Indigenous knowledge in utilizing natural resources in batik as sustainable development in Kebon Gedang district of Ciwaringin Cirebon

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Abstract. This study aims to find out the indigenous knowledge of the Ciwaringin society in managing natural resources for sustainable development as an indigenous identity. The research method used in this study is a qualitative approach. Data were obtained through field observations and direct interviews with the indigenous society and five artisans. The results showed that the majority of Ciwaringin society was batik artisans who only painted batik produced in this region. In coloring process of batik, dyeing and painting techniques are used. Natural dyes are obtained from the bark, rind, and leaves that are easy to find. Indigenous knowledge is only popular among craftsmen who acquired initially from the ancestors. This coloring technique is reused by 85% of craftsmen and become a uniqueness of Ciwaringin batik. Although the production process of a sheet of batik cloth is longer than the use of synthetic dyes, it increases the selling price. Besides, this method is believed to reduce the risk of environmental pollution. This step supports the creation of sustainable development. It is hoped that the values of indigenous knowledge can be used as references and enrich scientific knowledge and become constructive thinking contributions to formulate policies of environmental management and conservation.

1. Introduction
Batik has become a part of Indonesian cultural heritage that has been known since the seventeenth century. In 2009, UNESCO declared it as a non-object Indonesian cultural heritage [1]. Cirebon has two batik manufacturing centers, namely Trusmi and Ciwaringin. The development of Ciwaringin batik goes hand in hand with the revitalization of Trusmi. Ciwaringin is located in the west of Cirebon city which borders with Majalengka Regency. In this region, there is a community of batik craftsmen who have different coloring techniques from batik produced in Trusmi Village. According to one of the craftswomen, Ms. Taifah (45), the use of natural dyes in Ciwaringin batik was initially born from the activities of the boarding school in Babakan Ciwaringin. Along with the rapid development of Islamic boarding schools and the increasing number of santri, batik activities were handed over to indigenous craftsmen, the indigenous society of Kebon Gedang village in Ciwaringin area.

Natural resources are essential for humanity. The reduction and loss of natural resources will have a significant impact on human survival. Human activities in fulfilling the needs of life and socio-economic needs are achieved if supported by the availability of adequate natural resources [2]. Well, natural
Resource management activities are not damaging the surrounding natural environment. Environmental conservation is carried out for the sake of the preservation of natural resources and the sustainability of their benefits. According to Wikantiyoso [3], the resilience of natural resources can improve welfare and sustainable development. Indigenous knowledge is formed from the results of human activities when interacting with the environment continuously which will then develop along with the time. Indigenous knowledge can be dynamic because it can be influenced by external technology and information such as research activities of scientists, counselling, other traditional community experiences, and various information through mass media. However, not all techniques and information that come in can be accepted, adopted and practiced by indigenous people [4]. Indigenous knowledge or often called ecological intelligence is empathy and a deep concern for the surrounding environment and a critical way of thinking about our behaviour to the surrounding environment. Indigenous knowledge can be used as a cultural filter and transformational power in achieving national glory [5]. Indigenous knowledge that derived from community culture is considered to provide many solutions in development because it is the learning outcomes of indigenous communities in addressing the dynamics of their changing environment. The existence of indigenous knowledge indicates that indigenous people participate in controlling the use of available resources because they have the concern in these resources [6]. This study aims to reveal the indigenous knowledge of the Ciwaringin society in managing natural resources for sustainable development. It is hoped that the values of indigenous culture can be used as references and enrich scientific knowledge and make constructive thinking contributions to formulate environmental management and conservation policies.

2. Method
This study used a qualitative approach [7]. Data collection techniques include observation, interviews, direct involvement, and literature study. Informants were selected purposively including five craftsmen and administrators of Cooperation who are about of 40-50 years old at junior high school education level. Data analysis that is used is descriptive exploratory analysis. The data presented in this paper is data obtained from observations in May-June 2018.

3. Result and Discussions

3.1. Indigenous Knowledge of The Society in Utilizing the Natural Resources in Kebon Gedang Ciwaringin
Most of the Ciwaringin villagers work as farmers and batik artisans, especially in Kebon Gedang area. According to the story, Ciwaringin batik village began with the activity of boarding school students in Babakan Ciwaringin village. Besides studying Qoran, they were also learning to print batik. Some of them are indigenous students, who were studying Qoran during the day and then return to their village right after. These students contribute to developing batik production in Ciwaringin. It is believed that Ciwaringin batik developed along with Cirebon batik. The popularity of Ciwaringin batik is far compared to the traditional batik village in Cirebon, although Ciwaringin batik is also marketed in the trusmi. Batik activity in Ciwaringin had suspended. However, since batik was designated as a nonobject world heritage by UNESCO in 2009 the progress of Ciwaringin batik was re-built. The prestige of Ciwaringin batik compared to other regional batik productions is due to the consistency of batik artisans in the use of natural dyes. Usually, the natural dyes used by craftsmen are obtained from the types of plants that are easily found around the batik artisans' place, although some are purchased from outside Ciwaringin. The natural dyes used by artisans are indigo leaves, mahogany bark, mango bark, tegeran bark, and rinds such as rambutan and mangosteen. To become natural dyes, some parts of the plant must go through processing. For example, mango or mahogany bark is boiled for more than 7 hours until their color comes up, then filtered and put into a container. This extract is used as a fabric dye. Indigo leaves are the most widely used dyes by craftsmen. Mahogany (Swietenia sp), Mango (Mangifera indica) and Tegeran (Cudrania javanensis) bark are widely used after Indigo (Indigofera tinctoria) leaves. Indigo leaves extract produces blue, mango leaves produce dark green, while mahogany extract produces a dark
brown color. Tegeran bark produces yellow, mango bark extract, rambutan and mangosteen will produce a brown color.

Natural dyes can only be absorbed perfectly in mori–primisima fabrics which are more expensive than prime mori cotton or biron. Batik coloring takes a long time; the dying process must be done repeatedly (6-7 times) until the expected color appears. The method of drying batik is also influenced by natural conditions such as weather and daylight.

To strengthen the colour to not fade away in Extrication process, that is the wax decay process in the process of slamming, the fixation solvent is used or according to the craftsmen indigenous knowledge are "locking" in the form of slaked lime (Ca(OH)\textsubscript{2}), Ca(SO\textsubscript{4})\textsubscript{2} and iron sulphate (FeSO\textsubscript{4}) and vinegar (CH\textsubscript{3}COOH). The color that is produced will depend on the type of fixation solvent. That matter because of the differences in secondary metabolites in each part of the plant extracted into dyes. For example, indigo-based dyes containing indicant glucosidal when bound to FeSO\textsubscript{4} will produce dark blue, while with lime fixation will produce greenish blue color [8].

Indigenous knowledge about the coloring process of cloth using natural dyes that last for generations is ecological intelligence in utilizing natural resources that guarantee environmental conservation. The use of plant bark and fruit rind is one of the 3R concepts (reduce, reuse & recycling) at this time. Producing batik with natural dyes reduces waste disposal from the batik industry because real waste can be reused for the next production process. However, in the process of batik fixation still uses chemicals. Consideration of high production costs makes craftsmen unable to use natural fixation solvents such as brown sugar and lime to anticipate by the presence of batik waste treatment plants whose procurement is assisted by external parties.

3.2. The Process of Adoption and transfer of Knowledge of Craftsmen from Kampung Batik Ciwaringin

As a fostered village of corporate social responsibility (CSR) program of cement company PT. Indocement since 2005 until now, batik artisans have attended several pieces of training such as the use of natural dyes, Wastewater treatment plant management and the improvement of the quality of batik held by related parties. The artisans developed new knowledge from the basic knowledge they already have and added from an external suggestion. That is product diversification. Initially, batik production only used cotton fabric, but now the process of natural dyes also uses silk fabric. The in-depth interview with Ms. Ella (40), a batik artisan, the trial was also conducted to look for red dye from nature. A simple test was conducted to find the red colour obtained from the extract of morinda root. However, these dyes are considered craftsmen can harass the preservation. Therefore, they are not useful to use as dyes likewise with coloring techniques. Indigenous knowledge of the batik society in batik village Ciwaringin is dipping, but along with external ideas, the craftsmen innovate by developing dyes and printed coloring techniques (coloring techniques with repeated watercolor brushes, ‘coletan’) or a combination of both. The indigenous society develop new knowledge from the basic knowledge they already have plus external ideas. If there are a new knowledge and innovation that is introduced to the craftsmen, then they will carry out a series of simple experiment to test the effectiveness and benefits of the new knowledge. From the results of the research, they decide whether to implement the latest innovation or not. If the results are as they expected, then they will adopt that knowledge [9].
3.3. Indigenous Knowledge of Ciwaringin Society to achieve Sustainable Development.

Batik until the early 1990s was the lifeblood of the Ciwaringin village society, especially women in Kebon Gedang. Along with the emergence of printing batik which prices were much lower, furthermore, the economic crisis that hit Indonesia caused many craftsmen had difficulty in a business fund. Therefore, batik business was not profitable. In this challenging situation, many women chose to leave batik and switched to become migrant workers. Working as a migrant worker is considered an easy choice to improve the family's economy. At the time Ciwaringin's batik broke down. Besides so many craftsmen left this business, not many young people are interested in batik business. Generally, only adults are loyal to their old activities. Income earned from working as a migrant worker can indeed improve the village economy, but various family problems also arise. Because it is considered to have a severe impact, awareness to revive the batik tradition in Ciwaringin also grew up. In 2009 the Cooperation service collaborated with the rest batik entrepreneurs to form SMEs. The craftsmen are given production management training, raw materials, work equipment, and business fund assistance. The production of Ciwaringin batik began to growth again. In 2011 the craftsmen received marketing assistance and management training and offered capital loans from a corporate social responsibility (CSR) program of cement company PT. Indocement. They are included in exhibitions 5-6 times a year. From the exhibition, their batik began to be known and got many orders at a higher price. This success revives the spirit to make batik for the villagers. They return to being batik artisan. The production process which takes time during the coloring process has implications for high selling prices. One sheet of batik cloth can reach millions of rupiah because of its old fabrication and depends on motifs and fabric material.

Ciwaringin batik motifs are influenced by Central and East Java as a result of cultural assimilation when indigenous communities interact with their environment. However, Ciwaringin batik also has distinctive motifs, including tebu sekeret, kapal kandas, sapujagat dan pecutan. There is indigenous wisdom in the Ciwaringin batik motif. For example, the sapujagat contains the meaning of togetherness inspired by the prayer of the broom universe. The pattern of pecutan means an encouragement that can be a guide to life for villagers and society in general. Various batik motifs produced in Ciwaringin have their meanings and stories. Ciwaringin batik is unique because it summarizes all of the hopes and prayers of its makers.

Conservation and sustainable development are a holistic approach, which is not only focused on environmental conservation efforts but also considering socio-economics and traditions. Practically, indigenous knowledge is the effort of indigenous communities to conserve the resources so that they can be used sustainably to fulfil the needs of life and preserve the environment. Understanding and
maintaining indigenous knowledge is part of the life of the indigenous Cirebon community. The Sitiwinangun village community, Arjawinangun sub-district Cirebon also has indigenous knowledge of pottery making by using pinching and opening burning techniques, which not only aims to preserve ancestral heritage but also synergize with environmental conservation [10]. In order to reinforce by [11] that sustainable development can be created because of the harmony of social, economic and ecological aspects. These three aspects will be a supporting factor for the existence of indigenous knowledge in the printed-batik village Ciwaringin; besides that, it requires the participation of the indigenous community in ensuring its sustainability. Indigenous knowledge is proof that community understands themselves, their needs for resources based on their experiences [12]. Indigenous knowledge is in line with the goals of Education for Sustainable Development (ESD) which is oriented towards developing skills and values. Therefore, humans can contribute to environmental conservation, and it can be used for humans in the future [13]. The participation of indigenous people who return to being batik artisans and using natural dyes is an effort to maintain indigenous knowledge as well as preserving tradition; natural balance can also be used as a medium for educational tourism. They can ultimately create regularity and the achievement of the welfare of the community who preserve for sustainable development.

Table 1. Supporting aspects of the preservation of indigenous knowledge

| Aspect           | Description                                      |
|------------------|--------------------------------------------------|
| Environmental conservation | The use of natural dyes, the 3R concept            |
| Economy          | batik craftsmen                                  |
| Social           | tradition, educational tourism, nature conservation |

Although they have participated in marketing training, sometimes craftsmen still find it difficult to determine the selling price. Most of the craftsmen determine the prices only based on feelings. The craftsmen have not recorded expenditures in the production process that have an impact on determining the selling price. Anugerah Batik Ciwaringin cooperation plays a role in developing batik business with batik training for all people, business capital loans, provision of tools, batik raw materials and play a role in determining a reasonable selling price. According to one of the cooperation administrators, Fathoni (50 years old), this cooperation grew rapidly, at the beginning of the formation in 2014 consist of 29 craftsmen, it has now increased to 100 craftsmen. Regarding income, there was also an increase of 50%; initial capital increased by 37%. Moreover, there is an increase in turnover. Also, craftsmen also began to sell their batik online through e-commerce and social media sites. The craftsmen are one way of introducing Ciwaringin batik and increasing sales besides participating in exhibitions, opening showrooms in their homes and outside the city of Cirebon. In professionalism aspect, the craftsmen take the competency certification of the batik handicraftsmen from the Central Java BKSP professional certification institution, which the results are 100% of craftsmen pass the competency test. These efforts are the participation of the community in utilizing indigenous knowledge in improving welfare. Therefore, short-term and long-term sustainable development is achieved. Because the empowerment of community-based indigenous knowledge through community participation is an important factor, especially in the development that is evenly distributed and meets the needs of the community [3].

4. Conclusions

Indigenous knowledge of the use of natural resources in batik in Kebon Gedang Ciwaringin is the use of mango (Mangifera indica) bark, mango leaves, indigo (Indigofera tinctoria) leaves, Tegeran wood (Cundraina javanensis) and fruit rinds such as rambutan and mangosteen into natural batik dyes. The use of natural dyes and recycled dye water which is recyclable is a conservation concept that is obtained from generation to generation in Ciwaringin village. The indigenous knowledge of batik craftsmen communities has evolved along with the entering of external information. Dyed coloring techniques
have been developed into dyes and printed and a combination of both. Strengthening the participation of indigenous communities by becoming members of cooperation, participating in handicraft product exhibitions and certification of craftsmen's competency testing are important factors in the use of indigenous knowledge in improving welfare therefore short-term, and long-term sustainable development is achieved. Indigenous knowledge that has the values of nature conservation is a form of ecological intelligence of the Ciwaringin community. It is hoped that the values of indigenous knowledge can be used as ideas and enrich scientific knowledge and make constructive thinking contributions to formulate environmental management and conservation policies.

5. References

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