The values of local wisdom on human relations with the environment in Bobonaro district, Timor Leste

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Abstract. In the modern world, industrialization has been pushing out the growth of consumerism. More products produced in the recent decade. This industrialization absorbs tremendous natural resources at a faster rate than nature's recovery speed. To mend the relation of humans and nature, a new paradigm is needed. Bobonaro is a district in Timor Leste that adjacent to Indonesia. As a relatively young country, Timor Leste has much indigenous local wisdom. These local wisdoms let them live along with nature all this time. This paper explores local wisdom in Bobonaro that can revise how the modern world interacts with nature. The method used was descriptive qualitative ethnography research. This research found several amount local wisdom on how humans preserve nature, they are Tara bandu, Na'in, Terracing and stone walls, crop diversification, traditional medicine, and protection on water sources. The essence and spirit of these local wisdoms can be implemented in industrialization era to improve human-nature relationship.

1. Introduction

Modern society is advancing and growing fast, driven by science and technology. This advancement gives enormous contributions to industrialization and production efficiency. Industrialization absorbs a lot of natural resources fast and nature cannot catch up with the pace. This industrialization affects nature on clean water availability, forest land, air pollution, and global climate change. To tackle this, the industrialization needs to adhere to values and standards that sided with nature. These values will provide awareness and responsibility for nature conservation. To get these values, local wisdom can be a good place to look for. With these values, it's hoped to change society's paradigm on how to behave so when advancing and moving forward with industrialization, society is still mindful and not harming nature.

Local wisdom is all forms of knowledge, beliefs, comprehension, insights, custom, or ethics that guide human behavior living in an ecological community [1]. One of the functions of local wisdom is as an inspiration for knowledge that supports life: local wisdom that contains a value system and knowledge system that support the existence of nature's resources and sustainable lifestyle for all creatures in the local environment [2]. Therefore, local wisdom is a value that considered as good and right that exists across generations and abided by a society that lives in it as a result of interactions between humans and nature.

Bobonaro is a district in The Democratic Republic of Timor-Leste that adjoined the Timor Timur province of Indonesia. Timor-Leste is a young country, established in 1999 [3]. Before that, it was part of Indonesia. After the referendum sponsored by the United Nations, Indonesia let Timor Timur Province go and become Timor-Leste. Timor-Leste is a developing country that still full of local traditions and customs. The contrast between local traditions and customs with modern culture can be a fresh point of view of how to live along with nature. By getting local wisdom on nature
conservations, that local wisdom can enrich the way of view and thinking on how the modern world interacts with nature. With local wisdom, it is hoped that it can rectify human and nature relations along with technology advancement and industrialization.

2. Method
The research method used is descriptive qualitative ethnography research. Ethnography is the study of social interaction and culture groups, whether these groups are defined as societies, communities, organizations, or teams [4]. This research uses secondary data sources due to circumstances and limitations in this particular situation. Data were gathered from scientific books, reports, local announcements, and news. The gathered data were cross-checked from multiple sources. The results were filtered to get all local wisdom that has a positive impact on nature. The findings later were presented with an analysis of implementations in modern times.

3. Result & Discussion

3.1. Tara Bandu
Tara Bandu consists of 2 words, tara and bandu which both mean to establish and prohibit. So tara bandu is an establishment of prohibition for traditional society to prevent them to do activities that believed will put nature in a disadvantaged situation. The opposite of tara bandu is kasu Bandu which means to revoke prohibition. Tara bandu is also known as kdesi badu in Tokodede language.

Tara Bandu is a ritual in which leaders of communities gather and decide, based on the current situation, to establish new prohibitions that deemed necessary to maintain the nature and revocation of previous prohibitions that deemed not necessary anymore after nature is restored. Tara Bandu is varied depending on communities but it has the same spirit that rules are created, managed, and protected by their custom ritual.

Tara Bandu, in general, are performed with these considerations in mind [5],

- Water protection and conservation.
- Biodiversity conservation.
- Maintain ecological balance.
- Inter-generations equal ecological rights.
- In-generations and Inter-generations equal rights.
- Destroying nature is an ecological crime.

Tara Bandu is a continuous process of assessment and adjustment. Nature changes are evaluated and if deemed necessary to have a break from human interventions especially on nature resources extractions or treatment changes. This process requires wisdom and good knowledge from elders in those communities. This knowledge of nature is part of local wisdom that carried and inherited to future generations.

After the establishment of tara bandu, it requires awareness and observance from community members. Community rules to punish and prevent community members from breaking the prohibition is the deciding factor of a successful implementation of tara bandu. A community that is not able to commit will not be able to survive.

Tara Bandu as local wisdom is similar to another local wisdom known as lubuk larangan in Jambi, Indonesia [6]. Lubuk larangan is considered as unique local wisdom and cannot be found elsewhere in Indonesia. Lubuk larangan focuses more on areas around rivers and registered as an Indonesian intangible legacy [7].

3.2. Na’in
Communities in Timor Leste have an appointment system for natural resources ownership to individuals. This appointment is known as Na’in, the owner [8]. Even though the meaning is the owner, but it does not mean that person takes full control of its utilization, but rather as a guardian or custodian. Na’in has to ensure that the resource under his custody gives positive impacts to all members of society. For example, water Na’in, that Na’in will overlook the water and ensure the water is decent and safe to be consumed and enough for the community.
Na'in is a form of local wisdom for nature's control and warning system. Na'in becomes the community's eyes and ears to overlook essential resources for the community's survival. When a resource that "owned" is changed, if the change is toward less availability of the resource, then the society can react by doing restoration or reconditioning to avoid problems.

Role giving to members of the community gives a sense of responsibility and ownership that will give personal involvement and boosting motivation in taking care of nature. This social role assignment gives a sense of fulfillment and better mental health [9].

3.3. Crop Diversifications
Bobonaro's crop planting local wisdom taught the community not to plant single crop but multiple crops at the same time, such as corn, cassava, banana, taro. Crops are spread in the cropland not just for consumption, but they will help each other. Diversification will provide continuous harvest if the rainfall is abundant and ensure the community still have crops to harvest when rainfall is sparse [10].

This diversification system is very beneficial for soil nutrients content. If cropland is planted only with one crop over and over again, that will cause a nutrient imbalance in the soil since a single nutrient profile is absorbed over and over again by the crop. Other than that, diversification can increase crop yield [11]. Another form of diversification is crop rotation after harvest.

3.4. Terracing and Walls
Generally, the topology of Timor-Leste is narrow plain around the coast and a central mountain range. Steep slopes dominating most of the country with heavy rainfall [12]. Terracing will avoid heavy erosion and landslide if the trees covering the land are removed for cropland. Border of the Terrace border is not made from wood due to wood low durability and avoiding unnecessary tree logging. Terrace borders are made from stones.

Walls for land borders are made from stones as well. Stone walls will prevent erosion where the rich top layer of the soil is swept away by heavy water flows. Stone walls are durable and marked the land border to avoid conflict with other bordering landowners in the future.

3.5. Traditional Medicine
Rural communities have a lot of knowledge of herbal medicine from local plants. For example, papaya leaf to prevent malaria. Traditional medicine is a form of relationship where human dependence on nature. Remote communities are far away from clinics and hospitals, they rely on medicinal plants.

Due to this dependence, these medicinal plants are essential for survival. When nature is damaged, their medicinal plants will not be available. When nature is preserved well, medicinal plants are available whenever they need it. This local wisdom indirectly requires communities to look after nature and it becomes their habit to look after nature well.

3.6. Water Sources Protection
Bobonaro communities believed that locations where water is, produce rains. Therefore, those locations such as springs or lakes are sacred places that protected [13].

This local wisdom directly involves societies to protect their water sources so when drought comes, they can use those water sources. Other than that, when drought comes, Bobonaro societies have several rituals that performed, ceremonial cattle sacrifice, and betel leaves offering at the beginning of the year so waters can be safe to consume all year long.

4. Conclusion
Timor Leste, especially on Bobonaro district, has much local wisdoms since Timor Leste as a young country that still developing with many underdeveloped rural areas. These local wisdoms are still preserved due to how they strongly keep their traditions. Their adherence to local wisdoms keep nature in balance.

There are so many things that can be learned from local wisdom. The modern way of life is formed and supported by science and capitalism which replaces local customs and traditions. Industrialization is not on nature's side, it extracts natural resources faster than nature can keep up, to produce products fast and continuously. Therefore nature is at a disadvantaged position made by human demand. Local
wisdom can be brought into public awareness to remind and change human activities so they friendly to nature and align to Sustainable Development Goals (SDG) 15 [14].

These are the things that can be applied in modern life based on local wisdom in Bobonaro district,
- Create a control and monitoring system for natural resources.
- Review and adjust regulations to protect natural resources periodically.
- Involving the community by assigning them as the stakeholder of natural resources.
- Clustering and counterbalancing industries. Do not put extreme stress on demand of particular natural resources in one place.
- Use safer alternatives for materials.
- Sourcing locally. Grow natural resources while keeping nature in balance. Lowering the carbon footprint from logistics.
- Protect water sources. Climate is changing, prepare for a drought.

Despite the existence of local wisdom, it would not guarantee that nature will be protected since external factors influencing as well. There is Oenbit village, nearby Bobonaro district in Nusa Tenggara Timur, Indonesia, which had manganese mine exploited there [15]. This proves that other than local wisdom, awareness, and involvement from elders and community leaders are needed to enforce it. Local wisdom must be preserved, enforced, and followed responsibly by all community members.

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