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OPTIMIZATION OF AGRICULTURAL LAND USE THROUGH WATER SAVING AND ENVIRONMENTALLY FRIENDLY AGRICULTURE

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Abstract: Integrated agriculture is a combination of two activities, namely the agricultural Integrated agriculture is a combination of two activities, namely the agricultural sector and the livestock sector and is sometimes also known as the Livestock and Crop Integration System. By mastering technology, farmers can manage their resources more effectively, reduce dependence on outside parties, and create added value from their agricultural products. agriculture, but also as a driving force for a sustainable local economy. The aim of the research is to describe the use of agricultural technology through the application of water-saving and environmentally friendly agricultural technology and to realize community economic independence and preserve natural resources (soil nutrients). The research was carried out at the Tnao Mat Farmers Group Garden, III Bieto Hamlet, Niuk Baun Village, West Amaraasi District, Kupang Regency. The data collection methods used were observation, interviews and documentation. Next, experiments were carried out to produce Organic Fertilizer (Bokashi, POC and Drip Irrigation). The results obtained are that the environmentally friendly agricultural model has strengths greater than its weaknesses, as well as its opportunities greater than its threats. So farmers can be directed to dare to try environmentally friendly agricultural models to reduce production costs and increase quality agricultural products.
Keywords: Production, Cucumis sativus L, SP-36, Cow manure

INTRODUCTION

Integrated agriculture is combining two activities, namely the agricultural sector and the livestock sector and is sometimes also known as the Livestock and Plant Integration System. The main characteristic of this Livestock and Plant Integration system is the existence of synergism or mutually beneficial linkages between plants and livestock. Environmentally friendly agriculture is an agricultural system that manages all agricultural resources and farming inputs wisely, based on technological innovation to achieve sustainable productivity increases that are economically profitable and socially and culturally acceptable and have low risk or are not dangerous for humans..

Low pressure irrigation technology that utilizes piping techniques, such as drip and the like, is known to have a significant level of water use with high efficiency compared to open channel or gravity irrigation. This technology is an alternative technology that can be developed for eventual implementation. Drip irrigation has great potential to be applied in dry land farming with very limited water availability.

Niuk Baun Village is an agricultural area in terms of livelihood, most of whom are farmers. Members obtain technological information only through print media (newspapers and agricultural magazines), electronic media broadcasts (television and radio). This causes the Farmer Group's agricultural system to still be conventional and rely more on human labor as the main factor in the production process. Apart from that, the agricultural commodities produced are not yet optimal and competitive (quantity, quality, type of commodity, and processing technology).

The types of plants cultivated also vary, including rice, corn and vegetables such as onions, kale, mustard greens and beans. This also really depends on the availability of water on the land. In the rainy season farmers prefer to plant field rice, while in the dry season farmers plant horticultural crops by relying

on water from shallow wells with very limited water flow. Rice and horticultural crops are cultivated conventionally using chemical fertilizers such as single fertilizer Urea, TSP and KCl or NPK compound fertilizer.

The use of organic fertilizers for planting rice, corn and vegetables is not carried out, this is due to farmers' lack of knowledge regarding the importance of organic materials for soil and plants as well as farmers' ignorance of the methods, technology for making and applying them in cultivating their plants.

Cattle, goats and chickens are left free. Livestock manure is almost not used. Farmers only use dry livestock manure for ornamental plants as a planting medium mixture. Vegetable and corn waste are used as animal feed. Furthermore, the organic fertilizer produced can be used in cultivation activities so that it can reduce or replace the inorganic fertilizer used by farmers.

The priority problems of the Tnao Mat Farmers Group, Niuk Baun Village are as follows: (a) High intensity of use of inorganic fertilizers, so that nutrients in the soil are increasingly reduced. Production results are less than optimal and of poor quality. (Not friendly to nature) (b) There is no use of organic waste in processing solid organic or liquid organic fertilizer.

Objectives: (1) Identify, apply and optimize the use of agricultural technology through the application of water-saving and environmentally friendly agricultural technology. (2) To realize the economic independence of the community and the preservation of natural resources (soil nutrients) as a result of the sustainability of this Program.

RESEARCH METHOD

This research was carried out in the Tnao Mat Farmers Group Garden, III Bieto Hamlet, Niuk Baun Village, West Amaraasi District, Kupang Regency.

Research data is used to solve practical problems of the modern world, both practical problems of individuals or groups.

Data collection is carried out to obtain the information needed to achieve research objectives. In this research, researchers used primary data and secondary data. The data collection methods used were observation, interviews and documentation. Next, experiments were carried out to produce Organic Fertilizer (Bokashi, POC and Drip Irrigation) and a sustainable agricultural development strategy was designed.

RESULT AND DISCUSSION

Organic Agriculture/Environmentally Friendly Agriculture

Agriculture with intensive use of local resources with little or no use of external input is a method of farming which is often referred to as organic farming, meaning that this farming method no longer uses chemicals such as chemical fertilizers and pesticides. It is hoped that this agricultural method will not damage the environment but will produce high quantity and quality of products (Oktavia, H.F., Susilastuti, D., 2020).

Environmentally friendly agriculture has a sustainability concept which is expected to produce high agricultural productivity as an ecologically based agricultural system. Quoting Sumarno's words, Husnain explained that there are 4 components of environmentally friendly farming, namely: (1) land degradation mitigation is carried out by controlling erosion and surface runoff, (2) the farming is free from external pollutant contamination, (3) low greenhouse gas emissions and (4) organic agricultural products that are free from residue are safe for consumption. (Husnain, Nursyamsi, D., 2012).

Environmentally friendly farming is a simple agricultural technique because in its implementation it uses beneficial microorganisms in the soil so that the soil is more balanced so that it can increase plant growth. (Nur Rahmawati, 2016).

According to Sumarnodan Suyamto, as explained by Alya Putri Mulyani and Adi Firmansyah, one alternative for sustainable farming is environmentally friendly agricultural businesses. By taking advantage of opportunities, increasing self-awareness and commitment in managing available resources, farming sustainability can be achieved. Producing innovation in agricultural cultivation techniques oriented towards producing quality results, optimal production, and maintaining environmental sustainability by implementing environmentally friendly farming. Through this environmentally friendly innovation, we will be able to produce products that are high quality, highly competitive and in line with market preferences. (Mulyani and Firmansyah, 2020).

The development of environmentally friendly agriculture can reduce farming costs by maximizing the use of materials available around farmers which can improve farmer welfare. Environmentally friendly farmers can carry out the 3Rs in order to manage environmentally friendly plants. The 3Rs in question are:

1. Reduce ; Farmers are expected to minimize the use of goods or materials. Using more and more materials can increase the amount of waste.

2. Reuse; Farmers are encouraged to use reusable items as much as possible. This can extend the time an item can be used before it becomes trash.
3. Recycle; As far as possible, farmers are expected to recycle items that are no longer useful. (Sunarti, 2013)

Organic fertilizer

Farmers in general carrying out farming activities cannot be separated from the need for fertilizer. Fertilizers that are commonly used by farmers and are relatively expensive are factory-made chemical fertilizers. Apart from that, fertilizer shortages due to delays in supply from distributors also often occur. Apart from requiring expensive production costs, the use of chemical fertilizers also has a negative impact on the environment.

According to the Minister of Agriculture Regulation No.2/Pert./HK.060/2/2006, what is meant by organic fertilizer is fertilizer that consists mostly or entirely of organic material derived from plant or animal residues that have undergone engineering in solid or liquid form. which is used to supply organic matter, improve the physical, chemical and biological properties of soil.

Compost

One of the organic fertilizers that is often used in environmentally friendly agriculture is compost. Plant residues and animal waste that have undergone a decomposition or weathering process are materials used to make compost. According to Subekti, as stated by Adi Ratriyanto, compost fertilizer is an environmentally friendly fertilizer, one of its advantages is that it can repair physical damage to the soil due to excessive use of inorganic (chemical) fertilizers and can increase the income of farmers..

Manure

Manure from livestock manure can be used to improve the quality of organic fertilizer so it is hoped that it can overcome farmers' problems and ultimately increase farmer production as a center for organic crop harvesting.

Liquid Fertilizer

Liquid fertilizer is a solution that contains one or more soluble carriers of elements needed by plants. Its ability to provide nutrients according to plant needs is one of the advantages of liquid fertilizer. Some of the benefits of using liquid fertilizer are: (1) Increasing the absorption of nitrogen from the air; (2) encouraging the formation of leaf chlorophyll thereby increasing the photosynthetic ability of plants; (3) increase plant resistance to drought; (4) increasing plant vigor so that plants become sturdy and strong; (5) reducing the dropping of flowers and fruit; (6) increasing the formation of flowers and fruit; (7) stimulate the growth of production branches; (8) increase plant resistance to drought.

SWOT Analysis Results

SWOT analysis is used to analyze existing data using the following analysis pattern matrix:

Table 1. SWOT Analysis Pattern/Template

Strength	Weakness
1. Making organic fertilizer is easy 2. Increasing results at low costs 3. The high price of Synthetic Chemical Fertilizer	1. Lack of willingness of farmers to use organic fertilizer 2. Lack of education for farmers. 3. Agriculture still believes in synthetic chemical fertilizers
Opportunity	**Threath**
1. Raw materials are everywhere and there is still minimal production of organic fertilizer 2. Can reduce farmers' costs because it uses available natural resources 3. Can be a model for future agriculture	1. 1. Farmers' desire to switch from the conventional system to the classic system. 2. Farmers' fear of decreasing yields. 3. The lure of subsidized fertilizer from the government.

Table 2. SWOT Analysis for Strategy Development

Internal / Eksternal	**Strength**	**Weakness**
Opportunity	Strengths/Opportunities Choose Advantages 1. Providing information to the public about how easy it is to make organic fertilizer because the ingredients are easy to obtain 2. Using organic fertilizer can increase agricultural yields at minimal cost 3. The increasingly expensive price of synthetic chemical fertilizers can attract farmers to use organic fertilizers which are relatively cheap	Weaknesses / Opportunities Taking Advantage of Opportunities 1. Raw materials that are easy to obtain can attract the attention of farmers to make and use organic fertilizer 2. Farmers can be educated that the agricultural model is friendly 3. The environment can reduce farmers' costs because natural resources are the main ingredient in making organic fertilizer. 4. Can become a model for future agriculture so that it can give confidence to farmers to switch to environmentally friendly agriculture
Threath	Strengths/Opportunities Choose Advantages 1. Take advantage of the ease of making and using organic fertilizer to become part of agricultural entrepreneurship 2. Promote to farmers about environmentally friendly agriculture so that farmers get information about environmentally friendly agricultural models 3. Conduct outreach to farmers so that farmers know that environmentally friendly agriculture is good to do	Controlling Threats Weaknesses / Threats 1. Provide special training to farmers regarding making organic fertilizer 2. Providing motivation to farmers that environmentally friendly agriculture is sustainable agriculture 3. Provide understanding to farmers that we should not continue to depend on government subsidies.

Table 3. SWOT Analysis and Development Strategy Priorities

Internal / Eksternal	**Strengths**	**Weaknesses**
Opportunities	1. Using available natural resources to make organic fertilizer that can be worth rupiah 2. Increase agricultural yields by reducing production costs by using organic fertilizer made by farmers themselves. 3. The high price of synthetic chemical fertilizers can be a reason to make environmentally friendly agriculture a future agricultural model because the system is sustainable	1. Motivate farmers to create and use organic fertilizer 2. Providing education to farmers about environmentally friendly agriculture which can become a model for future agriculture 3. Growing confidence in farmers that environmentally friendly agriculture can reduce farmers' costs because materials for environmentally friendly agriculture are easy to obtain and make..
Threat	ST Strategy Use "S" to Avoid "T" 1. Making and using organic fertilizer can be a solution to the lack of subsidized fertilizer from the government 2. Increasing product yields at low costs can be a source of confidence for farmers to eliminate farmers' fear of decreasing production yields. 3. The high price of chemical fertilizers can be a reason for farmers to create and use organic fertilizers so that it can increase farmers' interest in switching to an environmentally friendly agricultural model.	WT Strategy Minimizing the "W" to Avoid the "T" 1. Ease of obtaining raw materials for making organic fertilizer can be the main capital in motivating farmers to make and use organic fertilizer 2. Educate farmers regarding environmentally friendly agriculture which can become a sustainable agricultural model 3. Provide concrete evidence to farmers regarding environmentally friendly agricultural models that environmentally friendly farming can be an agricultural model that benefits farmers.

CONCLUSION

The environmentally friendly agricultural model has strengths that outweigh its weaknesses, and its opportunities outweigh its threats. So farmers can be directed to dare to try environmentally friendly agricultural models to reduce production costs and increase quality agricultural products

Based on the conclusions above, it is appealed to the government, especially the ministry of agriculture, to continue to provide education to farmers regarding environmentally friendly agriculture. Apart from that, farmers are encouraged to promote environmentally friendly agricultural models so that they do not continue to depend on government fertilizer subsidies

This research is still far from perfection, the limitations of research on one case and one particular area cannot be used as a basis for generalization. It does not allow a comprehensive understanding to be obtained. In line with this, further research is needed to accommodate more cases to obtain a deep and comprehensive understanding.

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