



The *Awiq-Awiq* in Controlling Deforestation for Environmental Sustainability: A Deep Ecology Perspective on Forest Management of the Bayan Indigenous People

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Abstract: *Awiq-awiq* is a local wisdoms in forest management used by indigenous people of Bayan in North Lombok, Indonesia. This study aims to identify the behavior of the Bayan indigenous people in controlling deforestation for environmental sustainability from a deep ecology perspective based on *awiq-awiq* forest management. This qualitative research conducted in the Bayan indigenous community in North Lombok. The participants in this study involved traditional leaders, indigenous peoples, sub-district heads, and village heads of Bayan Village. The research data was collected through participatory observation, in-depth interviews, and documentation. Data analysis includes data reduction, synthesis categorization, answering the research objectives, and drawing conclusions. The results indicated that the community’s behavior in managing forests based on *awiq-awiq* aligns with deep ecology principles, which can control deforestation, thus affecting environmental sustainability. Forest management based on *awiq-awiq* may contribute in controlling deforestation for environmental sustainability. The Bayan indigenous people’s behavior toward the forest, which is controlled by *awiq-awiq*, aligns with the deep ecology perspective. This study provides recommendations for environmental sustainability, specifically through the development of a program to implement forest conservation and the optimization of a region’s cultural elements in order to preserve sustainability.

Keywords: *Awiq-awiq*; Local wisdom; Deep ecology; Forest management; Environmental sustainability

1 Introduction

Local culture has various contributions to society, nation and state. These contributions can be seen in its ability to maintain social and environmental harmony through inherited local wisdom [1]. Ethical values, norms and principles in local culture teach solidarity, a sense of togetherness and respect for nature and others [2]. In addition, local culture is also a source of unique arts and cultural heritage, such as musical traditions, dance, visual arts and handicrafts [3]. This contribution has various benefits, one of which is to improve the nation’s economy through the tourism sector [4].

The forest is one of the natural resources that can be renewed, but that management must consider sustainability factors. Forest management affects the composition of forests through the implementation of various concepts and functions. The existence of sustainable forests may have advantages for human well-being and the country’s foreign exchange. Indonesia, which possesses the third largest forest area following Brazil and the Democratic Republic of the Congo, has a significant opportunity to realize economic development by considering forest resource management [5].

Deforestation causes the loss of 50% of the world’s tropical forests to decrease [6], particularly in developing countries such as Sub-Saharan Africa, Latin America, and Southeast Asia [7] which has a negative impact on humanity, increases greenhouse gas emissions, and reduces biodiversity [5]. Despite the phenomena of forest degradation, there are still sustainable forest areas in Indonesia, specifically customary forests in Bayan, West Nusa

Tenggara. Moreover, as its sustainability is preserved, the area of vegetative cover expands. This condition cannot be separated from community involvement in forest management which brings direct economic benefits [8–10]. According to research by Wulandari [11], the rate of vegetation changes in the Bayan customary forest increased from 2000–2012. The change data is presented in Table 1.

The coverage of customary forest vegetation in Bayan has increased for the past twelve years, as shown in Table 1. The rapid growth of vegetation is directly related to the participation of customary institutions in forest management. *Awiq-awiq* are rules relating to human interaction with God, nature and fellow humans that applied in the Bayan indigenous community [11]. According to environmental ethics, human is the part of nature, has the similar position, and cannot be separated from the environment, also known as “deep ecology” concept. According to a Norwegian philosopher [5], stated that the environmental movement known as “deep ecology” is the environmental ethic that focuses to all species and prioritizes the long-term ecological community [12]. This behavior aligns with the perspective of deep ecology which states that the position of nature and humanity is equivalent, thus emphasizing the importance of conservation. Therefore, it is essential to investigate forest management based on *awiq-awiq* from the perspective of deep ecology. It is anticipated that the results can identify the behavior of the indigenous people of Bayan from the perspective of deep ecology based on *awiq-awiq*.

Table 1. Rate of changes of indigenous forest vegetation cover in Bayan Village from 2000–2012

Customary Forest Areas in Bayan Village	2000 (Ha)	2012 (Ha)	Change Rate in 2000–2012
Bangket Bayan	51.25	53.10	2.12%
Mandala	8.98	9.50	0.60%
Tiu Rarangan	5.67	6.01	0.41%
Pengempokan	6.03	7.47	1.65%

2 Method

This research used a qualitative approach that explored the behavior of Bayan indigenous people in managing forests based on *awiq-awiq* from the perspective of deep ecology. Deep ecology is an environmental ethic concepts with ecocentrism approach that considers humans as a component of nature rather than the center of it. Every element, both natural and human, occupies an equivalent position in the living environment. This research was conducted in Bayan Village, Bayan Sub-District, North Lombok Regency, West Nusa Tenggara Province, Indonesia. The research location can be seen in Figure 1.

Data were collected using in-depth interviews, participatory observation Data were collected using in-depth interviews, participatory observation, and documentation. The data, data collection techniques, and data sources are presented in Table 2.

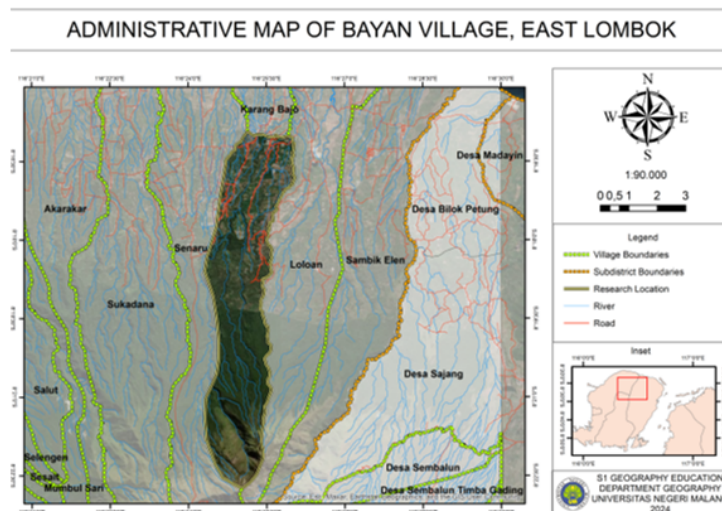


Figure 1. The research location

The research participants included 30 people, consisting of traditional leaders, indigenous people, sub-district heads and village heads of Bayan Village. Furthermore, the traditional leader serves as the key informant for the research, while the head of the sub-district, the head of Bayan Village, and the Bayan indigenous community are supporting informants.

Table 2. The data, data collection technique, and data sources research

Data Sources (Participants)	Data	Data Collection Technique
Traditional Leader and Bayan Indigenous People	Daily activities	Observation
Traditional Leader and Bayan Indigenous People	The data of people's behavior in managing the forest based on <i>awiq-awiq</i>	In-depth interview
Head of Village, Traditional Leader, and Bayan Indigenous People	The data of forest management based on <i>awiq-awiq</i>	Focus Grup Discussion
Head of Village, Traditional Leader, and Bayan Indigenous People	Dailvactivities, data of perception, behavior, the mechanism in forest management	Documentation

A total of 30 informants were used because the research objective was not to make statistical generalizations but to gain a deeper understanding of the phenomenon under study. In qualitative research, sample size is determined based on the principle of data saturation, which occurs when the information obtained is repetitive and no longer yields new findings. In this study, the sample size was used up to the 30th informant because after that point, the data from the informants became repetitive and no new findings were found.

In this qualitative study, the data analysis consisted of five stages: data reduction, categorization through thematic exploration of the information gathered from the participants, synthesis, answering the research objectives, and drawing conclusions from the results. Moreover, data analysis used in this study consists of data reduction, synthesis categorization, answering the research objectives, and concluding the results.

3 Results and Discussion

The behavior of individuals in forest management is influenced by their perception and reaction to their interactions with the forest. Behavior can be defined as the way in which an individual reacts to their surroundings in response to their own perceptions and personalities [13]. The way individuals perceive forests has a substantial impact on whether they exhibit positive or negative behavior [14]. The forest management practices of the indigenous Bayan people are controlled by customary law and *awiq-awiq*. The previous activities can be observed through the participation of individuals and traditional institution in forest management based on *awiq-awiq*. The human behavior in managing the forest is closely related to *awiq-awiq* as stated by an informant as follow:

“We manage the forest following with *awiq-awiq*. One of the regulations is the prohibition of logging the tree without the traditional leader (*toaq lokaq*)/customary institution. A punishment will be applied as a sanction for the violence against *awiq-awiq*. That's why, people attempt to follow the rule, by not doing illegal logging.”

In forest management, *awiq-awiq* is regarded as a regulatory guideline that controls human behavior toward the forest, similar to how natural resources are perceived by humans; this prevents humans from behaving uncontrollably toward the forest. According to Sumarmi and Amiruddin [15], local wisdom is cultural knowledge that includes a model of sustainable natural resource management that involves maintaining a relationship with nature by using and preserving the environment carefully, and it is a realization of an environmental ethic. This case corresponds with the deep ecological concept of human and nature being in the same position, with the emphasis on using natural resources meaningfully and deeply and providing a strong foundation of moral ethics as the human's foundation that must keep and protect the living environment, including forests, so that nature is respected as well [16, 17]. According to the research findings, people's behavior in forest management based on *awiq-awiq* is reflected in the role of the customary institution and people's participation. An increase in local wisdom regarding the management of natural resources corresponds to arise in public participation in forest conservation [18]. Humans protect and preserve the living environment because they recognize that they are a part of nature, and that a continuous living environment is beneficial to all ecological populations, as the concept of deep ecology [19].

The behavior of using forest natural resources for social and customary purposes is presented as the behavior of protecting and preserving customary forest in Bayan, and it must be permitted by the traditional leader in accordance with *awiq-awiq* regulations regarding the allowed actions. Furthermore, people can get natural resources in the forest by picking up rather than strumming. In the context of deep ecology, indigenous peoples' behavior in utilizing forest resources is linked to the principle of political change to ecopolitics. This principle holds that excessive use of forest natural resources can destruct the forest, hence environmental preservation is accomplished by modifying the method of forest preservation [20–23].

The primary goal of a deep ecological perspective is to create environmental balance and justice. The practice of *awiq-awiq* among the Bayan indigenous people raises their ecological awareness of the forest. The customary

law of *awiq-awiq* teaches tree felling, regulates obligations, and even imposes social and theological sanctions, demonstrating ethics that, with biocentric principles, are fundamentally within the context of the Bayan community. This constitutes a responsibility and morality for the Bayan people. *Awiq-awiq* is a local morality in which deep ecology functions in control and spirituality in preserving the forest. Some cultures that align with the principles of deep ecology are the *awig-awig* of the Tenganan indigenous people, Bali, Indonesia. The preservation of the Tenganan ecological forest based on *awiq-awiq* is in accordance with the deep principles that have been able to maintain forest sustainability so that it benefits the ecology, both economically and culturally [24, 25]. Other research findings that demonstrate cultural practices that are able to preserve the environment, such as the Sasi tradition in South Papua, and Pasang Rikajang in South Sulawesi [14, 26].

Forest management is supervised by customary institutions. This is supported by the presence of forest guardians known as *perumbaq* (individuals who supervise and live in the forest) and *penyanding* (individuals who support *perumbaq*) in customary forests. The objective of this forest supervision is to control illegal logging, which is prohibited in *awiq-awiq*. Sanctions will be applied on those who violate *awiq-awiq* by cutting down trees in customary forests for personal gain. This condition aligns with sustainable forest management in terms of forest protection. Forest protection includes the monitoring of the forest for illegal development [23, 27–29]. Violations of *awiq-awiq* by illegal logging in customary forests will be sanctioned through customary discussions (*gundem*), followed by a call to the suspect to explain the punishment and establish a payment schedule. According to the informant, the sanction will be implemented with the support of two witnesses and supporting evidence. Prior to administering sanctions and establishing a payment schedule, the appropriate time is determined through discussion (*gundem*), which is handled over by the traditional leader (*toaq lokaq*), thereby involving the customary institution actively. To create efficient ways to counteract reforestation management, scientific and environmental organizations and authorities should collaborate [30]. In addition to paying the sanction, the violators will also face social exclusion, according to the following informant:

“Before the sanction is carried out, the customary institution (*gundem*) starts an open dialogue mediated by the traditional leader. In addition to paying a large penalty, those who commit the crime will experience disgrace as a result of social exclusion. This case serves as a reminder to individuals not to engage in illegal logging or obey the *awiq-awiq*.”

This traditional deliberation was held in the *beruqaq agung* in the Bayan traditional house (*kompu*), which can be seen in Figure 2.

One aspect of forest management observed among the Bayan indigenous people is the rule to avoid logging of trees without getting permission from the traditional leader (*toaq lokaq*) or customary institution. Illegal tree logging will result in the imposition of mild, moderate, or serious penalties in accordance with the *awiq-awiq*. The following information from an informant relates to this case:

“First-time offenders who practice illegal logging in violation of *awiq-awiq* shall be subject to a medium sanction consisting of a fine that is equal to the value of a chicken, a buffalo, rice 1 *rombong* (a basket of rice), traditional sugar 1 *longsor* (a tube of traditional sugar), *kepeng bolong* (ancient money) 244 pieces and replanting ten tillers of the tree similar to the logged one. The mild sanction is a warning, and the serious sanction is expelled from the customary area, and individuals who repeatedly violate the regulations and refuse to pay the medium sanction will not be supported by the Village.”

The informant’s statement illustrates that the sanctions imposed consist of light, medium and heavy sanctions according to the conditions of the violation. Serious violations will be subject to sanctions of one chicken and one buffalo, 1 *rombong* (basket of rice), 1 *longsor* (traditional sugar tube), 244 pieces of *kepeng bolong* (ancient money), and replanting 10 saplings of the same tree as the tree that was cut down. The payment for these sanctions is made in accordance with the established procedure and schedule. As for the *longsor* (traditional sugar tube) and the *kepeng bolong* (ancient money) can be seen in the Figure 3.

Following *awiq-awiq*, the community avoids from doing illegal logging. Furthermore, this is done to maintain their good reputation. Therefore, customary institutions and leaders must be informed regarding the utilization of forest resources (*toaq lokaq*). Tree logging for commercial purposes is permitted, and forest products may be extracted through picking rather than strumming. This case aligns with the explanation provided by the following informant:

“Bayan indigenous people are allowed to log the trees only for ceremonial purposes and with the institution’s approval. Besides, we use the products of the non-wood forest by picking up not strumming”.

This statement identifies the fair and balanced behavior that the community should demonstrate when utilizing forestry resources. The *awiq-awiq* rules illustrate the relation between humanity, nature, and God. Therefore, individuals’ behavior in forest management, guided by *awiq-awiq* principles, contributes to the sustainability of forests by fostering a harmonious relationship between humanity and the natural world. Finding the harmonization with nature (forest), the people around the forest behave to the forest to keep and preserve the forest ecosystem [31]. The forest management of Bayan indigenous people is reflected from their behavior to the forest based on *awiq-awiq*

in accordance with the concept of deep ecology, which results in local wisdom based on forest preservation. This belief is grounded in the evidence that the local community has the ability to supervise forest management and ensure fairness; furthermore, they share the responsibility of conserving the forest [32–34]. Several studies have found that individuals living in nearby areas of forests effectively protect the environment through conservation efforts [35, 36].



Figure 2. Customary Deliberation (*gundem*) in *Berugaq Agung*



(a)



(b)

Figure 3. (a) *Longsor* (traditional sugar tube) and (b) *Kepeng bolong* (ancient money)

The practice of *awiq-awiq* in the Bayan indigenous community not only serves as a local mechanism for maintaining forest sustainability but also has significant relevance in addressing global challenges such as climate change and deforestation. Customary rules governing the use of forest products, prohibiting indiscriminate logging, and imposing sanctions on violators reflect the application of deep ecology principles that place forests as entities of intrinsic value, not merely economic resources. This mechanism significantly supports climate change mitigation

efforts through protecting forest cover, increasing carbon sequestration, and preserving biodiversity, while demonstrating that local wisdom can make a real contribution to controlling environmental damage [37]. Thus, this study confirms that *awiq-awiq* is not only a cultural heritage but also a model of forest governance based on ecological ethics that challenges technocratic and exploitative approaches and offers a more sustainable alternative in addressing the global environmental crisis.

Table 3. The interaction between deep ecological principle and *awiq-awiq*

Deep Ecological Principle	<i>Awiq-Awiq</i> Custom	Evidence From <i>Awiq-Awiq</i>
Respecting all ways and forms of life in nature	Prohibition of destructing the forest to respect the beneficial.	
Human is only one of the species among many other species. All species have the same value.	Prohibition of logging the tree and it is reflected in the behavior of not logging the tree.	The act of not cutting down trees indiscriminately in customary forests because it is considered a violation of life that must be respected.
The principle of self-realization that views human is not only a social animal but also ecological animal.	Saving and protecting the forestry area and all heritages in it and preserving the forest by planting the trees similar of the existing trees in the forestry area.	Communities replant trees after harvesting forest products
Recognition and respect for the ecological diversity and complexity in a symbiotic relationship.	Applying the sanction for the violator of <i>awiq-awiq</i> ; for example, illegal logging and one of the sanctions is plating ten the similar trees; it means that the tree must be protect.	The implementation of sanctions in the form of light, medium and heavy sanctions consisting of material and reforestation actions, as well as moral sanctions
Political change to ecopolitics	It is prohibited to take the wood product of the forest by strumming, but it is allowed by picking up.	Taking resources in the forest is based on need, not excessive desire because the aim is only to meet current needs (for example, if two candlenuts fall, only one is allowed to be taken).

The conservation of the traditional forest in Bayan is impacted by the *awiq-awiq* substance relating to the deep ecology principle. The foundation of a sustainable and preserved ecosystem is the deep ecology principle [19]. The ecology around the forest with high tree growth and soil fertility can be used to identify its sustainability [28]. The suitability of *awiq-awiq* for the deep ecology is illustrated in Table 3.

The interpretation of the relationship between the principle of deep ecology and *awiq-awiq* custom is compatible, as shown in Table 3. The implementation of *awiq-awiq* to forest management has reflected deep ecology. Establishing a symbiotic relationship between humanity and the natural world by using natural deep ecology behavior [19]. Furthermore, sustainable forest management aligns with the fundamental principles of *awiq-awiq*. Sustainable development is promoted when ecological, economic, and social factors are considered in the utilization of forest natural resources [38, 39]. The condition of the forest is improved by forest protection, which can reduce activities that threaten its sustainability. This protection is also consistent with the fundamental meaning of *awiq-awiq* regarding the forbidden activity, which is the illegal logging of trees. Ecological crises and the manifestation of ecosystem imbalances on a global level result from the excessive exploitation of natural resources in disregard for the carrying capacity of the environment [40]. Forest conservation is an implicit value of *awiq-awiq*, which cannot be separated to the participation of customary institutions in forest management and is demonstrated through environmental awareness actions.

Awiq-awiq as customary laws of the Sasak community does not only serve as indigenous law norms, but also as a way of life that regulates relationships between humans and the environment and between humans. In the ecological context, *awiq-awiq* teaches communities to maintain balance within nature such as laws on forests, rivers, and seas not be excessively exploited. This principle illustrates the existence of local wisdom that is in line with the concept of sustainability, in which nature is part of life that should be taken care of for the next generation [22, 41–43]. On the other hand, in the sociocultural perspective, *awiq-awiq* plays a role in strengthening social bonds through musyawarah, working together, and joint compliance with collective values. Based on this, it can be found that traditional communities can build a harmonious governance system between ecological and socio-cultural aspects,

so that a regular balance is created between humans, the environment and the culture inherited from their ancestors.

4 Conclusions

Based on the findings of this study, *awiq-awiq* has been proven to be an effective customary instrument in controlling deforestation and maintaining forest sustainability, in line with a deep ecological perspective that positions forests as entities of intrinsic value. This indicates that forest management based on local wisdom not only supports ecosystem sustainability but also strengthens the socio-economic resilience of the Bayan indigenous community, which is highly dependent on forests. Therefore, a follow-up recommendation is the need to integrate *awiq-awiq* into formal forest management policies through regulatory support and government-community collaboration schemes, so that cultural values and local mechanisms can function synergistically with modern conservation strategies. In addition, further research programs are needed that not only emphasize qualitative aspects but also measure ecological impacts quantitatively, such as land cover changes, biodiversity, and carbon sequestration, so that the contribution of *awiq-awiq* can be mapped more clearly within the framework of sustainable forest management and climate change adaptation. Thus, this study not only provides academic understanding but also offers policy directions and a concrete research agenda to strengthen environmental sustainability.

Data Availability

The data used to support the findings of this study are available from the corresponding author upon request.

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Conflicts of Interest

The authors declare that they have no conflicts of interest.

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