THE INTENTION OF USING BIOFERTILIZER AMONG SHALLOT'S FARMERS IN NGANJUK REGENCY

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Abstract. The excessive use of chemical fertilizer leads to a critical contribution to environment such as the decline of soil fertility and shallot's productivity in the future. Whereas, biofertlizer is one of the alternative ways to diminish the usage of chemical fertilizer to support a sustainable agriculture. However, the majority of shallot's farmers have a lack of knowledge towards biofertilizer. This study aims to analyze the influence of attitude, subjective norms and perception towards intention of using biofertilizer. This research was conducted in September 2022 – November 2022 in Gondang and Rejoso District, Nganjuk Regency, East Java, Indonesia. The respondents are considered by census method and it is distributed to 140 shallot's farmers who are consisted of biofertilizer users. The data was analyzed by using Partial Least Square (PLS) in order to examine the influence of attitude, subjective norms and perception towards the intention of using biofertilizer. Overall, it is illustrated that attitude, subjective norms and perseption have a positive and significant influence towards intention of using biofertilizer among shallot's farmers

Keywords: biofertilizer; intention; partial least square; shallot

INTRODUCTION

Nowadays, shallot has became one of the strategic crops with an annual increase of production in Indonesia. Furthermore, shallot's production reached 2.01 million tons in 2021. Afterwards, it rise to 10,42% compared to the yield in 2020 which was reached 189.15 thousand tons (BPS, 2023). In Indonesia, East Java is the second largest shallots' production after Central Java. It has contributed 24,99% with total production of 500.99 thousand tons and the total of harvested area is 53.67 thousand hectares. However, Nganjuk Regency is the main production of shallots in East Java. The production of shallots in Nganjuk Regency increased by 193.6 thousand tons in 2021, when it controlled 39.83% of the total production of shallots in East Java (BPS, 2023).

Despite the improved trend of shallot's production, it is important to pay attention to the utilization of an agricultural input, particularly chemical fertilizer. Chemical fertilizers is one of the main agricultural inputs that has a significant role in raising crop's production. Nevertheless, chemical fertilizers are used exaggratedly to increase shallot's yield without concerning the environmental issue. The excessive use towards chemical fertilizers contributes to reducing the soil fertility and inhibit nutrient uptake. Thus, it has an impact towards soil health and the yield of shallot in the future (Massah and Azadegan, 2016).

However, applying biofertilizer is one of alternative ways to decrease a hazardous of chemical fertilizer in order to support sustainable agriculture. In addition to that, biofertilizers are substances containing the diversity of living micro-organism that has has many advantages such as to enhance soil fertility, improve crop's yield, incrase plant's nutrient uptake, raise crop resilience towards abiotic and biotic stress (Atieno et al., 2020; Dasgupta et al., 2021; Mącik et al., 2020).

Therefore, the advantage of using biological fertilizers is able to replace 23-52% of nitrogen fertilizers usage (Rose et al., 2014). Afterwards, another findings revealed that the combination of applying biofertilizer, chemical fertilizer and organic manures can improve onion's yield, bulb quality and maintained soil fertility. In addition to that, this application can reduce 25% of chemical fertilizer (Thangasamy and Lawande, 2015).

Although biofertilizer can improve soil fertility and contribute to chemical fertilizer use effiency, the findings from (Naveed et al., 2015) was demonstrated that the habit

of farmers and their dependency towards using chemical fertilizers, which has a purpose to rise the production rapidly and the limied knowledge about the benefits of biofertilizers are the main barriers to use biofertilizer. Furthermore, there are another issues that contribute to farmers' restricted usage of biofertilizers such as the majority of farmers still have inadequate knowledge, information, and skills, as well as a lack of access to gain biofertilizers (Timilsina et al., 2018).

Moreover, the majority of farmers have a moderate passive attitude towards using biofertilizers. The main obstacles are the lack of technical expertise towards utilizing biofertilizers and the inavailability of high-quality biofertilizer ((Joshi Senior Scientist et al., 2019; Pathak et al., 2019). According to the descriptions above, this study will examine the influence of attitude, subjective norms and perception towards the intentions of shallot's farmers to use biological fertilizer.

METHOD

This study was conducted in September 2022 – November 2022 in Gondang and Rejoso District, Nganjuk Regency, East Java, Indonesia. The research location was chosen purposively while the selection of respondents was conducted by census method. The respondents are consisted of 140 biofertilizer's users. The data analaysis are presented by quantitative method.

The data analysis is conducted by using structural equation measurement model with the Partial Least Square (PLS) pproach by using SmartPLS software. In this study, there are several variables that are used namely latent and manifest variables. The further test is to measure the validity and reability towards each latent. This study was to screen the initial model based on the loading factor for each indicator. The indicator for each construct is output stepwise based on the lowest external exposure value until the final result of loading factor value is greater than 0.5 (Ghozali and Latan, 2015).

Afterwards, the inner model is tested in order to examine the influence between latent construct. For structural model, R square on the endogeneous costruct is also tested in order to estimate a path coefficient. The number of R square has a coefficient from endogeneous construct, thus it is used for a goodness-of fit model test (GoF). The goodness-of-fit (GoF) is a statistical model which describes how well it fits to observations and it aims to validate the overall structural model (Maydeu-Olivares and García-Forero, 2009).

Nevertheless, the estimation of path coefficients value which is examined the realtionship between latent's variables is conducted by bootstrapping procedure. The high contribution of latent construct is reflected by indicators with high number of loading factors The latent variabels are devided by attitude, subjective norms, perception and intention.

Tabel 1. Latent and Indicator Variables

Latent Variables	Indicator Variables
Attitude (SK)	Knowledge of biofertilizer (SK1)
	Importance of biofertilizer (SK2)
	Biofertilizer can improve soil fertility (SK3)
	Ingredients of biofertilizer (SK4)
Subjective Norms (NS)	Farmers community (NS1)
	Farmer's friends (NS2)
	Biofertilizer's agents (NS3)
Perception (PS)	The convenience of biofertilizer (PS1)
	Environmental friendly (PS2)
	Low dosage of biofertilizer (PS3)
	The efficiency of chemical fertilizer (PS4)

RESULTS AND DISCUSSION

The measure of outer model describes the relationship between latent variables and their indicators. The evaluation of the assessment on the outer model in this study describes 15 indicators drawn from the final model with corresponding latent variables, which are attitude (SK), subjective norm (NS), perception (PS) and intention (IN). which can be seen on the Figure 1. Indicators with outer loading values less than 0.5 should be deleted or removed from the construction (Ghozali and Latan, 2015).

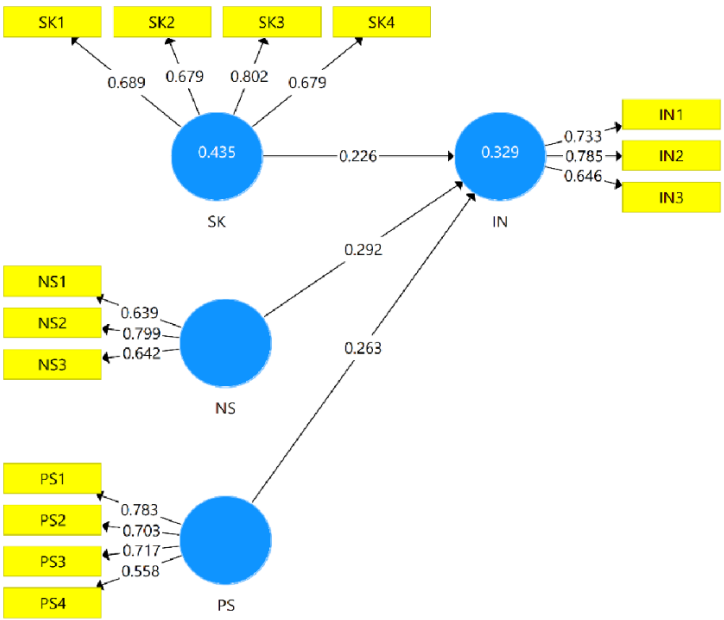


Figure 1. Path diagram of the structural equation of farmer's intention towards using biofertilizer

According to Figure 1, a variable of attitude is reflected by biofertilizer can improve soil fertility (SK3) with a loading factor value of 0.802. The subjective norm variable is reflected by the farmer's friends (NS2) with a loading factor value of 0.798. The perception variable is described by indicator variable, namely the convenience of

using biofertilizer (PS1) with a loading factor value of 0.783. Afterwards, the intention variable is demonstarted by the intention to use biofertilizer (IN2) which has the high value of loading factor is 0.785. The model can be illustrated as a discriminant if the AVE's value is greater 0.5. (Abdillah and Hartono, 2015). According to the table 2, all latent variables show that the square root of AVE is greater than 0.5 Therefore, all latent variables are fulfiled the requirements of discriminant validity test. A variable is considered to be reliable if the composite reability is greater than 0.7. According the table 3, all the latent variables are reliable due to the number of composite reability is more than 0.7. Furthermore, the last step is to find out the significant effect of independent variable towards the dependent variable by considering the parameter's coefficient and T-Statistic. The significant effect can be viewed based on bootstrapping test on Table 4. In addition to that, the significant level is illustrated by the path coefficients with the number of t-statistic >1.96, α=5% and p-value <0.05 (Hair et al., 2012). Refering to Table 4, it is interpreted that all the variables have a positive and significant effect towards the intention of utilizing biological fertilizers.

Table 2. The square root of AVE and the correlation of latent variables

Latent Variables	IN	NS	PS	SK
Intention (IN)	0.724*			
Subjective Norms (NS)	0.451	0.632*		
Perception (PS)	0.399	0.247	0.695*	
Attitude (SK)	0.418	0.431	0.302	0.714*

*=Square root of AVE

Table 3. Composite reability in each constructs

Latent Variables	Composite Reability
Intention (IN)	0.767
Subjective Norms (NS)	0.722
Perception (PS)	0.787
Attitude (SK)	0.806

Table 4. The results of bootstraping

Path Coefficient	Original Sample	T-Statistics	P Values
Attitude -> Intention	0.226	2.144	0.033
Subjective Norms -> Intention	0.292	2.363	0.019
Perception -> Intention	0.263	3.053	0.002

*significant to α=5%

The Influence Of Attitude, Subjective Norms And Perception Towards Intention

The results of this study shows that the shallot farmers have a high awareness towards using biological fertilizers because they had acknowledged its advantages and the importance in a long-term. The results of this study is related to the findings of (Ataei et al., 2022) which was demonstrated that the more farmers understand the knowledge and benefits of using biofertilizer, their intention to utilize biofertilizer is rised. Furthermore, this study finds that subjective norms has a significant impact on willingness to use biofertilizers supplied by farmers' friends. It is associated with other study which is revealed that subjective norms are the strong influence of personal norms towards farmers' intention to utilize biological fertilizer. It can be concluded that stricter social norms improve the necessary to use biofertilizer. The result also go hand-in-hand with (Adnan et al., 2018) which was revealed that the social pressure that farmers feel affects their intentions to utilize bioferilizer.

Moreover, perception has a significant effect towards intention of using biofertilizer. Farmers considered to use biofertilizer because of its convenience. Furthermore, perception has a significant impact towards farmers' intentions to use biofertilizers. Respondents considered to use biofertilizer due to convenience. The easiness of using biofertilizers is due to the fact that the majority of farmers use granular and solid biofertilizers and there is no other tools are required for this type of biofertilizer.

The results of this study are related to other study from which was revealed that farmers have a better reason to use biological fertilizers when they consider that it is easy to use (Ataei et al., 2022). It can be concluded that perception is an important factor in the emergence of intentional processes among farmers. The factors that determine whether or not to take advantage of a new innovation depend on situation, access, and perception of its benefits.

CONCLUSION

These findings contributed as a good awareness concerning to the intention of using biofertilizer among shallot's farmers. The results releaved that the value of attitude, subjective norms and perception have a significant impact towards the intention of using biofertilizer.

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