The implementation of indigenous people local wisdom *lekuk 50 tumbi* in managing agriculture and lakes as biological learning sources

D C Putri*, A Munandar and B Supriatno

Departemen Pendidikan Biologi, Universitas Pendidikan Indonesia, Jl. Dr. Setiabudi No. 229, Bandung 40154, Indonesia

*devinaclaudiaputri28@gmail.com

**Abstract.** The environment plays a crucial role for the survival of living things. But now the environment has encountered various problems such as pollution. Some people still wisely manage the environment, the indigenous people Lekuk 50 Tumbi are a good example of the wisdom in managing agriculture and lakes. This can be one solution to deal with environmental problems, namely by applying the local wisdom into learning one of them through biology learning. This study aims to apply local wisdom of indigenous Lekuk 50 Tumbi as a source of biology learning. This research was conducted by survey method through conducting in-depth interview, participant observation, documentation study and field note. Data have been analyzed by triangulation using qualitative analysis of data collection, data reduction and data display. Indigenous peoples Lekuk 50 tumbi manage their farms by maintaining traditions such as *ureh padoi*, *kenduri sko*, *tauh*, *mina padoi* and managing the lake by applying the rules and customary law and mutual cooperation together by the community. The value of indigenous knowledge of indigenous peoples is implemented as a source of biology learning that is adapted to the basic competencies of learning.

1. Introduction

Human life with its dynamics require interaction and adaptation with the surrounding natural environment. Currently the environment is encountering different environmental issues on a global scale, one of the significant reasons behind death environmental damage is one cause of death that amounted to 23% [1], the occurrence of global warming adversely impacts the life of different living creatures. Indonesia is one of the countries in the world experiencing many environmental problems. Indonesia's greenhouse gas emissions tend to increase year by year. Emissions from the energy, agriculture and waste sectors increased by 4.5%, 1.2% and 4.0% every year respectively [2].

Jambi Province is one of the districts encountering environmental issues. Jambi is one of six provinces in Indonesia that should be prioritized for handling forest fires and shifting the function of agricultural land, this is what correlates to the frequent occurrence of forest fires, illegal logging, river and lake water pollution and waste. The area of critical land in Jambi Province is 779,774 Ha or 15.55% of the existing land area in Jambi Province. Kerinci is one of the regions in Jambi Province, Kerinci Lake has been polluted, it is considered as one of the 15 national prioritized lakes due to high level of damage [3].
Local wisdom is one of the solutions to deal with the problem [4]. Culture is one of the elements that play a role in maintaining the environment, behavior in culture with prevailing norms can move people to apply well or not to nature [5]. Indigenous peoples have a local wisdom that is believed to be truth and sacredness and become the guidance of the life of its members which is passed down through generations so that affect the pattern of life. A strategy that can be used to foster students' awareness of the environment is by applying local wisdom to formal education in schools, one of them through biology learning. Learning with local wisdom needs to be supported by using appropriate learning resources. Indigenous peoples who can be an example are indigenous people with their wisdom in managing agricultural land and lake that is around them. Indigenous peoples manage their farms wisely and utilize traditional means in their farming systems. This indigenous region is the largest producer of rice, cinnamon and vegetables in Kerinci Regency. In addition, this region has a lake that is wisely maintained by the community.

Local wisdom values of indigenous people Lekuk 50 Tumbi will be well internalized through learning by using a meaningful learning resource in biology learning, especially learning related to the environment and natural surroundings. In biology learning students will gain values that can give them an understanding to understand the importance of preserving the environment for their lives now and in the future.

2. Research methodology
Methods in this study is a survey with a qualitative approach that aims to analyze the values of local wisdom to be integrated as a source of learning. Data collection was done by participant observation, in-depth interview and documentation. The data collected is related to the management and tradition related to the rice fields of Lekuk 50 Tumbi indigenous peoples and the way the community manages their lake to maintain its sustainability. The location of the research was conducted at touristic district Lempur, Kerinci Regency, Jambi Province. The research instruments used are field notes, camera, voice recorder, interview sheet and indicators of local wisdom values. Data in analysis by using Miles and Huberman which consists of model that is data reduction, data display, and conclusion or verification. Indicators of the value of local wisdom in the adaptation of previous researches are religious values, values of respect, loving creatures of God's creation and gratitude, educational value, harmony and balance values, interaction values, environmental preservation values, mutual counseling and ethnobotany values [6].

3. Result and discussion
3.1. Local wisdom of indigenous peoples Lekuk 50 Tumbi in managing agricultural land
3.1.1. Irrigation system. Irrigation of farmland in Lekuk 50 Tumbi Lempur comes from the mountain of stone, Lingkat Lake and river. There are two types of irrigation in the rice fields of Lekuk 50 Tumbi, the first is to make irrigation channels in the form of plots from water sources, then the second is by using the waters that irrigates the rice fields from the river near the rice field, that named kinci ayik made of bamboo and flowed towards rice fields by making a channel of bamboo that connects between the water with the rice fields.

3.1.2. Ureh padoi. Ureh padoi is a traditional Lekuk 50 Tumbi community to reduce pest disturbance in rice fields. Ureh padoi is done using natural ingredients from herbs. Communities or in groups do this tradition as a cure for pests. This activity is done at the time of rice field finished basia (weeding) about one month after payo rice in planting by society.

Implementation of this ureh padoi activity begins with the search for plant material, while the plants used are jeringau rhizome (Acorus calamus L), chakra leaf (Polycias fruticosa (L) Harms), Areca catechu leaf, banana (Musa sp) bangle (Zingiber pupureum Roxb.), kumpeh alun (Polygonum sp), fresh pacing (Costus speciosus (Koenig) Smith), cocor duck (Bryophyllum pinnatum) and garlic (Allium
sativum), all the ingredients are chopped or sliced then mix all ingredients the. After the mixed material is added with enough water then stirred. The material is then brought to the destination rice field, with starting with zikir and prayer readings of materials are watered and scattered into the fields and placed near the irrigated fields so it will go into the rice field evenly.

3.1.3. Mina padoi. Mina Padoi is one of the activities of the community which aims to reduce pest snail mas on paddy fields by using ducks. Ducks used by bringing ducks to rice fields, ducks like mas snails as food, therefore by using ducks to rice fields will change the food chain in the rice field ecosystem and reduce the snail pests in the fields.

3.1.4. Making Kalibong. Kalibong is a hoax to drive or block the birds approaching the rice fields. Kalibong is made of colorful plastic hung with straps with thin bamboo supports made around rice fields or rice fields that want to be protected from bird attacks. With the creation of Kalibong by the community can block the birds that will approach the rice, because the birds will be deceived by the presence of Kalibong made by the community.

3.1.5. The tradition of taking Padoi. Padoi parent picking is intended to take the rice mothers first before the large harvest. This tradition begins a day before people harvest rice harvest, first they take seven stalks of rice to take home to which they regard as the mother of rice, they pick up the rice mothers first before all the rice they take or harvest as a form of their respect for rice who feed them every day. The next day, all the rice is harvested by the community and put into the rice storage area.

3.1.6. Kenduri sko ceremony. Kenduri Sko ceremony is the biggest ceremony in indigenous people Lekuk 50 Tumbi. This ceremony indicates that the community has finished harvesting rice or they call it as a merchant already harvest, but also as a form of thanksgiving for harvesting rice, as a form of inter-community relations, and as a ceremony to clean the ancestral heritage objects of their ancestors.

3.1.7. Dance tauh. Dance Tauh is one of traditional dances typical of indent Lekuk 50 Tumbi Lempur, dance tauh accompanied by music gong and tambourine and mantau conducted by experts. Dance tauh contains many meanings such as the dance movement that hangs the customary manners, then contains the meaning of the movement in the paddy field and the monitor that contains the advice to the community as well as the lead customary institution.

3.2. Local wisdom indigenous peoples lekuk 50 tumbi in managing the lake
In managing the lake of indigenous people Lekuk 50 Tumbi impose customary rules and laws for the community. There are several rules that should be done by the community, such as restrictions on taking fish in the lake, fishing rules that are not allowed to use bombs or poisoning, then banning cutting trees and disposing of garbage around the lake, planting trees and working together to clean the lake. All these rules are enforced in order to maintain their lake ecosystem in order to stay awake. If there is a violation it will be subject to customary law in the form of a fine giving one buffalo plus a hundred cans and holding a feast.

3.3. Local wisdom values indigenous peoples lekuk 50 tumbi

3.3.1. Religious values. Before recognizing the existence of religion, indigenous people Lekuk 50 Tumbi adheres animism belief that believes in spirits and spirits, assumes that everything on earth is alive and has spirit and must be respected. But now the belief has shifted as the entry of trust to embrace the religion, today the indigenous people Lekuk 50 Tumbi are all Muslims. However, in some traditions they still believe in the existence of spirits, such as Kenduri sko ceremonies, the tradition still uses magic in its activities. With the existence of Islam society always perform activities that start with prayer.
3.3.2. The value of honoring, loving the creatures of God's creation and grateful. Community activities related to agriculture and lakes such as kenduri sko ceremony, parent padoi, the existence of padoi barn which is done in the planting of rice to harvest and after harvest is a form of expression of sense of respect, love of rice and lake and grateful for the harvests obtained by the community. This is evident from the activities within the tradition.

3.3.3. Educational value. In the customary community structure Lekuk 50 Tumbi to regulate the daily life of the community, regulated by the existence of custom rules and customary law in the form of sanctions for those who violate custom rules. The value of the sanctions payments aims to change and regulate the morals or behavior of the people, realizing their mistakes and improving their behavior in a better direction and maintaining harmony between their relationships.

3.3.4. Value of alignment and balance. Alignment is a fit or fit [7]. Living in harmony with nature is evident from how farmers choose the right time to start farming, choosing farming types, eliminating proper pests, managing and maintaining crops to determine harvest time with adjustment to farming traditions to be made in accordance with their environment.

3.3.5. Interaction value. Interaction is an action that occurs when two or more objects affect or have an effect on each other. Interactions that occur in kenduri sko ceremony, ureh padoi, mina padoi, dance tauh can cover the interaction between man with god, among human beings, and the interaction between man and nature and other living things. At ceremonies such as sko kenduri interaction occurs between indigenous peoples and between people with god, then on traditions such as ureh padoi and mina padoi interaction between living things in the fields and between humans and gods with prayers, dance tauh describes interactions among human beings.

3.3.6. Value of environmental conservation (conservation). Environmental preservation is a must for human beings to keep the ecosystem awake [8]. The occurrence of disturbances to ecosystems result in negative impacts to the ecosystem and will disrupt the lives of humans and other living creatures that live in them. Humans must behave positively to their environment including for example maintaining the sustainability of land, forests, water resources, river and lake sanitation and protecting the environment from pollution.

3.3.7. Gotong royong value. Gotong royong is a form of social interaction in society which is one of the characteristics of Indonesian society. Growing mutual cooperation is still very strong in indigenous communities Lekuk 50 Tumbi among others are people who always work together, help each other in doing activities such as in cultivating agricultural land, kenduri sko ceremony, ureh padoi, rice planting, tree planting, tegeak umah done together and helping each other between communities. Environmental cleaning activities are also carried out together and help each other. This value provides an example of not being individual and maintaining the relationship of socialization among humans for the younger generation.

3.3.8. Scientific value. Scientific value of farmers activities can be seen from the activity of rice ureh using natural ingredients to expel pests from rice at the time after the cleansing of weeds or chewed on about a month after planting, as well as mina padoi, when rice began to bear fruit early mada planting rice, making of natural fertilizer from straw and organic waste. There is also a time when the neglect of agricultural land after harvest about 1-2 months left, this becomes effective food chain breaker and disease in plants. The absence of rice cultivation for a long time makes the pest has no food source and will die by itself.

3.3.9. Ethnobotany value. Ethnobotany describes the community and explains the connection between culture and the usefulness of plants, how plants are used, treated and judged to benefit human beings
[9]. Utilization of diversity of plant species by indigenous people *Lekuk 50 Tumbi* as medicine and as clothing and board needs, such as plants used in *ureh padoi*.

### 3.4. Identification of local wisdom values of indigenous peoples *lekuk 50 tumbi* as a learning source

Local wisdom of indigenous people *Lekuk 50 Tumbi* in the management of agriculture and lakes can be used as teaching materials in learning in school. Local learning allows students to take scientific principles according to their environment [10]. The learning process in school can be tailored to the theme that will be discussed in the classroom. In the 2013 curriculum [11], teachers are given the opportunity to develop learning in the classroom by selecting the method of learning, compiling teaching materials and learning resources in accordance with the subject matter. The result of identification of local wisdom of indigenous peoples *Lekuk 50 Tumbi* in accordance with curriculum and applicable basic competence, that is study of ecosystem which felt more appropriate to integrate that value.

### 4. Conclusion

Local wisdom can be used as one solution to solve environmental problems. One of the local wisdom that can be an example is the local wisdom of *Lekuk 50 tumbi* dredging communities in managing agriculture and lakes. The wisdom can be applied in biology learning, by identifying the value that it possesses and adapting to the 2013 curriculum of the ecosystem to make teaching material.

### Acknowledgments

- Customary Institute of *Lekuk 50 Tumbi* who have cooperated and provide information related to research purposes
- Prof. Dr. Achmad Munandar, M. Pd. Bambang Supriatno, M. Si. As a mentor who always give input and criticism to the author
- Parents and families who always encourage authors.

### References

[1] WHO 2015 *World Health Statistics 2015* (USA: World Health Organization)

[2] Kementerian Lingkungan Hidup dan Kehutanan 2015 *Statistik Kementerian Lingkungan Hidup dan Kehutanan Tahun 2015* (Jakarta: KLH).

[3] Kementerian Lingkungan Hidup 2014 *Rencana Pembangunan Jangka Menengah Nasional (RPJMN 2015-2019)* (Jakarta: KLH).

[4] Kamonthip K 2007 *Local Wisdom, Environmental Protection and Community Development: The Clam Farmers in Tambon Bangkhunsai*, Phetchaburi Province, Thailand *Journal of Humanities*. 10, (1), pp. 2-10.

[5] Peursen, VCA 1976 *Strategi Kebudayaan* (Yogyakarta: Kanisius).

[6] Aditya, Y.A. 2013 *Nilai-nilai Kearifan Lokal Masyarakat Cigugur-Kuningan dalam Pelestarian Lingkungan Hidup sebagai Sumber Belajar Geografi* Tesis S2 pada FPIPS SPs (Bandung: Universitas Pendidikan Indonesia)

[7] KBBI 2016 *Pengertian keselarasan* (Online), (http://kbbi.web.id/pusat) 8/2/2018.

[8] Subhan, A 2017 *Pengembangan Bahan Ajar Berbasis Nilai-Nilai Kearifan Lokal Pertanian Padi di Cirebon untuk Meningkatkan Literasi Lingkungan Siswa SMP* Tesis S2 (Bandung: Universitas Pendidikan Indonesia)

[9] Lia YS 2015 *Nilai-Nilai Kearifan Lokal Suku Anak Dalam (Orang Rimba) Provinsi Jambi Terhadap Pengelolaan Hutan Taman Nasional Bukit Duabelas Sebagai Sumber Belajar Biologi* Tesis S2 (Bandung: Universitas Pendidikan Indonesia)

[10] Edy L 2015 *The Economic Value of Natural Resources and The Principle of Local Wisdom as Environmental Protection Efforts in Indonesia* *International Journal of Business, Economics and Law* 7(4) pp. 48-53

[11] Miss RM 2012 *Knowledge and Local Wisdom: Community Treasure* *International Journal of Humanities and Social Science* 2 (13) pp. 174-181