

Restore the Actant in the Socio-Ecological Sustainability Debate: A Case Study of the Ekowisata Mangrove Hijau Daun CSR Program

Eka Setia Budi¹, Dewi Luqmania², Anjumiz Sunani³

^{1,2,3}PT PLN Nusantara Power UP Gresik, Indonesia

Email: eka.setia@plnnusantarapower.co.id

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Abstract. Natural activities are considered the primary cause of environmental damage that occurs in various locations. However, in reality, humans also contribute to environmental degradation, leading to climate change. Erosion and flooding disasters in the coastal areas of Daun Village do not solely occur due to the intrusion of seawater but also due to the behaviors of people who harm nature by engaging in mangrove deforestation and the use of chemicals by fishermen. This study aimed to highlight the Hijau Daun Mangrove Ecotourism Program as a best practice in conservation practices, serving as a significant consideration for the sustainability of human (actor) and non-human (actant) agencies in the future of Bawean Island. The method employed was a case study with a single-case study design and secondary data analysis, where the unit of analysis is the CSR Program of PT PLN Nusantara Power UP Gresik. The Hijau Daun Mangrove Ecotourism Program successfully addresses the issues caused by natural disasters and the activities of the local community that exacerbate their impact. Together with the Hijau Daun Community Monitoring Group (Pokmaswas Hijau Daun), CSR PT PLN Nusantara Power UP Gresik has been able to restore land, subsequently utilized for mangrove ecotourism, shrimp and crab aquaculture, agricultural land, and mangrove product processing. The restored mangrove forest provides more benefits to the people of Daun Village through the development of integrated programs. The goal of program implementation is not only to preserve the existence of the mangrove ecosystem as an actant but also to create reciprocity from environmental conservation activities for the future existence of humans (actors). The presence of volunteer movements in the community, such as Coastal Warriors, can help achieve the goals of the program.

Keywords: Mangrove Conservation, Community Movement, CSR.

A. INTRODUCTION

Climate change is a contemporary issue that poses a genuine threat to the global ecology (J. Moore, 2015, 2019; Swyngedouw, 2013). As a global concern, climate change is debated in various contexts, particularly in relation to the forms of erosion and flooding disasters. Nevertheless, the connection between climate change and these two disasters is not discussed as extensively as the overarching issue of climate change itself (Hylland Eriksen, 2020). However, climate change in the form of erosion and flooding is indeed manifesting in various locations, including affecting remote areas in eastern Java, Indonesia, such as Bawean Island. In this context, Daun Village stands out as the most severely impacted area by erosion, leading to the disappearance of agricultural land, which is a primary source of livelihood for coastal communities (Statistics Indonesia, 2021).

However, to date, the debate on climate change, specifically in the form of disasters such as erosion, has remained stagnant and primarily centered around the concept of anthropocentrism (Fowles, 2016; J. W. Moore, 2016). Yet, there have been criticisms of anthropocentrism, including the intention of this perspective to question non-human actants or agencies in the everyday practices of human life (Latour, 1990).

The environment, for instance, is often relegated to a subordinate position to be conquered (Fowles, 2010; Smith, 2008). Alternatively, disasters like floods and erosion, which

frequently occur, are merely considered natural events in which non-human agencies alone contribute to the creation of disasters (Smith, 2006). Such a viewpoint subsequently casts doubt on specific human agencies, such as illegal loggers, who are actually directly involved in driving these disasters (SODEC, 2019a).

This article aimed to highlight the erosion disaster in Bawean Island, which has driven the emergence of the Om Budi CSR Integration Program by PT PLN Nusantara Power UP Gresik, Indonesia. The CSR program comprises three integrated programs: the Ekowisata Mangrove Hijau Daun Program, the Shrimp and Crab Cultivation Program, and the MSME Development Program. These programs continue to exist and are currently being implemented and supported by various agencies, including groups, companies, and the government, to address ongoing socio-ecological crisis issues in Bawean Island.

Furthermore, the extensive integration of the CSR program not only emphasizes erosion management through mangrove conservation but also inherently contributes to sustainability and a sense of security, especially for the communities that have been engaged in crab and shrimp cultivation after coastal farmland was eroded. The question then arises: Why is the best practice of the Ekowisata Mangrove Hijau Daun Program, particularly in conservation practices, a significant consideration for the sustainability of human (actor) and non-human (actant) agencies in Bawean Island in the future? This question in this study is answered by linking and giving primary attention to the Ekowisata Mangrove Hijau Daun Program through the actor-network theory by Bruno Latour.

B. METHOD

This study was conducted as a single case study (Hollweck, 2015; Yin, 2009), focusing primarily on answering the question: "Why is the best practice of the Ekowisata Mangrove Hijau Daun Program, particularly in conservation practices, a significant consideration for the sustainability of human (actor) and non-human (actant) agencies in Bawean Island in the future?" Data collection for this study was carried out through direct interviews with various stakeholders, including the CSR program implementers from PT PLN Nusantara Power UP Gresik. Additionally, secondary data analysis was gathered from company CSR documents related to the program.

The study was located on one of the remote islands in eastern Java, specifically Bawean Island, with a particular focus on Daun Village, where the implementation of the Ekowisata Mangrove Hijau Daun CSR Program took place. This study thus refers to the practices carried out by the Hijau Daun Community Monitoring Group (Pokmaswas Hijau Daun). Pokmaswas Hijau Daun engages in ecotourism practices along the coast of Daun Village with two primary objectives, including economic and ecological goals.

The ecological objective remains the predominant focus in the business of Pokmaswas Hijau Daun. Essentially, ecotourism emerged in response to concerns about the significant erosion that affected the coastal areas of Bawean Island back in 2004. Therefore, this study primarily investigates the mangrove conservation practices carried out by Pokmaswas Hijau Daun, which are inseparable from their ecotourism business. On one hand, it remains a business that prioritizes economic profit through the appropriation of the beauty of mangrove landscapes and other ecosystems. On the other hand, the successful environmental conservation efforts represent an intriguing gap that warrants further in-depth exploration.

C. RESULT AND DISCUSSION

In Bruno Latour's actor-network theory, actors are defined as all interconnected elements that naturally form networks, where actants are noted as actants capable of controlling other actors. The environmental degradation occurring in the Sangkapura District, Bawean

Island, is solely attributable not to natural factors but to human activities. It is reported that the people of Bawean Island began exploiting mangrove forests for their daily needs as early as 1998 (Munif et al., 2021). This situation exacerbated the impact of the flood disaster that occurred around 2004 on Bawean Island, particularly in the Sangkapura District. This disaster affected 43 hectares of agricultural land owned by the local community, including the agricultural areas of Daun Village, resulting in the loss of livelihoods for the residents.

Recognizing that the natural disaster was not solely a result of natural factors, the leaders of Daun Village initiated mangrove planting independently in the 1990s. However, this movement was carried out sporadically and did not have a widespread impact. Therefore, the village elders entrusted this environmental initiative to the younger generation, forming a group called the Coastal Savivors Community Forum (FKPP) in 2008. This forum's role was to protect the mangrove areas and coastal regions of Daun Village while providing education, particularly to fishermen, to refrain from using chemicals or substances that could harm the marine ecosystem. This community continued to grow and eventually changed its name to Hijau Daun Community Monitoring Group (Pokmaswas Hijau Daun) in 2013, supported by the East Java Provincial Fisheries and Marine Office (DKP).

Pokmaswas Hijau Daun emerged as an actor capable of transforming the environmental damage experienced by Daun Village through activities such as mangrove planting, coral transplantation, environmental preservation education, and various other conservation activities. The mangrove planting activities of Pokmaswas Hijau Daun were carried out in collaboration with government agencies, such as the DKP, the Department of Environment (DLH), and the Natural Resources Conservation Center (BKSDA) in the East Java Province, as well as the private sector. The CSR initiative of PT PLN Nusantara Power UP Gresik has been instrumental in planting 48,448 mangrove trees, a project that began in 2015, and in improving embankments to prevent erosion in the area. These activities complement and enhance the mangrove forest restoration efforts previously undertaken by Pokmaswas Hijau Daun in collaboration with various government agencies in the East Java Province.

The long-term environmental improvement efforts undertaken by Pokmaswas Hijau Daun have ultimately paid off. Pokmaswas Hijau Daun has successfully transformed environmental challenges, such as environmental degradation caused by local community activities and areas exposed to erosion disasters, into a mangrove forest covering an area of 69,058 hectares through mangrove planting activities and coastal conservation education for the community. The mangrove forest in Daun Village contributes to reducing air pollution by absorbing 2,654.3 tons of carbon dioxide (CO₂) annually and producing 6,336 kilograms of oxygen (O₂) each year. This achievement led Pokmaswas Hijau Daun to receive provincial-level awards in East Java, specifically the first prize in Resource Conservation of Water Resources and the first prize in Pokmaswas Evaluation in 2016.

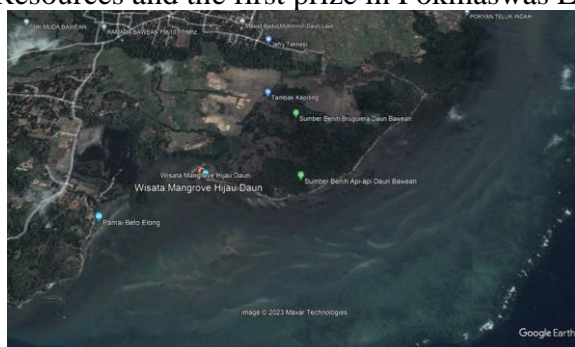


Figure 1. Condition of Daun Village in 2009



Figure 2. Condition of Daun Village in 2021

PT PLN Nusantara Power UP Gresik has transformed a mangrove forest that resulted from the restoration efforts of the Hijau Daun Community Monitoring Group (Pokmaswas Hijau Daun) into an education-based mangrove tourism area through the Hijau Daun Mangrove Ecotourism Program. This program was initiated to enhance the economic benefits of mangrove forests, particularly through the development of tourism and mangrove seedling nurseries in 2019. Hijau Daun Mangrove Ecotourism has become one of the flagship attractions on Bawean Island. This tourism initiative offers a range of attractions, including the beauty of the mangrove forest, beaches, and various photo spots. The mangrove ecotourism activities have generated a revenue of IDR 128,087,500,- by 2023 from ticket sales and the sale of mangrove seedlings by the Hijau Daun Community Monitoring Group (Pokmaswas Hijau Daun).

The Hijau Daun Mangrove Ecotourism Program encompasses various activities aimed at enhancing the capacity of local groups to manage tourism while providing support through the development of facilities and infrastructure for tourism activities in the Hijau Daun Mangrove Ecotourism area. These include the creation of ecotourism interpretation boards, the construction of a mangrove gateway in Daun Laut Village, the establishment of a mangrove monument, and the renovation of the tourism parking area. As a power generation company, CSR PLN Nusantara Power UP Gresik installed a solar power plant (PLTS) in the Hijau Daun Mangrove forest area in 2018. This initiative represents a core competency of the company, whereby the community is encouraged to utilize appropriate technology harnessing solar energy to meet their electricity needs within the Hijau Daun Mangrove forest area. The use of PLTS in remote areas is more efficient and practical compared to using generators to produce electrical energy. The company transferred knowledge to the Hijau Daun Mangrove Ecotourism Program (Pokmaswas Hijau Daun) for the maintenance and use of PLTS.

The Hijau Daun Mangrove Ecotourism Program has created a multiplier effect on the local economy through the development of new businesses in Daun Village, such as motorcycle taxi services, small eateries, homestays, mangrove-based products, Bawean beekeeping, and more. Mangrove forests not only serve as tourist destinations but also provide leaves and fruits that can be utilized in food processing. CSR PT PLN Nusantara Power UP Gresik, in collaboration with the Putri Rembuyut Group, has processed mangrove resources into food products such as syrups, jams, and beverages. This mangrove-based enterprise utilizes fruits from various *Sonneratia* sp. mangrove species. The Putri Rembuyut Group consists of 12 members who are the wives of Pokmaswas Hijau Daun members.

Table 1. Implementation of the Hijau Daun Mangrove Ecotourism Program from Year to Year

Year	Program Implementation
2015-2017	Planting of 20,000 mangroves
2018	<ul style="list-style-type: none"> ● Planting of 10,000 mangroves. ● Installation of 40 coral reef stupas. ● Placement of 30 floating anchors. ● Implementation of sustainable fishing practices by fishermen. Installation of PLTS in the Hijau Daun Mangrove Ecotourism area.
2019	<ul style="list-style-type: none"> ● Development of Hijau Daun Mangrove Ecotourism through capacity-building activities for the Hijau Daun Community Monitoring Group (Pokmaswas Hijau Daun). ● Coastal conservation education. ● Diversification of mangrove-based processed products.
2020	<ul style="list-style-type: none"> ● The synergy between mangrove ecotourism development and integrated fisheries cultivation efforts.

2021	<ul style="list-style-type: none"> ● Optimization of mangrove tourism attractions. ● Optimization of educational activities within ecotourism. ● Optimization of ecotourism marketing. ● Development of new enterprises. ● Certification of 1,184 mature trees from 6 Mangrove Species.
2022	<ul style="list-style-type: none"> ● Propagation of 5,150 mangrove seedlings ● Planting of 2,110 mangrove trees. ● Marketing of 2,675 mangrove seedlings. ● Development of the mangrove education concept for intern students, community service program (KKN), and thesis research.
2023	<ul style="list-style-type: none"> ● Integration with the Aquaculture Group (Pokdakan) Putra Daun. Integrating mangrove education, nature tourism, and aquaculture studies within a single location in the Patekang area of Daun Village.

Engaging in mangrove-based processing ventures represents a promising new business potential worthy of development. Besides the fact that the raw materials are sourced directly from nature, these processed mangrove products are also distinct and challenging to replicate. The Putri Rembuyut Group is encouraged to continuously innovate in creating diversified mangrove-based products. This innovation enables the group to actively participate in educating the public about the wise utilization of mangroves, specifically focusing on the use of mangrove fruits and leaves. Additionally, diversifying mangrove-based products can enhance the group's income.

The mangrove ecotourism program by CSR PLN Nusantara Power UP Gresik began with mangrove conservation efforts and the construction of a 536-meter-long abrasion control embankment. Through these activities, the company and Pokmaswas Hijau Daun have successfully rehabilitated a coastal area of 15 hectares, which is now being utilized for agricultural purposes covering 7 hectares, involving 50 farmers. This land is also employed for an integrated aquaculture program, co-developed by the company, utilizing 1.3 hectares of land, and an additional 6.7 hectares of land ready for community utilization. The integrated fisheries cultivation program, known as OM BUDI, was initiated by Pokmaswas Hijau Daun and the company to maximize the benefits of restored land as shrimp and crab cultivation ponds managed by Pokdakan Putra Daun. This program is an integral part of the Hijau Daun Mangrove Ecotourism development, maintaining environmental preservation throughout the cultivation process.

The OM BUDI program was developed by CSR PT PLN Nusantara Power UP Gresik in collaboration with the Putra Daun Fish Cultivation Group (Pokdakan), which works synergistically with Pokmaswas Hijau Daun in converting restored land into aquaculture ponds. Pokdakan Putra Daun consists of 14 fish cultivators, some of whom are also members of Pokmaswas Hijau Daun. This program serves as an alternative source of livelihood for the residents of Daun Village during the COVID-19 pandemic. Pokdakan Putra Daun specializes in the cultivation of vaname shrimp and the growth of mangrove crabs, utilizing *Rhizophora sp.* mangrove trees as supplementary feed and medicine. The program also incorporates a Wastewater Treatment Plant (IPAL) for the ponds to reduce water pollution resulting from the exchange of pond water, which contains numerous residues. The IPAL not only serves to reduce nitrogen and phosphorus content in pond wastewater but also ensures that discharged water does not contaminate rivers or the sea.

In Bruno Latour's theory, an actor is defined as any element connected within a system that will later form a network scientifically. The involvement of key actors in the CSR program of PT PLN Nusantara Power UP Gresik is one of the keys to the success of the Hijau Daun Mangrove Ecotourism Program. The influential key actor approach in the community

encourages a shift in the culture of Daun Village's residents. Village elders are respected figures who act as key opinion leaders, actively participating in environmental awareness efforts within the Daun Village community. Furthermore, the guidance provided by CSR PT PLN Nusantara Power UP Gresik to Pokmaswas Hijau Daun has also led to the emergence of local heroes within the group, earning the Provincial-level Kalpataru award in East Java in 2021 for successfully transforming community behavior on a broad scale.

In the empowerment process of the Hijau Daun Mangrove Ecotourism Program, PT PLN Nusantara Power UP Gresik involves 54 members of Pokmaswas Hijau Daun as beneficiaries, comprising individuals from various backgrounds. Some members of the group were formerly mangrove loggers and turtle egg hunters as their livelihoods. The call of nature, as an actant, has transformed the behavior of the Daun Village community from environmental destroyers to environmental stewards. Members of Pokmaswas Hijau Daun who previously engaged in environmental degradation to support their families have now become environmental custodians and educators in mangrove conservation and turtle conservation. In fact, 11 members of Pokmaswas Hijau Daun have become environmental conservation trainers and actively provide environmental education in various areas of Bawean Island.

Humans, as actors, strive to align themselves with the natural environment, thereby leading to social and cultural changes. Max Weber, in his book "Sociological Writings," argues that changes in social and cultural aspects result from changes in societal situations due to the incongruity of elements (Baharuddin, 2015). The Hijau Daun Mangrove Ecotourism Program has succeeded in transforming the system and behavior of the community for the better, driven by a grassroots movement. Pokmaswas Hijau Daun, with support from CSR PT PLN Nusantara Power UP Gresik and the community leaders of Daun Village, seeks to align itself with the surrounding environmental conditions. Conservation efforts along the coastal areas are promoted by the group to enable sustainable living in Daun Village. The Pokmaswas Hijau Daun's commitment to preserving the coastal environment has initiated the formation of coastal warriors, comprising 46 children of Pokmaswas Hijau Daun members. These coastal warriors regularly engage in coastal cleanup and mangrove planting activities in the coastal areas of Daun Village.



Figure 3. Mangrove Nursery House



Figure 4. Mangrove Planting Education

The environmental improvement activities undertaken by the Hijau Daun Community Monitoring Group (Pokmaswas Hijau Daun) in collaboration with CSR PT PLN Nusantara Power UP Gresik have also led to the establishment of village regulations (Perdes) concerning environmental conservation in Daun Village. The Daun Village government issued Regulation Number 6 of 2018 concerning environmental preservation in Daun Village, which governs the use of the environment, including land, water, air, and all living organisms, both flora and fauna, that is beneficial for the sustenance of life and human well-being. This regulation, binding in nature, prohibits all activities by the community that may result in environmental

pollution or damage within the Daun Village area. In this regard, Pokmaswas Hijau Daun acts as a monitor of community activities and as an educator in coastal conservation for the residents. Daun Village residents can report any environmentally destructive activities to Pokmaswas Hijau Daun, which can then be addressed by the Daun Village government.

Regulation Number 6 of 2018 was formulated based on the environmental challenges previously faced by Daun Village. The degradation of the coastal environment in Daun Village was not solely the result of mangrove deforestation but was also due to the activities of fishermen using chemicals and explosives for fishing, as well as the exploitation of rock and sand mining. This regulation also stipulates sanctions in the form of compensation for trees and land restoration through planting and land reconditioning. For instance, any Daun Village resident who disperses chemicals and toxins for fishing will be subject to sanctions, including compensating with the planting of 50 tree seedlings and conducting reforestation. This regulation also encourages active community participation in its implementation. The community is expected to play an active role as social and environmental monitors, offering suggestions, opinions, proposals, objections, and complaints, as well as providing information and reports. The community has an equal and extensive opportunity to actively engage in the preservation and management of the environment.

The presence of actants in the CSR program of PT PLN Nusantara Power UP Gresik has the capacity to influence lifestyles, thus reshaping the structure within the Daun Village community. This, in turn, has led to the emergence of actors as key opinion leaders or key actors, further encouraging change. The environmental preservation activities enforced by village regulations indirectly compel the residents of Daun Village to carry out their activities without harming the surrounding environment. Furthermore, the development of the Hijau Daun Mangrove Ecotourism program is directed towards becoming a center for mangrove studies or a learning laboratory in the eastern part of Java. Within the Hijau Daun Mangrove Ecotourism, 3,000 individuals from 75 institutions have already participated in learning about mangrove conservation. This is reinforced by the presence of a mangrove nursery house, which serves as the propagation center on Bawean Island, where six types of mangroves have been certified by the Technical Implementation Unit for Forest Seedlings (UPT PTH) of East Java Province.

The concept of anthropocentrism, which places humans at the center of the universe and attributes value to them, while considering nature as a tool to satisfy human interests and needs, leading to exploitation, has not proven true in the community of Daun Village. The changes in the social and cultural constructs of Daun Village's residents as a result of the environmental preservation activities of the Hijau Daun Community Monitoring Group (Pokmaswas Hijau Daun) serve as evidence that anthropocentrism does not prevail within the scope of Daun Village's community. Environmental degradation resulting from excessive exploitation of nature has sparked a movement among the community to improve both environmental conditions and their own behavior. The planting of mangroves, initiated by the village elders in 1999 and continued by the younger generation of Daun Village, has borne fruit in the present and undoubtedly for the future.

The changes in social and cultural constructs are considered the value system of Daun Village's community, which has had a positive impact on the environment and significantly contributes to sustainable community life. This aligns with the paradigm of ecocentrism, which posits that humans and their environment (animals, plants, and natural materials) are an integral and harmonious unity (Arimbawa & Putra, 2021). The efforts of Pokmaswas Hijau Daun have cultivated awareness among the residents of Daun Village to live in harmony with nature and their surrounding environment. The CSR program of PT PLN Nusantara Power UP Gresik has successfully empowered Pokmaswas Hijau Daun and has had an impact on changing the

behavior of the group, as well as the entire community of Daun Village, encouraging them to conduct their activities without harming the natural environment. Consequently, the goal of developing the CSR program of PT PLN Nusantara Power UP Gresik towards Daun Sustainable Village has been realized through various efforts undertaken by community groups, corporations, and governmental entities.

Restoring the Coastal and Mangrove Perspective as Living Actants

It has been extensively studied by many scholars that the philosophy of Cartesian and Kantian dualism, which is rooted in the productive dualism of separating Nature and Humanity (Buchli, 2015; J. Moore, 2015; Smith, 2008), practically creates significant issues in constructing human thinking, even in daily practices. This philosophy of dualism is often unconsciously embraced by many people and is problematic in practice. For example, few people question whether Nature and Humanity are truly separate or whether there is a network connecting them, making Nature and Humanity, in reality, not separate.

Building upon this perspective, it can be traced and linked to different material historical contexts before and after the 1990s, particularly in Daun Village, Bawean Island. *Firstly*, it can be observed that the coastal erosion disaster occurred after the 1990s when extensive mangrove deforestation took place for the commercial needs of the community, such as crafting, agricultural equipment, and the sale of timber. This deforestation led to a major disaster, encompassing 43 hectares of coastal land, including the fields of local residents, being ravaged by erosion (SODEC, 2019b, 2019a).

This reality illustrates that disasters, especially erosion, are not solely the actions of what is referred to as "nature" to be subsequently labeled as natural disasters or natural events. Instead, there is human involvement, including the inhabitants of Bawean Island, in driving the "production of disasters." Therefore, disasters, often believed to occur naturally, are devoid of such a meaning. As Neil Smith (2006) aptly states, there are no disasters that transpire "naturally".

Including the significant erosion on Bawean Island that occurred in 2004, it was not merely a natural disaster. The involvement of several individuals who contributed to the massive deforestation of mangroves has also reshaped the relationship between humans and non-human entities. This is evidenced by the consequence of the disappearance of coastal farmland due to erosion, despite the fact that these fields had long been a cornerstone of the local economy (Putra et al., 2017). The coastal farmland ravaged by erosion and no longer suitable for agriculture was not solely a result of natural events but also due to the significant involvement of several individuals who extensively felled mangroves for commercial purposes.

Secondly, after we can comprehend the meaning of erosion disasters as "not solely a natural matter," it implies that the productive dualism way of thinking, the separation of Nature and Humanity deeply embedded in both conscious and subconscious minds, has been resolved. Resolving this issue is crucial because, at some level, this dualism is believed not only on a conceptual level but also in practice. This is demonstrated by some residents who extensively deforested mangroves for personal economic gain (SODEC, 2019b), without considering the consequences, thereby altering the significant relationship between the people of Bawean and non-human entities. This was evident in the significant erosion disaster in 2004, which not only wiped out farmland but also the livelihoods of the residents.

Building upon this, we can move forward to examine and critique anthropocentrism, which has traditionally only considered the agency of what Bruno Latour (1990, 1997) referred to as "non-humans" as secondary entities in the world's ecology. However, when examining the relationship between mangroves and the human entities of Bawean Island, we can reflect

that their relationship is not one of separation but one of interconnectedness. This is especially evident before the 1990s or precisely before 2004 when erosion had not yet struck. The mangrove ecosystem served as a barrier against erosion and simultaneously safeguarded the farmland that constituted the economic foundation of Bawean's residents.

The mangrove, one way to protect it is by controlling the habit of illegal logging. It is during this time that an equitable relationship between humans and non-humans is established and formed. Reciprocally, humans protect the mangrove, and the mangrove protects the farmland of the residents through the mangrove ecosystem that acts as a barrier against erosion. This mutually beneficial interconnection vanished when, after the 1990s, the mangrove was reduced to being merely a subordinate to humans. It was treated unequally through "illegal logging" by some individuals from Bawean for purely commercial purposes.

At this point, the reality of what is called post-colonial post-humanism is required (Fowles, 2016). This perspective begins with a harsh critique of anthropocentrism. Anthropocentric views not only create the idea that humans are the "superiors" of "non-human" entities (Fowles, 2010) but also carry the blame for the entire Human Race as environmental destroyers. However, in the context of erosion and the widespread disappearance of the mangrove ecosystem, it was caused by a few individuals, the "illegal loggers," not the entire population of Bawean.

The need to move beyond the productive dualism of separating Nature and Humanity, as manifested in the perspective of post-colonial post-humanism, can also describe the role of the Community Monitoring Group (Pokmaswas) in Daun Village, Bawean Island. This community group, which was initiated locally in 2009, was formed due to the concerns of residents about the threat to the mangrove ecosystem and the significant erosion disaster in 2004 (Munif, Faisal, Fakri, & Riyanto, 2021). Gaining momentum from the support of the CSR program of PT PLN Nusantara Power UP Gresik, Pokmaswas became increasingly active in conservation efforts. In 2015, the leadership of Pokmaswas shifted to the younger generation of Daun Village, and the group solidified its name as Pokmaswas Hijau Daun (Putra et al., 2017).

Alongside the intensified conservation efforts, particularly due to the enthusiasm of the younger generation and the supportive push from CSR PT PLN Nusantara Power UP Gresik, in 2017, a donation of 20,000 seedlings from the company achieved a high planting success rate of 92% (Putra et al., 2017). In the same year, it was not only the expansion of the mangrove that was successfully achieved by Pokmaswas Hijau Daun but also policy interventions in the form of the approval of Village Regulation No. 6 of 2018 on Environmental Conservation, which was also driven successfully by Pokmaswas Hijau Daun.

Sanctions in the form of planting a minimum of 30-50 mangrove seedlings or coral seedlings are imposed when violations occur, such as the use of chemicals in the sea, beaches, rivers, irrigation channels, and other ecosystems, as well as mangrove destruction and pollution resulting from business activities or illegal logging. Through this Village Regulation, various environmental violations can now be enforced through Pokmaswas as the supervisory and reporting body.

At this point, we can see that the practice of not only mangrove conservation but also broader environmental conservation along the Bawean coast has made progress. It reinstates the view and practice that non-human entities such as the coast, mangroves, rivers, and others in Bawean are not just "subordinates" to the people of Bawean. Instead, they are non-human agencies, or as Bruno Latour calls them, actants (Latour, 1990, 1997; Papilloud, 2018). These actants, in the view of productive dualism, are often seen as separate. However, in reality on Bawean Island, various non-human entities or actants are not separate from the existence of the people of Bawean; they are intricately interconnected.

Mangroves and the Pokmaswas Group as Equal and Relational Agencies

It cannot be denied that the contribution of Pokmaswas, which serves as both the executor and beneficiary of the Hijau Daun Mangrove Ecotourism Program, inherently possesses the spirit to restore mangroves or, more broadly, aquatic and terrestrial ecosystems simultaneously on Bawean Island as living actants. In other words, both human and non-human entities on Bawean Island are expected to be treated equally, not as subordinates to be conquered or to threaten one another.

The concept of coexistence between human entities (actors) and non-human entities (actants) on an equal footing can be reflected in the spirit of the Hijau Daun Mangrove Ecotourism Program, which has been concerned with what is referred to as "ecological unity" (Putra et al., 2017). When related to Bruno Latour's theory of actor-network (Latour, 1990), the "ecological unity" in the context of Bawean Island is at least reflected in the success of Pokmaswas in identifying ecological and economic aspects that are concurrently implemented in the ecotourism program.

Economic activities within the Hijau Daun Mangrove Ecotourism Program, despite their aim to generate economic income for Pokmaswas and the broader Bawean community, still prioritize ecological sustainability. This aligns with Jason W. Moore's perspective on world ecology, which posits that ecology inherently encompasses both human and extra-human entities (Coss, 2016; J. W. Moore, 2016, 2017).

However, in Bruno Latour's actor-network theory, the unity he refers to goes even further than Jason W. Moore's concept. It is not merely a homogenous unity that, in human thought, consists of just two entities: Nature and Humans, or one that starts from a monist philosophy emphasizing singularity (Nelson, 2016). According to Latour, the connections between actors and actants are heterogeneous, dispersed, and carefully woven through weak ties (Akrich, 2023; Latour, 1990). This is precisely like the implementation of the Mangrove Ecotourism Program, which has the aspiration to balance ecological aspects with economic ones.

Achieving this balance isn't merely about unity in rhetoric or believing that humans (actors) and non-human entities (actants) in an "ecological unity" are treated equally. It goes beyond that. Through practice or by uniting practice and theory, the idea of equality between actors and actants also needs to find specific connections or relations. These relations aren't just about equality but also about the specific relationships between actors like Pokmaswas and actants, namely the mangrove ecosystem and even broader ecosystems in Bawean, which are tied together in Pokmaswas Hijau Daun's awareness of "mangrove vegetation zoning".

Through the Mangrove Ecotourism Program, the mangrove entities indeed offer a captivating aesthetic appropriation for tourists on Bawean Island. However, this beauty can no longer be appropriated as long as the mangroves are not properly cared for. In the case of the Hijau Daun Mangrove Ecotourism Program implemented by Pokmaswas Hijau Daun, the group's "awareness" about various aspects of the mangrove ecosystem, especially regarding the "formation of mangrove vegetation zones," becomes a specific relationship that connects actors with actants (Latour, 2011).

Why does the "formation of mangrove vegetation zones" become one of the important aspects linking actors and actants on the Coast of Daun Village? This is because, at this point, what Latour calls the strength of the bond is realized, a bond that does not arise from homogeneity "but from dissemination, heterogeneity and the careful plaiting of weak ties" (Latour, 1990, p. 3). The mangrove ecosystem is not an actant with static environmental conditions; rather, it is dynamic. The formation of mangrove vegetation zones consists of at least two layers: the outer layer, which is easily exposed to sea waves, and the inner layer, which is dry due to less exposure to sea waves (Putra et al., 2017).

Building upon the concern for the dynamic aspects of the mangrove condition and zoning, human intervention (actor) in the sustainable care of mangroves can be manifested, primarily by Pokmaswas and the broader Bawean community. Furthermore, the selection of the mangrove species to be planted must be appropriate. Thus far, Pokmaswas Hijau Daun has understood that the *Rhizophora sp.* species is the type of mangrove that is easily adaptable to the coast of Daun Village, Bawean Island.

The precise selection of mangrove species that can easily adapt to the coast of Daun Village is highly influential. In other words, the *Rhizophora sp.* species has proven compatible with the salinity levels, inundation levels, and sedimentation in the coastal areas of Daun Village. Besides the appropriate species of mangrove, human intervention or actor involvement concerning the formation of mangrove vegetation zones includes the appropriateness of the mangrove community structure. The choice of mangrove species will not mean much when the role of other mangrove species is lost.

At this point, the second intervention by actors or humans significantly affects the formation of mangrove vegetation zones consisting of two layers, outer and inner. The high success rate of mangrove planting, reaching 92% out of 20,000 seedlings provided by the CSR program, was undoubtedly achieved by Pokmaswas Hijau Daun through the consideration and application of knowledge about the formation of mangrove zones. True success is not only enjoyed by Pokmaswas Hijau Daun alone.

Through the awareness and practice of knowledge, not just in caring for mangroves but also in understanding the formation of mangrove vegetation zones, the hope for the existence of mangroves always remains. It is not only about preserving mangroves as actants but actually also preserving the human actors of Bawean dialectically or reciprocally. We will explore this dialectical connection in the next section.

Practices that Nurture the Hijau Daun Mangrove Ecotourism and Conservation

One intervention arising from the awareness and practice of knowledge regarding mangrove vegetation zone formation by Pokmaswas Hijau Daun is, in fact, a practice of nurturing. Nurturing pertains not only to the mangroves themselves in the present and future but also to the human entities (actors) on Bawean Island. This can be observed through at least four aspects illustrating how the existence of mangroves significantly determines the livelihood of human actors on Bawean.

Firstly, mangroves' primary function as erosion barriers should be highlighted. It has been mentioned earlier that erosion is not just a natural disaster. Human intervention in mangrove existence through rampant deforestation solely for economic purposes not only disrupts the mangrove ecosystem but also destabilizes the economic structure of Bawean's residents, who were primarily rice farmers. The new economic structure, focusing on shrimp and crab cultivation, became a "necessity" following the major coastal erosion that hit the Bawean coastal areas, rendering the residents' farmlands unusable.

Secondly, the existence of Pokmaswas as the executor of the Hijau Daun Mangrove Ecotourism Program is contingent upon the existence of mangroves. Both ecological and economic aspects have become the primary goals of implementing the Mangrove Ecotourism Program. Consequently, nurturing mangroves has evolved from a secondary need into a primary requirement. It cannot be denied that tourism businesses, or the income derived from the appreciation of natural beauty, necessitate the maintenance of the beauty on offer.

Moreover, the role of Pokmaswas Hijau Daun, which has successfully expanded its network not only through members with diverse educational and professional backgrounds but also by attracting members from villages beyond Daun Village (Putra et al., 2017), signifies an

intention to expand knowledge and practices in nurturing terrestrial and aquatic ecosystems on Bawean Island.

Thirdly, following the major erosion event, the coastal regions of Bawean Island, including those most affected in Daun Village, experienced a situation where a significant portion of the land could no longer be used for farming by the residents. It is important to note that a considerable number of Bawean residents rely on agriculture for their livelihoods (Putra et al., 2017). Presently, thanks to the integrated program from the CSR unit of PT PLN Nusantara Power UP Gresik, there exists a community group known as the Fish Cultivation Group (Pokdakan) that has taken the initiative to seek alternative land management solutions on land previously affected by the 2004 erosion. These lands can now be utilized for shrimp and crab cultivation.

However, once again, the existence of Pokdakan and its income source through shrimp and crab cultivation on the coast of Daun Village is highly dependent on the existence of the mangrove ecosystem as an erosion barrier. When mangroves are still treated as they were in the years before the major erosion struck. Being regarded merely as "subordinates" by indiscriminate loggers, solely for economic purposes. Thus, significant erosion inevitably becomes an imminent disaster that threatens both the actors and actants of Bawean in the future. Erosion does not merely alter the coastal landscape but also reclaims the livelihoods that had been restructured, particularly for shrimp and crab cultivation.

Lastly, *fourthly*, another group that relies on income derived from utilizing mangroves is the Putri Rembuyut Group engaged in micro, small, and medium-sized enterprises. In practice, they process various food products, some of which originate from mangrove fruits. This group, which has been the executor and beneficiary of the integrated CSR program from PT PLN Nusantara Power UP Gresik, owes its existence to the mangroves as well.

Considering the fact that many human organizations on Bawean depend on the existence of mangroves or the broader environment, when mangroves are subject to rampant and reckless deforestation, and when the ecosystems, both terrestrial and aquatic, are polluted due to the actions of a few individuals who disregard the existence of non-human entities (actants), it becomes imperative for human organizations to promote environmental awareness. However, due to an increased awareness of environmental degradation, efforts to combat environmental destruction can now be enforced through Village Regulation No. 6 of 2018 concerning Environmental Preservation, which was successfully promoted by Pokmaswas Hijau Daun.

The reason behind this is that, apart from natural disasters, it is apparent that they do not occur solely due to natural processes but also significantly because of human intervention, such as erosion caused in part by illegal loggers. On the other hand, according to political ecology thinkers, disasters can also transpire due to a lack of policies or the enforcement of policies (Blaikie, 2016; Ernstson & Swyngedouw, 2018; Peet et al., 2010; Swyngedouw, 2013). Take, for example, erosion; it is not merely a natural event. According to Piers Blaikie (2016), erosion occurring in developing countries is politically charged and far from being politically neutral.

Associated with the absence of enforcement against the destruction of terrestrial and aquatic ecosystems, particularly in Daun Village before 2018 when the Village Regulation was not yet established, various uncontrolled practices of mangrove ecosystem destruction occurred massively. Therefore, it is undeniable that the issue of erosion in Daun Village before those years was not solely an environmental problem but also a political one (Piers Blaikie, 2016). Hence, there are no disasters that are genuinely natural as long as a disaster strikes a specific geographic area where there is a history of human presence (Smith, 2006).

D. CONCLUSIONS

The material history of the major erosion disaster that struck Bawean Island in 2004 marked an inflection point for many humans (actors) on Bawean to reassess and reflect. It revealed that disasters like erosion are not solely natural events but rather are caused by human intervention, such as the actions of mangrove illegal loggers who are actors contributing to the acceleration of erosion.

Therefore, after those years, many organizations were formed, especially Pokmaswas Hijau Daun, driven by the CSR Program from PT PLN Nusantara Power UP Gresik to engage in mangrove conservation. Members of Pokmaswas Hijau Daun, coming from diverse backgrounds, not only worked on expanding their network by recruiting members from outside Daun Village but also advocated for mangrove conservation and even broader conservation efforts encompassing aquatic and terrestrial ecosystems through environmental policies, as demonstrated by the establishment of Village Regulation No. 6 of 2018 concerning Environmental Preservation in Daun Village.

The purpose of all efforts undertaken by Pokmaswas Hijau Daun under the auspices of the CSR Program from PT PLN Nusantara Power UP Gresik is not merely to preserve the existence of mangroves or terrestrial and aquatic ecosystems referred to as mere actants. Rather, when Pokmaswas Hijau Daun successfully cares for and maintains the existence of mangroves through practical interventions in mangrove vegetation formation, it not only preserves and protects the mangrove ecosystem. In return, the mangroves also safeguard the existence of humans (actors) from the impact of erosion that can occur at any time.

Erosion affecting the coasts of Bawean Island, one of the causes being the erosion of mangrove vegetation due to the actions of some individuals, has forced many residents, especially those who depended on agricultural land for their livelihoods, to lose their jobs because their land can no longer be used for farming. Therefore, newly formed human organizations like Pokdakan, engaged in shrimp and crab cultivation to adapt and continue their livelihoods on the former erosion-affected land. Additionally, the Putri Rembuyut Group, relying on processed products from mangrove fruits, also depends on the existence of mangroves.

Hence, the purpose of mangrove conservation and broader ecosystem conservation efforts is not only to preserve various non-human entities (actants) but, in reality, to safeguard the lives and sustainability of humans on Bawean Island. Erosion disasters, particularly on Bawean Island, cannot be considered solely natural disasters but also require the intervention of human organizations and policy politics to control them. Because to this day, the lives of Bawean's people (actors) are intertwined with various other non-human entities (actants).

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