Ecological Literation of Rawapening Communities in Asinan Village, Semarang District

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ABSTRACT

Rawapening is a natural lake located in Semarang Regency, Central Java. Currently, Rawapening is encountering some environmental problems such as sedimentation, and massive growth of Eceng Gondok (Eichhornia crassipes), conflict of interest in utilizing Rawapening and illegal buildings around Rawapening. On the other hand, the Rawapening community is very dependent on the existence of the lake in fisheries, agriculture, Eceng Gondok handicrafts, organic fertilizer production, and tourist attraction. For this reason, communities around Rawapening are expected to take part in maintaining the existence of Rawapening. Increasing ecological literacy associated with the Rawapening area is essential. Ecological literacy is an activity to understand the importance of preserving the environment supported by the environmental awareness. This article aims to determine the level of ecological literacy of the Rawapening suburbs in Asinan Village, Semarang Regency. The number of samples are 94 families proportionately spread in the hamlets of Krajan, Baan, Sumurup, and Mangkelang. The variables studied included knowledge of the Rawapening ecosystem, attitudes of sensitivity to environmental changes in Rawapening, and community behavior in saving Rawapening with environmentally friendly Behavior. The assessment was carried out using the 30 items multiple-choice test item through a test instrument. The results showed that the Asinan Village community's ecological literacy is mostly in the Good category. The details are from 94 respondents; there is 9.60% in the very high category, 55.30% in the high category, 34.1% in the medium category, and 1.0% in the low category. The details of sub-variables show that the average level of community knowledge related to ecosystem rewapening is high (3,9). The average Attitude of sensitivity to environmental changes in Rawapening is high (3,8), then the average Behavior of the community in terms of saving Rawapening is included medium category (3,1). From the results of the study, it was concluded that the ecological literacy level of the Asinan Village Community is in the high category; however, in terms of saving Rawapening with environmentally friendly Behavior, it was included in the Medium category. Therefore, it is necessary to carry out routine lake cleansing activities by involving the community to foster environmental care behavior in Rawapening.

Keywords: Ecological literacy, knowledge, attitudes, behavior.

1. INTRODUCTION

Rawapening is a natural lake, administratively located in Semarang Regency, Central Java. The coordinate location is 7°04'00 "LS - 7° 30'00" LS and 110o 24'46 "BT-110°49'06" BT, has an altitude of 450 - 470 meters above sea level and has an area of 2,670 ha (Central Java PSDA Main Data Series 2006: I-1).

This lake has three main functions, which are functions of ecology, culture, and social economy. From the ecological aspect, Rawapening is a place where the water component's ecological cycle and aquatic life take place. The existence of the lake will affect the balance of the surrounding ecosystem. From the aspect of cultivation, the people around Rawapening often use swamps as floating nets and cage aquaculture. From the socio-economic aspect, Rawapening has a function that has a direct impact on the lives of communities around the lake, such as plantation land, rice fields, inland fisheries, and as a tourism area. With

so many advantages, proper and correct management is needed, including increasing the community's understanding of Rawapening's sustainability. In turn, the existence of Rawapening will last so long that it can be enjoyed even longer. The current condition of Rawapening is quite worrying because there are sedimentation problems that can threaten its ecological balance. A considerable volume of material carried by rivers that empty into Rawapening, erosion from upstream, and activities of the surrounding population (allochthonous) and material originating from the waters themselves, such as the decay of water hyacinth and dead algae (autochthonous) [1].

Research conducted by Apriliyana [2] shows an increase in sedimentation caused by the Eceng Gondok population, which significantly disrupts the Rawapening ecosystem, increased from 1991 to 2011. The study results presented that the percentage of Eceng Gondok population area in 1991 reached 20.68% of the water area. In 2001 it increased

to 43.59% of the territorial waters, and in 2011 it expanded again to 48.23% of the territorial waters. From the results of these studies, it can be seen that what dominates the silting of Rawapening is due to sedimentation from Eceng Gondok.

Development activities also influence sedimentation in Rawapening catchment area. Research conducted by Sanjoto et al [3] shows that the development of built-up land cover in the Rawapening Water Catchment Area tends to increase. In 2000 the area of land was built 5,202 ha, then in 2009, it was 6,722 ha, and in 2019 it was 8,053.64 ha. The impact is that sedimentation in raw materials is increasing. The construction of the Ambarawa-level road that passes through the outskirts of Rawapening results in higher accessibility to Rawapening. We are presented with a stretch of Rawapening that is very beautiful and interesting through this ring road. Therefore, several new tourist destinations, both culinary and water tourism, are visited by tourists. This condition needs to be addressed by instilling care of Rawapening to the community, both residents and migrants, in preserving the ecological preservation of Rawapening. One way is to provide an understanding of the importance of maintaining Rawapening ecology through ecological literacy.

Ecological literacy is an activity that understands the importance of preserving the environment, supported by the power of environmental awareness [4]. This is reinforced in Capra [5] opinion explaining ecoliteration, or environmental literacy, is the ability to high awareness about the importance of the environment with all its contents that must be used wisely. The Environment Education and Training Partnership (EETAP) states that an environmentally literate person knows what he will do for the environment, he knows how to do that (NAAEE, 2011) [6]. Mcginn [7] explains that to measure a person's ecological literacy dimensions, three dimensions are used: care, practical competence, and knowledge. Furthermore, Nasution [6] states that a person's environmental literacy status can be measured based on the criteria of environmental literacy components, which include 1) Knowledge, 2) Cognitive skills, 3) Attitude, and 4)

Responsible behavior on the environment. When associated with Rawapening ecological literacy, the intended knowledge is ecological knowledge, the knowledge that shows concern for the environment. The skills in question are related to identifying issues, intended attitudes, refers to environmental sensitivity and Behavior, refers to real commitment in pro-environment actions. Asinan Village, Bawen Subdistrict, is one area that borders directly with Rawapening, especially in Sumurup Hamlet, Baan Hamlet, and Krajan Hamlet. Some people of Asinan Village depend on Rawapening Lake as tourism, fish cages, plantations, and even making Rawapening as a tidal farm when the lake water is shrinking. Utilization must be done carefully because it can disrupt the survival of the Rawapening ecosystem. This paper aims to reveal the level of ecological literacy in the conservation of the Rawapening area in the Rawa suburbs, include the people of Asinan Village, Bawen District, Semarang Regency.

2. METHOD

2.1 Population, Sample, Research Variable

The study population was the entire population of Asinan Village consisting of 1527 families with a total population of 47747 people spread over four hamlets: Krajan Hamlet, Baan Hamlet, Sumurup Hamlet, and Mangkelang Hamlet. The number of samples taken using the Slovin formula obtained 94 household respondents spread proportionally in the 4 hamlets.

The primary variable in this study is Rawapening Ecological Literacy with sub-variables consisting of (1) Knowledge, which refers to ecological knowledge about the Rawapening ecosystem. (2) Attitudes, in terms of environmental sensitivity or sensitivity to environmental changes in Rawapening. (3) Skills, how the community knows the impact of Rawapening environmental problems. (4) Behavior can be seen by community action in saving Rawapening with environmentally friendly or pro-environment Behavior. The complete sub variable of Rawapening ecological literacy is presented in the following table.

Table 1 Variables and Indicators of Rawapening Ecological Literacy

Variabel Ecological Literacy	Variable Indicators
1. Knowlegde	1. Know the definition of ecology. 2. Know the definition of the environment. 3. Identify human influence on the enviroment. 4. Know the enviromental components 5. Know the definition of conservation. 6. Know the concept of conservation in terms of ecology. 7. Know the understanding of environmental problems. 8. Know the meaning of the lake. 9. Know the causes of environmental problems in Rawapening. 10. Know the impact of unwise use of Rawapening
2. Attitude	1. Can understand the man issues arising 2. Can conclude things that cause problems in the Rawapening area 3. Can understand efforts to maintain the existence of Rawapening
3. Skills	1. Know about the Rawapening 2. Know the vital role in the preservation of Rawapening

Variabel Ecological Literacy	Variable Indicators
	3. Know how to control Rawapening environment
	4. Know how to solve problmes from the use of Rawapening by the community
4. Behavior	1. Can conclude the principle of responsibilty for the environment
	2. Carry out activities concerning the environment of Rawapening.
	3. Using environmentally friendly production materials.
	4. Carry out natural resource exploitation activities wisely.

2.2 Data Collection and Analysis Techniques

Data collection has been done by observation techniques, documentation techniques, interview techniques, and test techniques. The test technique used to determine the level of ecological literacy of the Asinan village community in the conservation of the Rawapening area through a multiple-choice test.

Analysis of the data used is the percentage description technique to measure respondents' level of ecological literacy as well as the level of knowledge, attitudes, skills, and Behavior of respondents. There are five classes used: Very High (VH), High (H), Moderate (M), Low (L), and Very Low (VL). Then to determine the relationship between sub-variables used Pearson Productmoment Correlation Techniques.

3. DISCUSSION RESULT

3.1 Overview of Research Areas

This research was conducted in Asinan Village, Bawen District, Semarang Regency, Central Java. The elevation condition in Asinan Village from sea level is 500 m, rainfall 28 mm / year, lowland topography, and average air temperature is 30o C. The area of Asinan Village reaches 798 Ha, with administrative boundaries: north of Bawen Village, south of Rawapening, west of Tambakboyo Village, and east of Polosiri Village (Tuntang). The research location can be seen in Figure 1 below.
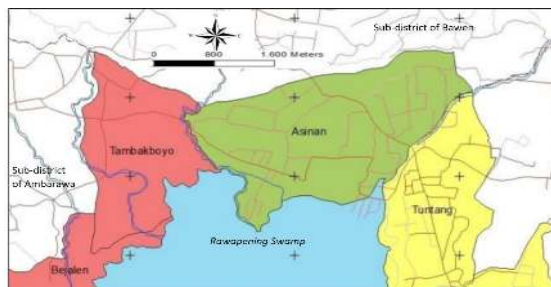

Figure 1 Location of Asinan Village

Asinan Village is located in a quite strategic location because it has high accessibility. Affordability with the surrounding area is as broad as Ambarawa District, Tuntang District, and Salatiga City. The main road of Asinan Village is an alternative road from Bawen and Salatiga to Ambarawa, Magelang, and Jojgakarta.

According to sex and age in Asinan Village, the total population is 4788 people, consisting of 2403 male sex residents and 2385 female sex residents. By looking at the statistical data, the age of 0-14 years is 1104 people, and the ages of 15-64 are 3347 people and more than 65 years of age as many as 337 people. Based on the calculation, the dependency rate of Asinan Village residents reached 43%. This number is below the national level average of 47.7% [8].

The level of education of the residents of Asinan Village is quite good. People who earn senior high school (high school/equivalent) are 954 people (20%), higher education 134 people (2.7%), the rest are primary education and those who have not attended school.

3.2 Level of Knowledge (Cognitive) Asinan Village Community

Knowledge *(cognitive)* is an essential domain for the formation of one's actions because Behavior based on knowledge will be more lasting than behavior that is not based on knowledge. Many factors affect people's level of knowledge. According to Notoatmodjo [9], a person's knowledge can be influenced by experience, level of education, beliefs, sources of information, social culture, and age.

In this study, the level of ecological knowledge of someone who shows concern for the environment around Rawapening is one of the important elements in the community's ecological literacy. The study results related to the level of ecological knowledge of the Rawapening community in Asinan Village, are presented in table 2 below.

Table 2 Frequency Distribution of Rawapening Ecological Knowledge

Criteria / Category	Frequency	Percentage (%)
Very High (VH)	14	15
High (H)	57	61
Moderate (M)	22	23
Low (L)	1	1
Very Low (VL)	0	0
Total	**94**	**100**

Source: Research Results, 2020

Based on table 2 above, it is seen that the level of community knowledge related to the ecology of Rawapening is mostly (61%) included in the High category. Then followed by the Moderate category reached 23%, and the Very High category reached 15%. This condition shows that the level of knowledge of Asinan Village residents about the Rawapening ecosystem is good. It becomes a valuable asset in fostering attitudes, cognitive skills, and Behavior in maintaining and managing Rawapening.

Based on the results of the calculation of Pearson product-moment correlation, it can be seen that the relationship of respondents' level of knowledge to attitudes produces r = 0.4927, with r table = 0.202, meaning that the knowledge sub-variable is positively related to the attitudes sub variable. Likewise, the relationship between the level of knowledge and the Skill sub-variable, the value of r = 0.42197, and the relationship with Behavior, the value of r = 0.3692.

3.3 Public Sensitivity Attitudes on Rawapening Ecology

Attitudes determine how individuals react to a situation and determine what individuals are looking for in life. Attitudes will underlie and lead to several interrelated actions so that there must be information on someone for them to behave. From this information will arise positive or negative feelings on an object and cause a tendency to behave in specific ways, then an attitude occurs [10].

In this study, the Attitude in question is related to environmental sensitivity or sensitivity to environmental changes in Rawapening. Based on the results of the study, the Attitude of the population related to environmental sensitivity on respondents can be seen in the following table 3.

Table 3 Frequency Distribution of Environmental Sensitivity Attitudes

Criteria / Category	Frequency	Percentage (%)
Very High (VH)	36	38,30
High (H)	25	26,60
Moderate (M)	21	22,30
Low (L)	8	8,50
Very Low (VL)	4	4,30
Total	**94**	**100**

Source: Research Results, 2020

Table 3 above shows that the Attitude of the population is related to the sensitivity to the changing conditions of the Rawapening environment, mostly including the Very High category (38.30%) and the High category (26.60%). This condition is highly influenced by one's level of Knowledge and Skills.

Based on the calculation of the Pearson correlation model, it can be seen that the sub- variable Attitude has a relationship with the sub-level of respondents' knowledge level of r = 0.4927 and the Skill sub-variable of r = 0.3259. Conversely, a person's Attitude has nothing to do with the

Behavioral sub-variable, namely the value of r = 0.1390 (r table = 0.202).

3.4 Cognitive Skills in Identification of Issues

Cognitive skills are someone's skills in using the mind to make decisions or solve problems. In connection with this study, the skills are how the community knows the Rawa Pening environmental problems and how the community resolves the problem. The research results related to cognitive skills in identifying Rawapening problem issues are presented in the following table 4.

Table 4 Cognitive Skill Levels in Identification of Issues

Criteria / Category	Frequency	Percentage (%)
Very High (VH)	9	9,60
High (H)	25	26,60
Moderate (M)	36	38,30
Low (L)	15	16,00
Very Low (VL)	9	9,50
Total	**94**	**100,00**

Source: Research Results, 2020

Table 4 inform that the majority of Asinan Village residents have moderate cognitive skills (38,305), followed by the High category (26.6%). Thus, in general, the Asinan Village residents have good cognitive skills. Even so, some people are still not good, namely the category of Low (16.0%) and Very Low (9.5%). Furthermore, the condition of cognitive skills that are quite good in society has to do with sub-variables of the level of community knowledge itself, with

a value of r = 0.4514. The relationship with the Attitude sub-variable is quite good, with a value of r = 0.3259. The relationship with the Behavioral sub-variable is also quite good, with the value of r = 0.4219.

3.5 Responsible Behavior Towards Rawapening Environments

The Intended Behavior is about pro-environment or environmentally friendly actions and attitudes of responsibility towards saving Rawa Pening with environmentally friendly or pro- environment Behavior. This variable illustrates how the Asinan village community works in protecting the Rawapening ecosystem. The results related to the Behavioral sub-variable shown in Table 5 below.

Table 5 Frequency Distribution of Behavior Towards Rawapening Environment

Criteria / Category	Frequency	Percentage (%)
Very High (VH)	17	18,00
High (H)	33	35,10
Moderate (M)	29	30,90
Low (L)	11	11,70
Very Low (VL)	4	4,30
Total	**94**	**100,00**

Source: Research Results, 2020

Based on table 5 above, it can be seen that people's Behavior towards the Rawapening Environment is in the High category, which is 33 respondents (35.1%) and 17 respondents (18.0%) are in the Very High category. The rest of the Moderate category were 29 respondents (30.90%); the rest were the Low and Very Low categories. In general, the Asinan Village Community's Behavior towards the Rawapening environment is in a Good category.

The Behavior of the Asinan Village Community is included in the good category and has a relationship with the Knowledge sub variable of r = 0.3692, and the cognitive skills sub variable of r = 0.4220. On the contrary, with the Attitude sub-variable, there is no significant relationship with r = 0.1390. The overall picture of the relationships between the sub-variables of Rawapening ecological literacy studies is presented in table 6 below.

Table 6 Relationships between sub-variables

	Knowledge	Attitude	Skills	Behavior
Knowledge	r = 1	r = 0,4927	r = 0,4514	r = 0,3692
Attitude	r = 0,4927	r = 1	r = 0,3259	r = 0,1390
Skills	r = 0,4514	r = 0,3259	r = 1	r = 0,4220
Behavior	r = 0,3692	r = 0,1390	R = 0,4220	r = 1

Source: Calculation Results, 2020   r table = 0,202

3.6 Level of Ecology Literacy in the Asinan Village Community

Ecoliteration or environmental literacy is the ability of high awareness about the importance of the environment with all its contents, which must be used wisely. The power of community *ecoliteration* must be built in early age to open mindsets and actualize the defensive role in reducing environmental degradation. Environmental problems cannot be overcome only by improving the relationship between humans and their environment and improving the values, norms, and ethics of life. Ecologically literate people care about the importance of protecting the environment, caring for the earth, ecosystems, and nature as places for developing life.

Based on the study results, the distribution of the Asinan village community's ecological literacy level is presented in the following table 7.

Table 7 Frequency Distribution of Ecological Literacy Variable Scores

Criteria / Category	Frequency	Percentage (%)
Very High (VH)	9	9,60
High (H)	52	55,30
Moderate (M)	32	34,1
Low (L)	1	1,0
Very Low (VL)	0	0
Total	**94**	**100,00**

Source: Calculation, 2020

Table 7 shows that the Asinan Village community's ecological literacy is mostly in the High category (55%); even the Very High category reaches 9.5%. From these data, it can be concluded that the Ecological Literacy of the Asinan Village community is in a Good category.

In the literature, the study explained that the community's ecological literacy is related to the level of knowledge, attitudes, cognitive skills, and Behavior of the community itself. Based on the calculation results, it is known that the

equation of the multiple linear regression analysis is as follows.
Y = 0.368 + 1.078 X1 + 0.831 X2 + 1.020 X3 + 0.866 X4 + e
Information:
Y   = Ecological Literacy
a   = Constant

b   = Regression Coefficient
X1   = Ecological / environmental knowledge
X2   = Attitude (Environmental Sensitivity)
X3   = Cognitive Skills (Issue Identification)
X4   = Responsible Behavior (Pro Environment)
E   = Strandar error

Table 8 Results of Multiple Linear Regression Tests

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
1 (Constant) Pengetahuan Ekologi	,368	,784		,469	,640
Sikap Sensitivitas Lingkungan	1,078	,092	,478	11,761	,000
Ketrampilan Kognitif Perilaku	,831	,113	,273	7,335	,000
Tanggung Jawab	1,020	,131	,307	7,799	,000
	,866	,130	,247	6,676	,000
a. Dependent Variable: Literasi Ekologi					

Based on table 8 of the multiple linear regression test results above, it can be seen that there is a significant relationship sub ecological knowledge variables, attitudes, skills, and behavioral responsibilities towards ecological literacy. The ecological literacy of the Asinan Village Community, which belongs to the good category, cannot be separated from the support of all parties, including the government— seen from the active community efforts in conservation activities Rawapening. Public interest seems very enthusiastic if there are counseling activities from the government and students who come down to the field to support the conservation activities of the Rawapening area. The Asinan village community's conservation efforts received support from the government, for example, in clearing swamps from the Eceng Gondok population. The government assisted it by lowering heavy equipment to transport water hyacinth to the edge of the swamp (see figure 2 below).

Figure 2 Heavy equipment to transport water hyacinth to the edge of the swamp

4. CONCLUSION AND SUGGESTION

The level of ecological literacy of the Rawapening community in Asinan Village is relatively high. There are four variables related to Ecological Literacy, namely Knowledge, Attitudes, Cognitive Skills, and Behavior. Of the four sub-variables, it turns out that the knowledge sub-variable with the cognitive skill sub-variable has a very close influence.

Concerning the relationship between sub-variables, in general, have a significant relationship except for the relationship between Attitude and cognitive skills, the relationship is very weak.

Even though Ecological Literacy is already good, it still needs to be improved regarding ecological literacy for the community in the efforts of conserving the Rawapening area in order to achieve a prosperous life, and the existence of Rawa Pening will always be maintained.

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