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Factors that influence the intention of consuming vegetables from fertilizing biosolids (*human faeces fertilizer*)

R R Novanda¹, E Yunita¹ and A Amiruddin²

¹University of Bengkulu, Bengkulu, Indonesia

²Agribusiness Study Program, Department of Socio-Economic of Agriculture, Faculty of Agriculture, Hasanuddin University, Makassar

Email: ridha.rizki.novanda@gmail.com

Abstract. Human waste is one of the great potentials to produce fertilizer for plants. Manure fertilizer called biosolid fertilizer. Biosolid fertilizer can increase crop yields and supply nutrients for plants. The use of biosolids for vegetables is considered very good economically. The potential for this biosolid fertilizer is very large applied to vegetable crops to increase vegetable productivity in Bengkulu province. The purpose of this study is to analyze what factors influence the intention to consume vegetables derived from biosolid fertilizer. The study was conducted in several traditional markets in the city of Bengkulu. The traditional markets are Pasar Minggu and Panorama Market. The research location was chosen purposively because the two markets are centers of vegetable sales in the city of Bengkulu. The study was conducted in June 2019. The data collected was analyzed quantitatively (Partial least square) and descriptive approach. The results obtained are Attitude toward the behavior significantly influences the intention to consume vegetables from biosolid fertilizer with a T-count value of 2.170. Subjective Norm has a significant effect on the intention to consume vegetables from biosolid fertilizer with a T-count value of 6.294, as well as the Perceived Behavior Control significantly influence the intention to consume vegetables from biosolid fertilizer with a T-count value of 2.530.

1. Introduction

Human waste is one of the great potentials to produce fertilizer for plants. Human excrement has good soil nutrient ability [1]. Human excrement fertilizer is a superior input for farming development. Biosolid fertilizer can increase yields and supply nutrients to plants [2]. The application of biosolids in soils can significantly reduce the cost of sludge removal and provide a variety of nitrogen-phosphorus for plants. The use of biosolids as a source of organic matter enhances the nature and chemistry of agricultural soils, resulting in increased yields [3].

The use of biosolids can provide great benefits because the results obtained are two times more than ordinary fertilizers. In addition, biosolids have been shown to improve moisture retention in soils significantly. The high benefits of biosolids fertilizer can show the potential of the fertilizer. The application of biosolids fertilizer to farmers is expected to provide additional income to farmers. Biosolids are a useful way to recycle organic matter and nutrients, to improve the physical, chemical, and biological properties of the soil, and to rebuild vegetation and restore damaged ecosystems [4].

Vegetables are one of the agricultural commodities that need fertilizer as the main input in the cultivation of vegetables. Fertilizer is one of the inputs that consumes the highest cost, among other



inputs. Waste from human waste that is processed into biosolids fertilizer becomes one of the solutions for handling added value waste. This type of biosolids fertilizer has been widely used in Indonesia.

Biosolid fertilizer is the fertilizer that is declared safe for consumers, but the USDA still prohibits the use of biosolid fertilizer for consumers. Careful biosolid fertilizers can cause heavy metal contamination, organic pollutants, and pathogens in biosolids, even at low concentrations, which can pose a threat to the environment and animal and human health over time [4].

Health problems can worsen the popularity of biosolid fertilizers. Many people think that vegetables produced by biosolids are not suitable for consumption. People are reluctant to consume these vegetables due to the fertilizer used. The application of biosolids to agricultural land is well implemented even though trust is still minimal, which must protect consumers from contamination and to minimize potential adverse effects on the environment [5].

In 2018, research on the application of human manure fertilizers to vegetables on coastal land in Bengkulu Province showed that it was economically profitable. The use of manure fertilizer for vegetables is considered very good economically. The potential for manure fertilizer is very large applied in Bengkulu to increase productivity. However, the intentions of the community in consuming vegetables derived from biosolids fertilizer cannot be known. What factors cause these vegetables can be consumed by the people of Bengkulu. This is closely related to the level of revenue that will be received by farmers due to the purchase of vegetables produced by human waste. It is necessary to analyze the factors that influence the intention to consume vegetables derived from biosolids fertilizer in advance in order to know whether or not vegetables are worthy of the results of human waste are cultivated and marketed in the province of Bengkulu. So the research objective is to analyze the factors that influence the intention to consume vegetables derived from biosolids fertilizer in the city of Bengkulu and analyze the most dominant factors affecting the intention to consume vegetables originating from biosolids fertilizer in the city of Bengkulu.

2. Method

2.1. Place and time of research

The study was conducted in several traditional markets in the city of Bengkulu, namely Pasar Minggu and Pasar Panorama. The research location was chosen purposively because the two markets are centers of vegetable sales in the city of Bengkulu. The study was conducted in June 2019.

2.2. Method of collecting data

Data collection is carried out with several tools, namely:

2.2.1. Literature study by collecting data and information such as literature, literature, reports, and previous research relating to the problems at hand.

2.2.2. Interviews with related parties

2.2.3. Questionnaire survey that provides a list of questions to respondents regarding the intention to consume vegetables produced by fertilizer

2.3. Determination of respondent methods

Respondents in this study are consumers of mothers who buy vegetables at the vegetable market. The number of research respondents is 100 people in accordance with the standard analysis tool of the Model-Partial Least Square (SEM-PLS) analysis. The sampling method is based on accidental sampling.

2.4. Data processing and analysis methods

The data that has been collected is then analysed quantitatively and using a descriptive approach. Descriptive analysis was conducted to determine the characteristics of respondents, dominant intentions,

and factors that influence the intensity of consuming vegetables from human waste. Quantitative analysis is done by structural equation model-Partial Least Square (SEM-PLS).

2.4.1. Descriptive Analysis. Descriptive analysis was chosen to explain the characteristics of respondents that are related to the tendency of respondents' intentions.

2.4.2. Structural Equation Model-Partial Least Square (SEM-PLS). PLS is an analytical tool that can work in calculating Intervening variables. In this study, Intention is a variable that requires intervening variables. So PLS is really needed. In this study to determine the most dominant influencing factors. Analysis using PLS has several test stages, namely:

a. Analysis of the Outer model

Tests carried out to see the relationship between the indicator block with its latent variables and carried out by testing the Outer model. First, to test the validity of using loading factors with standard 0.7. If there is a loading factor below 0.7, it must be removed from the model. Second, an analysis of convergent validity values, as seen from the value of Average Variance Extracted (AVE) with a threshold of 0.5. Third, Test discriminant validity. The test is by comparing the value of the AVE square root AVE with the correlation value between constructs. After completing the analysis of the Outer model, then proceed with the analysis of the inner model.

b. Analysis of the Inner Model

Inner model analysis is an analysis that describes the relationship between latent variables with other latent variables. Evaluation of inner models is done by calculating the value of Goodness of Fit (GoF). Following are the GoF values:

Small : 0.1

Medium : 0.25

Besar : 0.38

c. Hypothesis testing

The last stage is testing the hypothesis that has been formulated. Hypothesis testing is a test conducted to see the effect of exogenous latent variables on endogenous latent.

2.4.3. Hypothesis.

- a. ATB (Attitude Toward the Behavior) has a significant effect on the intention to consume vegetables as a result of fertilizing human excrement.
- b. SN (Subjective norm) has a significant impact on the intention to consume vegetables as a result of fertilizing human excrement.
- c. PBC (Perceived Behavioral Control) has a significant effect on the intention to consume vegetables as a result of fertilizing human excrement

2.4.4. Relationship of Indicators to Latent Variables

Table 1. Relationship between latent variables and indicators

Variabel Laten	Indikator
<i>ATB (Attitude Toward the Behavior)</i>	ATB1-ATB9
	ATB 1 Freshness
	ATB 2 Quality
	ATB 3 Price
	ATB 4 Size
	ATB 5 Lifestyle
	ATB 6 Taste
	ATB 7 Health
	ATB 8 Cleanliness
	ATB 9 Trust
<i>SN (Subjective norm)</i>	SN1-SN3
	SN1 Children
	SN2 Friends
	SN3 Husband
<i>PBC (Perceived Behavioral Control)</i>	PBC1-PBC3
	PBC1 Access
	PBC2 Reassures the family
	PBC3 Ease of getting
<i>I (intention)</i>	I1-I3

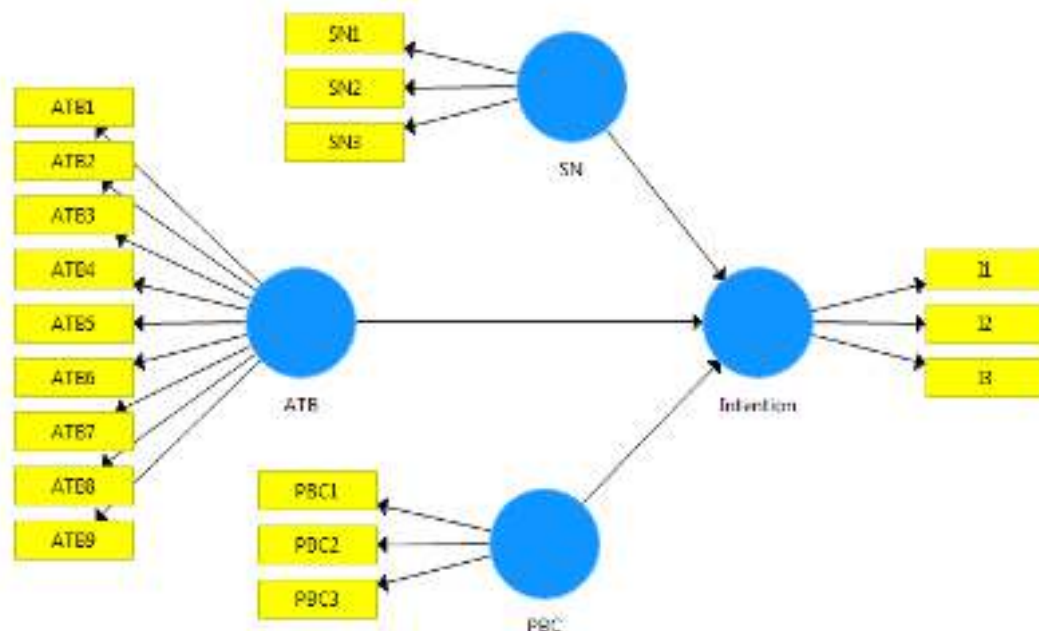


Figure 1. Model of Measurement of the factors that influence the intention to consume vegetables reduced by fertilizing human waste.

3. Results and discussion

3.1. General overview of respondents

The majority of respondents have a vulnerable age of 37 to 53 years, or 45% of the total respondents. While respondents above 53 years of age rarely buy vegetables to the market. That is because the age factor is already in the old category. This condition shows that respondents between the ages of 37 and 53 are mothers who have the belief that buying vegetables in the market will be a priority. At that age, the household already has several obligations, namely providing children with good nutritious food. There is a relationship between the role of mother as an educator with the availability of vegetables at home [6] . So this needs to be related to the price, quality, and variety of vegetables in the traditional market.

The majority of respondents have four family members or 33% of the total respondents. The number of family members correlates with the number of vegetables consumers will buy. Meanwhile, only one person who has family members at home occupies a low percentage of 1.00%. This shows that the more family members, the more they need for organic vegetables.

Table2. General overview of respondents

Criteria	Frekuensi	%
Ages		
20-36 year	43	43.00%
37- 53 year	45	45.00%
53<year	12	12.00%
Number of family members (people)		
1	1	1.00%
2	6	6.00%
3	16	16.00%
4	33	33.00%
5	28	28.00%
>5	16	16.00%
Suku		
Jawa	17	17.00%
Bengkulu	9	9.00%
Serawai	10	10.00%
Rejang	7	7.00%
Lembak	5	5.00%
Melayu	21	21.00%
Minang	6	6.00%
Batak	7	7.00%
Sunda	4	4.00%
Other	14	14.00%
Job		
PNS	28	28.00%
Private employees	17	17.00%
Housewife	48	48.00%
Entrepreneur	7	7.00%

The most dominant occupation was housewives at 48%. Housewives have more free time to buy vegetables in traditional markets compared to other professions while entrepreneur women are only 7% in both markets or most minorities in buying vegetables in both markets.

3.2. Model testing

3.2.1. Convergen validity

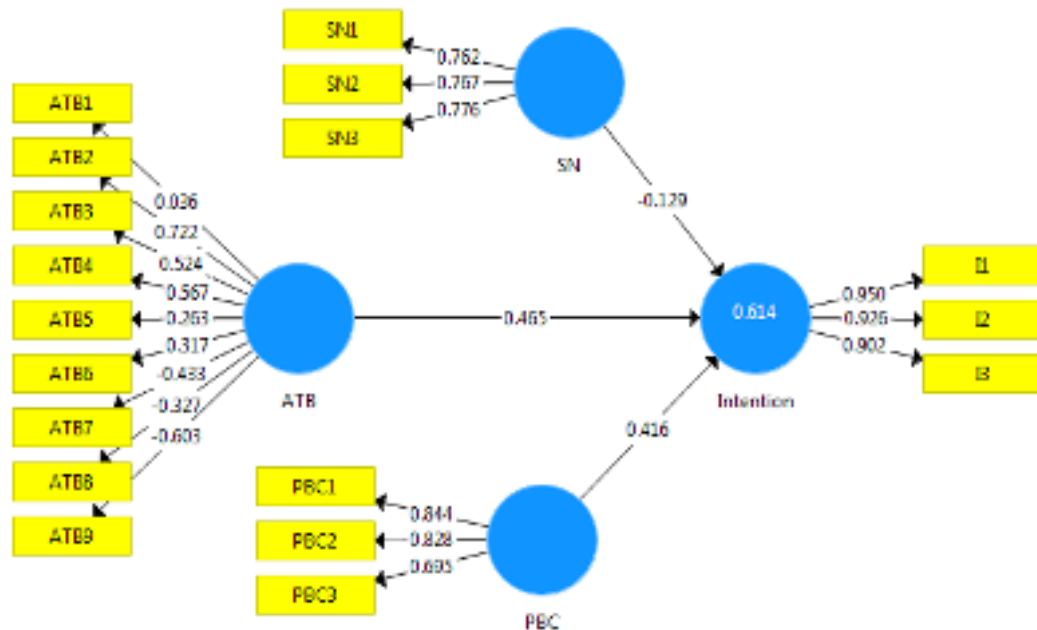


Figure 2. Path Diagram

The loading factor value is an individual reflective measure which has a standard of 0.7. So the manifest variable whose value is below 0.7 must be removed from the model. Based on the results of the study, the loading factor below 0.7 must be excluded from the model in indicators (Table 3):

Table3. Loading Factor Value

Manifest	Loading Factor	Keterangan
atb1	0,036	Reject
atb2	0,722	Accepted
atb3	0,524	Reject
atb4	0,567	Reject
atb5	0,263	Reject
atb6	0,317	Reject
atb7	-0,433	Reject
atb8	-0,327	Reject
atb9	-0,603	Reject
SN1	0,762	Accepted
SN2	0,767	Accepted
SN3	0,776	Accepted
PBC1	0,844	Accepted

PBC2	0,828		Accepted
PBC3	0,695		Reject
I1	0,950	Accepted	
I2	0,926	Accepted	
I3	0,902	Accepted	

After removing several manifest variables, the path model diagram is obtained, as shown in Figure 3. The path diagram has issued variables that are not fit in the model. Maintaining variables that are not fit will invalidate the model.

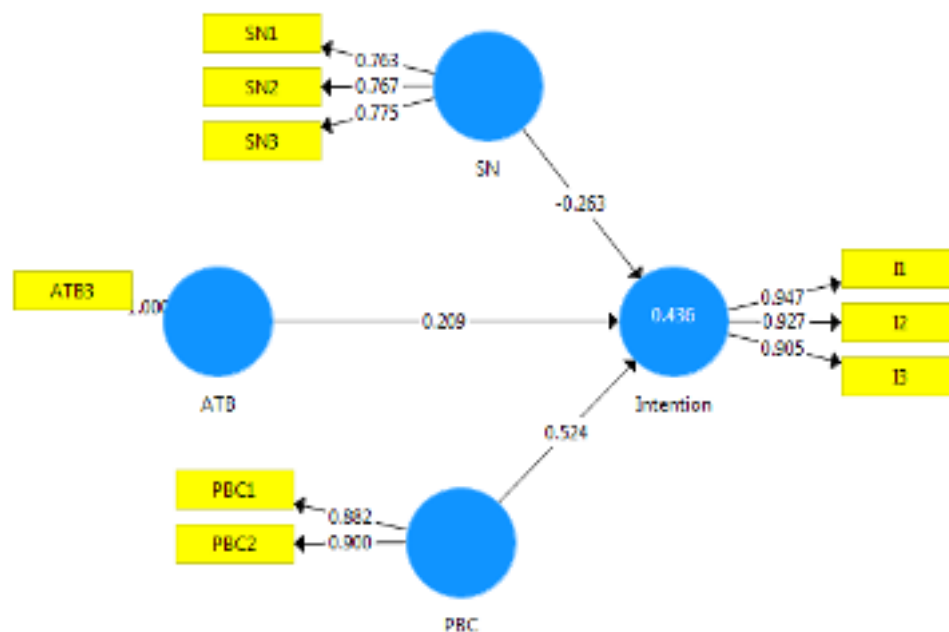


Figure 3. Diagram of the final path

3.2.2. Discriminant validity

Construct validity is assessed based on the Average Variance Extracted (AVE). In this study, the AVE value of each construct is above 0.5. Therefore, there is no convergent validity problem in the tested model. The entire model is declared valid.

Table 4. Average Variance Extracted (AVE)

<i>Croch alpa</i>	<i>rho A</i>	<i>Composite reability</i>	<i>AVE</i>
1	1	1	1
0.917	0.918	0.948	0.858
0.741	0.744	0.885	0.794
0.655	0.656	0.812	0.590

Information: AVE > 0.5 = Valid

Composite Reability > 0.6 = Realible

Construct validity is assessed based on the Average Variance Extracted (AVE). In this study, the AVE value of each construct is above 0.5. Therefore, there is no convergent validity problem in the tested model. The entire model is declared valid.

Construct reliability is assessed based on Composite reliability to measure internal consistency, and its value must be above 0.6. Based on table 5, the overall Composite reliability measurement results are above the value of 0.6 or reliable. This means that the data has been consistent and able to explain the model.

3.2.3. *Evaluasi inner model*

a. Goodness of fit

Evaluation of inner models can be done to calculate the value of GoF (Goodness of fit). Gof value of 0.593 and included in the large category which means that the model is fit and suitable for use.

b. Evaluate coefficients

Coefficient evaluation is to assess the relationship between latent variables in the model. Based on the results of data processing, only ATB has a negative relationship with intention. While SN and PBC have a positive relationship with intention (Table 5).

Table 5. Coefficient Evaluation

Relationship and influence between variables	Koefisien	Relationship
ATB ->I	-0.263	Negative
SN ->I	0.209	Positive
PBC->I	0.524	Positive

c. Hypothesis testing

Based on the results of data processing, it was found that ATB has a significant effect on intention with the P Value value significantly influencing the intention with a P Value value of. PBC has a significant effect on intention with a P Value of 0,000. And SN has a significant effect on intention with a P Value of 0.012 (Table 6).

Table 6. Hypothesis testing

	Standar D	T Statistics	P Values	Information
ATB->I	0.096	2.170	0.030	Significant
PBC->I	0.083	6.294	0.000	Signifikan
SN->I	0.104	2.530	0.012	Signifikan

Notes : P-value<0.05 =significant

3.3. *Factors that Influence the Intention to eat vegetables from biosolids fertilizer*

3.3.1. Attitude toward the behaviour. Based on the results of the study, it was found that ATB significantly influenced the intention to consume from biosolids fertilizer with a P-value of 0.030. And the only indicator that can explain ATB is the price indicator. The results show that respondents in the city of Bengkulu are very sensitive to price changes. For respondents, if there is a lower price difference, respondents will tend to choose vegetables that are cheaper. Attitude toward the behavior refers to the extent to which individuals judge something that is beneficial and which is not profitable [7]. When the evaluation indicators of prices are the only indicators that raise ATB, the price indicators are strongly related to the intention to consume vegetables from biosolids fertilizer.

In line with [8] in his study which stated a number of elements of the ATB variable that is wanting high economic value (economic opportunity). The price shows that the economic value of a vegetable is very important for the people of the city of Bengkulu. If the value of high-economic organic vegetables can be sold at a cheaper price, the community can gladly accept vegetables that come from biosolid fertilizer. This shows that respondents are very sensitive to prices. So it is very important to position a

competitive selling price for vegetables that come from biosolids fertilizer. The results showed that as many as 82% of consumers are willing to pay more with an increase of 8.5% -15% of the current price of organic vegetable products [9].

The decision to consume will affect the decision to buy vegetables. Based on the results of Darmawan's research [10], it states that the price of these vegetables greatly influences the decision to purchase vegetables. Price of vegetables strongly influences purchasing decisions [11]. The price of vegetables is the dominant factor affecting the intention to consume vegetables in the city of Bengkulu.

3.3.2. Subjective Norm. Subjective norm has a significant effect on the intention to consume vegetables from biosolids fertilization with a T value of 2.530 and a P-value of 0.012. According to [7] Subjective norms are more likely to be formed from respondents' belief in the expectations of important people around the perpetrators. The subjective norm factor indicates social pressure from the surrounding environment. That can improve. In this study, the hope of eating vegetables from human waste is measured based on three groups: children of respondents, friends, and husbands. From the measurement results, it is found that the husband's expectation is the most important indicator — the loading factor value of 0.775, followed by the expectations of friends and children. Decision making in the family is centered on the head of the family so that its role is very influential in purchasing decisions in the family [12,13].

Meeting the expectations of the head of the family in consuming vegetables is the most dominant factor explaining the Subjective norm. The husband is the head of the family in a household. While the respondent is the wife, who decides what vegetables to consume at home. The head of the family's expectation of vegetables to be consumed has a significant effect on the decision to consume vegetables in a household [12,13]. In the traditional view, the husband has a more significant influence in Family decision making. Decision making in the family is centered on the head of the family. So that its role is very influential in purchasing decisions in the family. Thus, that the husband's decision on the choice of vegetables will significantly influence the wife's decision to cook vegetables for home consumption.

Meeting the expectations of friends is the second indicator that can explain ATB. The influence of friend's expectations will determine the intention to consume vegetables from human waste. The majority of respondents chose that their friends were very influential in the decision to consume vegetables from fertilizer biosolids. Friendship groups are very influential in the decision to buy [14]. The neighbour is one part of the friend. The habits of neighbours in buying vegetables affect the decision to consume these vegetables.

Meeting the expectations of children is a factor that can explain SN and affect vegetable consumption patterns. Children have their taste for food consumed at home. The influence of children is very dominant in the choice of vegetables at home. Prioritized children will eat vegetables for growth and development. The child's expectations of the type of vegetables will significantly influence the decision to consume vegetables at home taken by a mother. Based on the results of the study, that the SN of children positively correlated. The decision to consume vegetables is related to the child's expectations.

3.3.3. Perceived behavioral control. Perceived behavioral control (PBC) is perceived ease or difficulty that is formed from behaviors that are assumed based on past experience and anticipate obstacles and obstacles [7]. Based on the results of the analysis, PBC has a significant effect on the intention to consume vegetables from biosolids fertilization with a T Value of 6.294 and a P-value of 0.0000. PBC is explained by two indicators of ease of access to vegetables and the comfort of reassuring families. With the ease of convincing families to eat vegetables.

The ease of convincing families to consume vegetables as a result of fertilizing biosolids is the most dominant factor of PBC, which has a significant effect on intention. Convincing families to consume vegetables produced by biosolids is not an easy thing to do. The perception of dirty human waste has a negative stigma on the family. So respondents need to convince the family that this vegetable is good.

The ease of access to vegetables is the next factor that influences the intention to consume vegetables as a result of fertilizing biosolids. In this case, the traditional market will be tough to find differences in

vegetables based on fertilizer. So respondents need to be able to access the vegetables in the conventional market.

4. Conclusion

ATB has a significant impact on the intention to consume vegetables derived from biosolids fertilizer. The price indicator is the only indicator that explains ATB. SN is has a significant impact on the intention to consume vegetables from biosolids manure. With indicators of expectations of the husband who occupied the most dominant. PBC has a significant impact on the intention to consume vegetables derived from biosolids fertilizer. With indicators to convince the family is the most dominant indicator influential.

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