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Fight for the green earth: The existence of local knowledge in agriculture

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Abstract. Traditional agriculture has always been taking place in rural areas. This agricultural model tends to utilize simple technology and is in accordance with local socio-cultural conditions. The traditional agricultural model is also the opposition of modern agriculture in the concept of a green environment or green earth. If modern agriculture has many negative impacts on the environment, then traditional agriculture has many positive impacts on the lives of all earthly creatures. This paper aims to reveal the actions of farmers in managing their agricultural land based on local knowledge. This research took place in three locations, namely: (1) Labuku Village, Maiwa District, Enrekang Regency, (2) Ilan Batu Village, Walenrang Barat District, Luwu Regency, (3) Segeri Village Segeri District, Pangkep Regency. The informants of this study were farmers in the three regions. Each region has 2 informants so that the total was 6 informants. The key informants are each of the traditional leaders, and village officials. Data collection using interview techniques, observation, and study of literature. Data analysis uses Three-Flow techniques namely reduction, categorization, and conclusion. The results showed that traditional farming techniques in Labuku, Ilan Batu, and Segeri Village were characterized by rain-fed rice fields, not using chemical fertilizers as plant fertilizers, rice disease repellent, and rat repellent but instead using betel leaves, betel nuts, and lime. Even so, high-quality rice is harvested once a year. The conclusion of this research is that traditional knowledge-based agriculture in the research location always uses the surrounding environment resources. Such methods directly impact on the creation of a green environment and indirectly counteract the negative impacts of modern agriculture.

1. Introduction

In the history of national development, rural areas have always been the focus of development areas specifically in agriculture. This policy is reasonable because the condition of Indonesia is an agrarian country, where most of the population live in villages and are engaged in agriculture. Jefta Leibo even stressed that during the New Order government, the agricultural sector always had a central position to support development in other sectors [1].

In Indonesia, agriculture always occupies an important position in the development sector. According to Dawam Rahardjo, this was due to the large contribution of the sector to development by 30% [2]. Another factor is there are more than half of Indonesia's population who work as farmers.

In order to increase production, the Indonesian government recommends that farmers use modern technology, both in the process of planting and processing agricultural products. For that there are



various policies that can be taken. For example, diversifying agricultural products by utilizing land, water and new technologies that will provide additional income for farmers [3][1].

Other activities carried out are intensification, extensification and agricultural diversification. One of the activities in it is the expansion of Five Farm Program which include the use of superior types of rice seeds, the use of fertilizers, good soil management, eradication of plant pests and irrigation regularly, and the use of mechanical devices [4].

After the modernization of agriculture lasted several decades, it was proven that the achievement of its objectives was successful, namely improving the productivity and welfare of farmers. However, negative impacts also emerge. This was stated by Ulil Amri and Lestari Eka Pratiwi in their research that the modernization of agriculture not only had a positive influence, but also a negative influence on the community, especially rural communities [5,6]. Including the findings of Tri Pranadji and Pantjar Simatupang that agricultural modernization that occurs does not always coincide with development, and (in some cases) can even have a negative impact on agricultural development [7]. In fact, Mellor actually connects the modernization of agriculture with poverty [8].

In this research context, it is important to reveal the actions of traditional farmers as a form of resistance or fight to the impact of the green revolution in realizing a green earth.

2. Material and Method

This research took place in three locations, namely: (1) Labuku Village, Maiwa District, Enrekang Regency, (2) Ilan Batu Village, Walenrang Barat District, Luwu Regency, (3) Segeri Village Segeri District, Pangkep Regency. The informants of this study were farmers in the three regions. Each region has 2 informants so that the total were 6 informants. The key informants are each of the traditional leaders, and village officials. Data collection using interview techniques, observation, and study of literature. Data analysis uses Three-Flow techniques namely reduction, categorization, and conclusion.

3. Empirical Findings

3.1. Modern and Traditional Agriculture in The Village

Table 1. Kinds of agriculture system in the village

Kinds of Agriculture	Labuku Village	Ilan Batu Village	Segeri Village
Traditional	++	++	++
Modern	+	+	+

Symbol notes: ++ = Dominant in traditional agriculture
+ = Involving the modern agriculture

In modern agriculture based on Five Farm Program, elements often used by farmers are mechanization in the form of the use of tractors, and intensification in the form of use of chemical fertilizers. Based on this description, the conditions of agriculture in the study sites as Table 1 can be illustrated that all regions have absorbed modern agriculture and no one is purely using traditional agriculture today. In the three regions, each involved elements of modern agriculture in the form of the use of tractors, and the use of pumping machines for irrigation.

3.1.1. Agriculture in Labuku Village. Labuku village is located at an altitude of about 500 m above sea level with topographic areas of mountains and valleys. This region is predominantly a plantation and forest area with fruits, vegetables and some forest products.

Even so, there is a private rainfed lowland farmland. Even though it is privately owned, the management of agricultural land is still based on traditional and adat-based agriculture.

One of the characteristics of traditional agriculture in Labuku Village is not to use chemical fertilizers either as a fertilizer for plants, to repel pests, rats and weeds, as well as plant fattening. Only the tractor engine as an element of modern agriculture that they try to use today.

In the entire agricultural process from seeding to harvest, all are based on local customary knowledge. This is a must because all the rituals that are held always involve the traditional leaders *Tau Appa'*. Especially in agriculture, it is always led by '*Dulung*' and '*Sanro*' [9]. For the Labuku people, agriculture does not only plant but also asks permission from the land guard so that the plants grow well and have blessings. The procession of planting also has rules as a form of ethics in nature. In addition, the processing of rice fields must be free from any disturbance. Related to this, *Sanro* is in charge of completing it. This was as stated by *Dulung* that his role was very important with *Sanro* in assisting the community because of the many rituals related to 'land' (Interview on March 23, 2015)

In all the ritual processes, they use the facilities that are around them as described above. For them, modern technology is good but not all are in accordance with their environment and even cause many problems for their environment. This matter was said by the Village Head that the community was expected to obey the rules of land management based on adat so that everything went in harmony with the natural surroundings (Interview on March 25, 2015).

Looking at the description above it can be concluded that traditional agriculture is the application of farmers' knowledge in cultivating land based on local socio-cultural conditions that are harmonious and in harmony with the cosmos. The fact that is seen to this day is the creation of peace of life with the natural surroundings by farming the local community.

3.1.2. Agriculture in Ilan Batu Village. Ilan Batu Village is a mountainous and highland region on the border of Luwu Regency and Tana Toraja Regency. Residents of Ilan Batu Uru Village generally live as shifting cultivators. Even so, a number of its residents also cultivated paddy fields. The local knowledge that they apply in their farming system is related to the following:

Soil Fertility. The method used to find out that a piece of cultivated land is fertile or not, the ilan Batu Uru community knows it with certain characteristics. As for the characteristics of fertile soil is a soil that is rather blackish in color that is overgrown by fertile trees such as *Po'po* wood, wood with or on the land of ferns. The opposite, the soil is considered infertile if certain grasses grow on that land or the wood is not very fertile.

Seed Selection. Rice seeds are always stored in rice barns made of bamboo and round. The granary is known by the people of ilanbatu as *Palipu'*. This is where all the rice harvested in the previous period is stored. Rice stored in *Palipu'* takes the form of bonds and is arranged upside down. When preparing seeds, the bundles of rice are taken to taste and broken down into grain using the feet. This process is called *Mallullu'*.

Weeding. The immediate purpose of this stage is to help reduce certain plants that grow in the fields. This activity is carried out when the rice starts with 10 days to 30 days. The Ilanbatu community in this weeding phase, knows two kinds of techniques, namely by using hands directly and by using certain tools called *Kaje'*.

3.1.3. Agriculture in Segeri Village. Segeri Village is about 20 km from the capital city of Pangkep Regency, South Sulawesi. This region is located in the western coast of Sulawesi and part of it in the plain. This Segeri area has the potential of extensive paddy fields and the potential of citrus and cashew plantations. however, people's livelihoods in general still depend on rice farming.

The interesting thing in Segeri Village is the traditional farming system that is still strongly adhered to by the community, even though modern agriculture has been introduced to them. One form of the traditional farming system is seen in the traditional ritual '*Mappalili*' at the beginning of cultivating rice fields as shown in Figure 1. At the same time, almost all agricultural processes still involve the traditional leader '*Bissu*'. [10]

In starting the planting season which often coincides with the rainy season in the month of Muharram, the people of Segeri Village start with a ritual of going down to the rice fields called

'Mappalili'. During the ritual all agricultural equipment is prayed by *Bissu* so that there are blessings in it when used (Interview on July 25, 2016).

In the process of tillage, most farmers use tractor engines to ease their work. However, in subsequent phases such as cleaning grass and weeds continue to use sickles. This was stated by H. Fatahillah, a farmer in Segeri that farmers in Segeri experienced a shift in farming. They combine traditional methods with modern methods (Interview on July 27, 2016)

For the process of fattening plants, eradication of pests still used traditional methods such as betel, areca nut that is burned and used to smoke rice. However, this method is no longer as restrictive as in the Labuku and Ilan Batu Uru areas. Several methods of land management are carried out based on instructions from government agricultural extension workers. This is slowly making farmers pragmatic so that the impacts are increasingly felt.

For farmers who still maintain most of the traditional-based farming methods, there are also many positive impacts such as lack of pests, fat rice. Only, they harvest once a year. For example, *maccera manurung* in Maiwa as an expression of gratitude after harvest (Figure 2).



Figure 1. Mappalili Ritual in Segeri, is held when going down to the fields working on the land [11]



Figure 2. Maccera Manurung ritual in Maiwa, as an expression of gratitude after harvest [12]

4. Discussion

4.1. Modern Agriculture and Environment Impact

The entry of the Green Revolution and reconstructing the mode of production of paddy rice. Rice fields are no longer considered by farmers as a subsistence production base, but have been converted into a commercial production base. Rice fields are used as a production base for goods that can be marketed so as to generate income in the form of money that can be used to meet the needs of family life. As a result, farmers take action to intensify rice cultivation. This intensification is the beginning of overhauling the boundaries of tradition and farmers acting on rational considerations, for example by adopting a number of new technologies that are considered to be able to increase rice production. This results in an ecosystem in which rice fields are in an imbalance. This encourages farmers to go further (unwise) by using overdosed pesticides so that production targets are achieved. As a consequence, as said by Harahap and Tjahjono [13], "pests that are resistant to pesticides, appear to be resurgent from the target pests, the problem of residues left on the material harvested, and the problem of environmental pollution."

In addition, excessive use of pesticides causes accumulation in the soil and body parts of plants. When it rains, the pesticide is carried by the flow of water to the river. Pesticide material in water is difficult to be solved by microorganisms, even lasting for a long time. In the use of insecticides, they

are often mixed with petroleum compounds, so that the water affected by this pest-fighting waste surface is covered with a layer of oil. This causes a decrease in oxygen content in water.

The impact of the use of DDT (*Dichloro Diphenil Trichloroetan*) pesticides, called biological magnification, is the removal of pollutants by higher-level organisms. The doubling of DDT content in the body of an organism can occur because the organism regularly consumes DDT, and accumulates in the body so that the longer the concentration of DDT in the body the greater. The largest DDT accumulation is found in the last level of consumers. This happens because DDT can not be removed by the body but is buried in the fat layer. Humans who eat fish contaminated with DDT can experience poisoning, because DDT is difficult to decompose. According to the investigation, the effect on the human body is the malfunctioning of the liver as a filter for toxic substances that enter the body and also disorders of the nerve tissue with symptoms of fatigue, seizures until paralysis arises.

In addition, the use of chemical fertilizers causes microorganisms and phosphorus to drift along with the soil and be swept into rivers. This is very disturbing algae growth. In the end, phosphorus is trapped in the silt in the riverbed. Loss of phosphorus causes farmers to have to buy expensive fertilizer to return the phosphorus element to the soil.

4.2. Local-Based Traditional Agriculture

The condition of the research area which is characterized by an agrarian society is no different from other agrarian societies both socially and ecologically. Socially they have a strong bond of solidarity and ecologically they depend their lives on the land. Therefore, the land is a part of their lives which reciprocally requires special treatment which is reflected in ritual activities in cultivating agricultural areas, especially in the farming period.

In treating the soil, farmers clean all crops using plows pulled by buffalo - sometimes cattle. Farms are fertilized on a large scale with manure derived from buffalo dung or cows that attract plows. In addition, goat droppings, ducks that are herded in rice fields or gardens also influence soil fertility. While domestic chicken manure is collected by farmers to be used as fertilizer. However, getting enough animal waste is also a challenge. There are several underlying reasons, first, farmers rarely have enough animals to produce all of the manure that is needed. Also, farmers do not limit the use of their domestic animals, because the owners slaughter them for various celebrations. Animal food to produce sufficient quantities of manure is also very limited. So the farmer does his best to overcome difficult conditions, and this means that he sometimes puts lime in the soil as additional fertilizer. Many animals are raised by farmers, both as a means of work and as a source of food. Male and female cows are very important in agriculture, and both are also used for food and skin taken. Chickens, ducks, ducks and goats are also kept, and this is the most valuable of all animals raised, at least as a food source. The animal is very important as a food source because it can be eaten economically, grows quickly, and can be prepared efficiently for slaughter, in addition to its eggs that can be enjoyed at any time.

In traditional agriculture, activities are still within the boundaries of tradition, which is still considering a balance between meeting economic and social needs. They are more social people - who are aware of the social ecosystem in cultivating rice fields, farmers consider ecological stability. They and the rice fields live side by side (coexistence) peacefully. Paddy ecology is also stable, under conditions according to Harahap and Tjahyono [13], there will be no pest problems, because all components of the ecosystem are in a state of balance ".

In the macro study of the green revolution or the modernization of agriculture as a global movement, it still leaves a negative impact on environmental degradation. This situation is getting worse when capitalism goes hand in hand with the green revolution [14]. Anticipating this, various efforts were made by humans, both individually and in organizations.

In the local context in rural areas, resistance to the impact of the green revolution was carried out by farmers through the application of local knowledge and based on local social norms. This is in line with the statements of Steward [15], Dumont [16], and Bookchin [17] that the socio-cultural order is a very determining factor in the community system in the management of natural resources and the

environment. Specifically H. Djoko Sudantoko and Joko Mariyono [18] offer solutions related to improving the welfare of rural communities can be achieved through improving the rural environment, and Tri Pranadji [19] through strengthening social cultural norms.

5. Conclusion

Traditional agriculture is basically a term that is binary in opposition to modern agriculture. It connotes with simplicity, as it is, while the term modern agriculture connotes great, advanced, with sophisticated technology.

However, the reality shows that modern agriculture that carries productivity and technological progress actually has an impact on environmental damage, especially land that is felt after almost 30 years of the adoption of the green revolution. Environmental damage is what then impacts human social life as a whole as an ecosystem cycle.

Overcoming the above problems, human efforts to strengthen local knowledge of socio-cultural agriculture reappear. Interestingly, there are still many areas where agriculture remains based on local knowledge. This indirectly is a form of 'resistance' to the negative impact of modern agriculture for the re-establishment of the 'Green Earth' that once existed.

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