Environmental literacy in agriculture and coastal areas

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Abstract. This research aim to investigate the environmental literacy of junior high school students in agricultural and coastal areas in Subang based on knowledge, cognitive skill and attitudes toward to environment. This research used descriptive method. The subjects of the research were 7 grade students of junior high school and involved 62 participants in agriculture area and 64 participants in coastal area. The instrument of environment literacy adapted from Middle School Environment Literacy Survey (MSELS) and adapted to the context of agricultural and coastal area. The results showed that: environmental literacy in agricultural areas is 169.30 with moderate category and environmental literacy in the coastal area is 152.61 in the moderate category.

1. Introduction
The environment is a part of human life, but in fact many environmental damages caused by human activities such as illegal logging and excessive use of natural resources without any conservation is sustainable. Likewise in the Subang area that has agricultural areas and coastal areas. There are damages occurring in the agricultural and coastal areas of Subang. Damage in the agricultural area of Subang such as the conversion of agricultural land onto non-agricultural such as industry. Based on data from 2008 - 2012, there is a tendency to decrease wetland from 85,355 hectares in 2008 to 84,659 hectares in 2012 [1]. The transfer of agricultural land will become a serious problem with the long-term considering the development and development of the region will continue. In addition to land conversion, environmental damage that often happens is the excessive use of pesticides that have the effect of decreasing the quality of the agricultural environment. While the environmental damage at the coastal areas of Subang included: the conversion land from coast into farm land the loss of mangrove forests as much as 6000 trees in Legan Kulon and Pusakanagara, 5 meter/year coastal abrasion in Legan Kulon and Pusakanagara, and the emergence of soil arose in Pamanukan [2].

Environmental damage both in the agricultural and coastal areas in Subang need to be a concern for all people in Subang, including students and teachers. Environmental damage can be overcome by securing an understanding of the importance of the environment through environmental literacy to students. Environmental literacy is an ability that every individual has to behave well in his daily life, using his understanding of environmental conditions. The environmental literacy can be measured based on the criteria of environmental literacy components that is knowledge, cognitive skill, attitude and environmentally responsible behavior (Behavior) [3]. In this study will be measured only components of knowledge, attitudes and cognitive skills.
2. Methods
The research method used descriptive method. Respondents who participated in this study were 7th grade students of junior high school, involved 62 students in agriculture areas and 64 student in coastal areas.

To collected data we construct environmental literacy test as an instrument. Environmental literacy consists of four components: knowledge, attitudes, cognitive skills, and environmentally responsible [3]. In this study will be measured components of knowledge, attitudes and cognitive skills. The Middle Schools Environment Survey (MSELS) adapted to environmental literacy test and adapts to the local context of the agricultural area or coastal area of Subang. The environmental literacy test consisting of 69 items, there is 25 items about knowledge, 35 items about attitude and 9 items about cognitive skills. This instrument has been validated using SPSS 22. The transformation of raw scores of the environmental literacy tests result used methods referring to the transformation method used by MSELS. The transformation method is presented in Table 1.

Table 1. The transformation raw scores of the results of the environmental literacy [4]

| Components and measures of environmental literacy | Number of question | Number of items | Range of possible scores | Maximum score |
|--------------------------------------------------|--------------------|----------------|--------------------------|---------------|
| Knowledge                                        | 1-25               | 25             | 0-25                     | 25            |
| Attitude                                         | 25-60              | 35             | 35-175                   | 175           |
| Cognitive skill                                  | 61-69              | 29             | 9-27                     | 27            |
| Total                                            | 69                 |                | 44-227                   | 227           |

Note:
Knowledge: Range = 0-25, Low = 0-8, Moderate = 9-17, High = 18-25
Attitude: Range = 35-175, Low = 35-81, Moderate = 82-128, High = 129-175
Cognitive skill: Range = 9-27, Low = 9-15, Moderate = 16-21, High = 22-27
Environmental literacy: Range = 44-227, Low = 44-105, Moderate = 106-166, High= 167-227.

3. Results and Discussion

3.1. Student’s Environmental literacy in agriculture areas
Environmental literacy in agricultural areas included in moderate category with average score of 163.92. student’s environmental literacy for each aspect can be seen in Table 2 and Table 3

Table 2. Students’s Environmental Literacy in Agriculture Areas

| Aspect          | Class | Aspects of environmental literacy | Environmental literacy |
|-----------------|-------|-----------------------------------|------------------------|
|                 |       | Knowledge                        | attitude               | Cognitive skill |               |
| Score           | A     | 381.00                           | 4335                   | 455            |               |
|                 | B     | 364.00                           | 4213                   | 457            |               |
| Average         | A     | 12.29                            | 135.90                 | 14.68          |               |
|                 | B     | 11.74                            | 138.48                 | 14.74          |               |
| Total score (A and B) |        | 745.00                           | 8548.00                | 912.00         | 163.92        |
| Average category of environmental literacy |        | 12.02                            | 137.19                 | 14.71          | moderate      |
Table 3. Detail Student’s Environmental Literacy in Agriculture Areas

| Class | Knowledge |  |  | Atitude |  |  | Cognitive skill |  |
|-------|-----------|--------|--------|----------|--------|--------|-----------------|---|
|       | low | moderate | High | Low | moderate | high | Low | moderate | high |  |
| A     | 5 | 26 | 0 | 0 | 3 | 28 | 16 | 15 | 0 |  |
| B     | 8 | 23 | 0 | 0 | 9 | 22 | 10 | 21 | 0 |  |
| Total | 13 | 49 | 0 | 0 | 12 | 50 | 26 | 36 | 0 |  |
| percentage | 21% | 79% | 0% | 0% | 19% | 81% | 42% | 58% | 0% |  |

3.2. Students’s environmental literacy in coastal areas

Environmental literacy in coastal areas included in moderate category with a score of 152.62. Student's environmental literacy for each aspect can be seen in Table 4 and Table 5.

Table 4. Student’s Environmental Literacy in Coastal Areas

| Aspect | Class | Knowledge | attitude | Cognitive skill | Environmental literacy |
|--------|-------|-----------|----------|-----------------|------------------------|
| Score  | A     | 330 | 4128 | 406 |  |
| B     | 394 | 4083 | 426 |  |
| Average | A    | 10.31 | 129.00 | 12.69 |  |
| B    | 12.31 | 127.59 | 13.31 |  |
| Total score (A and B) | 724.00 | 8211.00 | 832.00 |  |
| Average | Moderate | 11.31 | 128.30 | 13.00 | 152.61 |  |
| category of environmental literacy |  |

Table 5. Detail Student’s Environmental Literacy in Coastal Areas

| Class | Knowledge |  |  | Atitude |  |  | Cognitive skill |  |
|-------|-----------|--------|--------|----------|--------|--------|-----------------|---|
|       | Low | moderate | High | low | Moderate | high | Low | moderate | high |  |
| A     | 7 | 25 | 0 | 0 | 17 | 14 | 21 | 11 | 0 |  |
| B     | 7 | 25 | 0 | 0 | 21 | 11 | 19 | 13 | 0 |  |
| total | 14 | 50 | 0 | 0 | 38 | 25 | 40 | 24 | 0 |  |
| percentage | 22% | 78% | 0% | 0% | 59% | 39% | 63% | 38% | 0% |  |

3.3. Discussion

The result showed that Environmental literacy of agricultural area was 163.92 higher than Environmental literacy of coastal area (152.61). Both was included in the moderate category. The details each environmental literacy in the agricultural area for the knowledge aspect received a score of 12.02 including the moderate category, attitude aspect is 142.40 including moderate category and cognitive skill aspect is 14.71 including low category. Each aspect of environmental literacy in coastal area for knowledge aspect has score 11.31, including moderate category, attitude aspect has score 128.30 including moderate category and aspect of cognitive skill has score 13.00 belong to low category. Based on research, it can be concluded that the environmental literacy of junior high school students in agricultural areas each aspect of environmental literacy is greater than in coastal areas but has the same category of environmental literacy that is the moderate category.

Aspects of knowledge and attitudes of students in agriculture and coastal areas are included in the moderate category, this explains that students understand enough knowledge about the environment and have a good attitude to the environment. The study concluded that the aspects of knowledge and attitude
have a positive correlation. This result is in line with [5] which assessed of the environmental literacy of sixth and 12th grade students. The aspect of knowledge and attitude correlates moderately to grade 12. There is a correlation between attitudes and knowledge twice as much for grade 6 [5]. It’s explained that there is a correlation between aspects of knowledge and attitude in environmental literacy.

However, a cognitive skill aspect in agriculture and coastal areas including low category. Cognitive skills in environmental literacy include identifying issues, analyzing issues and planning action on environmental issues. Test of cognitive skills in environmental literacy test had questions that are long enough reading, thus requiring literacy skills of reading students. So as a teacher needs to encourage interest in reading students so as to improve literacy skills of reading students.

Although students have sufficient understanding of environmental knowledge do not mean their cognitive skills high. According to [6] the Knowledge component does not indicate a positive relationship other than the component of cognitive skills, it is considered very weak. In addition the Components of Cognitive Skills indicate a non-significant relationship between any components. Based on this there is no positive relationship between aspects of cognitive skills with aspects of knowledge and attitude [6]

4. Conclusion
The environmental literacy in agricultural areas and coastal areas of Subang district including to moderate category. Literacy of student environment can be improved using environment-oriented learning process to enhance students comprehendness to the issues and environmental problems around them. Environmental literacy also has been influenced positively by reading literacy. Students should be familiarized with reading, teachers need to encourage students’ interest in reading.

5. References
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