

# Potential Benefits of Local Fruits and Vegetables From Jember District As a Biological Learning Source to Get the Highest Income

Sawitri Komarayanti<sup>1</sup>, Elfien Herrianto<sup>2</sup>, Wiwik Suharso<sup>3</sup>

<sup>1,2</sup> Biology Education Studies Program, Faculty of Teacher Training and Education, University of Muhammadiyah Jember, Indonesia.

<sup>3</sup> Informatics Engineering Program, Faculty of Engineering, University of Muhammadiyah Jember, Indonesia.  
[sawitrikomarayanti@unmuhjember.ac.id](mailto:sawitrikomarayanti@unmuhjember.ac.id)

**Abstract :** *Local fruits and vegetables in Jember District are part of Indonesia's biodiversity, which needs attention. The over supply of imported fruits to the regions can shift the presence of local fruits. Fruits and vegetables are food ingredients that are very beneficial for the body. This research is an exploratory study that aims to analyze the potential of local fruits and vegetables in Jember District as a source of learning high school biology based on local excellence. Analysis of potential learning resources is assessed through curriculum analysis by taking into account the suitability of learning resources with the 2013 curriculum that applies in high school. The results of the study showed that, the facts, concepts, principles and procedures relating to Jember local fruits and vegetables were in accordance with the standards of the contents of high school biology subjects in the 2013 curriculum. Furthermore, the results of the curriculum analysis can be used as a reference for the development of teaching materials based on the potential of local fruits and vegetables in Jember District through adjustments to the 2013 curriculum, the characteristics and needs of students and the ability of high school biology teachers.*

**Keywords :** *local fruits and vegetables; Jember District; biological learning source.*

## I. Introduction

Fruits and vegetables in general are one of the commodities needed by humans to live healthy. Fruits and vegetables are a source of water, nutrition and vitamins, and is one of the largest sources of natural antioxidants in the world (Saleh, 2017).

The diversity of local fruits and vegetables is a rich biodiversity that is very important in life, because fruit and vegetables are one of the human food needs. Local fruits and vegetables contribute to the availability of food in the region through optimizing the use of local fruit and vegetable resources as a food provider. Related to food needs that continue to increase, efforts are needed to increase the use of plant diversity to meet human needs (Pugalenthi *et al*, 2005).

The phenomenon over supply of imported fruits on the domestic market to the regions will shift the existence of local fruits. The dominance of imported fruits seems to be detrimental to local fruit producers because the selling price of local fruit is relatively cheap.

The increasingly fierce global competition today, has also encouraged efforts to increase education that is competitive and efficient. Decentralization of education is one of the government's policies to support this achievement. The policy directs the functions and authority of the regional government in making policies and implementing them according to variations in the potential and interests of the development of their respective regions. (Mukinan, 2011).

Local excellence of each region needs to be developed. Local excellence is anything that is a regional characteristic that covers aspects of economy, culture, information and communication technology, ecology, etc. Local excellence can be in the form of agricultural products, artistic creations, traditions, culture, services, natural resources, human resources or

other, which are the advantages of an area (Dedidwitagama, 2007 in Fatimah, 2016).

Each region has very varied advantages. One effort to introduce local excellence is to integrate it into local excellence-based education.

The need to develop education based on local excellence in the region, namely learning programs implemented in accordance with regional needs, utilizing a variety of local natural resources, human resources, cultural, historical, geographical and other potential areas that can develop competencies in accordance with the talents and interests of students. Integrating local excellence in learning can be realized for example through the use of local excellence-based learning resources. It is expected that students will understand well about the potential and values and culture in their own region and later be able to develop the potential in their area to be able to compete in the global era. This integration should ideally be carried out at all levels of education, including Senior High Schools.

The Senior High Schools biology curriculum has its own characteristics. The character of learning biology, biology is one branch of science that studies about living things and their environment. Studying biology is not just gaining knowledge about living things, but also getting knowledge about methods of practicing that science. The knowledge gained is expected to help solve problems in order to improve the welfare of human life. In achieving these objectives a systematic method is needed, called the scientific method. Therefore, students must gain scientific experience to obtain scientific products such as concepts, principles and laws.

Scientific experience is very relevant if obtained from the environment around students. Using local fruit and vegetable biology learning resources in Jember District will provide more meaningful biology learning and is an alternative to integrating local excellence in Senior High Schools biology learning.

The reality on the ground shows that most biology learning programs at Senior High Schools, including Senior High Schools in Jember District. Based on observations at the Senior High Schools of Muhammadiyah 3 Jember on biology, the teacher has not utilized the local excellence of Jember District as a source of learning biology at Senior High Schools. Biology learning has not been integrated with the local excellence of Jember District. Biology Learning Senior High Schools have not yet developed teaching materials (learning resources for biology) based on local potential. The teaching material used is still general, in the form of textbooks and student worksheets.

## **II. Methodology**

This research is a preliminary study to determine the potential of Local Fruits and Vegetables in Jember District as a source of learning for Senior High Schools Biology. This type of research is a qualitative descriptive study conducted through analysis of potential learning resources. Analysis of the potential of learning resources is done through curriculum analysis by looking at the suitability of learning resources with the curriculum applicable at Senior High Schools, in this case the 2013 curriculum. Observation, interview, and literature study techniques are used to collect data in the form of facts about Jember Local Fruits and Vegetables as a local advantage of Jember, while the documentation for collecting data is related to the Biology Senior High Schools curriculum. The data obtained were then analyzed descriptively and adjusted to the curriculum.

Analysis of the potential of local fruits and vegetables in Jember District as a source of Senior High Schools biology learning, was carried out by gathering information about the local

strengths of the Jember District through observation, interviews and literature review methods. The method of observation and interviews were conducted with fruit and vegetable traders in markets and fruit and vegetable sales centers in 31 districts, namely : Kecamatan Kencong, Gumukmas, Puger, Wuluhan, Ambulu, Tempurejo, Silo, Mayang, Mumbulsari, Jenggawah, Ajung, Rambipuji, Balung, Umbulsari, Semboro, Jombang, Sumberbaru, Tanggul, Bangsalsari, Panti, Sukorambi, Arjasa, Pakusari, Kalisat, Ledokombo, Sumberjambe, Sukowono, Jelbuk, Kaliwates, Summersari and Patrang. Literature review is carried out by searching information through various sources, such as: reference books, scientific journals, and data from the Department of Agriculture, Jember District.



### III. Research Results

Based on observations, interviews and literature studies, information can be formulated in the form of facts, concepts and biological phenomena related to local fruits and vegetables in Jember District. Some of the information formulation is as follows:

1. Diversity of local fruits and vegetables found in Jember District as many as 46 types of local fruits and 52 types of local vegetables, spread in 31 sub-districts in Jember District. The types of fruit are included in 3 classes, 16 orders, 21 genera and 28 species.
2. Local vegetables found included in 5 classes, 23 orders, 24 families and 51 species spread in 31 sub-districts.
3. Local fruits and vegetables spread in 31 sub-districts, 52.2% of the local fruits found are already cultivated ie : Avocados, Grapes, Carambola, Duku, Durian, Jambu biji, Jambu air, Citrus, Longan, Mango, Mangosteen, Melinjo, Jackfruit, Pineapple, Papaya, Banana, Rambutan, Salak, Sawo, Passion Fruit, Lime, Sardine and Breadfruit. 30.8% of locally grown vegetables are 16 types of local vegetables : Shallots, Cabbage Leeks, Cauliflower, Petai / mustard greens, Long Beans, Large Chillies, Hot Pepper, Mushrooms, Tomatoes, Eggplant, Chickpeas, Cucumbers, Siam Pumpkin, Kangkung and Spinach.
4. Identification of local fruits is carried out to the species level by matching with various reference books. Morphological identification includes size, weight, skin color, fruit flesh color and fruit group.
5. Local vegetables based on the portion used are dominated by 45% fruit-shaped vegetables, 6% flower vegetables and 4% tuber vegetables.
6. The local fruit colors found in Jember District include: red, green, yellow, orange , blue / purple / black and white / brown / brown. Colored fruits contain phytonutrients that are different from each other. Phytochemical compounds are compounds found in fruits that give a distinctive taste, aroma or color to the fruit.
7. Percentage of the number of fruit vegetables and tubers based on skin color, flesh and seed color, the most green and white / sawo matang / brown color. The percentage of leaf vegetable color is dominated by green (light green to dark green), while flower vegetables are dominated by white.
8. Production of local fruits in 31 sub-districts shows a different amount of production in each fruit. The results of the analysis showed the most amount of production was siam oranges and the least amount of production was pineapple.
9. Local vegetable production spread in 31 sub-districts, showing long beans, large chillies, cayenne pepper and mushrooms is the most production compared to other types of vegetables.

To find out the potential of local fruits and vegetables in Jember District as a source of learning biology, the information collected through observation and literature study is then reviewed and adjusted to the Senior High Schools biology curriculum (curriculum 2013). The results of the suitability study of the potential of local fruits and vegetables in Jember District with the Senior High Schools biology curriculum can be seen in Table 1 below.

**Table 1.** Results of Analysis on Potential Analysis of Local Fruits and Vegetables in Jember District With Senior High Schools Biology Curriculum.

Objects and Symptoms of Biology Observed	Potential Potential for High School Biology Learning Resources	Basic Competencies												
<p><b>Jember District Local Fruits and Vegetables</b></p>  <p>Examples of local fruits in Jember District (Komarayanti <i>et al</i>, 2018)</p>  <p>Examples of local vegetables in Jember District (Komarayanti <i>et al</i>, 2018)</p>	<p><b>Facts:</b></p> <ol style="list-style-type: none"> <li>Diversity of local fruits and vegetables in Jember District</li> <li>Local fruits and vegetables found are included in different classes, orders, families and types.</li> </ol> <p><b>Biological Problem:</b></p> <ol style="list-style-type: none"> <li>What is the difference of morphology of these local fruits?</li> <li>What is the difference of morphology of the local vegetables?</li> </ol>	<p>3.2 Analyzing the results of the observation data on various levels of biodiversity (genes, types and ecosystems) in Indonesia.</p>												
<table border="1"> <thead> <tr> <th>No</th> <th>Types of Plants</th> <th>Species Name</th> <th>Distribution Place (District)</th> </tr> </thead> <tbody> <tr> <td>1.</td> <td>Avocado</td> <td>(<i>Persea americana</i>).</td> <td>Gumukmas, Puger, Wuluhan, Ambulu, Silo, Mayang, Mumbulsari, Jenggawah, Rambipuji, Balung, Semboro, Sumberbaru, Tanggul, Pant, Arjasa, Pakusari, Kalisat, Ledokombo, Sumberjambe, Sukowono, Jelbuk, Sumpersari, Patrang.</td> </tr> <tr> <td>2.</td> <td>Black Grape</td> <td>(<i>Vitis vinifera</i>).</td> <td>Ambulu, Rambipuji, Sumpersari, Patrang.</td> </tr> </tbody> </table>	No	Types of Plants	Species Name	Distribution Place (District)	1.	Avocado	( <i>Persea americana</i> ).	Gumukmas, Puger, Wuluhan, Ambulu, Silo, Mayang, Mumbulsari, Jenggawah, Rambipuji, Balung, Semboro, Sumberbaru, Tanggul, Pant, Arjasa, Pakusari, Kalisat, Ledokombo, Sumberjambe, Sukowono, Jelbuk, Sumpersari, Patrang.	2.	Black Grape	( <i>Vitis vinifera</i> ).	Ambulu, Rambipuji, Sumpersari, Patrang.	<p><b>Facts:</b></p> <ol style="list-style-type: none"> <li>There are 24 types of local fruit that have been cultivated (52.2%) spread in 31 sub-districts.</li> <li>There are 14 types of local vegetables that have been cultivated (30.8%)</li> </ol>	<p>4.2 Presenting the results of the identification of proposed biodiversity conservation efforts in Indonesia based on the results of data analysis of the preservation of the diversity of a variety of unique Indonesian animals and plants that are communicated in various forms of information media</p>
No	Types of Plants	Species Name	Distribution Place (District)											
1.	Avocado	( <i>Persea americana</i> ).	Gumukmas, Puger, Wuluhan, Ambulu, Silo, Mayang, Mumbulsari, Jenggawah, Rambipuji, Balung, Semboro, Sumberbaru, Tanggul, Pant, Arjasa, Pakusari, Kalisat, Ledokombo, Sumberjambe, Sukowono, Jelbuk, Sumpersari, Patrang.											
2.	Black Grape	( <i>Vitis vinifera</i> ).	Ambulu, Rambipuji, Sumpersari, Patrang.											

No	Types of Vegetables	Distribution Place (District)	Biological Problem :
3.	<i>Star fruits</i> ( <i>Averrhoa carambola</i> L).	Kencong, Gumukmas, Puger, Wuluhan, Ambulu, Silo, Mayang, Mumbulsari, Jenggawah, Ajung, Rambipuji, Umbulsari, Semboro, Jombang, Sumberbaru, Tanggul, Panti, Arjasa, Pakusari, Kalisat, Sumberjambe, Sukowono, Jelbuk, Kaliwates, Sumbersari, Patrang.	How about the preservation or cultivation of other local fruits and vegetables?
4.	<i>Star fruits of wuluh</i> ( <i>Averrhoa bilimbi</i> L).	Ambulu, Balung, Tanggul, Kaliwates.	
5.	<i>Blewah</i> ( <i>Cucumis melo</i> ).	Ambulu, Balung, Tanggul, Sukowono, Kaliwates, Patrang	

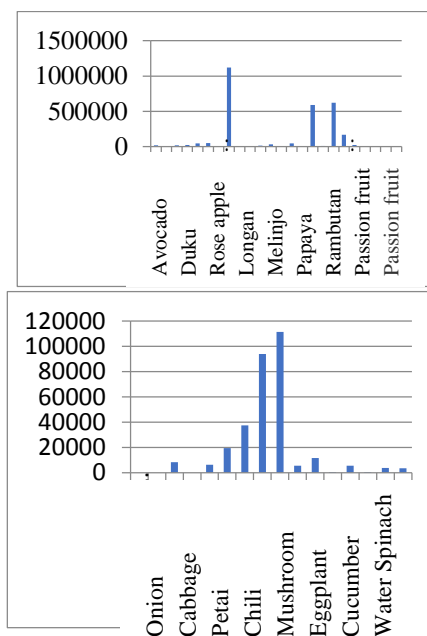
Local Fruit Distribution (Researcher Documentation, 2019)

No	Types of Vegetables	Distribution Place (District)
1.	Green Bean ( <i>Phaseolus vulgaris</i> Linn)	Kencong, Ambulu, Balung, Umbulsari, Sukorambi.
2.	Big Red Chili ( <i>Capsicum annum</i> L.)	Kencong, Gumuk Mas, Puger, Wuluhan, Ambulu, Tempurejo, Silo, Mayang, Mumbul Sari, Jenggawah, Ajung, Rambipuji, Umbul Sari, Semboro, Jombang, Sumberbaru, Bangsal Sari, Sukorambi, Ledokombo, Sumber Jambe, Sukowono, Patrang.
3.	Cayenne pepper ( <i>Capsicum frutescens</i> L)	Kencong, Gumuk Mas, Puger, Wuluhan, Ambulu, Tempurejo, Silo, Mayang, Mumbul Sari, Jenggawah, Ajung, Rambipuji, Balung, Umbul Sari, Semboro, Jombang, Sumberbaru, Tanggul, Panti, Sukorambi, Arjasa, Pakusari,

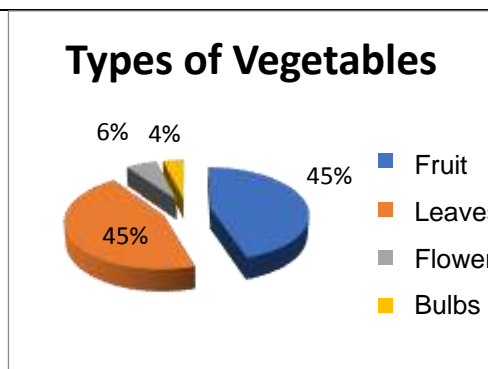


	Kalisat, Ledokombo, Sumber Jambe, Sukowono, Jelbuk, Sumbersari, Patrang.
4. Gude ( <i>Cajanus cajan</i> L.)	Kalisat, Jenggawah dan Tanggul.
5. Long Beans ( <i>Vigna unguiculata sesquipedali</i> )	Kencong, Gumuk Mas, Puger, Wuluhan, Ambulu, Tempurejo, Silo, Mayang, Mumbulsari, Jenggawah, Ajung, Rambipuji, Balung, Umbulsari, Semboro, Jombang, Sumberbaru, Tanggul, Bangsalsari.

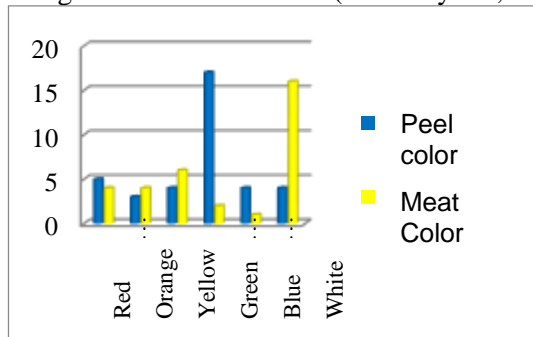
Local Vegetable Distribution (Researcher Documentation, 2019)



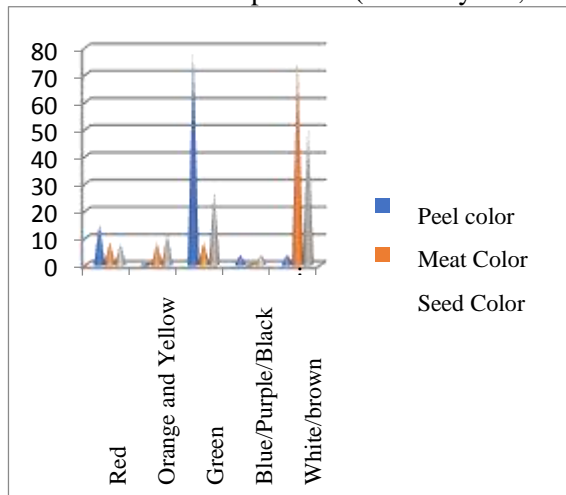
Fruit and Vegetable Production (Dinas Pertanian, 2017)



Vegetables based on used (Komarayanti, 2017)



Local Fruit Color Spectrum (Komarayanti, 2017)



Local Vegetable Color Spectrum (Komarayanti, 2017)

**Facts:**

- a. The part of vegetables that is utilized in the form of fruit vegetables, leaves, flowers and tubers
  - b. Fruit color diversity includes red, orange, yellow, green, blue / purple / black, white / brown
  - c. Vegetable color diversity includes red, orange, yellow, green, blue / purple / black, white / brown.
- 3.7 Applying the principle of classification to classify plants into division based on observations of plant morphology and metagenesis and linking their role in the survival of life on earth.
- 4.7 Present data on morphology and the role of plants in various aspects of life in the form of written reports

**Biological Problem:**

- a. How does the morphological difference in the parts of vegetables that are utilized have to do with nutritional value ?
- b. How the diversity of colors of local fruits and vegetables relates to the phytonutrients they contain ?

## IV. Discussion

Based on Table 1 it can be seen that the results of the suitability of the potential of local fruits and vegetables in Jember District with the Senior High Schools Biology curriculum indicate that the local fruits and vegetables in Jember District have fulfilled the requirements of learning resources. According to (Djohar, 1987 in Aprisiwi, 2014), the requirements for learning resources include: 1) clarity of potential, 2) conformity to learning objectives, 3) clarity of objectives, 4) clarity of information that can be revealed, 5) clarity of exploration

guidelines, and 6) clarity of expected outcomes. Clarity on the potential of local fruits and vegetables in Jember District as a source of learning Biology is shown by the presence of a number of facts and problems related to local fruits and vegetables in Jember District, both in terms of the structure of the plant's function, cultivation, and benefits that can encourage students to find out about the problem. In addition, the objects and problems related to local fruits and vegetables in Jember District are also in accordance with the 2013 curriculum content standards of the Senior High Schools Biology Curriculum, especially in K.D 3.2, 4.2, 3.7 and 4.7, regarding the subject of biodiversity and plant classification. This shows the conformity with the learning objectives.

Clarity of objectives in this learning resource refers to the clarity of existing learning objects and subjects. The object of learning in this case is concrete, namely the local fruits and vegetables of Jember District as one of the local strengths of Jember, while the subject of learning is Senior High Schools students. Clarity of information that can be revealed from this learning source is information in the form of facts, concepts, principles and procedures regarding local fruits and vegetables in Jember District in accordance with Senior High Schools Biology material. The clarity of exploration guidelines can be explained that information in the form of facts, concepts, principles and procedures regarding local fruits and vegetables can be obtained through a scientific approach. While the clarity of the acquisition of learning resources is later expected to use local fruits and vegetables, Jember District as a source of learning based on local excellence will be able to improve students' knowledge, attitudes and skills.

Based on the analysis of local potential, it can be concluded that the facts and problems related to local fruits and vegetables in Jember District are in accordance with or related to the content standards of Senior High Schools Biology subjects in the 2013 curriculum, especially on the subject matter of the scope and problems of Biology, biodiversity and classification plants, so that it can be used as a reference for developing / packaging teaching materials based on local excellence. Further efforts are needed to package / develop Biology teaching materials based on local excellence that are tailored to the learning needs and characteristics of students.

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