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Analysis of Natural Dye Batik Waste Management in Ciwaringin Village that is Integrated into Science Learning in Elementary Schools as an SDGs Program

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Abstract

Batik is a cultural heritage of Indonesia, this is recognized by UNESCO that batik is an Indonesian culture that must be preserved. But in reality, the development of the batik industry is inversely proportional, Impact on the environment where the batik industry uses a lot of synthetic dyes, which have a negative impact on the surrounding aquatic environment. The purpose of this research is to analyze the process of processing batik waste using natural dyes carried out by batik craftsmen in Ciwaringin village then the natural dye process can be integrated in science learning in elementary schools as one of the SDGs programs that utilize local potential and improve environmental conservation in the surrounding environment so that the waste produced does not damage the environment. The research method used is descriptive qualitative method, where data collection uses interviews, observation and documentation. Data analysis was carried out with three main stages, namely data collection through exploration, data reduction, analysis, and integration in science learning in elementary schools. The results showed that the analysis of waste treatment starting from the process of making natural dyes, the process of making batik and the results of coloring the resulting waste is very low in residual waste so that batik products using natural dyes can be analyzed in terms of local wisdom that can be integrated in science learning in elementary schools, this can be used as an SDGs program in elementary schools that has a positive impact on the environment. The implication of this research is an effort to implement education to create local wisdom and environmental preservation and stimulate student creativity in creating art products that have SDGs sustainability values.

Keywords: SDGs program, natural dye waste treatment, science learning, elementary school

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INTRODUCTION

Indonesia has a very famous batik called coastal batik because of its motifs that developed in the northern coastal areas of Java island such as Cirebon, Cirebon has a characteristic batik commonly known as Batik Trusmi and Batik Ciwaringin. According to research results (Borshalina, 2015) Batik Trusmi is located in Plered District, Cirebon Regency, with the freedom to innovate and create. Trusmi batik has a variety of decorative natural patterns in the form of flora and fauna both on land and in the sea. The uniqueness of Trusmi batik motifs and coloring is characterized by bright colors, there are red, yellow, green, blue, purple. The use of

synthetic colors is more to attract buyers because most coastal batik is a trade commodity with a strategy of developing small and medium entrepreneurs and utilizing the internet. Not much different from the batik craftsmen in Ciwaringin village.

Ciwaringin Village is located in the western part of Cirebon city bordering Majalengka Regency, the population of this village mostly works as farmers, and there is a community of batik craftsmen who are very distinctive compared to other batik in the Cirebon area. According to research results (Tresnawati, 2018) Batik Ciwaringin which is a legacy of ancestors has a batik motif that has its own symbolic meaning such as the motif of a thousand creeping leaves, pecutan, pring sedapur and ganepo and Ciwaringin village community utilizes waste from several types of plants both local plants and those from outside the city and Cirebon district. Thus, there are similarities and differences between Batik Trusmi and Batik Ciwaringin.

Batik Trusmi and Batik Ciwaringin both types of batik come from the Cirebon area, West Java, have similarities in the process or steps of making batik but Batik Trusmi and Batik Ciwaringin have differences in terms of coloring, According to research results (Supenah et al., 2015) Batik Trusmi uses synthetic dyes, the advantage of using synthetic dyes is that the colors produced are very striking so there are many enthusiasts while Ciwaringin batik. According to research results (Tresnawati et al., 2020) which uses natural dyes can be said to be more environmentally friendly and utilizes resources so as to minimize related waste that does not pollute the environment.

In the difference between the two batiks, there is a weakness in Trusmi batik which uses synthetic dyes so it is not environmentally friendly. According to research results (Supenah et al., 2015) The river tends to be the disposal of synthetic dye liquid waste from Batik Trusmi and has experienced pollution from the data results which state that from the river the surrounding water becomes cloudy, the smell disturbs residents' activities and experiences flooding and of course has an impact on the community. The weakness of Batik Ciwaringin, in research (Tresnawati et al., 2020) revealed that by using natural dyes, the colors produced appear faded and not striking in contrast to the colors produced by synthetic dyes such as Trusmi batik. However, it can be said that it is more environmentally friendly and utilizes resources. This shows that the use of synthetic batik has a negative impact on the environment.

Therefore, in order not to have a negative impact on the environment, we need to start switching functions using natural dyes where batik craftsmen in Ciwaringin village use it with the process or steps of making batik in Ciwaringin village, the first process nguleni (mordanting) after the cloth is rinsed and dried in the sun by diacration, the second process nyanting (attaching wax), the third process of coloring waste from coloring can be stored again, the fourth process of color locking (fixation) by using arbor, the fifth process pelorodan (removing wax) wax that has been used can be recycled again, quoted from research (Tresnawati, 2018). So that Ciwaringin batik has values that are very useful for human life. In addition, it is expected to foster positive characters such as appreciating culture as local wisdom and preserving culture which has implications for the preservation of surrounding natural resources.

In addition to cultural conservation, we must also conserve the environment. According to (Rachman, 2022) We as a society must love culture and also protect the environment, we must implement it in social life, one of which is in the world of education. The importance of preserving batik culture using natural dyes where natural dyes reduce environmental waste. School learning where students must be exposed to culture according to the regulations of Law Number 23 of 2014 concerning Regional Government: Provides authority to local governments to regulate and manage the environment in their territory, including the preservation of culture and the environment (Ahmad Robi, 2023)

Local wisdom will effectively function as an heirloom weapon that equip the community in society in responding to and answering the challenges of the times. Exploring and preserving various elements of local wisdom, local traditions and institutions, including useful norms and customs, can function effectively in character education-based curriculum development (Margareth, 2017). Considering that the character inherent in each learner is reflected in daily behavior that unwittingly impacts the environment, we must think of various ways to solve environmental problems, learners must understand how important it is to preserve culture and the environment so that it needs to be socialized into the world of education, so that environmental problems can be resolved such as the problems in the research (Hetarion et al., 2020). In line with research (Tresnawati, 2018) who said that students do not know enough about regional culture (batik) and related to the environment because science materials in the classroom have not been applied to the surrounding environment and regional culture. this causes students to be less able to explore the problems that exist in the surrounding nature. One way to bridge the problem of this phenomenon is through learning based on local wisdom and forming the character of environmental care. Therefore, batik making in Ciwaringin can be integrated in science learning in elementary schools as one of the SDGs programs (Purnamasari & Hanifah, 2021).

Based on the phenomena that occur in elementary schools related to regional culture (batik) and the environment, the SDGs program can be integrated in science learning in elementary schools. The purpose of this research is to analyze the process of processing natural dye batik waste carried out by batik craftsmen in Ciwaringin village then the process is integrated in science learning in elementary schools as an SDGs Program. Therefore, the SDGs program must be implemented in science learning in accordance with the SDGs indicators regarding clean water and proper sanitation and how clean water is managed and the availability of sanitation and directing students to conduct exploration-based learning observations regarding waste treatment, so that the SDGs program is implemented in science learning in elementary schools by first socializing the processing of batik industry waste using natural dyes and their benefits to the environment, after socializing students manage the types of waste that exist in the environment and can be recycled as natural dyes which will produce environmentally friendly batik and minimize damage to the surrounding environment (Purnamasari & Hanifah, 2021).

METHODS

This research design uses a qualitative descriptive method. The descriptive qualitative method is used to analyze the processing of natural dye batik waste in Ciwaringin village as an SDGs Program in science learning in elementary schools. Batik Ciwaringin was chosen for research because at the stage of making natural dyes and batik making and how to process waste in Ciwaringin village that uses natural dyes from local plant waste, such as teak leaf waste, mango peel waste, mahogany peel waste, mangosteen peel waste, rambutan waste, and tegeran stem waste, can be a solution to reduce the impact of environmental pollution caused by the use of synthetic dyes so that the waste produced is not harmful to the environment and the waste produced is very little. Therefore, it can be integrated in science learning in elementary schools as an SDGs program.

The research was conducted in Ciwaringin village, Cirebon Regency, West Java by involving the batik show room of "Flora Boutique". The subject of this research is related to the stages of making natural dyes and making batik and how to process waste that does not damage the environment, each waste uses the reuse method, therefore it can reduce environmental damage so that it can be linked to the SDGs program in elementary science learning. The research instrument used by researchers is through interviews, namely there are two respondents to be interviewed, the first Mr. Fahtoni and Mrs. Rodiah, which contains several pre-planned questions, so that researchers use semi-structured and make observations related to the manufacture of natural dyes and batik making and how to treat the waste produced. The data collection process was carried out for one month from November 1 to November 30, 2023 in Ciwaringin village, Cirebon Regency, West Java. In the data collection process using interviews, observation and documentation. Data analysis involves three main stages, namely data collection, data reduction, and image presentation to facilitate analysis and integration in science learning in elementary schools. Can be seen in picture 1 as follows:

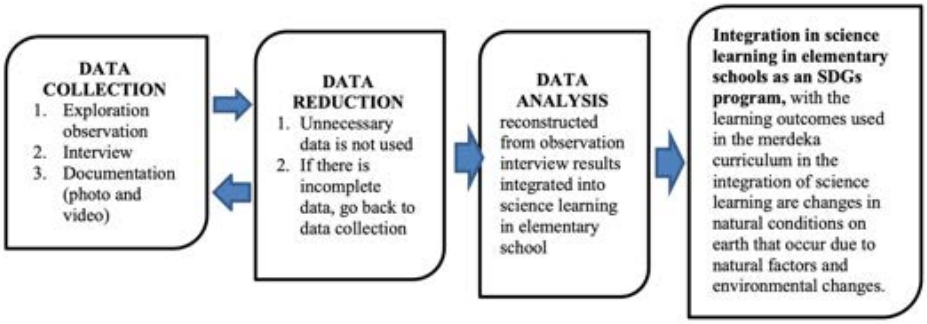

Figure 1. Data Analysis Stages

RESULTS & DISCUSSION

Exploration of Ciwaringan Batik

Batik Ciwaringin has local wisdom that has the characteristic of using natural dyes, this batik village has been consistent in preventing and minimising

environmental pollution due to synthetic dye waste, one of the natural dyes produced by Ciwaringin batik artisans is from the skin of mango tree bark. So that Ciwaringin batik received an ecolabel award for using natural dyes in the field of textiles and textile products from the Ministry of Environment and Forestry (Fadhilah & Widiawati, 2021). Based on the results of interviews in the field with Mr Fahtoni and Mrs Rodiah, it can be seen in Picture 2 , that the making of Batik Flora in Ciwaringin uses natural materials, the first is the process of making natural dyes that require materials such as bark, roots, flowers, fruit peels or leaves and using extraction techniques, can be seen in table 1 and 2. Secondly, the batik-making process consists of seven processes, the process of batik patterns that will be canting , the process of nyanting (applying wax) , the immersion process in tro water, the colour dyeing process, the colour locking process (fixation), the pelorodan process (removing wax), fabric drying process, and environmentally friendly waste treatment methods and the provide of an IPAL for waste disposal by filtration because batik making using natural dyes does not harm the environment, the water released from the ipal is small and any waste that uses the reuse method can be recycled again, can be seen in table 3.

Figure 2. Interview activities

Table 1. The process of making mango peel and mahogany bark natural dyes and the resulting waste

No.	Stages of natural coloring agents	Stages process	Picture	Waste generated
1.	The leather to be used is cut into small pieces	Mango peels come from several wooden furniture stores in the Cirebon area, this waste processing must be selected because making natural dyes is better using mango peels that are still wet. The selected mango peel will be used as a natural dye that produces a brownish yellow colour and mahogany bark produces a brownish red colour.	 	From this stage of the process, there is no waste, and even the unselected skins can be processed as fertilisers and traditional medicines.
2.	The selected leather undergoes a soaking process	In the process of soaking mango bark and mahogany bark is done for one day, the water used in soaking is clean water, the bark must be evenly submerged.		From this second stage of the process, waste is produced, namely the remaining bath water, but the remaining bath water is not dangerous because it is made of organic material so that the water can be discharged into the IPAL.

3.	After soaking for one day then do the boiling process	In the boiling process, which is carried out for eight hours, the bark can be removed until the water solution is used up 1/4.		This third stage of the process does not produce waste because the remaining water from dyeing can be reused for the next dyeing.
4.	The solution is filtered and separated from the pulp	Filtered using a sieve for staining so that all the bark that has been used can be removed.		The four stages of the process do not produce waste because the bark pulp that has been used can be used as sawdust by drying it first, the benefit of this sawdust is to absorb unpleasant odours from animal waste.
5.	Ready to use dye solution	The dye solution is ready to be used for fabric dyeing, the dye solution is separated from other dyes so that it is not mixed up.		From the fifth stage, this process produces no waste as the dye solution can be reused for further dyeing by mixing the remaining dye with the new dye.

Based on table 1, the process of making natural dyes of mango peel and mahogany bark has five stages and is different from other dyeing processes because it uses the soaking stage first (Kholila et al., 2020). The process of making natural dyes using reuse techniques, the waste produced in this process has a very low waste residue so that this process can be used as a reference for developing SDGs programs in elementary schools in accordance with the development pillar at point one, namely regarding clean water and proper sanitation.

Table 2. The process of making natural dyes from mangosteen peel, rambutan stem and tegeran and the waste produced

No.	Stages of natural coloring agents	Stages process	Picture	Waste generated
1.	Separate the skin from the seeds first	Mangosteen and rambutan peels can be obtained generally categorised as fruits that are often consumed by everyone. Selected fruit peels can be used as natural dyes, mangosteen peels produce a light brown colour, rambutan peels produce a light brown (beige) colour and tegeran stems produce a deep yellow colour.	  	From this stage of the process, there is no waste, and even the unselected skins can be processed as fuel.
2.	The selected leather undergoes a drying process	Tools for drying mangosteen skin, rambutan and tegeran stems are household furniture winnowing tools made of woven bamboo, the drying process is carried out by drying in the sun for 2 days.		The second stage of the process uses the reuse method so as not to produce waste, because the dried skin can be stored for the next soaking process.

3.	Once dry, do the soaking process	In the process of soaking using water for one day make sure the material can be soaked evenly, the purpose of soaking so that plant cells quickly release colour.		The third stage of the process produces waste, namely residual soaking water, but this residual soaking water is not dangerous because it is made of organic material so that the water can be discharged into the IPAL.
4.	After soaking for one day then do the boiling process	In the process of boiling cloth with boiling water, boiling is carried out for eight hours until the water solution runs out ¼. Scientifically, in the boiling process, the heat transfer process occurs by conduction and convection.		From the fourth stage of the process, which uses the reuse method, no waste is generated because the remaining dyeing can be stored and reused for the next dyeing.
5.	The dye is filtered and separated by the pulp	This filtering process aims to clean the bacteria in the mangosteen skin, rambutan and tegeran stem.		Of the five stages of the process does not produce waste because the pulp that has been used can be used as fuel by drying.
6.	Ready to use dye solution	The dye solution is ready to be used to colour the batik-patterned white cloth.		The sixth stage of the process uses the reuse method so that it does not produce

				waste because the remaining dyes that have been filtered can be reused by mixing them with new dyes.

Based on table 2, the process of making natural dyes from mangosteen skin, rambutan and tegeran stems has six stages and has a difference with other dyeing processes because it uses the drying stage first, because mangosteen skin, rambutan and tegeran stems that have been dried will produce a more intense colour (Amalia & Akhtamimi, 2016). The process of making natural dyes using reuse techniques, the waste produced in this process has a very low waste residue so that this process can be integrated in science learning in elementary schools as a SDGs program that is used as a reference for developing SDGs programs in elementary schools.

Table 3. Batik making process and waste generated

No.	Stages of batik making	Stages process	Picture	Waste generated
1.	The process of batik patterns that will be canting	In the process of making batik patterns using a pencil on a white cloth that will be canting with various ciwaringin motifs, one of which is tebu sekeret and gambir setemplik.		From the first stage of this process, no waste is generated, as the used-up pencils can be replaced with new pencils.
2.	The process of nyanting (applying wax)	Nyanting according to the desired batik pattern using canting tools to make it easier and using an apron to protect the front to avoid wax		From this second stage of the process, there is no waste because the waste wax can be reused by cooling it and then boiling it and ready to use, additional materials such as axle to thicken it so that it is not too liquid and

			  	busir to smooth the wax from the canting. Baron, as the new wax is called, is bright yellow while recycled wax is dark brown.
3.	Soaking process in tro water	In the process of soaking the fabric using a tripol/rinso solution so that the colouring process using natural dyes is evenly distributed.		From this third stage of the process, residual effluent is generated as the remaining Tro water cannot be stored and is discharged to an available IPAL.
4.	Dyeing process for colouring	After the process of soaking the fabric using tro water, the next is the process of dyeing the fabric into the dyes that have been provided such as dyes from mango skin, mangosteen skin, rambutan and tegeran.		The fourth stage of the process uses the reuse method so that it does not produce waste because it uses the reuse method so that the remaining dye that has been used can be reused for further dyeing by mixing the remaining

				dye with the new dye.
5.	Colour locking process (fixation)	This process aims to lock the dye into the fabric fibres so that the resulting colour does not fade or fade.	  	Of the five stages of the process using the reuse method so as not to produce waste so that the remaining mango skin, mahogany, mangosteen skin, rambutan can be used for fuel by drying then ready to be burned for the boiling process because it does not use gas. The fixation waste from tunjung and tawas can be reused by mixing it with a new one (tunjung/tawas) and giving a little water and then it can be reused or stored, except for lime sediment which must be disposed of because it does not really affect the environment, the lime sediment waste is disposed of to the ground.
6.	Pelorodan process (removing wax)	The pelorodan process aims to remove the wax that is still attached to the fabric.		Of the six stages of the process using the reuse method so as not to produce waste so that the wax waste from pelorodan can be reused for the canting process by cooling and

			 	then boiling and ready to dry. Wastewater from pelorodan is discharged into the IPAL by filtering with the first stages of fibre, small stones, large stones, husks (rice), charcoal, the stages that are often replaced are fibre, husks, charcoal, so all contents/stages are in the IPAL. Because the waste is minimal, the water released from the IPAL is also small.
7.	Fabric drying process	Drying the fabric in the sun until it is dry and the fabric is ready for trade.		Of the six stages of the process using the reuse method so as not to produce waste

Based on Table 3, the process of making natural dye batik has seven stages and has differences with other batik making and Batik Flora in Ciwaringin village still uses natural materials for coloring by using mango bark, mahogany, mangosteen skin, rambutan and tegeran stems and providing IPAL for water disposal. For modern times, there are already those who use sophisticated tools for batik and use textile materials that can damage the environment (Eskak & Salma, 2020). Therefore, the process of making natural dye batik in ciwaringin village produces very low waste, therefore it can be integrated in science learning in elementary schools as an SDGs program with the development of SDGs programs in elementary schools that prioritize local wisdom.

Integration in primary school science learning

The results showed that the analysis of waste treatment starting from the process of making natural dyes, the process of making batik and the results of coloring waste produced very low waste residues so that the sustainability of a batik product can be analyzed in terms of local wisdom that can be integrated in science teaching in elementary schools, the culture of batik in ciwaringin is integrated in elementary school science learning in the merdeka curriculum with phase C fifth grade material regarding types of waste in the surrounding environment and their

processing, with learning outcomes (CP) learners reflect on how changes in natural conditions on the earth's surface occur due to natural factors and human changes, identify lifestyles that cause environmental problems and predict their impact on social conditions, so that they can be integrated as SDGs programs. According to research results (Hasyim et al., 2024) by familiarizing students with batik culture, the environment and can create a sense of environmental care. So that students produce fabric dyes from natural dyes of local plants from these utilizations, such as teak leaves, mango bark, mahogany bark, mangosteen skin, rambutan and tegeran stems can be a solution to reduce the environmental impact caused by the use of synthetic dyes. Integration in science learning in elementary schools is carried out in one of the elementary schools in Cirebon Regency, which can be seen in Table 4.

Table 4. Implementation that has been carried out

No	Local plants	Produce colour	Step by step process of making local plants into dye	Picture
1.	Teak leaf	Brownish purple	• Teak leaf cleaning by washing • Teak leaves cut into small pieces • Soaking process in water for twelve hours • Teak leaves boiled until discoloured • In the filtration process, the teak leaves are filtered and the water is drained, putting the teak leaf extract water into a container with vinegar. • Teak leaf dye ready to use	
2.	Papaya leaf	Green	• Cleaning papaya leaves by washing • Papaya leaves were crushed using a blender until smooth to produce a green colour from the release of colorophyll/leaf cells. • Locking/fixation process using vinegar • Boiling process to blend colours with vinegar • Filtering process to separate papaya leaves and water • Papaya leaf colourant ready to use	

The implementation is supported by (Marthaputra et al., 2021). that Cirebon has local potential in the culinary field, one of which is nasi jamblang. Nasi jamblang is a typical Cirebon culinary where the characteristic is using teak leaves

as a rice wrapper, of course, it will produce waste, namely teak leaf waste. Researchers will utilise teak leaf waste from wrapping jamblang rice into natural dyes, of course as supporting materials researchers need other materials such as vinegar besides teak leaves, papaya leaves can also be used as natural dyes. According to (Try Larasati, 2017) in his research revealed that papaya leaves contain pigments in the chlorophyll of papaya leaves that produce a green colour, which can be used as a natural textile colour.

SDGs Programme

One of the goals of the Sustainable Development Goals (SDGs) is to address climate change such as preserving the environment. Problems such as disasters can occur due to the impact of extreme climate change, with concern for environmental sustainability needs to be applied. Habituation and application of environmental care attitudes need to be done as early as possible (Destami et al., 2024) . Therefore. Researchers have analysed Batik Flora Ciwaringin which has a very low waste residue, so that the sustainability of a batik product can be analysed in terms of local wisdom carried out, can be pursued in the application of SDGs (Sustainable Development Goals) in the world of education in science learning in elementary schools and is needed by the community at large because of the emergence of many pressures on the environment such as pollution of the surrounding environment (Aldi & Djakman, 2020). The SDGs are meaningfully implemented not only by developing countries, but also by developed countries for the betterment of all nations in the world. Each SDG requires education to empower people with the knowledge, abilities, skills and values to develop themselves and contribute to society, education is an important tool in achieving the SDGs, education policy has an important role in the effective implementation of education for sustainable development goals (Quoted from the book sudarmin 2020).

Goal four of the SDGs. According to research (Putra, 2022) for schools to ensure the quality of education is inclusive and equitable and increase learning opportunities throughout life for all, target number four point seven of the SDGs ensures that all learners gain knowledge and skills that are treated to enhance sustainable development. The environmental development pillar discusses the sustainable management of natural resources and the environment as the support of all our lives, the development pillar focuses on six goals, the first on clean water and sanitation, the second on inclusive housing, the third on production and consumption patterns, the fourth on addressing climate change, the fifth on preserving and utilizing marine resources, the sixth on protecting, preserving and improving the use of terrestrial ecosystems.

From the results of previous research, there are five SDGs programmes that have been implemented, in research (May Shinta Retnowati, Aisy Rahmania, 2022) The development of ecoprinting in schools as an SDGs programme where it can utilise local plants as natural dyes from leaves, roots, or stems that are placed on a piece of fabric can be done with several techniques, such as boiling, steaming, and mashing, which are related to this research. (Dewi et al., 2023) has also developed digital learning media in the form of applications based on Education for Sustainable Development (ESD), ESD is part of the SDGs for the scope of education, material related to ESD is the processing of household waste such as

shallots, shallots are one of the main cooking spices which of course will produce waste, namely peeled shallot skin waste can be a natural dye, not only digital learning media. (Destami et al., 2024) has also implemented the SDGs programme for elementary school children through BerLiMPah activities, BerLiMPah stands for Bersama Lima Menit Pungut Sampah, this activity is in the form of making bins by procuring two types of bins to provide students with an understanding of the types of waste and as a habit of sorting waste, inorganic waste processing can also be developed through the SDGs programme. According to (Sutarni Arifin & Rijal Syukri, 2022) By processing inorganic waste based on its type which can then be made into handicrafts in the form of bags, tissue holders and wallets from sachet drink wrapper waste, the development of the SDGs programme can provide knowledge and skills so that it can turn useless waste into products that have economic value, not only inorganic waste. Processing organic waste can also be used as an Eco-Enzyme in accordance with the SDGs programme. (Mariati et al., 2021) Eco-Enztme is the result of fermentation of organic kitchen waste such as fruit and vegetable pulp, sugar, and Eco-Enztme can be used as an environmentally friendly cleaning liquid and soap in accordance with the SDGs.

Based on the results of the analysis of making natural dyes and making Batik Flora in Ciwaringin village, it turns out to produce very low waste. So that the analysis related to the development of natural dyes from local plants as an SDGs program, can be developed in science learning in elementary schools, can be seen in table 4. In the development of natural dyes from local plants will be used as clothing dyes and making jumputan batik. In making jumputan batik, you must prepare tools and materials such as rubber bands, pans, buckets, scissors, cloth and natural dyes from local plants that can be obtained easily and grow and develop around the environment, while the process of making jumputan batik is that the cloth is taken and then tied in such a way with rubber to form patterns and then given natural dyes as desired (chris) So in conclusion, the SDGs program can be implemented as an effort to conserve environmental sustainability through local plants (Christi & Kinasih, 2016). So in conclusion, the SDGs program can be implemented as an effort to conserve environmental sustainability through local plants.

CONCLUSION

The conclusion of this research is that making batik using natural dyes from local plants, such as teak leaves, mango bark, mahogany bark, mangosteen skin, rambutan and tegeran stems can be a solution to reduce the impact of environmental pollution caused by the use of synthetic dyes. The use of the reuse method in the process of making natural dyes and the batik making process makes a positive contribution to the environmental sustainability program. The waste produced can also be reused, such as wax waste which is reused by cooling and then boiling.

Batik making with natural dyes in Ciwaringin village, local wisdom and implementation of natural dyes can be a reference for the development of SDGs programs in elementary schools. This program is integrated in elementary school science learning by using an merdeka curriculum with phase C elementary class V

material about the types of waste in the surrounding environment and their processing, the batik process in Ciwaringin can be used as an SDGs program with batik practicum activities using natural dyes from local plants. The development of the SDGs program by utilizing local wisdom in science learning in elementary schools is expected to provide a better understanding of the importance of environmental conservation, sustainable use of natural resources, and the role of the community in preserving the environment. Thus, the use of natural dyes from local plants in batik making is a real step in supporting sustainable development goals (SDGs) and has a positive impact on the environment. This program not only creates awareness of local wisdom and the environment, but also stimulates students' creativity in creating art products that have sustainability values.

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