Implementation study of environmental education as an effort to maintain the preservation of protected forests

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Abstract. Protected forests are the foundation of water availability and soil health. Even so, many protected forest areas that should be preserved, in fact, damaged and changed land functions. The preservation of protected forests is the responsibility of all parties. From the field of education, the application of an environment-based curriculum is a way of educating future generations about the importance of preserving the environment. This research is a type of descriptive research that aims to illustrate the extent to which environmental education has been implemented in schools. Data obtained by filling out a questionnaire which was then analyzed in a descriptive manner. Data analysis showed that the percentage of implementation of environmental education was 65.21\% in the ‘good’ category. Although the results obtained are right, the application of particular environmental subjects has not yet been carried out to the fullest, plants in the school garden have not all been equipped with types and Latin names, and the use of nature as a learning medium has not been maximized.

1. Introduction

Papua is a unique land and has many features. Most of the indigenous people of Papua settled in the forest and managed it themselves. Dense forests are scattered almost throughout the land of Papua [1]. Merauke, as one of the largest regencies in Papua Province, has a large protected forest area [2].

The protected forest is a forest area that has unique characteristics. The nature in question is the ability of the forest to protect the area around it and below it. The primary function of protected forests is to regulate the smooth water cycle, as a natural embankment to withstand floods, erosion, and maintain soil fertility in Presidential Decree No. 32 of 1990 concerning Management of Protection Forest Areas. The existence of protected forests in an area can help the availability of clean water. The roots of trees in protected forests can absorb and store water reserves in the soil so that the water on the surface is not inundated for a long time. Absorption of water into the soil causes the water does not experience heavy flow, which can cause erosion and landslides.

The forest in Merauke is a forest area that should be preserved. The forests in Merauke are divided into four types based on their functions and types, namely production forest areas, nature reserves, protected forests, and conservation forests. The total area of this forest area reaches 4.67 million ha [3]. Merauke Regency has a protected forest area consisting of Wasur National Park and Kumbe Nature Reserve [4]. The Merauke Regency Protection Forest has an area of 218,336 ha or
around 4.67% of the total area of the Merauke Regency forest land [2]. Ecosystem types that exist in this region consist of mangrove, riparian, savanna, and monsoon forests. This type of monsoon forest ecosystem is only found in the Papua region [5].

There are many damaged forest areas which should be preserved and it changed functions. The existence of protected forests is influenced by several threats including (1) mining, (2) clearing of fields, (3) grazing of animals, (4) plantations, (5) forest fires, (6) human settlements, (7) garbage disposal in random places, (8) illegal logging and deforestation, (9) population growth, (10) changes in consumption patterns, and (11) lifestyle. The party responsible for the threat of protected forest is from the government and the community. The role of local governments to maintain the existence of protected forests is to establish policies related to conservation and conservation of natural resources [6]. Various efforts have been carried out by those responsible for maintaining and utilizing and preventing and overcoming all damage to protected forests in Merauke Regency. The efforts made by the Regional Government in the world of education are by developing the curriculum of local environmental content at elementary and junior high schools [5], development and implementation of environmental education programs, ecological education, and Environmental Education [5,6].

Environmental education is a process to build all human beings in the world who are aware and care about the environment and all the problems associated with it [7]. The goal of environmental education is to create a society that has environmental concerns and has the knowledge, desire, and ability to work, both individually and in groups to solve existing problems and avoid the emergence of new environmental problems [8,9]. The assumption of the application of environmental education in schools is that if knowledge about the environment increases, then the behavior of environmental care also increases, thereby reducing environmental damage in the future [10].

The application of environmental-based education is a program that has been regulated by the Ministry of Environment. This program is called the Adiwiyata program. Educational units involved in this program are elementary and secondary schools (Minister of the Environment Regulation) [11]. The Adiwiyata program consists of four components, including aspects: (1) environmentally sound school policies, (2) environment-based school curriculum, (3) participatory-based school activities, and (4) management of environmentally friendly school supporting facilities and infrastructure (Minister of the Environment Regulation) The implementation of the Adiwiyata program in the school environment aims to train the school community to care for the surrounding environment.

The Adiwiyata program is expected to be able to foster a love for the environment, especially to preserve protected forests. A description of the components of the Adiwiyata program in the world of education that aims to preserve protected forests is presented in Table 1. This study aims to determine the extent of the application of environmental education in schools that aim to preserve protected forests. In addition, this research is also to find out environmental-based activities that have not been well implemented in schools.
Table 1. The components of the Adiwiyata program

| Components                                              | Indicators                                                                                           |
|---------------------------------------------------------|-------------------------------------------------------------------------------------------------------|
| Aspects of school policies that are environmentally    | The government makes policies in the form of educational strategies [12].                               |
| sound                                                   | Integration of environmental education into school subjects [13].                                       |
| Aspects of an environment based school curriculum       | Implementation of the adiwiyata program [12].                                                         |
|                                                         | Schools have provided effective learning practices [14].                                               |
|                                                         | The teacher must develop learning media based on the environment [15].                                  |
|                                                         | Learning by using an environmental approach [13].                                                      |
| Aspects of participatory-based school activities        | Implementation of the Eco-School program [16].                                                        |
|                                                         | Conservation education is given as early as possible to children [17].                                 |
| The management aspects of supporting facilities and    | Schools make a habit of environmentally friendly within the school environment [18].                    |
| infrastructure of schools that are environmentally     |                                                                                                       |
| friendly                                                |                                                                                                       |

Various obstacles are still experienced in the application of environmental education at school. Sungkowo [19] revealed that the implementation of Environmental Education still experienced many obstacles among them, (1) low community participation, (2) narrow understanding, (3) inadequate material and methods, (4) incomplete facilities and infrastructure, (5) lack of budget to implement PLH, and (6) weak coordination between agencies. These obstacles cause the implementation of environmental education in schools is not optimal. Following the current situation, researchers focus on conducting surveys on the implementation of environmental education to preserve protected forests, especially in Merauke.

2. Methods
This research was included in descriptive research. The aim was to describe the response of students to the extent to which the application of environmental education that has been implemented in schools as an effort to preserve protected forests. Respondents in this study were taken based on purposive sampling technique. The respondents involved were Musamus University students who graduated from high school in Merauke Regency. Data obtained through a questionnaire that had been developed adjusted to the components in the Adiwiyata program. The results obtained were analyzed with quantitative descriptive techniques through the overall percentage of responses. The percentage is calculated using the following equation.

\[
\text{percentage} = \frac{\text{Total Score}}{\text{Maximal score}} \times 100\%
\]

The percentage of research data was then interpreted according to the results criteria [20] presented in Table 2.
Table 2. Interpretation of percentage results

| Percentage (%) | Categories     |
|----------------|----------------|
| 0 – 20%        | Very less      |
| 21 – 40%       | Less           |
| 41 – 60%       | Sufficient     |
| 61 – 80%       | Good           |
| 81 – 100%      | Very good      |

The application of environmental education in schools is said to have been implemented well if the percentage was $\geq 61\%$. After knowing the categories of each component of the diwiyata program, then descriptively described in accordance with the results of data analysis obtained.

3. Results and discussions

The survey on the implementation of environmental education was carried out by distributing questionnaires to students at Musamus University. The data used only from students from the high schools in Merauke Regency, Boven Digoel Regency, Mappi Regency, and Asmat Regency while students from outside the district were not included. This because of the purpose of this survey was to find out the implementation of special environmental education at schools in these four districts.

Based on the results of a survey that had been carried out, it was obtained that the percentage of implementation of life education in schools was 65.21% in the 'good' category. This means that the implementation of environmental education in schools in Merauke on average had been implemented well. Correctly, the average percentage of Adiwiyata program components was presented in Table 3.

Table 3. Components of the Adiwiyata program

| Components                                               | Percentage (%) | Category  |
|----------------------------------------------------------|----------------|-----------|
| School policies that are environmentally friendly         | 56.55          | Good      |
| School based environment curriculum                       | 61.61          | Good      |
| Participatory based school activities                     | 70.83          | Good      |
| Management of supporting facilities and infrastructure of schools that are environmentally friendly | 85.71          | Very Good |

Implementation of environmental education, known as the Adiwiyata program is divided into four components [12]. Following the average percentage data in Table 3, information was obtained that the average percentage of the application of environmental education in the aspect of environmentally friendly school policies of 56.55% was in the 'good' category. Furthermore, the average percentage of aspects of the environment-based school curriculum was 61.61% with the 'good' category. The percentage of aspects of participatory-based school activities is 70.83%, which was also in the 'good' category. Unlike the other components, the percentage of aspects of managing the facilities and infrastructure that support environmentally friendly schools was 85.71, which was in the 'excellent' category. Based on this data, it could be concluded that the implementation of environmental education in each component of the Adiwiyata program had been well implemented in schools. The Adiwiyata components were also translated into several indicators. The average percentage of each indicator in the Adiwiyata component was presented in Table 4.
Table 4. Indicators on the adiwiyata component

| Indicators                                                                 | Percentage (%) | category |
|----------------------------------------------------------------------------|---------------|----------|
| The government makes policies in the form of education strategies.         | 65.48         | Good     |
| Integration of environmental education into school subjects.              | 47.62         | Sufficient |
| Implementation of the adiwiyata program.                                 | 55.95         | Sufficient |
| Schools must provide effective learning practices                          | 72.62         | Good     |
| The teacher must develop learning media based on the environment.         | 55.95         | Sufficient |
| Learning by using an environmental approach.                              | 61.90         | Good     |
| Implementation of the Eco School program.                                | 71.43         | Good     |
| Conservation education is given as early as possible to children.         | 70.24         | Good     |
| Schools make a habit of environmentally friendly within the school environment. | 85.71         | Very good |

Based on Table 4, information was obtained that the average environmental education in schools had been carried out well on each of the assessment indicators. However, based on the results obtained there were 3 indicators that needed to be considered namely, (1) integration of environmental education into school subjects, (2) implementation of an Adiwiyata program, and (3) development of environment-based learning media by teachers. In particular, the three indicators were still in the category of 'sufficient'. This means that there were several aspects of environmental education that had not been optimally applied at school. In its implementation, not many schools had applied particular environmental subjects or environmental education connections with other subjects.

Furthermore, related to the Adiwiyata program, although parks in schools had been planted with various types of plants, not all schools supplement these plants with information on plant types and their Latin languages. Though the information given could increase students’ insights regarding the environment and also foster a sense of love for the environment. In addition, the implementation of compost making training had also not been carried out optimally. The last indicator to consider was the development of environment-based learning media. The teacher had not maximally utilized nature as a learning medium.

4. Conclusion
The application of environmental education as one of the efforts to preserve protected forests in Merauke has been well implemented in schools in Merauke and surrounding areas. This is evidenced by the average percentage results of the application of environmental education questionnaire of 65.21%, which is in the excellent category. Even so, the application of particular environmental subjects has not been carried out to the fullest, plants in school parks are not all equipped with information on types and Latin names, and the use of nature as a learning medium has not been maximized.

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