

# Analysis of Local Potential as a Learning Environment in High School in Fak-Fak Regency, West Papua Province, Indonesia

Nikodemus Yafet Tuturop<sup>1\*</sup>, Hamsu Abdul Gani<sup>2</sup>, Nurlita Pertiwi<sup>3</sup>

Department of Environmental Science, Universitas Negeri Makassar  
Makassar, INDONESIA

\*Corresponding author's email: niko210814 [AT] gmail.com

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**ABSTRACT----** *This study explores the local potential in Fak Fak Regency, which can be used as learning materials. This study involves junior high school teachers to find local potentials that meet the requirements for implementing environmental education. The elements considered are empirical, caring, aesthetic, and social elements. The analysis of the assessment of the potential of plants to develop students' abilities through empirical recognition found that areca nut plants have the greatest potential on five indicators, namely observation, understanding, analysis, and interpretation which show the high category. Likewise, in the analysis of the development of students' environmental awareness, pinang plants strongly support increasing students' awareness of conservation efforts and the use of their fruit. The results of the analysis of the development of students' aesthetic values found that the matoa plant has the potential to support the development of students' aesthetic assessment.*

**Keywords:** empirical, caring, and esthetic

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## 1. INTRODUCTION

Environmental education aims to increase students' knowledge and awareness about the urgency of environmental problems. The environmental education in Indonesia at the primary and secondary school levels through monolithic learning and integrated patterns [1]. Most schools choose the integrated method based on considering the density of compulsory learning subjects. The problem teachers face in implementing the pattern of integration of environmental education with subjects is the difficulty of inserting material following the learning objectives of compulsory subjects. Furthermore, the teacher's common understanding of environmental education is a challenge to the low application of environmental material integration.

Environmental education is applied in compulsory subjects by referring to the curriculum as a standard document or curriculum. [2]. In other words, learning activities have a very strong position for successfully implementing the curriculum as a written plan [3]. One of the concepts of integrating environmental education in secondary school subjects is using local potential or topics that students easily understand. This affects the success of the development of environmental education without neglecting the learning objectives following curriculum standards [4].

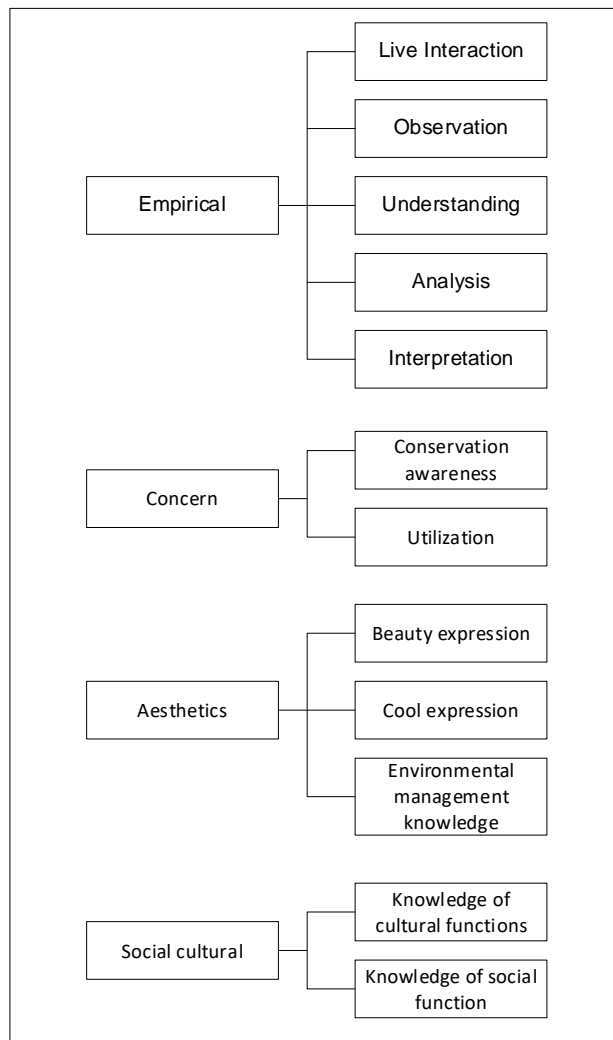
The problem faced by high school teachers in Fak Fak Regency, West Papua Province, Indonesia, is the difficulty of students understanding standard books because, empirically, the material presented is national. This is because of the geographical location of West Papua Province, which borders East Papua New Guinea and is very far from other islands in Indonesia. Limited internet access in this area makes it difficult for students and teachers to access teaching materials. With limited teaching materials, teachers can take advantage of local potential as environmental education teaching materials and enable the achievement of environmental education competencies required by the curriculum.

As part of developing teaching materials with a pattern of integrating environmental education with subjects, researchers explore local potentials in Fak Fak Regency that can be used as learning materials. This study involves junior high school teachers to find local potentials that meet the requirements for implementing environmental education. The elements considered are empirical, caring, aesthetic, and social elements. The empirical element requires that the subject matter allows students to interact with their environment directly, observing, understanding, analyzing, and interpreting all phenomena and natural resources. The element of caring guides the teacher so that the subject matter raises students' awareness of environmental protection. Aesthetic elements, namely learning materials, can form students' understanding of the existence of natural resources and non-physical needs such as natural scenery and beautiful environmental arrangements. With the growth of this awareness, the learning process instills a sense of responsibility in students towards these environmental resources. The social element is the subject matter that observes the social, cultural, and economic community. Students should be allowed to observe a society's social life. With this understanding, students' awareness of

improving social conditions will improve.

## 2. METHOD

The method used in this research is descriptive quantitative by using a questionnaire as a data collection tool. The researcher asked questions about the local potential that made it possible to become teaching materials for environmental learning. Assessment indicators as the basis for measuring the potential of teaching materials are presented in Figure 1.



**Figure 1. Variables For Measuring Material Feasibility in the Environmental Education Integration Pattern**

One of the local potentials in question is the red fruit plant (*Andanus considers*), areca nut (*Areca catechu*), and matoa fruit plant (*Pometia pinnata*). Furthermore, the questionnaire includes four choices along with the value of each choice, namely a score of one on a very low assessment, a value of two on a low assessment, a value of three on a high assessment, and a value of four on a high assessment. The recapitulation results of respondents' answers are divided into four categories (Table 1).

**Table 1. Score of the Feasibility Topic as Environmental Education**

<i>Category</i>	<i>Score</i>
<i>Very Low</i>	<i>1.00 – 1.7</i>
<i>Low</i>	<i>1.80 – 2.5</i>
<i>medium</i>	<i>2.6-3.3</i>
<i>High</i>	<i>3.4- 4.4</i>
<i>Very High</i>	<i>4.4-5.0</i>

### 3. RESULT AND DISCUSSION

Papua Island has a variety of endemic plants that are unique and are used as a source of food and medicinal ingredients. This study focuses on three types of local plants that will be used as teaching materials in environmental education.

#### 3.1. Description of the Local Potential of Red Fruit (*Pandanus considers*)



Fig 2. Red Fruit Tree

The integration of environmental education in biology learning can be described in the sub-chapter of biology subjects, taxonomy or sociology, and local elements. Red fruit (*Pandanus considers*) is an endemic plant in the Papua region. Red fruit has an important meaning for the Papuan people for several reasons. Red fruit oil is used as edible oil and medicinal base ingredients. Red fruit is consumed by eating directly or processed by boiling. Red fruit serves as a basic ingredient of medicine because of its fatty acid and proximate content [5,6]. In addition, red fruit is processed into a paste as a food and is believed to be an appetite enhancer. The red fruit tree has a shape resembling a pandanus with a height of up to 16 m supported by tunjang roots. The fruit is oval with a bud covered with fruit leaves. Red fruit has a fruit length of 55 cm, a diameter of 10-15 cm, and a weight of 2-3 kg. Local communities propagate red fruit plants through seeds and seedlings (separation of tillers or stem cuttings).

Papuan people have a habit of consuming betel nut as a result, areca nut is known as Papua candies. Areca nut is consumed with whiting and complementary ingredients. For the people of Papua, chewing areca nut is a habit, so this fruit is sold on the roadsides of big cities in Papua. Papuan people like to chew areca nuts because of their distinctive taste sensation. The combination of sweet and sour tastes is a sensation that is considered irreplaceable with sweets.



Fig 3. Areca Tree

### 3.2. Description of the Local Potential of Matoa (*Pometia pinnata*) fruit plants

Matoa is one of the fruit plants that grow in all areas of Papua Province. Matoa plants (*Pometia pinnata*) generally grow naturally. Currently, Matoa plants are widely cultivated productively. Planting matoa trees with seeds will produce fruit at the age of four years. This Papuan tropical fruit plant produces delicious-tasting fruit because it belongs to the Sapindaceae family. The matoa tree found in Fak Fak is a type of matoa papeda with a chewy and soft seed coat. The diameter of the seeds is between 1.40 – 2.00 cm. Besides functioning as a fruit plant, matoa trees also produce quality wood. Papuans use Matoa logs for building materials. Furthermore, the bark is used for the treatment of muscle and joint diseases as well as diabetes medicine.



Fig 4. Matoa Trees

### 3.3. Analysis of Plant Potential Assessment To Develop Students' Ability Through Empirical Introduction

The development of students' knowledge in an empirical view is the formation of beliefs based on information received by their memories and senses. The trust is formed through interactions in everyday life, the process of observation, understanding, analysis and interpretation. This study reviews the enormous potential of red fruit, nutmeg and areca nut as teaching materials for environmental education in Junior High Schools in Fak Fak Regency. The teacher's assessment of the potential for developing students' environmental knowledge with the introduction of red fruit is presented in Table 2.

Table 2. Validation Of Students' Ability Through The Introduction Of Red Fruit

<i>Vegetation</i>	<i>Indicators</i>	<i>Score</i>	<i>Category</i>	<i>Average Score</i>
<i>Red Fruit</i>	<i>Live Interaction</i>	1.48	<i>Very Low</i>	1.96
	<i>Observation</i>	1.48	<i>Very Low</i>	
	<i>Understanding</i>	2.78	<i>Medium</i>	
	<i>Analysis</i>	2.78	<i>Medium</i>	
	<i>Interpretation</i>	1.30	<i>Very Low</i>	
<i>Betel</i>	<i>Live Interaction</i>	3.125	<i>Medium</i>	3.375
	<i>Observation</i>	3.35	<i>High</i>	
	<i>Understanding</i>	3.425	<i>High</i>	
	<i>Analysis</i>	3.525	<i>High</i>	
	<i>Interpretation</i>	3.45	<i>High</i>	
<i>Areca</i>	<i>Live Interaction</i>	3.275	<i>Medium</i>	3.26
	<i>Observation</i>	3.35	<i>High</i>	
	<i>Understanding</i>	3.25	<i>Medium</i>	
	<i>Analysis</i>	3.075	<i>Medium</i>	
	<i>Interpretation</i>	3.35	<i>High</i>	

The results of the teacher's assessment of the empirical potential of red fruit in the low category or this type of plant are considered difficult for students to understand. In everyday life, students do not interact with red fruit, making it difficult for analysis and interpretation activities. The results of the teacher's assessment of the potential of areca nut as teaching materials to increase students' empirical knowledge in the high category or type of plant are considered easy for students to understand. In everyday life, students really understand the structure of plants and betel nuts because of their existence in everyday life. As a result, students easily analyze the benefits of the environment. The results of the teacher's assessment of the empirical potential of matoa fruit in the medium category or type of plant are considered quite easy to understand by students. Matoa plants are not well recognized by students because of their presence in minimal settlements. However, the fruit is often found in traditional markets. With these conditions, the teacher considers that empirical knowledge is difficult to develop in environmental education learning materials.

One of the important aspects of environmental education material is student concern. Materials that have a good student care function will support the improvement of students' environmental knowledge. The results of the analysis of the potential of red fruit plants are reviewed on the student's concern function in table 3.

**Table 3. The potential of local plants as teaching materials for the development of Student Environmental Awareness**

<i>Vegetation</i>	<i>Indicators</i>	<i>Score</i>	<i>Category</i>	<i>Average Score</i>
<i>Red Fruit</i>	<i>Conservation awareness</i>	2.825	<i>Medium</i>	2.825
	<i>Utilization</i>	2.825	<i>Medium</i>	
<i>Betel</i>	<i>Conservation awareness</i>	4.45	<i>Very high</i>	4.475
	<i>Utilization</i>	4.5	<i>Very high</i>	
<i>Areca</i>	<i>Conservation awareness</i>	4.375	<i>Very high</i>	2.91
	<i>Utilization</i>	1.45	<i>Very low</i>	

The teacher's assessment of the potential of red fruit as teaching materials results is relatively moderate or still doubtful. The development of students' awareness of plant protection and its use can be achieved by using red fruit as teaching materials. The utilization of red fruit is also relatively low, so it isn't easy to be used as environmental learning material. The potential of areca nut as teaching material for environmental education gets a high rating or can increase students' environmental awareness.

The results of the teacher's assessment of students' attention to betel nut conservation can increase student awareness. Likewise, the use of betel nut will support the improvement of students' environmental awareness. Matoa is a fruit that tastes sweet and is loved by all people. Therefore, the teacher assessed that student would have good awareness if they understood well the matoa plant.

The results of the teacher's assessment of the potential concern of matoa fruit in the medium category. The teacher's assessment shows that environmental learning will increase concern for the conservation of matoa plants. In contrast, the pattern of fruit utilization does not have the potential to increase students' environmental awareness.

One of the important aspects of environmental education material is the aesthetic function. Materials that have a good aesthetic function will support increasing students' environmental knowledge. The results of the analysis of the potential for red fruit plants reviewed for their aesthetic function are presented in table 4.

**Table 4. Local Potential Assessment to Improve Student Aesthetic Assessment**

<i>Vegetation</i>	<i>Indicators</i>	<i>Score</i>	<i>Category</i>	<i>Average Score</i>
<i>Red Fruit</i>	<i>Beauty expression</i>	1.275	<i>Very low</i>	1.358
	<i>Cool expression</i>	1.425	<i>Very low</i>	
	<i>Environmental management knowledge</i>	1.375	<i>Very low</i>	
<i>Betel</i>	<i>Beauty expression</i>	2.775	<i>Medium</i>	2.7
	<i>Cool expression</i>	2.6	<i>Medium</i>	
	<i>Environmental management knowledge</i>	2.725	<i>Medium</i>	
<i>Matoa</i>	<i>Beauty expression</i>	4.425	<i>Very high</i>	4.483
	<i>Cool expression</i>	4.55	<i>Very high</i>	
	<i>Environmental management knowledge</i>	4.475	<i>Very high</i>	

The results of the teacher's assessment of the aesthetic potential of red fruit in the very low category or students do not understand the function and management of this plant. As a result, the teacher considered red fruit difficult to use as environmental education material for analysis and interpretation. Areca nut plants scattered throughout the land of Papua have their own characteristics. However, assessing the aesthetic function is considered moderate or inappropriate as environmental education material. The results of the teacher's assessment that pinang fruit does not have an expression of beauty and coolness. Therefore, this plant is considered not to have a good aesthetic function.

Furthermore, matoa plants have very high potential with the beauty of their shape and coolness. The results of the teacher's assessment of the aesthetic potential of Matoa fruit in the very high category or this type of plant are considered easy to understand by students. Students often interact with matoa fruit in everyday life, so it is easy to analyze and interpret activities.

One of the important aspects of environmental education material is understanding society and culture. Materials that have a good aesthetic function will support the improvement of students' environmental knowledge. The results of the analysis of the potential for red fruit plants reviewed for their aesthetic function are presented in table 5.

**Table 5. Red Fruit Potential in Developing Socio-Cultural Knowledge in Students**

<i>Vegetation</i>	<i>Indicators</i>	<i>Score</i>	<i>Category</i>	<i>Average Score</i>
<i>Red Fruit</i>	<i>Knowledge of cultural functions</i>	2.825	<i>Medium</i>	2.475
	<i>Knowledge of social function</i>	2.125	<i>Medium</i>	
<i>Betel</i>	<i>Knowledge of cultural functions</i>	4.525	<i>Very high</i>	4.55
	<i>Knowledge of social function</i>	4.575	<i>Very high</i>	
<i>Areca</i>	<i>Knowledge of cultural functions</i>	2.675	<i>Medium</i>	2.9875
	<i>Knowledge of social function</i>	3.3	<i>Medium</i>	

Students consider the results of the teacher's assessment of the socio-cultural potential of red fruit in the medium category or this type of plant quite easy to understand. Students often interact with red fruit in everyday life, so it is quite easy to analyze and interpret activities. The results of the teacher's assessment of the socio-cultural potential of areca nut in the very high category or this type of plant are considered easy to understand by students. Students often interact with betel nut in everyday life, so it is quite easy to analyze and interpret activities. The results of the teacher's assessment of the socio-cultural potential of matoa fruit in the medium category or plant are considered quite easy to understand by students. Students often interact with matoa fruit in everyday life, so it is quite easy to analyze and interpret activities.

#### 4. DISCUSSION

The subject teacher's assessment of local potential indicates an opportunity to incorporate Papuan plants as environmental learning materials. The local potential that is part of the community of an area is sometimes unthinkable to be managed properly and has value in supporting daily life. This is the focus of attention, so it is hoped that through the educational process in the classroom or school, students can build an important awareness of paying attention and manage and utilize the potential possessed in their area.

Utilization of nutmeg, areca nut, and matoa plants as local natural resources can be applied by applying cooperative learning models. Several articles describe the five basic elements of the cooperative learning model [7], namely (1) positive interdependence (2) face-to-face interaction (3) personal responsibility for the subject matter in group members (4) requires flexibility (5) improves collaboration skills in solving problems. (group process) [8][9]. Students can work well together through discussion when discussing local plants so that the interaction between students goes well. In addition, the direct interaction relationship between students, namely in the process of group work, a collaboration between individuals in groups is built to discuss and complete the topics discussed. Thus, it will be easy to develop group interpersonal skills by discussing local vegetation, which can increase students' knowledge and environmental awareness [10].

#### 5. CONCLUSION

The analysis of the assessment of the potential of plants to develop students' abilities through empirical recognition found that areca nut plants have the greatest potential on five indicators, namely observation, understanding, analysis, and interpretation which show the high category. Likewise, in the analysis of the development of students' environmental

awareness, pinan plants strongly support increasing students' awareness of conservation efforts and the use of their fruit. The results of the analysis of the development of students' aesthetic values found that the matoa plant has the potential to support the development of students' aesthetic assessment.

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