

Community Response of Small Scale Bio fertilizer Production

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ABSTRACT

Biofertilizer act same like chemical fertilizer for plant. be a plant nutrition source, like carbon, nitrogen, potassium and other micro mineral. More environmentally save than the chemical fertilizer. Some problems emerge during the production, particularly in fermentation and decomposing process with the microbial decomposer. The problems start on smell pollution, time consuming, and lower price. And like other developed country, the farmer or group of farmer produce the bio fertilizer by their own in the small scale. Mostly, the farmers applied without understanding the environmental and nearby community response. This social service activity aimed to understand the community acceptance and upgrading the production activity to be reducing any kind of pollutions. The upgrade protocol conduct by upgrade the standard operational procedure, rate and the equipment. Based on the survey result, major community member nearby agree on the small scale production of bio fertilizer, where produce on their farmer group. The interesting result found in the women respondents who have nearest house in production location. More than 75% of have problem with the odor pollutions especially in the mixing time and fermentation. The significant opposite result found in the male respondent. They inform it doesn't really matter about the smell. They think it smell not for all the day, just common in the mixing and fermentation. The reducing negative response are decrease with distance of the production site and the respondece site or housing.

Keywords: decomposer, fertilizer, odor, microorganism

Accepted: 25-11-2022, Published: 01-12-2022

INTRODUCTION

Bio fertilizer is one of kind fertilizer were help the plant to fulfil the nutrition as far as it needed. Produce with the organic source like microbes, plant, vegetable and fruit waste. In addition it can produce by low economically plant or plant part. Based on Raimi *et al*/(2021) the global bio fertilizer market is expanding due to the rising acceptance of efficient soil nutrient management practices such as the application of bio fertilizers amongst farmers. Bio fertilizers are preferred to chemical fertilizers because they are cost-effective, ecologically friendly, and guarantee sustainable agricultural production

The nutrition content of bio fertilizer is richer than chemical one, more safe to microbial environment around the plant, make the plant became more healthy. Furthermore the plant stronger

to tackle plant disease than applied by chemical. Based on the Mitter *et al* (2021) bio fertilizer became key mechanism/role of nutrient acquisition, especially on Nitrite Fixation, phosphorus solubility and mineralization, potassium solubilisation, oxidation of sulphur, micronutrient chelation and solubilisation and nutrient mobilization. Furthermore, based on Bargaz *et al* (2018) bio fertilizers (i.e., microbial-based fertilizers) are considered to determining part of sustainable agriculture, with long lasting effects on soil fertility.

The source of bio fertilizer came from various microbes, plant, part of plant and manure. Normally, it produces with the uptake the waste as main ingredient and produce with fermentation process. The main ingredient of it came from household, factory or traditional market. Produce by small or large group of farmers. Some of them has sell nationally while other produce for fulfil the group needed.

The bio fertilizer and bio energy based on plant production, either big or small production of bio fertilizer producing facing same problem. The odour pollution while production (Izah, 2019). Sometimes, it is overlooked to do research on how the community responds to the presence of bio fertilizer producers around them. Begin with that, in this community service aimed to understand how far community understand and accept the producer of bio fertilizer around them.

METHODS

The social service activity conducts in Andongsari Village, Jember, Indonesia. It works with the Margo Makmur Farmers Group as main partner. The research for understanding the community response was conducted by direct interview with triple language (Javanese, Maduranese Language and Bahasa). The 20 respondents have interviewed with the same portion of sex type. All respondent are not the member of Makmur Group and live around the centre bio fertilizer production site, where produce by its farmers group.

The distance of residence house and the site start from 10 meter from the site and increasing by multiple distances until 500 m from the site. The interview deliver with the three main question, about the agree or not of the production of bio fertilizer in nearby respondent community, about people's expectations with the existence of bio fertilizer producers and regarding community input on the development of bio fertilizers in the future. The main parameter is about the distance of house and production site then the age, where the selected residence only for 20-50 years old. This age range is used owing the fact they have been and still have activeness in expressing opinions to their community.

RESULTS AND DISCUSSION

The Andongsari village-Jember are farming sub culture, with the rainfall irrigation system. Located nearby south Java Sea and surrounded by hill. It make this village quite cold without harsh wind from the sea. The majority soil in Andongsari is rich, it can planted by several kind of plant, from vegetable until rice. Mostly the farming waste are burning directly in the land. It makes smoke pollution and starting follow potassium deficit in severa the soil area of Andongsari. Many negative effects followed that burning practice.

Recharge the farming waste to become bio fertilizer is the best strategy to reducing burning practice in the Andongsari farming land. Many fermentation methods have applied to change the agricultural waste to be bio fertilizer, like solid state fermentation and liquid fermentations. It

depends of the main ingredient start from. Typically, the production of bio fertilizer in Indonesia holds by small or medium group of farmers. The bio fertilizer product used by their own groups or sell in limited sell. Little industrial producer used of agricultural waste to produce bio fertilizer.



Figure 1. The Production and accompaniment of bio fertilizer by solid state fermentation in the Margo Makmur 2 Member backyards

The Margo Makmur 2 Group is one of farmers group where supported by University of Jember to produce the bacterial enrichment bio fertilizer. It start from decompose rice straw to be liquid biofertilizer and the corn cobs to be bran and powder bio fertilizer. It production start on 2019 and produce for group and other near group or limited selling to other farmers. Like other bio fertilizer production, the main problem is on the production process, the production time, odour. In the social aspect, the problem may occur like refusal of the community of the production site.

The Andongsari community housing type and location as like as combination of Javanese ang Maduranese housing type. The house has small garden and backyard, with medium size of house (Figure 1). The density of housing in the Andongsari is normal. Normaly each separated with medium alley, it can crossed by motorbike. The biofertilizer production site were own by Margo Makmur is located in backyard of the members house.

Table 1. Distribution of Respondent

House Distance (from the Site)	Respondent Number		Respondent Age (Year Range)	
	Male	Female	Male	Female
10-100 m	3	2	30-40	25-30
101-200 m	2	3	32-40	30-33
201-300 m	1	2	30-50	22-30
301-400 m	2	1	30-50	30-35
401-500 m	2	2	30-50	30-35

Note: Total respondent 20 People

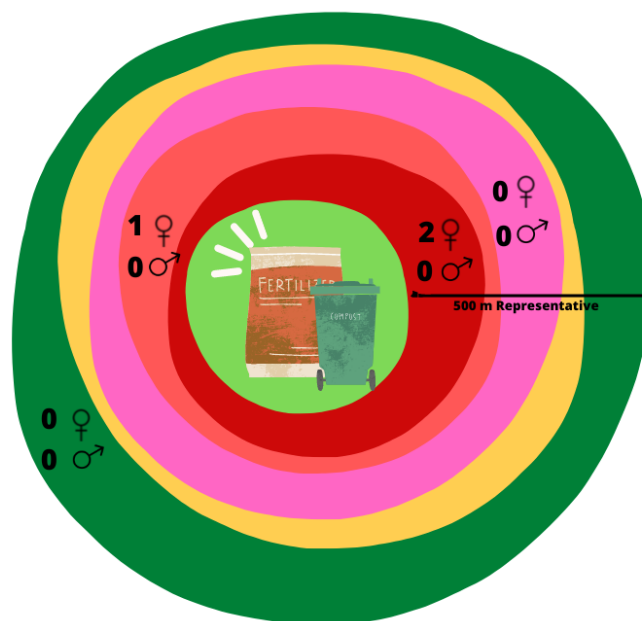


Figure 2. The Response of respondent based on sex type and house distance. The number appear in the circle indicated of disapproval respondent number on the existence of bio fertilizer producers

Based on the interview result with conducted in several respondent (Tabel 1) showed if the houses distance are significantly reduce the number of public disapproval on the bio fertilizer production (Figure 2). Mostly disapproval of the bio fertilizer production is come from the nearest house of the site. Separated by sex type, the most women where have the nearest house are rejected the bio fertilizer production. It became with various rejection opinion. The common rejection is about from odour and bad smell from the site during the production, especially while the mixing process and fermentation just begun. They worried about the odour can effect of the food stock or they health (Tabel 2).

The opposite reactions arise from the man, who have same house distance or some of them is one family with the women and live in the same house. Mostly the men not worried about the odour came from production and highly support of bio fertilizer production (Table 3). And the main of man opinion is about the increasing the chemical fertilizer price in Indonesia, supported by the knowledge and opinion about of the decreasing soil fertility of Andongsari land. Majority of respondent agree of the bio fertilizer production site who produce by Margo Makmur 2 Farmer Group, with the main agreement opinion about the change of fertilizing scheme. It supported with the expensiveness and the infrequent of chemical fertilizer. Majority of respondents not too worried about the odour pollution during the fermentation process.

Bio fertilizers is a low cost fertilizer, renewable sources of plant nutrients and environmentally friendly, facilitate nutrients availability for the plant, improve and remediate the soil health to increase productivity of agricultural crops and to reduce the application inorganic fertilizers in sustainable ways (Simarmata et al., 2018). Moreover Sucahyono et al (2021) the main components of bio fertilizer are P-solubilizing and N-fixing microbes, like other microbes in general, require optimal environmental conditions for growth and activity. The important growing environmental factors include pH and humidity. In addition Hakeem (2015) The addition of bio fertilizer can increase plant growth by providing nutrients. The combination of several types of

microorganisms in a bio fertilizer is more effective than just one type of microorganism. Many combinations of microorganisms increase the supply of phytohormones that can increase plant growth.

Table 2. Response of Non - Agreements Opinion

House Distance (from the Site)	Disapproval Respondent Number		Respondent Age (Year Range)		Opinion of Disapproval	Note
	Male	Female	Male	Female		
10-100 m	0	2 (100%)	30-40	25-30	Odour pollution, Noise pollution of the chopper machine, health worried from the odour	Disapproval Respondent age: 25
101-200 m	0	1 (33 %)	32-40	30-33	Safety worried by odour	Disapproval Respondent age: 30
201-300 m	0	0	30-50	22-30	-	-
301-400 m	0	0	30-50	30-35	-	-
401-500 m	0	0	30-50	30-35	-	-

Table 3. Response of Approval Opinions

House Distance (from the Site)	Approval Respondent Number		Respondent Age (Year Range)		Opinion of Approvals	Note
	Male	Female	Male	Female		
10-100 m	3	0	30-40	25-30	Expensiveness of Chemical Fertilizer	Reported have dissent opinion with the wife
101-200 m	2	1	32-40	30-33	Expensiveness of Chemical Fertilizer	-
201-300 m	1	2	30-50	22-30	Expensiveness of Chemical Fertilizer	-
301-400 m	2	1	30-50	30-35	Decreasing the soil Fertility	-
401-500 m	2	2	30-50	30-35	Decreasing the soil Fertility and Expensiveness of Chemical Fertilizer	-

The positive impact of bio fertilizer not accompanied by reporting of social impacts of them. Lacking information about the reason rejection and disapproval of bio fertilizer production. This has the effect of underdeveloped production of biological fertilizers, especially in Indonesia. This is also reflected in the lack of demand from farmers for organic fertilizer products. Because in addition to the insufficient supply, there are not many biological fertilizers that are widely circulated and traded in the community. Based on Marlina et al., (2018) the bio fertilizer demand on producer partner are continues to decrease.

The nearest community response were reported in the development of agricultural industries are in agro industrial. Like in the of the mushroom production, based on Wendirol et al (2019) the economic development is rooted in the existing social, economic, and environmental contexts of target communities, there is a multiplier effect across social, economic, and environmental domains. Moreover based on Williams (2019) agribusiness helps accelerate rural development in many other communities. On contrast of that any rural developer must do to induce response from local people whatever their role in the agribusiness. Based on the result, one way to tackle disapproval of woman due to small scale industrial bio fertilizer production in with women empowering. Strong women empowering can boost the achievement of production and demand.

The pollution problem can tackle with the improvement processing of raw material. It include the upgrading chopper machine and fermentation protocol. The bokhasi process can adopt to the fermentation process of Margo makmur bio fertilizer. Based on (Quiroz & Céspedes, 2019) bokashi is an organic amendment that can be used as a source of organic matter and nutrients (i.e., nitrogen), similar to compost. However, during its preparation, a microbial starter can accelerate the degradation process, which could allow a final product to be obtained in a shorter time than that needed for the elaboration of compost. However, depending on the recipe and raw materials used, this time could be extended, with the possibility of even obtaining a semi-stabilized final product.

CONCLUSIONS

Bio fertilizer brings huge positive impact for agriculture, plant, soil and environment. It can improve and remediate the soil health to increase productivity of agricultural crops and to reduce the application inorganic fertilizers in sustainable ways. The positive impact of bio fertilizer not accompanied by reporting of social impacts of them. Lacking information about the reason rejection and disapproval of bio fertilizer production, especially for small-scale production. The disapproval majority is about the odor and noise pollution. it came from the production and fermentation process. The improvement of fermentation process technology and equipment can reduce the pollution.

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