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Training on Making NPK Liquid Organic Fertilizer With The Application of Econobiotechnology

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ABSTRACT

Policy reforms and research on agricultural ecology need to be intensified to reduce land degradation and the massive ecological and chemical impacts of soil chemical pollution. This is related to the increase in population that requires clothing, food, and welfare. Furthermore, although there has been a shift toward a form of agriculture with high-added value. This problem must be solved by diversifying efforts, applying ecology to agricultural cultivation land, and making breakthroughs in making organic fertilizers with various sources and environmentally friendly ways. This is rational and can be done by involving the industry, universities, and farmer groups who are smart and productive. Regarding farming diversification, The results obtained are by the solutions offered, farmers can make liquid organic fertilizers by utilizing water measuring 200 nm to 10 m of Micro-Nano-Bubbles (MNBs). This is following the concept and is the application of Econobiotechnology. Knowledge before participating in the training in making fertilizers Organic Liquid is 74%, while knowledge after attending training on making Liquid Organic Fertilizer is 91%. The interest in learning and making Liquid Organic Fertilizer is 40%.

Keywords: NPK Liquid Organic Fertilizer, Effective, High Fertilizer Prices, Eco Nanobiotechnology.

INTRODUCTION

The state of agriculture in Indonesia is at a crossroads. To support the lives of hundreds of millions of Indonesian people, the agricultural sector requires steady, fast, and stable economic growth. Hussaini (2014) explains that this sector is one of the main components of government programs and strategies to eradicate poverty. The government needs to ensure infrastructure integrity with more intensive involvement of irrigation users. In addition, efficient use of water to achieve a more optimal harvest down to every drop of water. On the other hand, agricultural activities and the agriculture department as well as the agricultural services at the central and regional levels do not pay attention to ecological and environmental aspects. The economic, ecological, and environmental aspects and agricultural business results are important interaction triangles in overcoming agricultural business problems in a narrow or broad sense. Job creation and drastic poverty reduction. This was achieved by focusing attention on staples such as rice, corn, sugar, and soybeans. the majority of farmers work in fields of less than half a hectare, agricultural activities lose the potential to create additional income and jobs (Lan, 2019; Pham Thi et al., 2021).

The sharp decline is due to business or agricultural activities not paying attention to ecological and environmental aspects which have an impact on decreasing production due to poisoned soil, rat pests, planthoppers, increased production costs, and environmental

damage around the ecosystem of rice fields and fields. The above statement is supported by research by Sumarno & Kartasasmita (2014) in the book Policy Reform Towards Agricultural Development Transformation (Sumarno, 2014). Empirically it shows that paddy fields in Banten and Lampung experience symptoms of soil degradation, as seen in the need for higher fertilizer to obtain the same rice yield, compared to previous seasons, the layer of mud or topsoil that becomes shallower, the need for irrigation more often, paddy soil dries easily and the soil organic matter content is low.

Regarding the decline in land quality caused by these various factors, Brown & Kane (1995) gave a stark warning as follows: Scientists have known that land degradation has resulted in decreased land productivity and a negative national food production growth rate in many countries. Land degradation and damage will continue to occur due to various causes and as a result food shortages in many countries will become a serious problem in the XXI century, it is only a matter of time. Related to this, in general, Brown & Kane (1995) citing from Scientific America states that the use of natural resources by the pressure of a large population and by poverty, will have an impact on reducing biodiversity and environmental quality, and if it is not prevented then humans will face a crisis. environment.

They recommend investing in environmental management technology in every production process with environmentally friendly technology. Environmentally friendly technologies such as making organic fertilizers, making probiotics, natural enemies, avoiding monoculture cropping patterns, and so on. Agricultural technology for food crops in paddy fields, of course, cannot be separated from these two strong statements. Indonesia at present and in the future faces problems and dilemmas insufficient food production, related to a very large population and declining environmental quality. Policy reforms and agricultural ecological research need to be intensified to reduce land degradation and the massive ecological and chemical impacts of soil pollution (Castillo, 1992)

Another obstacle is with increasing public awareness of food that is safe for consumption, farmers are not ready to produce it, which will result in Indonesia becoming an open market for products certified for quality assurance and safe for consumption from other countries. Another factor that has not yet been focused on is the diversification of the farming business. Although there has been a shift towards forms of agriculture with high added value. The effect of farm diversification remains limited to specific regions and commodities within each sub-sector. Policy reform and agricultural ecological research need to be intensified to reduce land damage and massive ecological impacts and soil chemical pollution. This is related to the increase in population that requires clothing, food, and welfare. Another factor that has not yet been focused on is the diversification of farming activities. Although there has been a shift towards forms of agriculture with high added value. Solutions to this problem must be sought through diversification efforts, ecological applications on agricultural cultivation land, and making breakthroughs in the manufacture of organic fertilizers with various sources and environmentally friendly ways. This is rational and can be done by involving industry, universities, and farmer groups who are smart and productive. Regarding the diversification of the farming business, the general public generally lacks the knowledge and ability to process and make organic fertilizers that are cheap and have economic value. This is related to knowledge, attention, experience, level of education, skills, economic factors, culture, and social environment. This is the first problem. This condition affects the productivity of farmers and vegetable crops and becomes a problem that must be solved.

This is one portrait of the condition of farmers and their groups such as in Nagari Sungai Abang, Lubuk Alung, Padang Pariaman Regency, West Sumatra. Currently, the

price of NPK Mutiara reaches IDR 630,000-IDR 800,000 if we look at Shopee, the online sales exchange. only IDR 150,000 last year. High production costs cause many farmers to lose money and stop farming and switch to working in the informal sector, such as motorcycle taxi drivers and so on. This is the second problem for which a solution is sought through community partnership service. Farmers' groups are productive community groups that are currently experiencing difficulties.

These difficulties in carrying out vegetable cultivation business due to chemical fertilizers and drugs for plant maintenance, anti-pests, and other pesticides have increased significantly. This has reduced the turnover of vegetable sales due to rising vegetable prices. Consumers experience a decrease in the purchasing power of basic needs. This has an impact on all aspects of the daily life of the community in the village, including vegetable farmer groups. That is, the economy affects income, health affects education, and education is related to and influenced by economic factors and other aspects. manufacture of liquid organic fertilizer by utilizing water measuring 200 nm to 10 m (Micro-Nano-Bubbles; MNBs) which is effectively absorbed by plant roots and is expected to increase production by 30 percent. MNBs is a nanotechnology to change the water in the media for making liquid fertilizer. This is by the concept and is an application of Econobiotechnology (Henriksson & Teeri, 2009). MNBs have been developed and have been manufactured under the name Nanobubbles Fresh. The production cost of NPK fertilizer is relatively cheap, namely IDR 2000. Furthermore, the activities were carried out 6 times with the stages shown in this PKM activity schedule. These stages will be carried out consistently starting with a meeting with the Wali Nagari to identify problems. The activities were carried out 6 times with the stages shown in the PKM activity schedule. These stages will be carried out consistently starting with a meeting with the Wali Nagari to identify problems. The activities were carried out 6 times with the stages shown in the PKM activity schedule. These stages will be carried out consistently starting with a meeting with the Wali Nagari to identify problems.

METHODS

The method of implementing this activity consists of 6 meetings with a duration of 8 hours each meeting consisting of 4 stages, namely:

1. Stage of activity to implement the solution to the problem: Stage 1, Wali Nagari meeting to make a memorandum of understanding for the implementation of Partnership PKM.
2. Activity stage for problem solution: 1) Stage 2, Situation Analysis and identification of existing problems in the field; and 2) Stage 3, Preparation of Tools and Materials after the funds are disbursed.
3. Demonstration and participation of partners in activities: Stage 4, Demonstration and partner participation which is the implementation of activities for 3 meetings including making PKM outputs and so on.
4. Program Evaluation and Sustainability: 1) Stage 5, Evaluation of program implementation in the form of a training participant's absorption test; and 2) Stage 6, Continuation of the PKM Program and creation of articles in printed/electronic newspapers as well as PKM Partnership videos with a duration of 5 minutes.

RESULTS AND DISCUSSION

Community service activities were carried out in Nagari Aie Tajun, Padang Pariaman Regency. This activity was carried out by the Universitas Negeri Padangcommunity service team consisting of lecturers and students in collaboration with a resident of Nagari Aie Tajun. Regarding the problems that exist in society in general, the lack of knowledge and ability to process and make organic fertilizers that are cheap and have economic value. This is related to knowledge, attention, experience, level of education, skills, economic factors, culture, and social environment. The existence of high farm production costs resulted in a very significant increase in fertilizer prices causing many farmers to lose and stop farming. The solution offered at this service is to conduct training on making liquid organic fertilizer by utilizing water measuring 200 nm to 10 µm (Micro-Nano-Bubbles; MNBs) which is effectively absorbed by plant roots and is expected to increase production by up to 30 percent. MNBs is a nanotechnology for changing water as a medium for making liquid fertilizer. This is by the concept and is the application of Econanobiotechnology. Furthermore, the manufacture of NPK organic liquid fertilizer derived from market waste and obtained cheap and effective organic liquid fertilizer that fits the needs of vegetable farmers.

The results obtained are by the solutions offered, farmers can make liquid organic fertilizer by utilizing water measuring 200 nm to 10 µm of Micro-Nano-Bubbles (MNBs). This is by the concept and is an application of Econanobiotechnology. Knowledge before participating in production training on Liquid Organic Fertilizer is 74% while knowledge after attending training on making Liquid Organic Fertilizer is 91%. Interest in learning and making Liquid Organic Fertilizer is 48%. Testing levels of Nitrogen EM4 B nano and MNBs PML on NPK liquid organic fertilizer products namely EM 4 B: 11.50% and MNBs PML 37.79%.

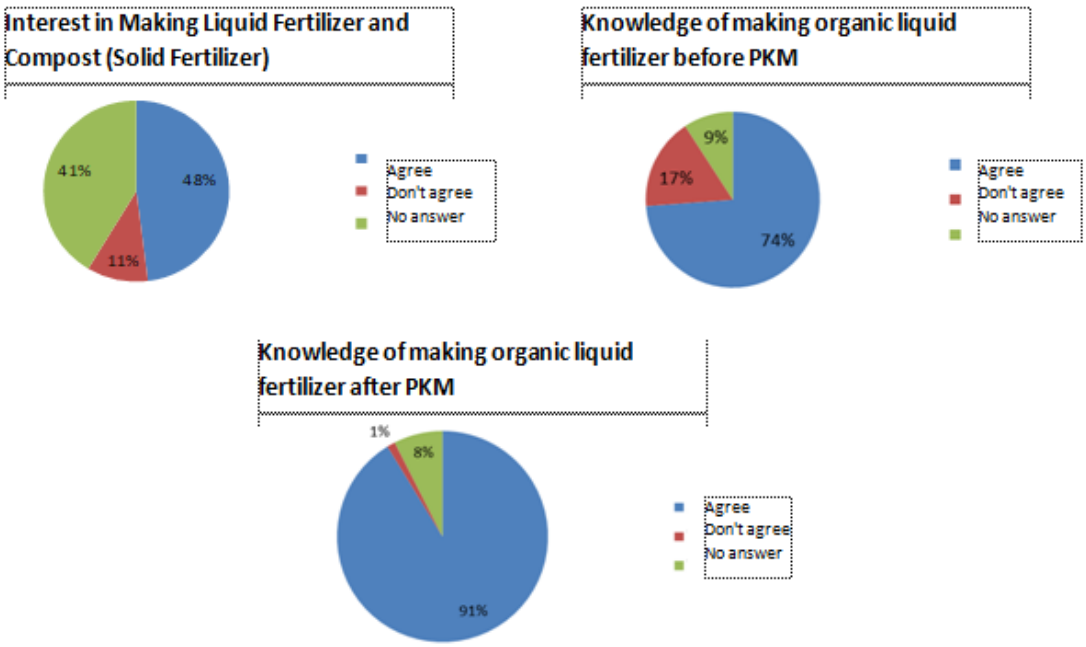

Figure 2. 1) Graph of residents' interest in making NPK organic liquid fertilizer; 2) Graph of residents' knowledge about the manufacture of NPK organic liquid fertilizer before the service is carried out; and 3) Graph of residents' knowledge about the manufacture of NPK organic liquid fertilizer after service

Figure 1. Portrait of making NPK liquid organic fertilizer with residents of Nagari Aie Tajun

Table 1. Test levels of Nitrogen EM4 B nano and MNBs PML on NPK liquid organic fertilizer product

No	Sample name	Sample volume (mL)	Blank Volume (mL)	Correction Factor (fk)	Nitrogen Content (%)
1	EM 4B nano	2.8	0.1	35.67	11.50
2	MNBs PML	5.0	0.1	34.77	37.79

Nitrogen Content (%)
= (Vs-Vb) x N x bst N x (100/mg sample) x fk
= (Vs-Vb) x N x bst N x (100/mg sample) x fk
= (Vs-Vb) x N x 2.8 x fk

EM 4B nano Nitrogen Content (%) =(Vs- Vb) x N x 2.8 x fx = (2.8 – 0.1) x 0.05 x 2.8 x 35.67 = 11.50%
MNBs PML Nitrogen Content (%) = (Vs- Vb x N x 2.8 fk = (5.0- 0.1) x 0.05 x 2.8 x 34.77 = 37.79%

CONCLUSION

The results obtained are in accordance with the solutions offered, farmers are able to make liquid organic fertilizer by utilizing water measuring 200 nm to 10 µm of Micro-Nano-Bubbles (MNBs). This is in accordance with the concept and is an application of Econanobiotechnology. Knowledge before attending Fertilizer making training on Liquid Organic fertilizers is 74% while knowledge after attending training on making Liquid Organic fertilizers is 91%. The interest in learning and making Liquid Organic Fertilizer is 48%. The testing levels of Nitrogen EM4 B nano and MNBs PML on NPK liquid organic fertilizer are EM 4 B: 11.50% and MNBs PML 37.79%.

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