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Analysis of Farmers' Behavior Improving Environmental Quality and Some Influencing Factors in the Bantimurung Irrigation Area, Maros District

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A B S T R A C T

Bantimurung District, with a rice harvest area of 10,652 hectares, has an important role in Maros Regency. This research identified a number of main issues, such as farmers' behavior in efforts to improve environmental quality in the Bantimurung irrigation area, knowledge about wet agricultural ecosystems, attitudes towards irrigation, and motivation to protect the environment. This research aims to understand farmers' actions in increasing agricultural production and the environment in a sustainable way, and to measure the impact of various factors, both individually and as a whole. This research method is quantitative using a correlational approach.The research location was chosen using a purposive sampling method in the Bantimurung irrigation area, Maros Regency. The research results show that farmers' behavior in improving environmental quality in the Bantimurung irrigation area has so far only reached a moderate level. Community knowledge about wet agricultural ecosystems, the environment, attitudes towards irrigation, and motivation to protect the environment in these areas tend to be low.

INTRODUCTION

Bantimurung District, one of the regions in Maros Regency, has an area of around 1,442.95 km² (BPS 2022) and a population of 389,580 people (BPS 2022). This sub-district recorded a rice harvest area of around 7,563 hectares, which is equivalent to around 19.76% of the total rice harvest area in Maros Regency. Currently, there is no information regarding the behavior of farmers in the Bantimurung irrigation area in agricultural practices, and the factors that influence their behavior are also unknown. Therefore, this is an important issue to research, especially in order to increase agricultural production and environmental quality for farmers in the Bantimurung irrigation area, Maros Regency.The research problems proposed are as follows: What is the behavior of farmers in improving environmental quality in a sustainable manner in the Bantimurung irrigation area, Maros Regency? What is their knowledge regarding wet agricultural area ecosystems, the environment, attitudes towards irrigation areas, and their motivation in protecting the environment in the Bantimurung irrigation area, Maros Regency? Does farmers' knowledge about wet farming area ecosystems, the environment, attitudes towards irrigation areas, motivation to protect the environment, and the area of land they manage have an influence, both individually and collectively, on farmers' behavior in improving environmental quality in a sustainable manner in the area Bantimurung irrigation, Maros Regency? The specific objectives of the research are:Untuk menggambarkan perilaku petani dalam meningkatkan kualitas lingkungan secara berkelanjutan di daerah irigasi Bantimurung, Kabupaten Maros.

The urgency of this research is as follows: Data regarding the influence of farmers' knowledge about agricultural area ecosystems, environmental knowledge, attitudes towards irrigation areas, and motivation to protect the environment, both individually and collectively, on farmers' behavior in improving environmental quality in a sustainable manner in the Bantimurung irrigation area, Maros Regency , is currently not available. This data has significant potential benefits for the Ministry of the Environment of the Republic of Indonesia in developing regulations, especially in supporting the development of farmer behavior in improving environmental quality in a sustainable manner. This data also has important relevance for the South Sulawesi Provincial Government in supporting the development of farmer behavior in improving environmental quality in a sustainable manner..

The figure of a farmer has many dimensions, so that various groups provide views according to the dominant characteristics. Moore in his book Social Origins of Dictatorship and Democracy and Peasant in the Making of the Modern World (1966:243) noted three characteristics of farmers, namely: legal subordination, cultural specificity, and de facto ownership of land. In general, the definition of a farmer is someone who works to meet their living needs from agricultural business activities, whether in the form of agricultural businesses in the fields of food crops, horticulture, plantations, animal husbandry and fisheries. Wolf as quoted by Teodor Shanin (1985:49) gives the term peasant for farmers who are characterized by: residents who are existentially involved in

farming and making autonomous decisions about the planting process. Mosher (1987:198) defines that farmers are humans who work to raise plants and/or animals to take advantage of them to generate income. There are "small farmers" with the following characteristics: 1) farming under increasing local population pressure, 2) having limited resources resulting in a low standard of living, 3) depending wholly or partly on subsistence production, and 4) lacking income. health services, education and other services. (Arie Sujito, 2013:32)

Environmental quality is an environmental condition that is related to the quality of life or the degree of fulfillment of basic needs in environmental conditions. Environmental conditions can provide maximum supporting capacity for human survival in an area (Susilawati et al, 2019). The higher the population, the more needs that must be met from nature or the environment. If population growth exceeds the growth of the availability of natural resources, excessive depletion of natural resources which are used to meet human needs can occur and result in environmental pollution due to activities in the production or consumption process (Sutikno, 2006). Irrigation is generally defined as the use of water in the soil to provide fluids needed for plant growth. Providing irrigation water can be done in five ways: (1) by flooding; (2) by using grooves, large or small; (3) by using water below the ground surface through sub-irrigation, thereby causing the ground water level to rise; (4) by watering (sprinkling); or with a trickle system (Hansen, 1986). The aim of drip irrigation is to meet the water needs of plants without having to wet the entire land, so that it can reduce water loss due to excessive evaporation, use water more efficiently, reduce runoff, and suppress or reduce the growth of weeds (James, 1993). Drip irrigation system has advantages compared to other irrigation systems (Keller and Bliesner, 1990).

METHODOLOGY

This research is a quantitative study with a correlational approach. The research was conducted in the irrigation area of Maros Regency and the research location was selected using the purposive sampling method. The research population consisted of farmers in the Bantimurung irrigation area, Maros Regency, and the sample consisted of 50 heads of farming families who were selected using the purposive sampling method. Samples were taken from Samangki Village.

The design of this research is correlational, with the aim of identifying the influence of the independent variable on the dependent variable. The research assumptions include three things: (1) the independent variables have an individual effect on the dependent variable in a linear manner, (2) the independent variables have a joint effect on the dependent variable in a linear manner, and (3) the dependent variable can be explained by the independent variables.

The variables studied include: The dependent variable is farmers' behavior in improving environmental quality in a sustainable manner in the Bantimurung irrigation area, Maros Regency (Y). Independent variables include: a) Knowledge about wet agricultural ecosystems (X1), b) Knowledge

about the environment (X2), c) Attitudes towards irrigation areas (X3), and d) Motivation in preserving the environment (X4)..

The operational definition of the variable is as follows: Farmer behavior in improving environmental quality in a sustainable manner in the Bantimurung irrigation area, Maros Regency (Y), is the action taken by farmers to increase agricultural production and environmental quality in the irrigation area. Indicators measured include soil cultivation, seeding, plant maintenance, fertilization and pest control. Independent variables: a) Knowledge about wet agricultural ecosystems (X1) includes farmers' understanding of the relationship between agricultural ecosystems in the Bantimurung irrigation area, Maros Regency. The indicators measured include cognitive, affective and psychomotor components, b) Knowledge about the environment (X2) includes farmers' knowledge about cultivating agricultural land, maintaining fertility and preserving the environment in the Bantimurung irrigation area, Maros Regency. The indicators measured include cognitive, affective and psychomotor components, c) Attitude towards irrigation areas (X3) is the tendency for farmers to act in improving environmental quality in the Bantimurung irrigation area, Maros Regency. The indicators measured include cognitive, affective and conative components, and d) Motivation in maintaining irrigation areas (X4) is the encouragement of farmers to improve environmental quality in the Bantimurung irrigation area, Maros Regency. The indicators measured include intrinsic and extrinsic motivation.

Data analysis includes: Descriptive statistical analysis, which is used to display statistics such as average, maximum value, minimum value, frequency distribution, and standard deviation of the independent and dependent variables. Inferential statistical analysis uses simple regression and multiple regression to understand the relationship between independent variables and dependent variables.

RESEARCH RESULTS

Community Behavior to Improve Environmental Quality in a Sustainable Way in the Bantimurung (Y) Irrigation Area. The results of descriptive statistical analysis regarding community behavior in increasing agricultural production and environmental quality in the Bantimurung irrigation area show that of the 15 questions in the questionnaire regarding behavior, no community showed behavior that supported sustainable environmental quality improvement in the area. As many as 17% of respondents had behavior that was considered low, 72% had behavior that was considered medium, and 11% had behavior that was considered high. None showed particularly high levels of behavior. In addition, none of the respondents had very high ecosystem knowledge..

Regarding Exosystem Knowledge (X1), the results of descriptive statistical analysis regarding community knowledge about ecosystems in the Bantimurung Irrigation area show that of the 15 True-False model questions asked, no community has very low ecosystem knowledge. As many as 19% of respondents had ecosystem knowledge which was considered low, 63% had

ecosystem knowledge which was considered moderate, and 18% had ecosystem knowledge which was considered high. None demonstrated a particularly high level of ecosystem knowledge.

Table 1. Regression Coefficient X1 against Y

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	12.81	.056		57.28	.000
	X1	2.77	.043	2.75	56.88	.000

a. Dependent Variable: Y

In Table 1 it can be seen that t X1= 0.000<α=0.05 is significant. This means that X1 contributes to Y. Regression coefficient X1=2.77. This figure shows that every time X1 is increased, Y will increase by 2.77. Based on the previous description, it can be concluded that X1 has an influence on Y. The influence is 54% and contributes to Y by 2.86.

The regression equation for the influence of X1 on Y is:

$$Y = 12{,}81+2{,}77X1$$

The results of descriptive statistical analysis regarding the environmental knowledge of residents living in the Bantimurung Irrigation area, by observing 15 True-False model questions, show that only around 5% of the community has very low environmental knowledge in this area. As many as 13% showed a low level of environmental knowledge, while around 70% had environmental knowledge which was considered moderate. Only around 12% of residents have high environmental knowledge. None demonstrated a very high level of environmental knowledge.

Table 2 Regression Coefficient of X2 against Y

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	21.53	.182		64.732	.000
	X2	3.12	.136	3.14	60.42	.000

a. Dependent Variable: Y

a. Dependent Variable: Y

The regression equation for the influence of X2 on Y is:

$$Y = 21.53+3.12X2$$

From the results of descriptive statistical analysis regarding the attitudes of residents living in the Bantimurung irrigation area, by examining 15 attitude statements or questions analyzed using the Likert Model, it can be seen that around 14% of the community shows a very low attitude towards the Bantimurung irrigation area. As many as 73% showed attitudes that could be considered low towards the Bantimurung irrigation area. Around 13% have a

moderate attitude towards the Bantimurung irrigation area. No one showed a high or very high attitude towards the Bantimurung irrigation area

Table 3. Regression Coefficient X3 Against Y

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	5.508	0.440		65.98	.000
	X3	4.52	0.892	4.28	66.21	.000

a. Dependent Variable: Y

The regression equation for the influence of X3 on Y is:

$$Y = 5.508+4.52X3$$

From the results of descriptive statistical analysis regarding motivation to preserve the environment in the Bantimurung irrigation area, by looking at 15 motivational statements or questions analyzed using the Likert Model, it can be seen that there are no people who show motivation that supports environmental preservation in the Bantimurung irrigation area. Around 14% have low motivation to maintain the environment in the Bantimurung irrigation area. As many as 77% have the motivation to maintain the environment in the Bantimurung irrigation area which is considered moderate. Around 9% have the motivation to maintain the environment in the Bantimurung irrigation area. No one showed very high motivation in preserving the environment in the Bantimurung irrigation area.

Table 4. Regression Coefficient X4 Against Y

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	5.14	0.133		66.88	.000
	X4	3.76	0.059	3.73	66.52	.000

a. Dependent Variable: Y

The regression equation for the influence of X4 on Y is:

$$Y = 5.14+3.76X4$$

Influence of Ecosystem Knowledge (X1), Environmental Knowledge (X2), Attitudes towards the Irrigation Environment (X3), and Motivation to Maintain the Irrigation Environment (X4) Together on Community Behavior to Improve Environmental Quality in a Sustainable Way in the Bantimurung Irrigation Area (Y).

Table 5. Regression Coefficients X1, X2, X3, and X4 on Y

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	22.83	.001		33,76	.000
	X2	4.77	.002	4.43	36.02	.000
	X1	3.99	.003	3.79	32,64	.000
	X4	3,78	.005	3.55	33.38	.000

X3	2.63	1.02	2.57	28.06	.000

a. Dependent Variable: Y

The multiple regression equation is as follows:
Y = 33,76 + 3,99 X1 + 4,77 X2 + 2,63 X 3 + 3,78 X4

DISCUSSIONS

Community behavior in improving environmental quality in the Bantimurung irrigation area is currently at a level that can be considered moderate. The findings show that residents in the Bantimurung irrigation area have shown behavior that supports the environment, although it still requires improvement. Factors that influence this behavior include ecosystem knowledge, environmental knowledge, attitudes towards irrigation areas, and motivation to maintain the environment in irrigation areas. There are other factors that have the potential to influence, but are not included in the analysis model, such as education level, income, environmental awareness, and others. This finding is consistent with what has been described previously, showing the existence of a linear relationship between environmental knowledge, attitudes and behavior (Darmawan & Saam, 2010). In addition, action skills, knowledge of action strategies, knowledge of environmental issues, personality factors, and other situational factors play a role in forming responsible environmental behavior (Salim. JBE, Rauf. BA, 2020). The findings of this research are also in line with the fact that the environment in which individuals live has an important role in determining behavior (Helmi, 2019). The results of this research also support that human behavior is greatly influenced by environmental situations or conditions (Iskandar, 2016). In other words, human behavior often arises as a response to the environment or is the result of interactions between individuals and their environment.

Knowledge of agricultural area ecosystems is currently considered quite good, but still requires improvement. This increase in knowledge will have a significant impact on improving community behavior in improving environmental quality in the Bantimurung irrigation area. The findings of this research also define knowledge as everything an individual knows about an object, including science (Suriasumantri and Jujun. S, 2019). And knowledge includes impressions that appear in the human mind as a result of using the five senses (Salim. JBE, Rauf. BA, 2020).

Knowledge regarding the environment of the community in the Bantimurung irrigation area is also considered quite good, although it still needs improvement. This increase in knowledge will make a positive contribution to the behavior of people living in the Bantimurung irrigation area. Knowledge of irrigation areas is also considered quite good, but still requires improvement. This increase in environmental knowledge will contribute to the behavior of people living in the Bantimurung irrigation area. Research findings are strengthened by Suriasumantri's view that knowledge basically includes all the information we have about certain objects, including scientific elements (Suriasumantri, 2019). And in line with Soekanto that knowledge can be

considered as traces or impressions that appear in the human mind as a result of the use of the five senses (Salim. JBE, Rauf. BA, 2020).

Sikap masyarakat yang tinggal di daerah irigasi Bantimurung saat ini dianggap rendah atau negatif. Oleh karena itu, perlu adanya upaya untuk meningkatkan sikap ini sehingga masyarakat cenderung melakukan tindakan yang lebih positif terhadap lingkungannya. Pelatihan dan penyuluhan terus-menerus mengenai lingkungan hidup, daerah irigasi, dan gaya hidup sehat dapat membantu meningkatkan sikap setiap penghuni rumah terhadap pelestarian daerah irigasinya. Peningkatan sikap ini akan memberikan kontribusi yang lebih baik terhadap perilaku masyarakat dalam merawat lingkungan di wilayah irigasi Bantimurung. Hal ini senada dengan Azwar bahwa sikap sebagai kesiapan untuk merespons secara positif atau negatif terhadap objek tertentu. Azwar menggambarkan komponen sikap terdiri dari pemikiran (kognisi), perasaan (afeksi), dan pre-disposisi tindakan (konasi) terhadap objek dalam lingkungan sekitar (Azwar dan Saifuddin, 2018). Sikap sebagai kesiapan atau kesediaan untuk bertindak, bukan sebagai pelaksanaan motif tertentu (Notoatmojo. S, 2018)

The motivation of people living in the Bantimurung irrigation area to care for the environment is currently considered moderate. This level of motivation is based on knowledge about ecosystems, environmental knowledge, and knowledge of irrigation areas. Increasing this motivation is needed through more intensive counseling and training, especially related to knowledge about ecosystems, the environment, irrigation areas, and other knowledge related to the environment and irrigation areas. This increase in motivation will have a positive impact on community behavior in protecting the environment in the Bantimurung irrigation area. The findings of this research are in line with the views of several other experts that motivation is an internal force that encourages a person or group to achieve achievements in accordance with their goals (Danim, 2017). Motivation is also a potential strength that an individual has and can develop both from within and through external factors (Winardi, 2016). Others say that motivation is an internal psychological drive that influences and regulates an organism's actions (Tokan & Immaculata, 2019).

Knowledge about ecosystems has a positive influence on community behavior in improving environmental quality in the Bantimurung irrigation area, both individually and collectively. Therefore, knowledge about this ecosystem needs to continue to be improved so that it can provide an optimal contribution to community behavior in improving environmental quality in a sustainable manner in the Bantimurung irrigation area. Knowledge about the environment also has a positive influence on community behavior in improving environmental quality, both individually and collectively in the Bantimurung irrigation area. Therefore, environmental knowledge also needs to continue to be improved in order to provide maximum contribution to community behavior in improving environmental quality in a sustainable manner in the Bantimurung irrigation area. Attitudes towards irrigation areas also influence community behavior in improving environmental quality, both individually and collectively in the Bantimurung irrigation area. Therefore, this attitude also needs to continue

to be improved to provide an optimal contribution to community behavior in improving environmental quality in a sustainable manner in the Bantimurung irrigation area.

Motivation to protect the environment in the Bantimurung irrigation area has a positive influence on community behavior in improving environmental quality, both individually and collectively in the Bantimurung irrigation area. Therefore, this motivation also needs to continue to be improved in order to provide an optimal contribution to community behavior in caring for the environment in the Bantimurung irrigation area.

CONCLUSIONS AND RECOMMENDATIONS

The conclusions of this research can be summarized as follows:

1. Community behavior in improving environmental quality in the Bantimurung irrigation area, Maros Regency is currently at a moderate level.
2. Community knowledge regarding wet agricultural area ecosystems, environmental knowledge, attitudes towards irrigation areas, and motivation to maintain the environment in the Bantimurung irrigation area, Maros Regency currently tends to be low.
3. Community knowledge regarding wet agricultural area ecosystems, environmental knowledge, attitudes towards irrigation areas, and motivation to maintain the environment in the Bantimurung irrigation area, Maros Regency have an influence, both individually and collectively, which contribute positively to community behavior in improving environmental quality in a sustainable manner in the Bantimurung irrigation area, Maros Regency.

Based on these conclusions, the recommendations from this research are as follows:

1. It is necessary to improve community behavior in improving environmental quality in a sustainable manner in the Bantimurung irrigation area, Maros Regency. Improvement efforts can be made through counseling and training related to knowledge of ecosystems in wet farming areas, environmental knowledge, attitudes towards irrigation areas, and motivation to maintain the environment in irrigation areas in a sustainable manner.
2. Community knowledge regarding wet agricultural area ecosystems, environmental knowledge, attitudes towards irrigation areas, and motivation to maintain the environment in the Bantimurung irrigation area, Maros Regency need to be improved. Increasing knowledge can be done through direct counseling on these topics to ensure better understanding. This increase in knowledge will make a significant contribution to improving community behavior in improving environmental quality in a sustainable manner in the Bantimurung irrigation area, Maros Regency.
3. Knowledge about the ecosystem of wet farming areas, environmental knowledge, attitudes towards irrigation areas, and motivation to maintain the environment in the Bantimurung irrigation area, Maros Regency have a significant influence, both individually and collectively. Therefore, these variables need to be maintained and improved continuously.

4. It is possible that there are other variables that are not included in the analysis model that also contribute to increasing behavior in improving environmental quality in a sustainable manner in the Bantimurung irrigation area, Maros Regency. Therefore, this variable needs to be investigated further through further research in the future

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