies to encourage local food production also serve as extrinsic motivation for the Binongko community. This is marked by the enactment of Government Regulation Number 68 of 2002 concerning Food Security. This regulation regulates a food diversification system that supports the community in producing local food. This regulation has presented a number of government programs and activities, namely providing facilities and education to farmers. Moreover, in various media, the government has urged the public to be active in consuming local food because it has economic, social, and health benefits. This is a motivation for farmers to be more active in developing their farming land, especially root crops.

Several informants have mentioned the motivation to intensify farming land due to government support. They admit that the local government, through the Wakatobi Regency Agriculture Office, has provided production facilities in the form of seeds, fertilizers and medicines to kill pests and plant diseases. Some forms of production assistance that have impressed farmers are the provision of 7 month old cassava cuttings, vegetable seeds (spinach, kale, bitter melon, cucumber, chilies and tomatoes) and equipment such as hoes, and grated sweet potato machines. They also admit that they have participated in training activities in farming land

management carried out by the government. The informants also stated that the provision of production facilities and training assistance did not take place patently and sustainably. However, most of the informants admitted that this assistance greatly stimulated them to manage their farming land. Some of them have been able to anticipate the availability of production facilities by buying them from other places. This situation indicates that government intervention has succeeded in stimulating farmers to be enthusiastic in managing their farming land.

Socially and culturally, the results of agricultural business can be assessed from the formation of social cohesiveness among community members in a series of farming activities. There is local wisdom in *posale* or *pohamba-hamba* starting from land clearing, planting, maintenance, harvesting and post-harvesting. Each series of activities held under the *posale* or *pohamba-hamba* system has created a space for people to interact and help each other. Farm products such as fruits and vegetables are usually shared with neighbors and other parties in need, so that the kinship between them is well established. Besides that, farming activities are also carried out in a series of traditions or culture, for example the implementation of a ceremony at the Kapitan Waloindi grave before planting or a joint prayer event in local institution meeting room (*Baruga*) after harvesting. These cultural rituals are still maintained today and have become community identities.

Ecologically, farming products can be assessed through the effect of cultivation measures on environmental conservation or maintenance processes. Farmers on Binongko Island apply a farming land management system that is environmentally friendly. The management system in question includes *honowu/katambhari* activities, namely the activity of collecting soil, plant litter or garbage around plant roots (Hidrawati et al., 2019, Hidrawati et al., 2016). This aims to increase soil nutrients and protect the surrounding plant roots from drought and weeds. *Honowu/katambhari* is a form of fertilization or traditional mulching which is classified into the practice of LEISA (Low External Input Sustainable Agriculture) or Sustainable Agriculture with Low External Input (Reijntjes et al., 1999). Mulching is an important technique for improving soil microclimate; improve soil life, structure and fertility; keep the soil moist; reduce weed growth; prevent damage from the effects of solar radiation and rainfall (erosion control) and reduce the need for soil management. *Honowu/katambhari* as an activity to add soil nutrients has ecological advantages. Soil nutrients can be formed from the weathering of plant litter and organic waste from *honowu/katambhari* activities. Organic material derived from plant litter will undergo a slow weathering process, but experience complexity over time (Kleber and Johnson, 2010). This means that weathering of organic matter can be a source of nutrients which will have increased availability for the plant. For this reason, soil productivity tends to stagnate and even increase, thus supporting ecological sustainability. The act of cultivating plants through *honowu/katambhari* activities can provide benefits in the form of creating environmental sustainability so that it contributes as an ecological advantage that can motivate people to continue farming activities.

Traditional Farming Techniques for the Coastal Areas and Small Islands Community

Traditional farming techniques referred to in this study ways of managing agricultural land which are based on several motivations. Farming technique is a manifestation of a strong desire to continue farming activities. This is related to manipulative actions to design land conditions so that it can produce optimally and sustainably. The community's traditional farming techniques are described below, starting from land preparation and clearing, planting, maintenance, harvesting and post-harvesting.

Preparation and Land Clearing

The land preparation stage is characterized by selecting land according to ownership, fertility conditions, and distance from the farmer's settlement. The aspect of land ownership is related to the division of farm land into a family clump. A newly married couple will usually be shown by their parents at least one area that they can manage as farming land. Each household head generally owns more than one farming land with relatively different land clearing times. Some land can be cleared in the east season, while other land can be opened in the west season. This is so that when one piece of land has been harvested, there is still another land ready to be harvested. Some

farmers cultivate their land using the period rest for land (*bera*) system with an average of 1 to 4 years. There are also those who cultivate the land without *bera* but the plants are replaced according to the season and time of harvest. For the example in the western season corn and vegetables are planted, and after the corn and vegetables are harvested, cassava and other tubers are cultivated, then, when the next west season, the land is planted back corn and vegetables and so on.

Having more than one farm is a form of supply and an effort to guard against food shortages, especially if there is an attack by pests and diseases on one farm. Besides that, ownership of land in more than one place is also a strategy for farmers in dealing with limited agricultural land resources. Binongko farmers have an average land area of 0.13 ha. Narrow control over land has triggered farmers to increase the amount of land.

After the ownership aspect, Degree of land fertility is also an important factor in choosing a farm with the main indicators used, namely growing vegetation and land topography. Fertile soils are characterized by *balande* and *kambaragi* (*Lantana camara L.*) vegetation and less fertile soil characterized by reeds (*Imperata cilindrica L.*) and rivers (*Eupatorium odoratum L.*). The topography of the land that is usually chosen by farmers is the valley (*kollo/bolonga*) which is a land area located between two hills. On the other hand, the location of the farm from the farmer's settlement is also a consideration in choosing the land. Those who are still young will usually choose land that is further away but is considered more fertile and wider. Meanwhile, those who are old usually choose to manage land close to their settlement because of labor and safety considerations.

The land that has been selected will then begin processing. Land processing begins with a land clearing ritual (*bhelaia*). *Bhelaia* is performed on a good day at the end of the eastern season or entering the western season, after seeing several signs shown by nature and animal behavior. These natural signs are like the appearance of the constellation *pari* sky (*sangia/pariama*); appearing lightning (*mbena-mbena*) in the sky; the frequency of the *kureu* chirping; whales (*bungkulawa*) surfaced on the edge of the deep sea and spouted water. The *bhelaia* ritual begins by entering the middle of the land that has been chosen, then sitting in the thicket or grass facing north. When sitting then grabbed the grass and chanted a mantra. After casting the spell, then began to *pameri*, namely cutting down trees and clearing grass. Trees whose trunk is approximately the size of a fist are cut / felled (*tambae*) only up to the chest, because it will die by itself when the roots rot. When it is cut down to the bottom (near the base of the root) it will quickly sprout again. The tree that is cut down half a chest (*pusino kau*) can later function as climbing poles (*seka/kancinae*) for vines, especially beans.

Planting

The timing of planting is based on time calculations (*kutika*), natural phenomena such as the position of the moon and stars and the tides of the sea. When the rain began to fall in the western season and after the farmers had cleared the land, the local institutions leaders of the *Cia-Cia* community agreed to determine the best time to start planting activities and the implementation of the *phitado* ceremony. The time indicator for the *pitadho* ceremony is adjusted to the time to plant corn, which is when it is known that the frequency of rain is getting high and it is estimated that rainwater has started to wet the soil completely. For the *Wali* community, the *phitado* ceremony is held with a prayer together at *Baruga Sarano Wali*, while for the *Waloindi Haka* community the ceremony takes place with a prayer together at the tomb of *Kapitan Waloindi*.

After the *pitadho* ceremony, the farmers started planting corn although perhaps previously some farmers had planted other crops such as various types of *dioscorea, sp* (*opa/tombili/santa/kano/manga*). After the rain falls, farmers will plant vines such as pumpkin, cucumber, bitter melon and so on followed by corn and beans. After all the vines, beans, and corn have grown with a minimum number of three leaves, then cassava is planted. According to the experience of farmers, corn will thrive when it is planted with beans around it. Agronomic theory suggests that legume plants can symbiosis with rhizobium bacteria to fix N from the air so that it meets the nutrient needs of surrounding plants (Raza et al., 2020), especially in intercropping or mixed farming systems.

The planting ritual is also marked by the chanting of a mantra to ask those in power to fertilize the cultivated plants, avoid pests and diseases and the results are sufficient to meet the needs of humans, animals and plants. The activity of planting cassava and various types of *dioscorea,*

sp is also accompanied by the technique of using a crowbar and the position of the hands which are believed to affect the yield of the harvest. When planting cassava, the crowbar is held by the right hand parallel to the cassava pile to be planted. The thumb and thumb of the left hand hold the cassava stem, while the other three fingers, namely the middle finger, ring finger and little finger are straightened and widened to resemble the braid cassava fingers that are expected to form. Binongko farmers believe that when the crowbar is placed parallel to the cassava stalk and the fingers are straightened and widened, a cassava tuber will form which collects at one point near the stem with a minimum number of tubers according to the number of fingers.

Maintenance

Plant maintenance activities include embroidery; fertilization; fighting weeds, pests and plant diseases. Stitching is carried out approximately 7 days after planting. In principle, embroidery is done on plants that do not grow. In cassava plants, embroidery is carried out if there are stems that do not grow and will be replaced with stem cuttings that are longer than seed cuttings when planted. This is so that the plant height is the same when the cassava plant grows. Meanwhile, embroidery of corn and various types of fruit and vegetable crops is carried out by replacing non-growing plants using available seeds. If the seed of the plant is no longer available, the farmer will replace it with another plant so that the land is not empty. Farmers pay great attention to optimal land use due to the narrow availability of land.

Fertilization of plants is carried out according to the stages of plant growth. The crops that are usually fertilized are corn, vegetables and fruits. Chemical fertilizers or artificial fertilizers such as urea and NPK are obtained by farmers from the government, and some are buying from outside area. For this reason, this type of fertilizer is only used by farmers when the government distributes it or when they have the financial capacity to procure it. If fertilizer is not available from the government, farmers use manure from goat manure or chicken manure mixed with kitchen ash or ash from burning during land clearing. The most commonly used livestock manure is goat manure. The ratio of livestock manure and ash is 1:1, for example 1 litter of livestock manure and 1 litter of ash. In fact, in some cases, some have mixed urea and goat manure and kitchen ash with 1 part urea and goat manure and 1 part kitchen ash. The mixed fertilizers are given after the corn, fruit and vegetable crops are approximately 45 days after planting.

Maintenance activities that are usually carried out by farmers are *honowu/katambhari*. At the time of planting, farmers will do *honowu/katambhari* after the seeds or seeds are planted, and then continuously as long as the seeds or seedlings grow until they are ready to be harvested. Unused plant parts such as leaves and fruit skin will be used again as mulch for further crops, if farmers harvesting. And so on until it resembles a cycle. The frequency of farmers doing *honowu/katambhari* actions is also supported by their belief that the more diligently they do it, the more fertile their crops will be and produce bountiful harvests.

Along with the implementation of *honowu/katambhari* activities, farmers also perform *pajere'e* and *bhija-bhija* rituals during the plant maintenance period. *Pajere'e* is done by going around the garden and the farmer places his palms behind (near the waist) while shaking and saying the pray. When doing *pajere'e*, the farmer will stop at one type of crop and then clean or fix the position of the plant canopy while casting a mantra. Plant disease pests can also be overcome by carrying out the *pidhawu* ritual. *phidawu* ritual can be done by individually at the farm location, or collectively by local institutions. If the pest attack is very severe, the traditional institution will hold a *pidhongka* ceremony. The *pidongka* ceremony is led by the chairman of the traditional institution (*sara*) with the highlight of the event, which is to wash the small boats containing offerings into the sea. The washing away of these objects is interpreted as the process of eliminating various pests and plant diseases.

The procedure for preventing plant pests through rituals as explained, theoretically, can be annulled as a mechanism for *agrocentrism* (Reijntjes et al., 1999, Sjamsir, 2017). Contextually, *agrocentrism* is carried out by farmers by avoiding the use of chemicals that are known to damage the life cycle of soil, water and air organisms. Limited eradication of pests and plant diseases is only carried out through a ritual which is essentially a communicative form between farmers and nature, and with animals and plants in their farming locations. *Pajere'a,*

bhija-bhija and *pidhawu* rituals are only the intended communication media, and are believed by farmers to have positive implications for their farming results.

Harvest and Post-Harvest

The harvest age of a plant is determined by its type and designation. Vegetables and corn crops can be harvested between 2 and 4 months. Cassava is harvested in about 7 months to 3 years depending on the variety and its designation (Umliyah et al., 2019). The cassava plants are harvested according to the farmers' needs and there is always a cassava stock on the farm with different harvest ages. If the farmer only owns one land, efforts will be made to ensure that the cassava production on that land can meet the farmers' needs continuously. It is like if the cassava farming land stretches from west to east. When the last harvest is in the east, then at the next harvest time, cassava in the west is ready to be harvested. For farmers who have several farming locations, if one cassava land has been harvested, there is still another land that is ready to be harvested. Thus, the farmer's cassava stock is always available throughout the year. This system applies not only to cassava plants, but also to other food crops such as various types of bananas, papayas and so on.

The harvest activity (*tompe'a*) is marked by the implementation of the *phidawu* ritual on the 4 edges (*jiku*) of the farming land while chanting mantras and placing offerings from the harvest. The mantras chanted in principle consist of surrendering a share of the harvest to all the spirits of nature including to animals and plants. It is the essence of the agro-centric understanding which assumes that the harvest obtained by farmers is the result of the harmonious work of the component systems of life in nature so that each component deserves a share of the results. In addition, post-harvest activities are also marked by prayer events in *Baruga* and the distribution of the harvest by the farmers.

Based on the results of this study, it can be concluded that the extrinsic motivations underlying the community's traditional farming techniques are (1) obtaining social rights; (2) obtaining agricultural products economically, socially and ecologically; and (3) support from the government. This motivation has encouraged farmers to apply local wisdom techniques to mixed farming systems on more than one farm. These local wisdom techniques are implemented starting from land preparation and clearing, planting, maintenance, harvesting and post-harvesting.

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