

# A Comparison of Student Environmental Literacy: Public and Islamic Schools in Banda Aceh, Indonesia

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The purpose of this study is to examine the differences in students' environmental literacy levels, between public and Islamic high schools in Banda Aceh. This study was conducted in four high schools in Banda Aceh, involving 327 students. The data was obtained through a questionnaire of environmental literacy, administered to the students and analysed using descriptive statistics and SPSS version 22. The results of this study showed that high school students' literacy was good. Further, the student environmental literacy level at an Islamic school was higher than at a public school, with average scores of 3.821 and 3.684 respectively. The findings showed that female students' environmental literacy level was higher than male students; 3.637 and 3.528 respectively. In conclusion, the application of environmental literacy at all levels of schooling must be integrated with students' daily life.

**Key words:** *Environmental Literacy, Environmental Attitude, Environmental Behaviour, Environmental Knowledge, Islamic School.*

## Introduction

The global environmental problem has been the most crucial issue discussed in many world forums. Much environmental damage occurs due to the irregular exploitation of nature, without sustainable conservation. The data from the National Disaster Management Agency

revealed that about 3,397 flood disasters occurred in Indonesia between 2015 and 2020, causing 600 people to die, and the evacuation of areas containing more than 7.7 million people. Furthermore, 745 forests and associated land in Indonesia were burnt from 2015 to 2020. During 2015-2020, Aceh province recorded about 237 flood disasters, causing the death of 21 people, and 1.2 million people had to evacuate (National Disaster Management Agency/ BNPB, 2020). The environment begins to show significant changes, indicating bigger environmental problems in future years, which can be categorised as local, national, regional and global environmental issues (Wulandari, 2019).

Environmental damage can simultaneously and systematically impact balance in an ecosystem. Thus, strategic efforts are required to prevent environmental damage, especially in an underdeveloped or developing country. Damage due to natural disasters, such as floods, lead to various changes, ranging from the loss of human lives, loss of shelter, buildings or infrastructure, to psychological damage suffered by the community, especially children (Caruso & Miller, 2015; Cas, Frankenberg, Suriastini, & Thomas, 2014; Gillespie et al., 2009). Environmental awareness is critical, considering the continuous environmental damage. This is an attitude of being aware of preventing environmental damage and developing efforts to fix the damage that has occurred (Khanafiyah & Yulianti, 2013). Environmental awareness starts with the individual who must be aware of the environment, and be an agent of change, to protect and manage the environment (Erhabor & Don, 2016).

Environmental awareness start from simple actions through education. The necessary character formation can be integrated into the learning process at school (Hamzah, 2013). Educationally, the goal is to create environmental literacy in society (Roth & Sedana, 2015). The awareness aims to construct societal knowledge, attitude, skills and behaviour that enhances environmental awareness (Hollweg et al., 2011). This point becomes essential in improving the quality of human life. One of the measurable indicators of environmental awareness is environmental literacy. Simmons developed the indicators in his criteria for analysing environmental literacy (Chu, Lee, Ko, & Shin, 2007; Erdoğan, Kostova, & Thomas Marcinkowsk, 2009; Stevenson, Peterson, Bondell, Mertig, & Moore, 2013). The literacy adapted from Simmons consists of an environmental attitude, knowledge of ecology, social politic and environment, responsibility for the environment, and the addition determiner of responsible behaviour (Nurwaqidah & Ramli, 2019).

Environmental literacy is known as someone's attitude that can be understood and observed, based on individual behaviours. The person should be able to decide to be responsible for the environment, to create balanced behaviour for a quality of life environment (Samuel, 2006; Zorrilla-pujana & Rossi, 2014). Hall and Allan explain that environmental literacy is individuals' knowledge and manner that relates to environmental problems, as well as their skills and motivations in solving issues (Hall & Allan, 2014). According to Rashid and

Asghar, environmental literacy should focus on environmental behaviour, particularly a sense of responsibility, and environmental education should teach the students about environmental literacy, specifically environmental behaviour (Rashid & Asghar, 2016).

Research about environmental literacy has been conducted in many countries, and the result indicates that environmental literacy relates to the basic skills, understanding, and feeling about human relations with the environment (Pe'er, Goldman, & Yavetz, 2007). The understanding means humans' interactions with their surrounding environment (Morrone, Mancl, & Carr, 2001; Scholz, 2011). The other indicators about environmental knowledge also involve values, attitudes, and skills which are then implemented into actions (Pe'er et al., 2007; Tuncer et al., 2009). In this study, environmental literacy becomes the focus of the environmental knowledge indicator, and of environmental behaviour and attitude. The measure of students' environmental literacy adopted from the previous study instrument adjusted to local wisdom in the research site, from the indicators: environmental knowledge, attitude and behaviour (Erdoğan, 2009; Fah & Sirisena, 2014; Farida & Hadiansah, 2019; Goldman, Pe, & Yavetz, 2015; Liang, Fang, Yeh, & Liu, 2018; Nunez & Clores, 2017; Veisi et al., 2018; Zhu, 2015).

Environmental behaviour, attitude and awareness can be actualised variously, especially in preparing students' understanding and practical skills in protecting the environment. This is like nature sustaining the life of humans and protecting their health in society (Desfandi, Maryani, & Disman, 2017b). In forming students' environmental literacy, schools need to be whole-hearted in developing environmental policies. Their policy is expected to be applied, and to broaden environmental insight in the learning process; for example, providing an extra subject in the school curriculum. Based on Setyowati's research findings, the extra subject relating to environmental management in SMK N 2 Semarang is in accordance with environmental-based school program or "Adiwiyata School" (Setyowati & Aji, 2015). This is as in Desfandi's research; the finding confirmed that the school's policy positively influences the students' environmental literacy (Desfandi, Maryani, & Disman, 2017a).

Due to environmental education, the adiwiyata awards keep increasing, reaching 3,871 awards in 2018. The program should improve the behaviour of protecting and preserving the environment. Banda Aceh is a capital city of Aceh Province that Adiwiyata School has provided environmental education learning, that is included in compulsory subjects or local content (Desfandi et al., 2017a). The research carried out at schools in Banda Aceh indicated that the implementation of the schools' environmental policy was not effective; two were at SMA Negeri 3 Banda Aceh and SMA Negeri 4 Banda Aceh (Desfandi et al., 2017b).

This study focused on the improvement of environmental literacy at public and Islamic schools. Some research was conducted, one by Nurwaqidah. The issue was about

environmental literacy mapping, based on *adiwiyata* and non-*adiwiyata* at a high school in Ponorogo (Nurwaqidah & Ramli, 2019). Another study about students' ecological literacy of *adiwiyata* and non-*adiwiyata* was also carried (Rahmadiani, Utaya, & Bachri, 2019). Further, similar research was compared environmental literacy between environmentally friendly schools and ordinary schools (Spínola, 2015). This study is different because it was conducted at Islamic and public schools. Several studies compared environmental and ordinary schools. However, this research will measure environmental literacy in different types of schools.

Islamic educational institutions educate like other schools, in general. The difference lies in the increase of religious activities after formal education. In the afternoon and evening, students are equipped with knowledge about religion as integrated into students' daily lives, including the issues of environmental preservation and management. *Pesantren* (Islamic boarding school), as an educational institution, plays a crucial role in increasing ecological knowledge for community environmental awareness (Fawaid, 2016). In Islam, humans and nature should be harmonious in life. The culture produced in *pesantren* positively contributes to overcoming environmental problems (Aulia, Mardhiah, Gunawan, & Isnaini, 2018).

The considerations mentioned earlier encouraged the researchers to compare environmental literacy between public and Islamic schools that implement environmentally friendly schools (*Adiwiyata*). This study compared environmental literacy, between public and Islamic school students. Specifically, this study compared the environmental literacy of public school students and Islamic school students who run the *adiwiyata* school program.

## Methodology

This study employed a survey method in its research design, with quantitative descriptive analysis. A survey is a procedure for managing questionnaires describing the attitudes, behaviour, opinions and characteristics of a representative sample of the population (Creswell, 2012). This study measures the students' environmental literacy and generalises the findings. More specifically, this study measured environmental literacy by administering questionnaires to students in the study. A quantitative approach in measuring environmental literacy enables the generalisation of the findings, based on the topic to be measured (Fraenkel, Wallen, & Hyun, 2011). The population in this study comprised 1835 students of SMA N 3 Banda Aceh, SMA N 12 Banda Aceh, MAS Babun Najah and MAS Darul Ulum Banda Aceh. Considering the large population, this study selected only a portion of the total population, using Slovin's formula to calculate the size of the research sample (327 students). The population data are presented in Table 1.

**Table 1:** The Number of Population by Group

No	Group	Number
1	SMA N 3 Banda Aceh	785
2	SMA N 12 Banda Aceh	592
3	MAS Babun Najah	209
4	MAS Darul Ulum	249
Total		1835

After determining the size of the research sample, the sampling technique using proportional random sampling, a technique to determine the research sample based on the number of each class group in a study (Johnson & Christensen, 2016). More details of the sample are presented in Table 2.

**Table 2:** Sample Determination

No.	Population Group	Number	Calculation	Sample	Sample (Rounded)
1	SMA N 3 Banda Aceh	785	$n = \frac{785}{1835} \times 327$	140,3	140
2	SMA N 12 Banda Aceh	592	$n = \frac{592}{1835} \times 327$	105,8	106
3	MAS Babun Najah	209	$n = \frac{209}{1835} \times 327$	37,4	37
4	MAS Darul Ulum	249	$n = \frac{249}{1835} \times 327$	44,5	44
Total		1835		327	327

Data collection was carried out through a questionnaire administered to the students. It measured students' environmental literacy using a Likert scale of 1-5. The researched schools were the Banda Aceh N 3 High School, Banda N 12 SMA Aceh, Babun Najah MAS, and Darul Ulum MAS. They had participated in the *adiwiyata* program, namely the environmental-based school program. SMA N 12 Banda Aceh and SMA N 3 Banda Aceh placed first and third in the Adiwiyata 2019 High School Championship. MAS Babun Najah and MAS Darul Ulum won the first and second place in the *Dayah* category (DLHK3 Banda Aceh, 2019). The data gathered through the questionnaires were then analysed descriptively using SPSS version 22 for Windows. The descriptive analysis of student's responses to the environmental literacy questionnaires was calculated and presented in a tabular form. Next, all items were explained using a range of questionnaire scores.

## Results and Discussion

Data in this study was collected in four schools in Banda Aceh, and the details have been presented in previous sections. However, the sample in this study amounted to 327 students from the four schools mentioned, sampled using the Slovin formula. The sample demographics in this study can be seen in Table 3 for further information. Table 3 provided the demographic data of the research sample.

**Table 3:** Demographics Profile of Respondents

Demography	Number	Percent
<b>Gender</b>		
Male	133	41
Female	195	59
<b>School</b>		
SMA N 13 Banda Aceh	140	43
SMA N 12 Banda Aceh	106	32
Madrasah Aliyah Darul Ulum	37	11
Madrasah Aliyah Babul Najah	45	14
<b>Class</b>		
10	119	36
11	130	40
12	79	24

**Table 4:** The Distribution of Three Aspects of Environmental Literacy (N=327)

	Range	Min	Max	Mean	Std. Dev.	Stat Variance
<b>EL</b>	2.192	2.576	4.769	3.593	0.370	0.137
<b>EC</b>	2.750	2.125	4.875	3.462	0.499	0.250
<b>EA</b>	2.250	2.750	5.000	3.689	0.452	0.205
<b>EB</b>	2.188	2.813	5.000	3.713	0.436	0.191

Table 4 shows that the mean of environmental literacy (LE) of public and Islamic schools in Banda Aceh is 3.593. The highest value is 4.769 and the lowest value 2.576. The analysis also shows a range of 2.192, the standard deviation of 0.370 and the variance of 0.137. After conducting the descriptive statistical analysis, the distribution of data from the sample was obtained by calculating the number of classes, using the formula  $1 + 3.3 \log n$ , where  $n$  is the number of research samples. From the calculation,  $n = 327$  and the class is  $1 + 3.3 \log 327 = 9.29$ , rounded to nine class intervals. Then, the data range was calculated by a maximum-minimum value, for a result of 2,193. Thus, the known range of data can be obtained by the class length of 0.24. Figure 1 shows the distribution frequency of community behaviour in environmental management.

**Figure 1.** Frequency Distribution and Percentage of Class Intervals

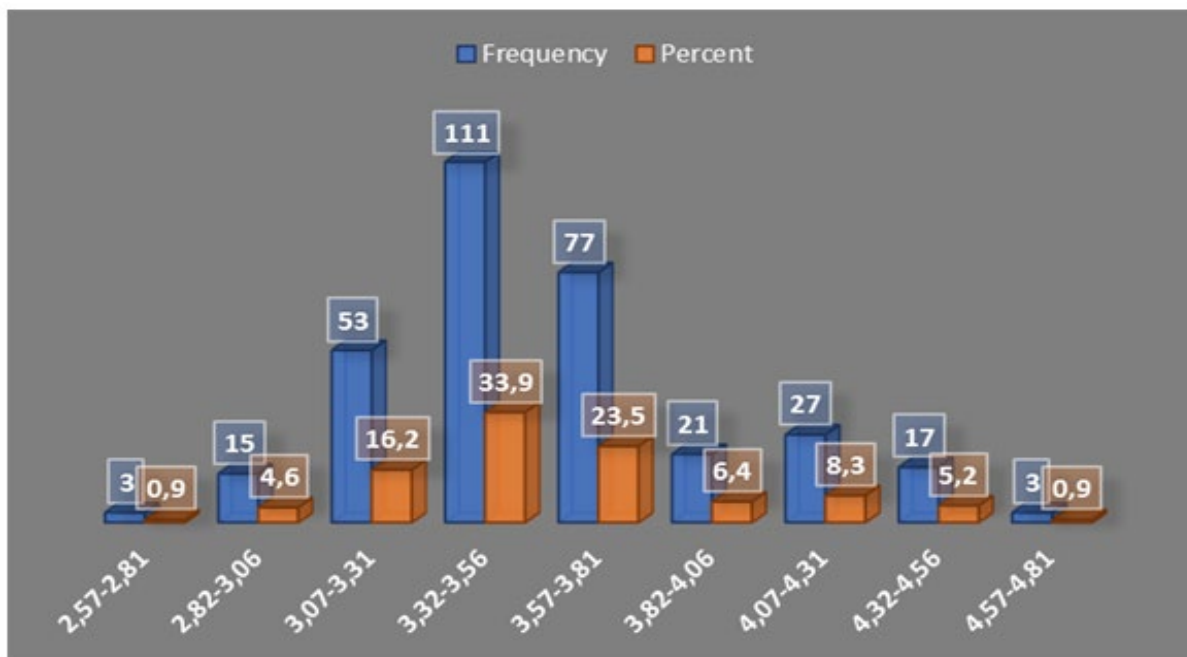


Figure 1 indicates the distribution of respondents. It is 111 students (33.9%) for the interval of 3.32-3.56, 77 students (23.5 %) for 3.57-3.81, 53 students (16.2%) for 3.07-3.31, 27 students (8.4%) for 4.07-4.31, 21 students (6.4%) for 3.82-4.06, 17 students (5.2%) for 4.32-4.56, 15 students (4.6%) for 2.82-3.06 and 3 people (0.9%) for 4.57-4.81.

**Table 5:** The Distribution of Environmental Literacy based on the Indicators

Type of Schools	EC	EA	EB	LE
Public	3.766	3.625	3.662	3.684
Islamic	3.705	3.889	3.871	3.821

Table 5 shows that the mean of environmental literacy (EL) of public and Islamic schools was 3.684 and 3.82, respectively. The results showed that the mean of each indicator, that was 3.766 and 3.705 for on indicators of environmental knowledge (EK), 3, 625 and 3,998 for on indicators of Environmental Attitude (EA), and 3.662 and 3,871 for on indicators of Environmental Behaviour (EB) for public and Islamic schools, respectively. Next, the data was analysed to classify the category of students' tendencies of each type of school towards environmental literacy. The tendency of students' environmental literacy refers to the average score calculated. The respondent's trends were then measured using the following formula.

Minimum score = 1, Maximum score= 5 and range is  $\frac{5-1}{5} = 0.8$

**Table 6:** The Result of Decision Categories using Tendency Interval

Interval	Criteria
1,00 – 1,80	Very Poor
1,81 – 2,60	Poor
2,61 – 3,40	Fair
3,41 – 4,20	Good
4,21 – 5,00	Excellent

Source: (Umar, 2000)

Based on the analysis of data, the trend distribution of the environmental literacy level of public schools in Banda Aceh is presented in Table 7.

**Table 7:** The Distribution of Students' Environmental Literacy Trends in Public School

Number	Score	Frequency	Percent	Category
1	1,00 – 1,80	0	0	Very poor
2	1,81 – 2,60	1	0,4	poor
3	2,61 – 3,40	92	38	Fair
4	3,41 – 4,20	137	56,6	Good
5	4,21 – 5,00	12	5	Excellent
Total		242	100	

Based on Table 7, the environmental literacy of students in public schools in Banda Aceh is good. As for the distribution of data, 137, 92, and 12 students were in the good, fair, and excellent category, respectively. Only one student was in the poor category. Table 8 presents the distribution of trends as to students' environmental literacy.

**Table 8:** The Distribution of Trends in Student Environmental Literacy

Number	Score	Frequency	Percent	Category
1	1,00 – 1,80	0	0	Very Poor
2	1,81 – 2,60	0	0	Poor
3	2,61 – 3,40	10	12.3	Fair
4	3,41 – 4,20	51	63	Good
5	4,21 – 5,00	20	24.7	Excellent
Total		242	100	

Table 8 indicates that the environmental literacy of students in Islamic schools Banda Aceh is good. Fifty-one students are in a good category, while 20 students are in the excellent category, and ten students are in the fair category.



**Table 9:** The Distribution of Environmental Literacy by Gender

Demography		Statistics	LE
Gender	Male	Mean	3.528
	Female	Mean	3.637

Table 9 shows that female students have a higher environmental level compared to their counterparts. A study on environmental literacy has been the major focus of the government, including the school, an educational institution for creating human beings with good attitudes and behaviours about the environment. The government, through the ministry of environment, has launched an environmental-based school program, known as *adiwiyata* school, aiming to create good environmental conditions in schools to increase the awareness of students and teachers in taking responsibility for efforts to preserve and save the environment for future development (Nurwaqidah & Ramli, 2019).

The findings revealed that students' environmental literacy level was good, indicated by the results in Table 3. This is inseparable from the fact of the schools being environmentally friendly schools (*adiwiyata*). The *Adiwiyata* school program has a strategic role in raising awareness about the environment (Wardani, 2020). The *adiwiyata* program has the four most important aspects in implementation; environmentally friendly policies, environmentally sound curriculums, participatory-based learning activities, and finally the management aspects of supporting facilities for environmentally friendly schools (Bahrudin, 2017; Desfandi, Maryani, & Disman, 2019). Based on the above findings, environmental literacy of students in Banda Aceh schools is at a good level due, to the environmentally friendly place for school students. This is in line with the research which revealed that environment-based schools have higher environmental literacy compared to their counterparts (Anggraini, Karyanto, Sarwanto, & Prihantomo, 2019; Desfandi et al., 2019; Nurwaqidah & Ramli, 2019; Spínola, 2015).

Schools, such as *Adiwiyata* or environmentally friendly schools, provide students with experiences related to the environment impact positively on knowledge, attitudes, and behaviour, to act responsibly towards the environment (Hsu & Hualien, 2004; OZSOY, 2012). The results also showed that the environmental literacy of students in Islamic schools is at a higher level compared to public schools (Table 5). Students' daily lives contribute to the high value of Islamic school students. Islamic students staying in boarding schools attend Islamic teachings after formal school. The habits they practise increase their concern about the environment. This is in line with the results of research reporting that education in Islamic boarding schools positively contributes to overcoming environmental problems (Aulia et al., 2018; Desfandi et al., 2017b; Fawaid, 2016). The key to the success of environmental preservation is the internalisation of environmental literacy, through the internalisation of Islamic values when learning (Farida, Hadiansah, Mahmud, & Munandar, 2017; Nurulloh,

2019; Sudjak, Asiyah, & Prasetyo, 2017). Islamic values used in environmental conservation education activities are the values of knowledge, sincerity, example and behaviour (Efendi, Irawati, Rohman, & Gofur, 2017).

The success of environmental preservation is due to the students' direct involvement in environmental management activities and habits in daily life. It is consistent with the results of research by Herdiansyah who argued that environmental empowerment could be done and improved by involving students in environmental preservation and management, both within the school and the broader community (Herdiansyah, Sukmana, & Lestari, 2018; Muhtarom, 2014). Environmental-based learning can improve student environmental literacy, both in public and Islamic schools. Students not only gain new knowledge about the environment but also develop the attitudes and behaviours of caring about the environment (Desfandi et al., 2019).

Environmentally-based schooling must use strategies and learning models appropriate to the conditions and material being taught. It is in agreement with research findings that material selection, integration of environmental values into other fields of study, and also problem-based learning models increase environmental literacy (Desfandi et al., 2019; Fajarisma & Adam, 2014; Herdiansyah, Jokopitoyo, & Munir, 2016; Krisnawati, Susilowati, Muhdhar, Rachman, & Budiasih, 2015; Maknun, Barliana, Cahyani, & Mardiana, 2016; Sya'ban, 2018). Furthermore, the findings reveal that females have higher environmental literacy levels, indicated by the higher average of females. It is consistent with the study reported that women have higher scores than male students regarding the environment (Kubiatko, 2014; Liang et al., 2018; Nurwaqidah & Ramli, 2019; Öztürk, Tüzün, & Teksöz, 2013). Furthermore, other studies revealed that gender also influences one's level of environmental literacy (Hunter, Hatch, & Johnson, 2004; Tuncer et al., 2005; Yilmaz, Boone, & Andersen, 2004). Also, Asteria, in her research, revealed that in protecting and empowering the environment, females are more proactive (Asteria, 2019; Asteria, Herdiansyah, & Apriana, 2016).

## **Conclusion**

This study measured differences in students' environmental literacy levels in public and Islamic high schools. Overall the level of students' environmental literacy is good, with Islamic school students scoring higher (3.821). The findings also reveal that gender influences the level of students' environmental literacy, as shown by the average score of female students (3,637) and male students (3,528). Based on the findings, several recommendations for future research are presented. The application of environmental literacy should be integrated into all fields of study. Also, the application of environmental literacy at all levels of schooling must be integrated into the student's daily life. It is recommended that



future research examines the variables affecting the high level of students' environmental literacy in Islamic schools.

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