

Local Knowledge of Farmer Communities in the Use of Organic Fertilizers to Increase Cashew Production in Buton Utara Regency, Southeast Sulawesi Province, Indonesia

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Local knowledge has an important role in agricultural practices. This study aims to describe the local knowledge of farming communities about the use of organic fertilizers as a strategy to increase cashew production in Buton Utara Regency, Southeast Celebes, Indonesia. The research method used is a qualitative approach with data collection techniques using in-depth interviews and observation. The research results showed that the farming community in this area has in-depth local knowledge of how to make and apply effective organic fertilizers sourced from the surrounding natural environment. However, there are challenges in access to the organic materials needed and constraints in the widespread implementation of organic fertilizers. This study recommends strengthening education and training programs to increase farmers' awareness and skills in using organic fertilizers.

Keywords: local knowledge, farmers, organic fertilizers, cashew

Introduction

Agriculture is an important sector in the Indonesian economy. Agriculture is an attempt to utilize biological resources to produce food (Akbar, 2017). Agriculture is a component of supporting people's lives (Sari & Zuber, 2020). The agricultural sector plays a role in meeting food needs and improving people's welfare (Zunaidah, Askafi, & Daroini, 2021). In Buton Utara Regency, one of the leading commodities that are widely developed by farmers is the cashew tree (*Anacardium Occidentale*). Cashew nuts have great potential as a source of income for local farmers, so efforts are needed to increase the productivity and quality of agricultural products.

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Cashew is a fruit crop that has high economic value because it is rich in nutrients and has stable market demand both at the national and export levels (Kurniawan, 2016). The cashew plant grows at dawn in tropical areas such as Indonesia and is a mainstay of many farmers in Buton Utara Regency as a source of income. However, to increase agricultural yields and maintain environmental sustainability, farmers must face various challenges such as climate change, soil degradation, and limited natural resources (Djabbar, Rizal, & Rizaly, 2021; Malihah, 2022; Mulyani, Ritung, & Las, 2011).

In facing these challenges, agricultural sustainability is a top priority. The use of organic fertilizers has been recognized as an environmentally friendly and sustainable solution for increasing agricultural productivity. Organic fertilizers are fertilizers derived from natural ingredients, such as compost, manure, organic waste, and other materials that contain essential nutrients for plants (Sulastri, Adam, Saftiana, Nailis, & Putri, 2023). The use of organic fertilizers can increase soil fertility, increase plant resistance to pests and diseases, reduce farmers' dependence on expensive chemical fertilizers that harm the environment (Roidah, 2013).

In the context of using organic fertilizers for cashew farming in Buton Utara Regency, local knowledge or traditional knowledge owned by farmers plays an important role in the agricultural sector. Farmers' local knowledge includes hereditary wisdom and practices passed down from generation to generation, and has become the foundation of hope in facing various local environmental challenges. This knowledge includes an understanding of the right type of organic fertilizer, how to apply it effectively, and setting the optimal fertilization schedule according to the season and soil conditions. However, with rapid technological developments and environmental changes, local knowledge often faces the risk of being extinct or displaced by modern, unsustainable practices. Therefore, it is important to further document and understand farmers' local knowledge about the use of organic fertilizers in cashew farming. Thus, this research will make a positive contribution to efforts to preserve and develop local knowledge, as well as increasing awareness about the importance of using organic fertilizers in sustainable agriculture.

Research on local knowledge of cashew farmers in organic fertilizers use in Buton Utara Regency is important to do. With a deeper understanding of farmers' local knowledge, appropriate ways can be identified to effectively integrate the use of organic fertilizers with existing farming practices. This will provide sustainable benefits, such as increasing agricultural yields, reducing dependence on chemical fertilizers, increasing soil fertility, and ultimately supporting the sustainability of the agricultural sector.

This research aims to describe and analyze the local knowledge of cashew farmers in Buton Utara Regency regarding the use of organic fertilizers in agriculture. The research results are expected to provide valuable input for policymakers, agricultural practitioners, and farming communities in designing and implementing agricultural development programs based on local wisdom and based on environmentally friendly practices.

Research Method

The research method used in this study is a qualitative descriptive method (Sugiyono, 2008). This qualitative descriptive research aims to understand in depth and detail the local knowledge of cashew farmers in organic fertilizers use in Buton Utara Regency. A qualitative descriptive method was chosen because this research emphasizes an in-depth understanding of the local knowledge of cashew farmers in organic fertilizers use, as well as understanding the social and environmental context in Buton Utara Regency area. This method provides a comprehensive and in-depth description of farmers' agricultural practices, factors that influence the use of organic fertilizers, as well as potential obstacles or challenges faced in adopting sustainable practices.

Data collection was carried out through in-depth interviews used to obtain in-depth information about local farmers' knowledge, views, experiences, and practices related to the use of organic fertilizers. In addition, data are also collected through field observations to see directly the agricultural practices carried out by farmers. The process of data analysis was carried out qualitatively by identifying patterns, themes, and interesting findings that emerged from the results of interviews and observations (Creswell, 2016; Maleong, 1989). The results of the data analysis are described in a narratively manner and linked to the social, economic, and environmental context in Buton Utara Regency.

Finding and Discussion

Farming Practices of Cashew Farmers

The cashew farming process in Buton Utara Regency involves a series of steps that have been part of the local knowledge of farming communities for many years. These stages are considered important to maintain and increase crop productivity and environmental sustainability in the area. In the custom of the farming community in Buton Utara district, clearing forests for land must be done carefully to maintain a balance in it. Wise use of forests will create harmony between nature and humans (Prabowo & Sudrajat, 2021). In this context, BD explains:

Cashew farmers have a special habit when clearing plantation land. Farmers usually carry out site surveys (*molelei*), ask permission from forest dwellers (*mongka banga*), chop down (*meweteki*), cut trees (*mepodoi*), and after that clear branches or stuck logs (*Modaha*). Even after the land is ready, to do the planting first determines the auspicious days. This is all done with the hope that farmers will get abundant agricultural produce and can avoid disturbances during gardening. (interview, October 2022, translated by the researchers)

The initial stage in the practice of cashew farming begins with the opening of plantation land. Before carrying out land clearing, the farming community in Buton Utara Regency conducts a location survey or *molelei*. *Molelei* is seen as an effort to preserve the environment because they realize that arbitrary clearing of land can have an impact on gardens and crop yields. Furthermore, farming communities also respect the environment by asking permission from forest dwellers or *mongka banga* before proceeding with the land clearing stage.

After obtaining a permit, the gardening process is continued by clearing or *meweteki*, which is clearing the land of wild plants. Furthermore, farmers carry out the felling of trees (*mepodoi*) and drop logs that are still stuck (*modaha*) to clear the land properly. All of these stages are carried out with full calculation and caution because the farming community believes that mistakes in land clearing can have an impact on crop yields.

When the time for planting comes, the farming community relies on the calculation of an auspicious day or *oloea maiko*. They choose the planting time based on the moon calculation system in the sky or *kucika*. This belief is believed to provide abundant crop yields and protect plants from pests and diseases. Therefore, the farming community is very careful about their behavior and speech so as not to cause disturbance to the planting process. The cosmology of the relationship between nature and humans formed through local knowledge of local communities is a force in maintaining the existence and balance of the environment (Efriani, Dewantara, Utami, & Listyaningrum, 2020).

Local knowledge regarding the determination of auspicious days is known through the results of interviews with a plantation skipper, namely Bapak Labengke who is 84 years old. This local knowledge includes calculating the correct time for gardening, especially for root crops or long-term crops. The calculation is based on observing the position of the moon in the sky and has symbols for the human body. According to

the calculations described, farmers can measure time by looking at the position of the moon in the center of the palm. Every rotation of the moon in the sky is calculated based on symbols related to parts of the human body. For example, if the moon is in the center of the palm, it is considered the first reckoning, and this time is considered suitable for planting root crops or plants that have creeping properties.

The second count, which is indicated by the position of the little finger, is considered unfavorable for planting because it is likely to encounter constraints or challenges in farming. Then, on the count of three, the position of the ring finger also marks the three moon cycles and is considered very suitable for growing corn. The middle finger symbol that sticks out like a corn seed is considered to be under the characteristics of the corn plant. Furthermore, the fourth calculation, which is marked with the middle identity, shows that the fourth calculation of the moon's rotation in the sky is very good for planting coconuts and cashews. The high position of the middle finger is interpreted as a long-term plant that towers high and produces lots of fruit. This illustrates the characteristics of coconut and cashew plants which are known as plants that have a long growth period and abundant yields. Finally, the fifth calculation, which is marked with the index finger and thumb, is considered less successful and tends to encounter problems such as disease or pests. This means that this time is considered less suitable to start gardening activities.

Furthermore, the next stage is making planting holes or hammering (*motasu*). Cashew farmers usually plant a distance of 5-6 meters between one hole and another. These carefully spaced plantings are based on their local knowledge of the ideal spacing to ensure optimal plant growth and more efficient use of the land.

After the *motasu* stage is completed, the next step in the cashew gardening process in Buton Utara Regency is planting guava. In the local knowledge of the farming community in the area, the cashew seeds to be planted must be cleaned before the planting process begins. Farmers usually don't graft the seeds but plant them directly without any additional processing. Before actually planting the seeds, farmers usually soak the guava seeds first in a process called "*teemoho*". This soaking process is usually done if the planting time is long enough from when it rains. However, if cashew seeds are planted during the rainy season, the soaking process is usually not carried out by farmers. Thus, the technique of soaking the seeds is largely determined by weather conditions or the presence of rain. As explained by Ibu Wa Damu as follows:

Cashew farmers, based on their farming experience, have adapted and have local knowledge about choosing good seeds to plant. (interview, August 21, 2022, translated by the researchers)

The local knowledge of the cashew farming community in Buton Utara Regency regarding superior seeds shows that they have a unique understanding and knowledge in selecting seeds that are considered superior; the farmers focus on several specific characteristics that help them identify the most productive types of cashews and produce lots of fruit. One feature that is considered superior is the shape of the cashew that extends to the top. This upward-widening shape is an indication to farmers that the cashew has good and fertile growth. This feature describes the strength of the plant in developing its branches and leaves which contribute to a bountiful harvest.

Another feature to consider in choosing superior seeds is the type of cashew nut. The farmers believe that the female model which is considered superior is the guava model. Female cashews are considered more profitable because they always produce lots of fruit. Meanwhile, male models of cashew nuts tend to have a slightly pointed shape at the ends and produce less fruit. Therefore, farmers prefer to use female cashew seeds for their crops because they are considered more productive.

The skill in selecting superior seeds is an example of how the local knowledge of farming communities in Buton Utara Regency becomes the basis for their agricultural practices. This knowledge shows good progress in increasing the productivity of the cashew crop and providing better yields. By continuing to appreciate and utilize this local knowledge, farming communities can continue to adapt to environmental changes and maintain the sustainability of their agricultural businesses.

In the farming community in Buton Utara Regency, it is customary to carry out the ritual procession of the *matantasu* before planting cashew seeds. *Matantasu* ritual procession aims to determine the starting point for planting which is usually placed in the middle of the garden and is believed to be the center of the heart. The purpose of implementing *matantasu* is for the cashew trees planted to thrive, avoid pests or diseases that can attack the cashew tree, and provide abundant sustenance. By carrying out the *matantasu* ritual, the farming community believes that cashew plants that grow from a ritually determined starting point will have good and fertile growth. In addition, the belief believes that plants grown from the starting point marked with *matantasu* will avoid pests and diseases; this practice shows that their local knowledge is the basis for developing sustainable agricultural practices.

The combination of the practice of cleaning the seeds before planting, the technique of soaking the seeds, and the performance of the *matantasu* ritual reflects the local knowledge of the cashew farming community which has been passed down from generation to generation. This knowledge is not just a belief, but also a wise way to ensure the success of agriculture and the fertility of the cashew tree, which is a source of livelihood for the people of Buton Utara Regency.

Communities in Wakorumba Utara, Buton Utara Regency have long incorporated local knowledge into their lives to cultivate nature locally, especially in the process of fertilizing the cashew tree. The community has a deep understanding of the use of organic or natural fertilizers to fertilize cashew plants. The organic fertilizers that are usually used come from natural sources around them.

One common practice is to collect and store the remains of wild plants that grow under the cashew tree, such as branches and leaves. The branches and leaves are then used as organic fertilizers to increase soil fertility and cashew yields. The rest of the guavas that have been picked are also collected and stored under the guava tree to be used as fertilizers again. Likewise, the grass that grows around the cashew is not burned but is left to rot under the cashew tree to provide additional nutrition to the plant and ensure that the plant remains fertile and bears a lot of fruit. This organic fertilization practice is a hereditary tradition passed down from the time of their grandparents. Initially, they used the burning residue as fertilizers, but later with an environmentally friendly approach, the fertilization process was improved by burning the remaining ash and leaving it in the soil for a few days before using it as a natural fertilizer.

The community has also developed a natural fertilization method by observing the experiences of women who live on the sea coast of Labuan Bajo. They use lure fish or anchovies or small fish that have been salted to be burned around the cashew plantation. The aroma that is produced from burning the fish is blown by the wind to reach the cashew flowers which are in the process of making their way to the fruit. This natural fertilization process is considered to provide benefits for the growth of cashew flowers. In addition, in the local understanding of the community, they know the term “*pagiba*” which is used to describe the period when the cashew plant requires nutrition, similar to the term “cravings” which is used in humans during pregnancy. This shows how deep their understanding is of the needs and development of the cashew plant and the importance of natural fertilization to support its growth.

Factors Influencing the Use of Organic Fertilizers

The use of organic fertilizers by cashew farmers in Buton Utara Regency is influenced by several factors. One of the main factors that influence the effectiveness of the use of organic fertilizers is related to the availability of the organic materials themselves. In this area, cashew farming communities often face challenges in obtaining organic materials in sufficient quantities to meet the fertilizer requirements on their farms.

Limited natural resources are an obstacle in facing this challenge. The availability of agricultural waste, manure, and forages as raw materials for organic fertilizers is often inadequate. In addition, farmers also face limited access to organic materials. The long distance to the place where organic materials are supplied makes it difficult for farmers to obtain them on time. This constraint limits the potential use of organic fertilizers on a larger and wider scale. Some farmers are forced to rely on chemical fertilizers that are more accessible and available on the market. Although chemical fertilizers can provide instant results, prolonged use can lead to a decrease in soil fertility and other negative impacts on the environment and human health (Mangalisu, Armayanti, Syamsuryadi, Fattah, & Khaeruddin, 2022).

Sociocultural aspects play an important role in the use of organic fertilizers in Buton Utara Regency. The results of observations and interviews show that some farmers still follow traditional agricultural practices because it is a legacy from their ancestors and an integral part of local wisdom that has been passed down from generation to generation. They believe that these traditional methods have been tested over the years and are suited to their environment and culture. As a result, they are reluctant to switch to new methods or technologies.

These cultural factors have had a significant impact on the adoption of organic fertilizers in agricultural practices. However, on the other hand, some farmers are more open to innovation and new technologies. They realize that modern agriculture requires greater efficiency and sustainability. They are then more inclined to adopt technological advances, including the use of organic fertilizers to increase crop yields and maintain soil fertility.

In facing the challenges of climate change and the sustainability of natural resources, A collaboration between sociocultural aspects and modern agricultural technology is important. In this way, cashew farmers in North Buton Regency can benefit from innovations that maintain their cultural values while still adapting to changing times to safeguard the future of cashew sustainability in their farms.

Potential Obstacles or Challenges in Adopting Sustainable Agricultural Practices

Potential obstacles or challenges in adopting sustainable practices in the use of organic fertilizers by cashew farmers in Buton Utara Regency can be identified as follows.

One of the main obstacles is the lack of knowledge of farming communities about the benefits of organic fertilizers. Some farmers are still not fully aware of the potential benefits of organic fertilizers in increasing agricultural yields and environmental sustainability. They are more accustomed to using chemical fertilizers or not familiar with effective ways of using organic fertilizers. Therefore, education and training programs that focus on the benefits and how to use organic fertilizers are very important to raise awareness and understanding of farmers. Through the right educational approach, farmers will become more open to sustainable practices and will be more inclined to adopt organic fertilizers in their farming.

Another challenge faced is access to adequate technology and infrastructure. Some farmers face difficulties in obtaining organic fertilizers due to limited access to production and distribution sites. This can

lead to difficulties in obtaining sufficient amounts of organic fertilizers to apply in their farms. Traditional practices that are applied cannot cover the entire plantation area, so it requires additional organic fertilizers. In addition, inadequate infrastructure such as poor road access or limited supporting facilities can also affect the distribution and availability of organic fertilizers in the region.

The success of using organic fertilizers is also very dependent on soil fertility. If the soil is already highly degraded and experiencing nutrient damage, the use of organic fertilizers alone may not be enough to achieve optimal results. Therefore, efforts are needed to improve the overall soil quality through good soil conservation and soil management practices. Implementing conservation practices such as planting cover crops, green manuring, or composting organic waste can help improve soil quality and the effectiveness of organic fertilizers used. In maintaining soil fertility, the cashew herb farming community in Buton Utara Regency implements a system of switching gardens. In practice, when it is found that the condition of the land has started to become unproductive, it will be abandoned and left for several years, which will later be reopened after going through the survey process again.

Conclusions

Local knowledge of cashew farmers using organic fertilizers in Buton Utara Regency is very diverse. Farmers have used organic fertilizers in their farming practices based on the hereditary knowledge that has been passed down. However, several factors affect the use of organic fertilizers, such as the availability of organic materials, production costs, and social and cultural factors. Apart from that, there are also potential obstacles and challenges in adopting sustainable practices, such as a lack of knowledge about the benefits of organic fertilizers, and access to technology and infrastructure. Therefore, a holistic and integrated approach through educational programs, community participation, and policy support is important in increasing the adoption of organic fertilizers and encouraging sustainable agricultural practices in Buton Utara Regency.

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