

## The Potential of Cireundeu Traditional Culture (Rasi) in Education for Sustainable Development (ESD) in Biology Learning

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### ABSTRACT

Indonesia is an agricultural country that still imports large amounts of rice. The increasing number of rice imports in Indonesia in recent years may indicate that food security in Indonesia is still low. This problem can be raised in learning that is integrated with Education for Sustainable Development (ESD). The aim of ESD is to equip students with the skills necessary to reflect on their behavior and consider the social, cultural, economic, and environmental impacts of their activities, from both a local and global perspective. ESD learning can also be supported by indigenous phenomena such as Rasi. Rasi is one of Cireundeu's traditional cultures, which has a sustainable food management system. Food security issues integrated with Rasi can be used as an effort to achieve Sustainable Development Goals (SDGs) target point two, namely ending hunger to achieve food security, improving nutrition, and encouraging sustainable agriculture. This ESD-integrated learning can be applied to biology learning in the independent curriculum phase F, especially in the digestive system chapter, sub-chapter food content.

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## INTRODUCTION

Indonesia is the country with the second largest biodiversity after Brazil and has abundant sources of local food raw materials (Widowati, *et al.*, 2023). These resources require good management to meet the food needs of the Indonesian people. Therefore, the agricultural sector has an important role in meeting food needs in Indonesia (Purwaningsih, 2008). Total rice production in Indonesia increased to 59 million tons in 2018

but fell to 54 million tons in 2019 (BPS, 2019). In contrast, Indonesia has consistently imported rice since 2000. This was done to maintain the availability of Indonesian rice stocks. The reason why Indonesia continues to import rice from abroad is believed to be a decrease in rice production, thereby increasing domestic rice prices (Ariska & Kurniawan, 2021).

A food crisis can cause a significant increase in commodity prices. The food crisis is caused by several factors, including

distribution barriers, climate change, natural disasters, and social and community conflicts (Akmal, *et al.*, 2022). A solution that can be implemented in the long term is diversifying food sources as an alternative solution (Salasa, 2021). This is in line with Law Number 18 of 2012 concerning food, the aim of this program is to reduce dependence on rice and ensure independent community access to food. Food diversification is an effort to increase the availability of diverse foods based on local resource potential (Qinthara, *et al.*, 2024). Currently, it is important to diversify diets to replace rice as a source of carbohydrates in order to strengthen national food security (Appiah-Twumasi, *et al.*, 2024). This is in accordance with previous research which states that food choices are a form of food culture (Zeng & Sun., 2014). This understanding can be used as a reference in food system policies and sustainable intercultural relations (Chen & Antonelli, 2020; Karaosmanoğlu, 2020; Ishak, *et al.*, 2019).

Food diversification is considered to be a way to achieve sustainable development goals (Addai, *et al.*, 2024). Therefore, knowledge about food diversification needs to be conveyed to students. Learning that can be applied is by using Education for Sustainable Development (ESD) (Sulistyaningsih & Sumarno, 2018). ESD aims to teach students about environmental problems (Shava, *et al.*, 2023). Therefore, the learning process with ESD integration is an interesting and interactive learning which is expected to have a good impact on students and the surrounding environment (Mukhlis, *et al.*, 2024).

ESD integrated learning is learning that has a target in the form of sustainable development or commonly referred to as *SDGs* (Comfort, 2024). Material regarding diversification can be applied to ESD learning

for *SDG* point 2. *SDG* point 2 has a discussion about *no hunger* or ending hunger, achieving food security and improving nutrition and encouraging sustainable agriculture (Manzoor, *et al.*, 2024). Sustainable Development Goal point two is "to create a world free of hunger by 2030" (Montagnini & Metzel, 2024). The *SDGs* indicators that can be worked on in learning are indicators 2.1.1 related to "prevalence of malnutrition" in the PBB *SDG* framework (United Nations, 2024). This indicator is defined as the percentage of the population whose food consumption habits are insufficient to provide the level of dietary energy necessary to lead a normal, healthy and active life. Another indicator, namely 2.3.2, is "average income from small-scale food production, based on gender and status of indigenous peoples" in the UN *SDGs* framework. This indicator is measured in the form of annual income from domestic food production and agricultural products.

One example of an agricultural system in Indonesia that is capable of realizing food security in its region is the agricultural system of the Cireundeu indigenous community (Fajarini, 2021). This indigenous community has unique characteristics in managing agriculture and managing its staple food in the form of Rasi. Rasi is a staple food made from processed cassava/cassava dregs. Cassava dregs are cassava dregs which are specifically used for making staple food so that the carbohydrate content is maintained (Priyanto & Desmafianti, 2022). The content contained in Rasi is quite high, making Rasi an alternative staple food that needs to be preserved to deal with food problems in Indonesia (Adiputra, *et al.*, 2021). This food alternative can be an example of food diversification in Indonesia and can be highlighted in learning.

## METHOD

### *Research Methods*

This research uses a qualitative descriptive method to describe the potential of Cireundeu traditional culture in ESD for biology learning

### *Research Location and Time*

The research location is in Cireundeu Village, Cibeber District, Cianjur Regency, West Java Province, Indonesia. The research will be carried out on December 19 2023.

### *Data collection technique*

Data collection uses inventory techniques in the form of observation, exploration, structured interviews and documentation. Observation activities were carried out directly in Cireundeu Village by observing the cassava plantation area and forest. Exploration activities were carried out by observing several species of cassava being planted, observing the division of forest areas and carrying out exploration related to the tools used in processing cassava into Rasi. The interview was conducted with the administrator of the Traditional Village, namely Mang Djajat. Information is collected by writing and recording directly. Documentation activities carried out using a cellphone camera as supporting evidence for research activities.

### *Data analysis*

This research uses data analysis based on the Miles and Huberman model in Sugiyono (2018), which consists of the data reduction stage, presenting the data and the conclusion drawing stage. Data and information collected directly from informants are then analyzed using the available theoretical basis and presented systematically based on data and facts in the field.

## RESULTS AND DISCUSSION

### *The origin of the Constellation of the Cireundeu Indigenous People*

The results of the interviews conducted focused more on discussing history and several customary laws that apply in Cireundeu Village. The origins of Rasi began in 1918 when Dutch colonization of the Indonesian people occurred (Mulyani & Wirakusuma, 2016). In 1918, the Cireundeu Traditional Village experienced a drought which resulted in famine, while rice supplies were difficult to obtain from the government. This made Aki Haji Ali, the elder of Cireundeu Village, look for a solution by leaving the village. Until finally he met a figure who gave advice to the Sundanese people which read "Teu nanaon teu boga huma ge as long as boga pare. Teu nanaon teu boga pare ge origin boga beas. Teu nanaon teu boga beas ge as long as you can dance. Teu nanaon teu can ngejo ge as long as you can get it together. Teu nanaon teu can nyatu ge as long as you can hiririr." The meaning of the sentence is: "It's okay if you don't have rice fields, as long as you have rice, it's okay if you don't have rice as long as you can cook rice, it's okay if you don't have rice but you eat, it's okay if you don't eat as long as you are strong." This philosophy led Aki Haji Ali to instruct that indigenous peoples needed to make staple food from ingredients other than rice, namely tubers (cassava) (Sumaludin, 2024). This history was explained further by Kang Djajat as a representative of the traditional community of Cireundeu Village. He explained that in 1924 Mrs. Omah Asnamah introduced rice derived from cassava as a diversified food substitute for rice. In 2010 the National Food Agency gave the name "Rasi" to the type of food diversification of the Cireundeu community.

Rasi eventually became one of the characteristics of the Cireundeu Indigenous

People. This uniqueness lies in the relationship between customs and staple foods made from cassava (Priyanto & Desmafianti, 2022). The community has regulations that require indigenous people not to eat rice-based foods. They only respect rice as a form of tolerance. For approximately 105 years they have not consumed rice and only consume Rasi as their staple food. To date, there are around 65 families who still maintain consumption of rice by adhering to the taboo of not eating anything derived from rice. These applicable customs cannot be violated unless they leave the category of indigenous people. There is a special ritual to leave the traditional community if someone wants to eat rice in an emergency, for example when being treated in hospital, because the hospital only provides rice.

***Rasi is one of the cultures of the Cireundeu Indigenous People***

The observation results support the research data with several findings related to the cassava agricultural land management system and post-harvest management. The cassava agricultural land in Cireundeu Village is presented in Figure 1.



**Figure 1.** Cassava plantation land (*Manihot esculenta*) of the Cireundeu indigenous people

The cassava farming system in Cireundeu Village applies several principles, namely: 1)

Agricultural land does not disturb the main forest area because the community protects the forest area as a conservation area; 2) Cassava plants that have a variety of types to reduce the risk of total crop failure; 3) The planting period and harvest period are adjusted according to special calculations that have been carried out for generations; 4) There are several traditional ceremonies that are carried out so that the harvest results are maximized; 5) The amount of land harvested will be adjusted to human needs and resources.

Cassava can be processed into several food products, especially Rasi. Rasi is not bought and sold to outside communities, indigenous peoples only present Rasi in the realm of tourism. This is done to maintain the supply of cassava and family needs for a certain period of time. The constellations are presented in Figure 2.



**Figure 2.** Rasi is the staple food of the Cireundeu indigenous people with the basic ingredients of cassava (*Manihot esculenta*)

Cireundeu traditional village is a tourism asset located in Cimahi City. The preserved habits of the Sundanese Wiwitan community and the staple food in the form of Rasi which is a characteristic of indigenous communities are able to provide tourism opportunities for indigenous communities (Mulyani & Wirakusuma, 2016). Rasi can also be reprocessed into several types of food. Examples of processed foods are cassava skin

jerky, *eggroll*, *simping*, *cireng* and *combro*. Women from traditional village communities can process several types of food made from cassava and Rasi to sell to visitors. This food diversification can increase income for traditional village communities (Sulaeman, *et al.*, 2023).

Rasi has the potential to become an alternative food to replace rice that Indonesian people can use to avoid hunger. The nutritional content of Rasi meets the requirements as a staple food for Indonesian people because it contains sufficient

carbohydrates. The nutritional content of Rasi can be maintained with proper management so that the cassava pulp used still contains sufficient carbohydrates (Priyanto & Desmafianti, 2022). Previous research conducted by Adiputra, *et al.* (2021) have conducted trials on the nutritional content of food dishes in the Cireundeu indigenous community. The nutritional content of recommendations for serving several foods served by the Cireundeu indigenous community is in Table 1.

**Table 1.** Recommendations for fulfilling nutritional benefits for the Cireundeu indigenous community

No	Nutrition	Average nutritional recommendations in Indonesia	Indigenous Recommended Nutrition
1	Carbohydrates (g)	315	321.80
2	Sodium (mg)	1375	1900
3	Magnesium (mg)	294	710

(Source: Adiputra, *et al.*, 2021)

The nutritional content of several foods recommended by the Cireundeu indigenous community is considered to be in accordance with the average Indonesian nutritional recommendations. The results show that the carbohydrate content of 321.80 grams meets the average nutritional needs of Indonesian people. This shows that Rasi has potential as a food that can be used as an alternative to rice which needs to be publicized to the Indonesian people. Research by Adiputra, *et al.* (2021) found that 1 kg of Rasi can be consumed by eight people in one day to meet their nutritional needs. Rasi also provides a feeling of fullness so that the Cireundeu indigenous people can consume it sparingly.

Rasi has the potential to be raised in learning, especially by raising the topic of food ingredients and agricultural land management. The Cireundeu Community Constellation management system is well organized to establish food security. This food security is of course supported by the norms maintained in

their customs (Nurhaniffa, & Haryana, 2022). The norms applied contain meanings that are in accordance with Indonesian culture. The norms implemented in the Cireundeu tradition are not only during the planting and processing of cassava, but there are also rules for how to eat it. An example of the norms conveyed is taking enough food when eating and not throwing away food.

#### ***The Potential of Constellations in ESD***

Discussions about Rasi can be raised in learning as an effort to recognize and strive to achieve SDGs targets. ESD is an educational approach that aims to unite learning with the SDGs sustainable development principles (Dahl, 2019). ESD learning is an effort to integrate an understanding of the complex relationships between the social, economic, legal and environmental dimensions of sustainable development into the curriculum, teaching methods and daily life in educational institutions (Kioupi & Voulvoulis, 2022;

Brundiers & Wiek, 2011). The ESD pillars are used as a conceptual foundation to promote the understanding, skills and values necessary for sustainable development. More than just imparting knowledge, ESD also seeks to shape attitudes and values that support sustainability, such as environmental awareness, social justice and social responsibility. Through ESD, individuals are expected to develop the skills necessary to participate in development (Biasutti, *et al.*, 2018).

The environmental aspect contained in this learning is related to how to manage agricultural land while maintaining its sustainability. This is also related to how people look for diverse varieties of cassava to maintain food security. The social aspect that can be taken is how society maintains cultural heritage that grows from year to year. The sense of tolerance that is fostered in indigenous communities can also be used as a lesson for students. The economic aspect contained in this learning is how society regulates production and trade patterns. Another economic aspect that can be seen is how the community manages the tourist village to generate additional income. This aspect of food diversification, if implemented more widely, could influence the amount of rice imports in the future. Legally, diversification and food management capabilities will influence government legal provisions regarding the price and quantity of food imports (rice).

The lessons learned from this study are also in accordance with SDGs point 2, indicator 2.4.1, namely the proportion of productive and sustainable agricultural areas. This is beneficial which is considered to be the management, conservation of natural resources and the orientation of technological and institutional change in such a way as to ensure the sustainable achievement and satisfaction of human needs for future

generations (Bappenas, 2023). Studies have been carried out to map sustainable local agricultural land to support the achievement of these SDGs (Muryono & Utami, 2020; Dewi, *et al.*, 2016; Janti, *et al.*, 2016). Apart from that, the content contained in constellations can be used as an analysis of the substances contained in staple foods. This is related to SDGs point 2 indicator 2.1.1, namely the prevalence of malnutrition. This can be applied to the digestive system material in the CP Independent Curriculum phase F. The sub-material that can be raised is related to the nutritional content of food ingredients.

SDGs point 2 indicator 2.3.2 is the average income of small-scale food producers, based on gender and indigenous community status. This target can be achieved by providing an explanation regarding the management of existing agricultural land in the Cireundeu community. Starting from land management, planting period, amount of harvest, processing of the harvest and even how to consume it. Indigenous peoples have several varieties of cassava plants to avoid collective crop failure. Each community structure has its own role in planting, managing and distributing cassava plants. Apart from that, the learning that needs to be conveyed is also related to how society teaches its descendants to preserve culture from an early age.

SDGs point 2 indicator 2.1.1, namely the prevalence of malnutrition, can be applied to learning using practical methods. Students will be introduced to several staple foods that are possible for Indonesian society. They also need to carry out tests and calculations to find out the content contained in food ingredients. The expected result in this learning is that students know the contents of food substances and learn to be able to consume them as alternative food ingredients other than rice.

The students' cognitive learning objectives from this lesson are related to several things such as: 1) Students know about hunger and malnutrition and their main physical and psychological impacts on human life, and about certain vulnerable groups; 2) Students know the main causes and root causes of hunger at the individual, local, national and global levels; 3) Students understand the need for sustainable agriculture to combat hunger and malnutrition worldwide and know other strategies to combat hunger, malnutrition, and poor diets. Apart from that, socio-emotional goals can also be raised as part of the learning process. Examples include: 1) Students are able to communicate the problems and relationships between the phenomenon of hunger and sustainable agriculture and improved nutrition; 2) Students are able to reflect on their own values and confront differences in values, attitudes and strategies in fighting hunger and malnutrition and promoting sustainable agriculture; 3) Students are able to feel empathy, responsibility and solidarity towards and towards people suffering from hunger and malnutrition. The most important thing in learning is also related to the behavioral goals expected in learning. Behavioral goals that can be addressed include students being able to change their production and consumption practices so that they can contribute to fighting hunger and supporting sustainable agriculture (Rieckmann, 2017).

Pembelajaran ini juga dapat melatih *sustainable competencies* pada siswa yaitu *system thinking competency* dan *anticipatory competency* (Arnold & Wade, 2015). *System thinking competency* can be taught in this way recognize and understand the relationship between problems related to expensive staple foods in Indonesia. Analyze complex systems by looking at statistical data and carrying out analyzes related to rice import data in Indonesia. Students can also think about how

these systems can be embedded in different domains and at different scales.

*Anticipatory* competency is related to the ability to understand and evaluate various possible futures. The vision for the future is to apply the precautionary principle in assessing the consequences of actions and to face risks and changes (Mokski, et al., 2023). Hal This can be conveyed to students by giving an example of how the Cireundeu Indigenous People divide agricultural land according to their needs, apart from that they choose to eat raisins because the ingredients are abundant and easy to grow in Indonesia. This can be used by students as an alternative staple food that can be consumed when times are difficult or when one of the other staple foods is expensive.

## CONCLUSION

ESD learning is an effort to integrate understanding of complex relationships in achieving SDGs. Problems related to staple foodstuffs in Indonesia are related to SDGs point 2, namely *no hunger*. This problem can be conveyed to students by integrating the culture of the Cireundeu indigenous community. Learning can be conveyed to students as discussion material in learning in accordance with the independent curriculum. Learning outcomes in the independent curriculum that can be used to train students are in phase F. The material presented to students is related to the human digestive system with the sub-material content of food substances.

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