



Repong Damar as Model of Sustainable Urban Development

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Abstract. The Repong Damar tradition of Pesisir Barat Lampung reflects a sustainable and ecocentric approach to environmental management, deeply rooted in local wisdom. This study explores the potential of integrating Repong Damar values into sustainable urban development as a model for balancing ecological preservation and urbanization. Using a descriptive qualitative method, data were gathered through literature reviews, interviews with local leaders, and field observations of Repong Damar land management practices. Findings reveal that Repong Damar embodies principles such as reforestation obligations ("take one, plant two"), crop rotation, and adherence to customary laws that prevent ecological degradation. These practices have maintained environmental balance, fostered biodiversity, and contributed to local livelihoods for generations. The study emphasizes that applying Repong Damar values in urban planning can mitigate deforestation, enhance resource efficiency, and promote green spaces within urban environments. This research concludes that incorporating Repong Damar principles into urban development policies offers a promising framework for achieving sustainability. By respecting cultural heritage and prioritizing environmental ethics, this approach can inspire innovative strategies for balancing development with ecological stewardship.

Keywords: Repong Damar, Ibu Kota Nusantara, Sustainable Development

1 Introduction

Urban development often leads to significant environmental challenges, particularly deforestation. Forests are frequently impacted by the development of residential areas, which often involves the expansion of infrastructure for transportation, energy generation, wastewater management, and other related services. [1]. The construction of residential areas without sufficient resources to restore original forests, coupled with inadequate planning for land allocation between nature reserves and urban development, will ultimately result in environmental degradation, such as the formation of degraded areas [2]. Urban development is often accompanied by industrial or agricultural expansion, driven by the economic needs of the community or the development itself. For example, out of the six funding schemes for IKN development, at least five involve private sector participation, including public-private partnerships (PPP), private investments, government-business collaborations, international investments, and creative financing [3]. Investment-based funding from the private sector will eventually lead to the need for land to develop infrastructure required by the investors. This is in addition to the daily needs of the residents who will live in IKN, who will also require consumer goods produced by the industrial and agricultural sectors.

In reality, urban or regional development is not the primary cause of deforestation in Indonesia. Previous studies show that most deforestation is driven by land clearing for agriculture, with palm oil plantations being the leading contributor at 23%, covering 2,080,978 hectares. This sector's dominance was even more pronounced between 2008 and 2009, when palm oil plantations were responsible for 40% of total deforestation during that period [4]. While new housing development is not the primary driver of deforestation, it is important to recognize that increased housing correlates with higher consumption levels [5]. The demand for food must ultimately be supported by the opening of new agricultural lands. The existence of the food estate project in Central Kalimantan is also one of the measures to meet national food needs [6].

The establishment of a new city inevitably requires a large amount of land, which is not only designated for urban infrastructure but also for supporting facilities that may be developed in different locations, such as the food estate project, which is separate from the city. This kind of development can contribute to environmental degradation through deforestation. The Ministry of Environment and Forestry Regulation No. 24/2020, which permits the use of protected forests for food estate initiatives, creates opportunities for deforestation and the deterioration of forest functions. This could lead to higher greenhouse gas emissions in Indonesia and exacerbate the impacts of climate change [7].

The development of urban community should entail a greater responsibility towards the environment by implementing compensatory afforestation or offset planting. Unlike reforestation, which involves planting in areas previously damaged by deforestation, compensatory afforestation involves planting in different locations outside the areas that have been used [8]. In fact, this method has long been recognized in Indonesia with even stricter regulations. Compensation for tree cutting or the use of forest land has been applied in the tradition of Repong Damar, which mandates the obligation to replant trees after clearing land that is generally used for agricultural purposes. This tradition has long been practiced by the communities of Pesisir Barat Lampung who rely on the agricultural sector for their livelihood. Unfortunately, the values inherent in this tradition are not widely known in other regions and have not been applied to the utilization of forest land on a larger scale, such as in city development. This research seeks to explore the potential of utilizing the values of the Repong Damar tradition to be implemented in the context of forest land use for urban development.

2 Methods

This study employs a descriptive qualitative method to identify values within the Repong Damar tradition that align with ecocentric environmental ethics. Descriptive research systematically gathers facts [9] and adopts a philosophical perspective supported by literature reviews, interviews, and field observations. This approach aims to inventory, systematize, critically evaluate, and provide new insights [10]. These insights pertain to the application of Repong Damar values in large-scale development projects.

Data were collected through field observations of land management practices in the Repong Damar tradition in Pesisir Barat, Lampung, and interviews with traditional leaders in Way Timbul Village, supplemented by literature reviews. Preliminary observations were conducted to understand the social and physical environment, while interviews provided insights that could not be obtained through observation alone [9]. After data collection, the reports were reduced, summarized, and focused on key points to identify patterns. The data were then classified and interpreted to draw meaningful conclusions.

3 Results

In this study, interviews were conducted twice. The first interview aimed to gather information about Repong Damar from the perspective of village authorities. The interview was conducted at the Way Timbul Village Office on January 12, 2024. The source for the first interview was Mr. Efriansyah, the village head of Way Timbul. The information sought was related to regulations concerning Repong Damar and the current implementation of the Repong Damar tradition. The results of the interview can be seen in Table 1 below:

Table 1. Questions and Answers in The First Interview

No	Question	Answer
1	How large is the Repong Damar area in the Pesisir Barat region that you are aware of?	According to the Regional Government, it was previously stated that the area covers approximately 17,500 hectares. Meanwhile, the Ministry of Environment and Forestry, through Special Regulation No. 47 of 1998, designated the Repong Damar area as 29,000 hectares within the limited production forest in Pesisir Barat Lampung Regency as a Special Purpose Area (KDTI).
2	What steps has the local government taken to preserve and protect the Repong Damar tradition in the Pesisir Tengah district?	A concrete step taken by the regional government was the establishment of an association consisting of damar farmers, named the Repong Damar Farmers' Association (PMPRD).
3	Is there any law regulating Repong Damar?	Legally, Repong Damar falls under Law No. 32 of 2009 concerning the Protection and Management of the Environment. Additionally, under Law No. 41 of 1999 concerning Forestry, Repong Damar is classified as Customary Forest. Moreover, in customary law, the management of Repong Damar is explicitly regulated within it.
4	Are all Repong Damar plantations owned and certified?	All Repong Damar plantations are owned, but not all are certified. This is because some Repong Damar lands have been opened from Pulan Tuha (Primary Forest).

Several important aspects can be derived from the results of the initial interview. The first point relates to the area of Repong Damar, which spans 17,500 hectares or 175 km². When compared to the total area of Pesisir Barat Regency, which reaches 2,889.88 km², the percentage of Repong Damar's area is around 6.05%. This size is not considered significant, given that it is still below 10%. This situation necessitates government support through the establishment of the Repong Damar Farmers' Association (PMPRD) and is also backed by Law No. 32 of 2009.

The research was then continued by interviewing a community leader who is a practitioner of the Repong Damar tradition. The second interviewee is Mr. Zulpikardo, one of the largest damar collectors in the village. This interview took place in the same village on January 14, 2024. The purpose of the second interview was to gain more detailed insights into the essence of Repong Damar and its implementation. The results of the interview can be seen in Table 2:

Table 2. Questions and Answers in The Second Interview

No	Question	Answer
1	What is meant by Repong Damar?	Repong Damar is a plantation that primarily consists of damar trees. This is what differentiates Repong Damar from a typical repong, which usually only contains fruit plantations; Repong Damar is a plantation dominated by damar trees. Additionally, its management has its own set of rules.
2	Is Repong Damar a tradition?	Repong Damar is a tradition that has become legendary among the people of Pesisir Krui since ancient times. This is in order to preserve the natural environment. It is referred to as a tradition because it has generationally maintained its own management rules, which have been adhered to by the entire community of Pesisir Krui.
3	What are the stages of management in Repong Damar?	The forest land that is commonly opened is primary forest or secondary forest, referred to as Pulan Tuha. The land that is cleared and cut down until it is ready to burn is called reba. The land that is ready to burn and plant is called pangrula or darak, which will gradually evolve into a plantation and repong. At this stage, reba may sometimes be left behind because it could not be burned in time due to rain or other reasons, causing the land to revert to brush (reba berok or rerahan) and forest (pulan ngura, pulan ngurai bai). If the newly abandoned rerahan land is cultivated again, it is referred to as repohan and will subsequently become darak, a plantation, and finally repong. Although the structure of the pulan ngura bai forest has equaled that of pulan tuha, the people of Krui still classify it as secondary forest because it has been previously cleared by humans
4	In the Repong Damar tradition, which stage is the most important?	All stages in Repong Damar are important because if any stage does not proceed, it will inevitably lead to delays in the entire cycle.

No	Question	Answer
		This would be detrimental to both the managers and the community at large due to the decrease in the area of Repong.
5	Is there customary law that regulates Repong Damar?	Yes, the customary law regarding Repong Damar regulates the management process, starting from the determination of the forest to be designated as pangrula or darak, until it becomes Repong Damar, which is equivalent to primary forest or pulan tuha. The regulations include examples such as "if you take 1, you must plant 2" and "forests that have been burned but left to become overgrown with shrubs are considered primary forests that can be cultivated by others."
6	Is there a penalty for community members who do not comply with customary rules? And what are the penalties?	There are specific penalties for community members who do not comply with customary rules, and these depend on the nature of the violation. For instance, if someone fails to plant the required number of trees, they may lose their land rights.
7	How high is the status of customary regulations in the Pesisir Barat at this time?	Customary practices in Pesisir Barat Regency are highly valued, similar to other regions in Lampung. This is because these customs have been firmly held for generations, passed down from the ancestors of the Lampung people, becoming an integral part of their identity.
8	Are there any other regulations besides the written regulations in the Repong Damar tradition?	Traditional regulations are essentially unwritten and are determined by customary leaders. In addition to these traditional regulations, the community also believes that certain practices in the management of Repong Damar must not be violated, such as cutting down trees that are at least 15 years old or first offering prayers to the ancestors. If these practices are not observed, the community believes that they will incur bad karma
9	How relevant is it to disseminate the Repong	It is highly relevant, as there are customary rules that govern everything from the

No	Question	Answer
	Damar tradition to the entire community in Indonesia and the world?	determination of Pulan Tuha to be used as land, to its development into repong, and ultimately into Repong Damar.

From the interview results, several important points can be highlighted. The first point relates to Repong Damar as a tradition that has strict regulations, allowing for penalties for violators. These regulations have been upheld by the community from ancient times to the present day. The second point concerns the various stages involved in the Repong Damar tradition. However, referring to the answers to the questions, there was no explanation regarding the regulations concerning an individual’s obligations when clearing land for other purposes, such as constructing buildings. To address this gap, the researcher conducted additional interviews via electronic messages to supplement the findings. From the information obtained, homeowners are required to allocate land for gardens; however, there is no obligation to plant damar trees in these gardens. In summary, the entirety of the repong tradition can also be viewed in Fig 1.

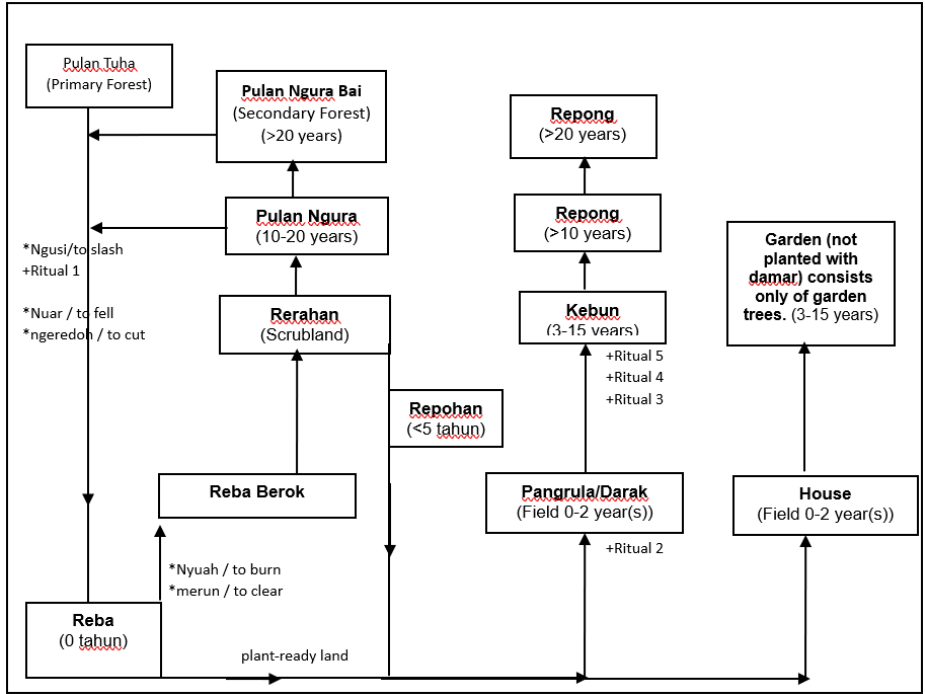


Fig. 1. Illustration of the stages in the repong damar tradition

In the reba phase, if a house or dwelling is to be built as seen in Fig. 1, additional requirements apply. In this case, the community is obliged to follow the prevailing customary rules, which involve obtaining permission from community leaders. The primary requirement is that there should be no disputes regarding the ownership status of the reba or the land intended for the house. Furthermore, the most important rule is that the area surrounding the house must remain a repong or a regular plantation. The community in Krui, which manages the pulan tuha for settlement areas, generally opts to create a plantation instead. This is because a repong is required to have a variety of tree species, making it difficult to clear the land when constructing a new house.

In Fig. 1, rituals 1, 2, 3, 4 and 5 can also be seen, which were not included in Table 2. The rituals in the Repong Damar tradition are divided into five distinct rituals. Ritual 1 is the ngebabalih ritual (establishing a peaceful relationship with the forest spirits), Rituals 2 and 3 are tetumbai rituals (performed during planting), Ritual 4 is the ngejalang ritual (performed during the harvest season), and Ritual 5 is the ngum-bai ritual (performed after the harvest). These rituals can be seen as a manifestation of respect for the components present in nature by positioning oneself as an equal being that relies on one another.

4 Discussion

4.1 Repong Damar and Environmental Ethics

Repong Damar is a form of local wisdom that has existed for a long time, to the extent that no one knows exactly when this tradition began to be recognized by the communities of Pesisir Barat Lampung. Some believe that the tradition has been known since the Dutch colonial period, approximately 120 years ago, and has become an integral part of farming practices for the communities of Pesisir Barat Lampung. Passed down for more than a century, this tradition has been able to maintain environmental balance and prevent landslides, thanks to the damar trees that help stabilize the soil [11]. The values that are capable of maintaining environmental balance make Repong Damar a potential ethical system, particularly in terms of environmental ethics.

In environmental ethics, every ethical system is typically divided into two main perspectives: anthropocentrism and ecocentrism. Both approaches prioritize positive outcomes and consider environmental care as a consequence of following either view. The distinction lies in the reasoning for protecting the environment. From an anthropocentric viewpoint, environmental preservation is seen as essential because it benefits humanity. In this sense, human interests take precedence in all actions, including efforts to protect nature. Conversely, ecocentrism views environmental stewardship as an inherent human duty, recognizing humans as equal to other components of the ecosystem. Therefore, protecting the environment is regarded as respecting the rights of other living organisms or ecological elements [12].

The awareness of maintaining the damar tree population among the communities of Pesisir Barat Lampung is not solely driven by knowledge of the long-term impacts of forest function loss, as the concept of global warming was only popularized by Wallace Broecker in 1972, and first mentioned by Svante Arrhenius in 1896 [13]. This suggests that the Repong Damar tradition emerged purely from the awareness of Pesisir Barat Lampung communities, who regard the damar tree as having an equally important role as other plants that serve as commodities directly beneficial to humans, in this case, the people of Pesisir Barat Lampung. This perspective is clearly aligned with how ecocentrism views the interests of all living beings as equally important, so the desire to protect the environment is not solely based on the impact it will have on humans, but is deeply ingrained within the society of Pesisir Barat Lampung.

There is a strong connection between the responsibilities of the people of Pesisir Barat Lampung when building houses and the principles of house construction inspired by the values of deep ecology. Deep ecology itself is a paradigm that emerged as a response to anthropocentrism, pioneered by Arne Naess, highlighting the interdependence and interaction between humans and the natural world [14]. Housing complexes maintained in the spirit of deep ecology with designed elements for urban agriculture (horizontal or vertical) combine the reproduction of traditional landscape elements such as woodlands, barks, meadows, and pastures [15]. This is identical to the obligations of the people of Pesisir Barat Lampung, who are also required to provide land used as repong or a regular garden. Due to the universal principles of Repong Damar, the values and regulations within this tradition can also be implemented in the development of city by referring to development that is inspired by the values of deep ecology.

4.2 The Value of Repong Damar in Sustainable Urban Development

In urban areas, overconsumption creates a lengthy chain of food system losses, including agricultural residues from production, inefficient feed conversion in livestock, losses during handling, storage, and distribution due to spillage and degradation, processing losses, consumer waste where uneaten food reaches the consumer, and excessive intake beyond nutritional needs [16]. This inefficiency arises from the lengthy food distribution chain, which is a result of the significant distances between agricultural producers, manufacturers of processed products, and consumers. This is further extended by a series of failures in food estate projects, leading to food consumption issues in the Kalimantan region [17]. As a result, food consumption in Kalimantan will still depend on producers from outside the area. Implementing smart systems could enhance efficiency. For instance, advanced technologies can help prolong food shelf life and reduce food loss and waste [18].

Giving nature a rest is actually common in agriculture, such as through crop rotation. However, in practice, the demand for mass production often forces farmers to continue monoculture farming, which has detrimental effects on the surrounding ecosystem, particularly the quality of the land itself [19]. The principle of giving nature a resting period is also manifested in the Repong Damar tradition. The people of Pesisir Barat have become accustomed to practicing crop rotation by allowing land that is considered to be losing its fertility to rest while planting in other areas. When leaving the old land, they allow the resin and other trees to grow, resulting in a forest-like appearance a few years later [20]. The concept of a green city aligns with the traditional values of Repong damar by providing space for plants to grow, allocating at least 75% of the area as green open space [5]. This is what makes it important to ensure the government's commitment to realizing a green city, in order to demonstrate responsibility towards the environment,

The application of the principle of 'take one, plant two,' found in the tradition of Repong damar, can also be implemented in the development of the new city, such as IKN. Since the development of IKN will take an area of forest spanning 145,920 hectares (57% of 256,000), the government is obligated to plant trees over an area of $145,920 \times 2 = 291,840$ hectares. This area is even larger when compared to the area of Palangkaraya, which is 285,300 hectares. While this may be a challenging commitment for the government, it is not impossible. For example, according to a report by Walhi quoted in Tempo, there are 15,579.747 hectares of former tin mining land in Bangka Belitung that have not been reclaimed [21]. If the government can increase the intensity of reclamation, it is not impossible to fulfill the responsibility of replacing the forest land needed for the development of the new city. The government can also utilize abandoned buildings, which often become spaces for vandalism by the local community [22]. These non-heritage abandoned buildings can be demolished, allowing the land to be repurposed as green open spaces.

Even if it is not possible to fully implement all the values of Repong Damar, the government should at least ensure that for every building constructed, there is green open space, just like the tradition of building homes in Repong Damar. This value can be strengthened by local regulations that require anyone planning to build in the city to allocate part of their land for a simple garden with plants. Similar regulations already exist in some areas, such as Magetan, which encourages tree-planting movements, including for those planning to get married [23]. Such regulations would be even more relevant if applied to developers or the general public building structures. With the implementation of this regulation, urban area development can fulfill its responsibilities towards the environment.

5 Conclusion

The Repong Damar tradition exemplifies a sustainable and ecocentric approach to land management, offering valuable lessons for urban development. By integrating practices such as tree planting obligations, crop rotation, and adherence to customary laws, the Repong Damar system has preserved environmental balance while supporting local livelihoods for generations. These values demonstrate the potential to align urban planning with environmental stewardship, ensuring that development does not come at the cost of ecological degradation.

This study highlights that urban development can benefit from adopting traditional ecological practices like those in Repong Damar. Key principles such as balancing land use, fostering biodiversity, and maintaining green spaces can address contemporary challenges of urbanization, including deforestation and resource inefficiency. Moving forward, incorporating Repong Damar values into urban planning and policy can serve as a model for achieving sustainable urban development. This approach not only safeguards the environment but also upholds cultural heritage, emphasizing the importance of integrating local wisdom in broader development strategies.

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