

## EXPLORING AND DEVELOPING LOCAL WISDOM IN RELATION TO MARINE CONSERVATION IN THE BUNAKEN NATIONAL MARINE PARK

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### **Abstract**

*The environment is a global concern, including within Bunaken National Park. Safeguarding biodiversity is crucial for sustainable use. However, conservation efforts still face challenges. A significant threat to forest ecosystems is illegal logging, fragmentation, and forest conversion. This study aims to comprehend the local wisdom of the Bunaken National Park community concerning marine conservation. The study employs a qualitative research method with an ecological anthropology approach. Data were collected by means of interviews, observations, and document analysis from local communities. The findings reveal several significant points: Firstly, the community actively engages in the marine conservation process through a participatory approach. Despite the initial clash of interests between fishermen and the national park management, a mutual understanding was eventually reached regarding marine protection zones, encompassing core and utilization zones. Secondly, religious leaders wield a pivotal role in conservation endeavors. They interact with formal leaders and the community during worship, encouraging marine environment protection and community involvement in trash cleanup and preservation of mangrove trees. Thirdly, local wisdom, knowledge, and values persist in people's daily lives. Despite the religious shift from traditional beliefs to Christianity and Islam, certain values endure, such as the correlation between celestial bodies (moon and stars) and agricultural and fishing activities. Fourthly, the Navy contributes to marine conservation by offering close supervision, influencing changes in the mindset and behavior of the neighboring community to safeguard mangrove forests and marine habitats while diminishing the risk of wave-related disasters during high tides.*

**Keywords:** Biodiversity, Bunaken National Park, Conservation Efforts, Environment, Forest Ecosystems

### **1. INTRODUCTION**

The issue of the natural environment has become a global concern, as the world community faces natural disasters that cannot be prevented by humans. With the continued increase in global warming, there are erratic changes in climate situations that endanger life on Earth. This adverse environmental situation is a result of ecological imbalance, primarily caused by human activities. Factors such as the exploitation of forests, agricultural land, and technology have all contributed to an environment that is no longer environmentally friendly. The excessive exploitation of these resources has led to an ecological imbalance.

In recent years, forest plundering and illegal logging in forested areas have become increasingly widespread, occurring on a massive and uncontrollable scale. The threat of forest destruction will undoubtedly yield enormous negative impacts due to the domino effect of forest loss, particularly in regions with significant ecological functions and biodiversity value. The consequences of these events encompass not only the depletion

of forested areas that once supported various aspects of human life—such as water supply, oxygen production, microclimate regulation, tourism appeal, economic revenue from non-timber forest products and timber, carbon absorption (carbon sink), and sources of food and medicine—but also the forfeiture of biodiversity that is entrusted to future generations.

Currently, a new trend is emerging on the international stage, known as carbon (CO<sub>2</sub>) trading. The inception of carbon trading can be traced back to the Kyoto Protocol agreement, which mandated carbon-emitting countries to curtail their emission levels by implementing advanced technologies and allocating funds to nations endowed with natural resources capable of naturally absorbing carbon emissions—primarily through vegetation like forests. With the distinction of having the world's third-largest forest area, Indonesia possesses the potential to significantly contribute to global emission reduction through carbon sinks. This potential could be realized by conserving existing forests, initiating afforestation in non-forest regions (degraded land), and restoring impaired forest areas through reforestation.

Forests, renowned for their extensive distribution, diverse structure, and composition, are anticipated to yield substantial environmental advantages for human existence. These include services like flood, erosion, and sedimentation mitigation, as well as regulation of the water cycle. Furthermore, forests are intricately linked to biodiversity—an integral component that ecologically maintains equilibrium in ecosystems, playing a pivotal role in sustaining life. Biodiversity serves as the bedrock for biological resources and a spectrum of other services that are crucial for human survival and well-being. Biodiversity embodies a wealth of ecosystems, species, and genetic variations among living organisms, spanning from animals and plants to microorganisms. Each individual organism is characterized by a myriad of genes, collectively yielding unique combinations, while a species comprises numerous organisms. An ecosystem emerges from the interplay between myriad species and the physical surroundings.

The conservation of biodiversity assumes paramount significance to ensure its appropriate and sustainable exploitation. However, the reality remains that effective preservation efforts are still lacking. The foremost menace to forest ecosystem conservation stems from the degradation, deterioration, and transformation of forest ecosystems due to illicit logging, fragmentation, and the conversion of forests for alternative purposes.

A comprehensive development policy should encompass three key components: ecological security, livelihood security, and food security. Sustainable agriculture entails an agricultural system rooted in the responsible utilization of natural resources such as land, water, and biodiversity. The concept of Sustainable Agriculture aligns with TAC/CGIAR 1998, which defines it as the adept management of resources within agricultural enterprises to meet evolving human requirements while concurrently enhancing or upholding environmental quality and safeguarding natural resources. Biodiversity constitutes a valuable asset for farmers in their endeavors to maintain food security, offering an avenue to diversify the range of cultivated plants.

Nevertheless, when managed by the state, agriculture may restrict farmers' autonomy. This is evident when governmental mandates compel farmers to cultivate specific crops, such as rice, to support food self-sufficiency initiatives. In the era of

globalization and free trade, as states relinquish intervention in the agricultural sector, they often fail to restore the authority and agency of farmers to oversee their agricultural enterprises. Instead, the vacuum is filled by global agribusiness corporations, which gain control over natural resources, production methodologies, and marketing and trade systems. The underlying predicament is the erosion of local knowledge and traditional wisdom, developed over centuries when communities established sustainable livelihood systems in harmony with the environment.

In traditional societies, the equilibrium between humans and their surroundings is central. These societies regard the natural environment as an integral part of their identity and consider nature as the abode of the creator. The profound reservoir of local wisdom and grassroots innovation within communities often remains overshadowed by external inputs, entering raw and bypassing the community's organic developmental process.

This paper underscores the significance of exploring and nurturing the local wisdom of the Bunaken community, thereby preserving the cultural essence that underscores environmentally conscious natural resource management. This approach serves as a potent means to reconnect with traditions that are essential for addressing contemporary environmental degradation. The shift from community behaviors that once harmonized with ecosystem equilibrium to the present trend of excessive environmental exploitation is also examined. The paper delves into the resilience of local wisdom in the face of modernization.

Cultural values and wisdom have been intrinsic to every ethnic group for generations, representing positive attributes that should be cultivated and safeguarded in an era of perpetual societal transformation towards modernity—where these values are at risk of erosion. On this foundation, it is crucial to undertake research into the local wisdom of the Bunaken community in the context of national character. Possible research inquiries include: How does the local wisdom of the Bunaken National Park community relate to marine conservation?

## **2. LITERATURE REVIEW**

### **2.1. The Concept of Culture**

When we try to understand how a community behaves and follows customs, we often refer to cultural theories. One widely used concept is the idea of culture. Culture encompasses many aspects and has been defined differently by experts. For instance, E.B. Tylor (2008) describes culture as a complex entity involving knowledge, beliefs, laws, and customs. Clifford Geertz sees culture as a system of symbols and meanings that guide people's interpretation of experiences.

Indonesian anthropologist Koentjaraningrat defines culture as a holistic system of ideas, actions, and human creations shaped by learning (Koentjaraningrat, 2000). James Spradley goes further, stating that culture is the knowledge people learn and use to make sense of their surroundings (Spradley, 2016).

Different anthropologists, such as A.L. Kroeber and C. Kluckhohn, have compiled various definitions of culture (Kroeber & Kluckhohn, 1952). Kluckhohn categorizes these definitions into types, highlighting culture's different forms. For instance, Koentjaraningrat identifies culture as a complex of ideas, values, norms, and more; a complex of activities and patterns in society; and the output of human creations. J.J. Honigsmann identifies culture as ideas, activities, and artifacts (Honigsmann, 2003).

It's clear from these explanations that culture exists because of humans. Humans create and shape culture, making it adaptable and responsive to change. Just like evolution, culture also changes over time due to factors like acculturation and diffusion.

Building on these cultural concepts, we study the local wisdom of the Bunaken community in managing natural resources. We explore how this wisdom has originated from culture and transformed as time passed. The changes in culture driven by people's understanding of their experiences and environment are crucial. According to James Spradley, culture is learned knowledge used to interpret surroundings and develop strategies for interacting with the world.

This learning process not only creates culture but also reshapes it. Cultural change, as described by Parsudi Suparlan, happens as humans adapt and learn from their environment, leading to changes in community culture as external factors evolve (Suparlan, 2014).

## **2.2. The Concept of Local Wisdom**

The culture that arises from learning and human adaptation is often termed as local wisdom, traditional wisdom, or traditional beliefs (Putra, 2005; Shohibuddin, 2003). These terms collectively encompass the cultural patterns within a community that have long served as behavioral guides for navigating their environment.

Local or traditional wisdom can be defined as the inherited knowledge held by a community to manage their surroundings, guiding their behavior in response to environmental adaptation and leading to positive implications for environmental sustainability (Purnomohadi & Soedradjat, 2006). For indigenous populations, traditional wisdom is seen as a guiding principle deeply ingrained in their culture and daily lives.

Communities that coexist harmoniously with nature possess knowledge passed down through generations on how to meet their needs without harming the environment. Nygrin's perspective, as cited by (Shohibuddin, 2003), asserts that such local communities, living in ecological balance with nature, are regarded as environmental experts and stewards of equitable and sustainable traditional resource management systems.

Wisdom, as described by Heddy Shri Ahimsa Putra (2013), is a tool derived from knowledge, used adeptly to address challenges. He emphasizes that "traditional" or "tradition" refers to a collection of beliefs or practices passed down through generations, becoming accepted by a society and holding the weight of law. Thus, "traditional" can be understood as "that which has been inherited through generations and is collectively accepted". This view establishes traditional wisdom as a repository of community knowledge, enabling adept and correct problem-solving. It stems from prior generations, often transmitted orally or through exemplified actions, and is an abstract component of culture.

Local genius or local wisdom emerges from a community's adaptation and lived experiences, communicated across generations. It is the indigenous knowledge employed by local communities for survival within an environment interwoven with belief systems, norms, and culture. It finds expression in traditions and myths adhered to over extended periods (Gunawan, 2008).

According to the Policy Synthesis Team, local wisdom is associated with traditional beliefs that contain significant empirical data about environmental phenomena, processes,

and historical shifts. This implies that traditional knowledge systems can offer valuable insights for planning and developmental processes. Traditional beliefs represent local cultural wisdom, serving as a vital source of empirical information and knowledge that can complement and enhance overall scientific comprehension.

Cultural or community wisdom comprises a wealth of knowledge and thought patterns grounded in ethnic culture, developed over extensive observation. It offers insights into the community's assumptions about the human environment and the intricate connections between humans and their natural surroundings.

Each region, tribe, or community possesses distinct traditional knowledge rooted in empirical values shared among community members. These values hold significance for social life as references in nurturing harmonious interactions. This local knowledge system is best understood as dynamic and continuously evolving, adapting contextually in response to increasingly heterogeneous and complex human necessities (Wisnumurti & Oka, 2010).

### **2.3. Approaches to Local Wisdom**

Understanding the importance of local wisdom and how we study it involves different viewpoints. Marshall D. Sahlins sees culture as a "way of life" that helps societies adapt and survive (M. D. Sahlins, 1963). Culture develops and adjusts to the environment, with both playing a role in shaping each other (M. Sahlins, 2013). The relationship between culture and the environment is complex, involving dynamic interactions.

A modern perspective on the human-environment relationship comes from ecology and ecological anthropology, as proposed by Andrew P. Vayda and Bonnie J. McCay (Vayda & McCay, 1975). This approach looks at how people respond to dangers and challenges in their environment. It aims to understand why some responses are successful while others are not.

Ecosystems are analyzed as units, not just biological entities. Individual organisms within ecosystems are affected by natural selection, leading to diverse strategies for coexistence. Information about how living beings respond to the environment forms the wisdom of human interaction with nature.

Cultures evolve through adaptation, and some adaptations maintain environmental balance while others change the environment. Sahlins explains that mature cultures often integrate new conditions into existing structures to cope with changes. Progress in culture is adaptive and complex cultures have a form of "overall adaptability." Over time, progress undergoes selection, leading to superior cultures that navigate the world effectively.

The influence of culture often leads to dominance over regions, sometimes at the expense of indigenous populations and the environment. This dominance can be destructive. Traditional communities are often seen as conserving nature. Different types of traditional resource use exist, with some sustaining forests and others degrading them. Traditional resource use can still align with environmental preservation.

In summary, local wisdom involves human adaptation to the environment through two approaches: adapting to the environment and adapting the environment to human needs. The latter approach can lead to advanced cultures exploiting and harming the environment, while the former maintains ecological balance and cultural traditions. This

exploration focuses on how humans adapt to the environment and how their dominance can change it.

#### **2.4. The Concept of Environmental Conservation**

In 1992, the Earth Summit in Rio de Janeiro spotlighted indigenous peoples and initiated discussions about "traditional conservation" based on cultural wisdom. This idea involves the practices of using natural resources by indigenous peoples, local communities, or traditional groups. These practices are deeply integrated into their daily lives and original institutions (Wiratno et al., 2004). It's important to recognize that traditional conservation practices are closely connected to the indigenous knowledge systems of local communities. They create unique conservation approaches tailored to their specific areas.

At its core, traditional conservation is a local knowledge system that emerges from the interaction between humans and their environment. It covers all aspects of culture, including language, history, art, politics, economics, and technical areas like agriculture, fisheries, and resource management.

This system isn't static; it continuously evolves through interactions with external knowledge. This evolution leads to new balances that address various challenges in community life and the environment, even when facing new technologies.

In essence, traditional conservation involves the efforts of traditional communities to manage and use natural resources in ways that follow principles of sustainability. These practices are passed down through generations, developed through coexistence with nature. The resource management practices that focus on sustainability are collectively known as traditional wisdom.

### **3. RESEARCH METHODS**

Utilizing qualitative methods as the principal approach, this research employs techniques such as Focused Discussions, In-depth Interviews, and Observation. The researcher serves as the primary instrument, while the source of data is referred to as the informant.

The research target or subject is the informant, categorized into two groups:

1. Individual informants: This entails utilizing in-depth interview techniques. Individuals are randomly selected from various strata and social statuses, encompassing different age groups, community leaders, traditional leaders, and religious leaders.
2. Group informants: This involves the application of focused discussion techniques. These discussions are conducted within communities residing in the Bunaken Marine National Park area across North Sulawesi Province, specifically in Tanawangko sub-district, Minahasa district, Tatapaan sub-district, South Minahasa district, and Bunaken island.

Data denotes information acquired to address the research questions. The sources of data for this study include:

- a. Primary data: This encompasses information gathered through direct observation, in-depth interviews, and focused discussions in adherence to the qualitative approach.
- b. Secondary data: Comprising data sourced from literature reviews, documents, and statistical information.

The data collection process comprises two key methods. Firstly, the Field Study or Field Research involves direct engagement with community members, such as community leaders, traditional leaders, and religious leaders, to gather pertinent data. Secondly, the Literature Study entails gathering information from relevant literature closely related to the research topic.

These methods are supported by specific techniques, including direct observation, in-depth interviews, and focused discussions, all in adherence to the qualitative approach. Secondary data, in the form of literature reviews, documents, and statistical data, supplements the primary data collection efforts.

Subsequent to data collection, a structured analysis procedure is undertaken. This involves editing and validating the collected data, followed by a descriptive analysis. The culmination of this process is the compilation of a comprehensive research report, presenting the findings and insights derived from the study.

## **4. RESULTS AND DISCUSSION**

### **4.1. Bunaken Marine National Park Area**

Bunaken National Park (TN) is a designated nature conservation area established through the Decree of the Minister of Forestry Number: 730/Kpts-II/1991 dated October 15, 1991. Encompassing an area of 89,065 hectares, it boasts exceptional biodiversity. Situated in the North Sulawesi province, the park's geographical expanse is divided into two regions: the northern and southern parts. The northern segment spans between 1°35'41" - 1°32'16" S latitude and 124°50'50" - 124°49'22.6" E longitude, incorporating five islands (Bunaken, Manado Tua, Siladen, Mantehage, and Nain) and the coastal stretch between Molas village and Tiwoho, known as the Molas-Wori coast, with an area of 75,265 hectares. The southern region occupies the territory between 1°24'0" - 1°16'44" N latitude and 124°38'3" - 124°32'22" E longitude, encompassing the entire coastline from Poopoh village to Popareng village, referred to as the Arakan-Wawontulap coast, spanning an area of 13,800 hectares. This marine park spans 22 villages, housing more than 30,000 inhabitants, situated within the jurisdiction of Manado City, Minahasa Regency, South Minahasa, and North Minahasa districts.

### **4.2. Conservation of Bunaken National Park**

Geographically situated between 1°35' - 1°49' N latitude and 124°39' - 124°35' East longitude, Bunaken National Park encompasses both the northern and southern areas. The northern region includes Bunaken island, Manado Tua island, Montehage island, Siladen island, Nain island, Nain Kecil island, as well as a segment of the Tanjung Pisok coastal area. Meanwhile, the southern sector encompasses a portion of the Tanjung Kelapa coast. This park is a representative example of Indonesia's tropical aquatic ecosystems, encompassing mangrove forest ecosystems, seagrass beds, coral reefs, and terrestrial/coastal ecosystems. The prevailing climatic conditions in the vicinity of

Bunaken National Marine Park are characterized by an air temperature ranging from 26°C to 31°C, an annual rainfall of 2,500 to 3,500 mm, and altitudes varying from 0 to 800 meters above sea level.

Functioning as a conservation area, Bunaken National Park serves three key conservation purposes: the safeguarding of life support systems, the preservation of plant and animal species diversity, and the sustainable utilization of biological natural resources and ecosystems. The 2014 zoning analysis was prepared by accounting for the dynamic conditions arising from changes in physical, biotic, and socio-economic factors within the community.

Ecological Conditions - Biodiversity. The marine environment features a salinity range of 33 - 35 ‰, visibility ranging from 10 to 30 meters, and tides with amplitudes of 2.5 meters. The region experiences a West Season from November to February and an East Season from March to October. The area boasts diverse biodiversity, particularly within its coral reefs. There are 13 coral genera thriving in the waters of Bunaken National Park, dominated by fringing and barrier reef types. An intriguing aspect is the presence of vertical coral cliffs reaching depths of 25 to 50 meters.

According to the Decree of the Minister of Environment No. 04/MENLH/02/2001 regarding Coral Reef Damage Standard Criteria, the condition of coral reefs in the core zone of Bunaken National Park (Sea) is assessed as 59.67%, indicating a favorable state of the coral reef ecosystem in these waters.

Traditional fishing activities yield various marine products, primarily reef fishes. During specific seasons, the main catch may include pelagic fish such as mackerel (deho), skipjack, and flying fish. Fishing techniques encompass methods like nets (soma darape, landra, and pajeko), fishing rods (noru, funae, tonda, and palinggir), fish traps (sero and bubu), and mollusk collection in coral reefs (nyare). (Source: proposed Zoning Revision: Bunaken National Park Center, 2014).

The management of this area falls under the jurisdiction of the Ministry of Forestry through the Bunaken National Park Center. In 2015, as part of management support, the Ministry of Marine Affairs and Fisheries initiated various activities, including providing assistance for fishing boats and implementing coral reef transplantation.

#### **4.3. Local Wisdom in the Conservation of Marine Resources in Bunaken National Park**

Local wisdom is an integral part of a community's culture. The sharing of local wisdom related to culture holds significant importance in maintaining cultural sustainability and ensuring its preservation. The diversity of Indonesia is showcased through the revelation of its cultural richness. The values encompassed within local wisdom constitute explicit and implicit concepts that are unique to individuals, groups, or societies. These values represent desirable ideals that influence the choices of forms, methods, and objectives of actions in an ongoing manner. Such values can only be deduced and interpreted from human speech, actions, and materials that have been passed down through rituals or educational activities. As a result, the primary function of these values is to guide individual behavior in everyday situations, while their secondary function is to express fundamental motivational needs.

Moreover, the significance of a value lies in its ability to compel individuals to undertake specific actions, providing continuous and sustainable direction as well as

emotional intensity to their behavior. In other words, values enable every actor to address both biological and aspirational needs, in addition to societal demands. However, in reality, these values are only integral to the lives of those who staunchly uphold traditions, in contrast to societies undergoing a shift in values. This cultural shift often leads to the forgetting of local cultural values, simultaneously contributing to the degradation of local wisdom derived from community culture. This trend is particularly noticeable in urban areas, where individuals tend to no longer recognize their own local wisdom due to the evolving cultural values.

In the pursuit of conserving Bunaken Marine National Park, the stages of conservation involving the community and their habitual activities are as follows:

1) Community Conservation Efforts

The coastal waters of Poopoh Village fall within the conservation area of Bunaken National Park, renowned for its rich marine biota. The community's awareness has grown and developed with a view to preserving this marine environment. Berce, a member of the Cahaya Trans group, reports the presence of a large sea turtle that consistently comes ashore to lay eggs in guard area 7, where the Buton people reside. Local residents, in collaboration with the Cahaya Trans fishermen group, play a pivotal role in safeguarding the turtle breeding sites.

As part of its conservation efforts, the Bunaken Marine National Park established an office in Poopoh village and formed a dedicated group known as the Cahaya Trans Group. This group actively supports the conservation initiatives carried out by the Bunaken Marine National Park's Section 2 office. Periodically, in line with the Conservation Office's budget, they receive support in the form of awareness campaigns related to conservation and equipment assistance such as motorboats and refrigerators. Collaborative marine monitoring activities involve local authorities, including the Water Police.

While some support from non-governmental organizations and external community groups is evident, there is a notable absence of institutions or organizations within the local villages actively supporting Bunaken National Park's preservation efforts. Exceptionally, the national park itself assists fishermen's groups.

Before the establishment of the Laur Bunaken National Park policy, a socialization process took place facilitated by the coastal project under the Natural Resources Management Program (NRM), with support from USAID. During that time, Mr. Laurentius Tering had not yet assumed his role as an elder but recalls his involvement in the target groups of the socialization process, including the establishment of conservation zones. This assistance was initiated in 2014 through the NRM.

According to Mr. Berce, the head of the Cahaya Trans group, when their group was formed and started collaborating with the National Park Office, there were opposing groups that disagreed with conservation policies. These disagreements were particularly related to the establishment of conservation zones, and there was jealousy as some perceived the assisted group to be favored in the village. Noteworthy events experienced by the assisted group include incidents in 2016 when their fishing gear was tampered with, although it was later found, and the ropes of temporarily parked boats were cut.

Berce reveals that he himself was once against the national park's efforts and earned the nickname "the mafia" among villagers. He shares that he had encounters with the North Sulawesi Police, the Water Police, and village officials. This was because of his opposition to the national park officers, during which he damaged their post out of

frustration against the conservation policies. He argued that the policies were an attempt to curtail their livelihoods, pointing out the forced removal of his fishing gear and equipment. The repeated visits from officials left his wife traumatized.

Following these events, in 2014, he was engaged in educational activities on several occasions. As he delved deeper into the conservation policies, it became evident that it was not the men of Poopoh Village who had given their approval, but rather the women. Historically, the village partners had been military personnel and other officials, viewing fishermen as subjects to be controlled.

The approach taken was deemed flawed, lacking an effective engagement process, and often resorting to violence. Physical confrontations became commonplace, with fishermen left frustrated due to the absence of solutions.

When the Bunaken National Park center adopted a more communicative and persuasive approach, the community became more receptive. This approach led to tangible cooperation, exemplified by the assistance provided to the Pak Berce fishermen group in obtaining boats in 2019. The assistance received is utilized well by the group, with no instances of selling the aid received. Instead, they continue to manage it collectively. With the shift away from repressive methods, local fishermen have grown less resistant. In fact, many fishermen from surrounding areas, such as Manado, Tumumpa, and others, now join the efforts. The village residents refrain from criticizing, hoping instead that officials will erect signs due to the savings in the conservation zones.

According to the Cahaya Trans fishermen, the marine life remains abundant, particularly when leveraged for tourism purposes. They utilize snorkeling and catamaran boats, reaping more substantial benefits than traditional fishing and selling practices.

Assisted Groups within Bunaken National Park. In this case, there is Cahaya Trans Group: Consisting of 10 core members, the group extends assistance to around 20 individuals; Coastal Mothers Group; and Banteng Gorango.

The Cahaya Trans Group achieved a significant milestone in 2016 by attaining level 1 national recognition in the field of capture fisheries. Berce has led the group since 2009, and they became part of ANTRA (Traditional Fishermen's Association) in 2014. Up to the present day, the Cahaya Trans Group has not encountered any legal issues. However, management-related challenges persist within the group, as described by Pak Berce. Violations occasionally occur, and while these are resolved through religious leaders, they tend to resurface the following day. Miscommunication and discrepancies between assigned tasks and actual implementation are common, largely attributed to the community's lower educational levels.

Arakan Village serves as an illustrative example. Once a part of Rap-Rap Village, Arakan Village has evolved into an independent settlement within the Bunaken Marine National Park area. Its location along the seafront contributes significantly to the appeal of the Bunaken National Park. Arakan Village is inhabited by a mix of ethnic groups, including Bajo, Sangihe, Gorontalo, and Minahasa, with the Bajo people forming the largest demographic. Renowned as a seafaring tribe, the Bajo people primarily engage in fishing, with only a small minority involved in other professions. This ethnic group, scattered across islands and coastal regions, maintains an unbreakable connection to the sea, and their fishing expertise is well-regarded.

The history of the Bajo tribe's distribution includes migration to Nain Island and the Arakan (formerly Rap-Rap) coast. Originally migrating from Gowa, South Sulawesi,

around 1698, 112 people arrived on the shores of Kima Bajo and Talawaan Bajo villages using nine boats. On the Minahasa coast of Sulawesi Island, they constructed daseng, modest houses at sea. This seafaring community extended its reach to Berau in Kalimantan and even the Philippines. Seeking clams (*Tridacna* spp) and fish prompted their migration. After over a century on the coast of Kima Bajo, the Bajo people relocated to Nain Island in 1823. Simultaneously, some migrated to the coasts of Likupang and Bitung. Additionally, Bajo families from Nain Island established dasengs on the northern side of Mantehage Island and eventually moved to Rap-rap.

The marine conservation management of Bunaken National Park traces back to the inception of the coastal project program under NRM. Musa Budiman, the head of Arakan Village, recollects the efforts led by NRM NGO, headed by Zulham Harahap. The program involved a series of socialization and utilized the Participatory Rural Appraisal (PRA) technique. This collaborative process led to community consensus on the establishment of marine protection zones.

However, the execution of this approach encountered challenges. While initially embraced by villagers, later developments seemingly soured community sentiment. Consequently, between 2001 and 20021, resistance emerged regarding the implementation of sonation zones. Flaws were identified in the engagement process with the villagers, resulting in widespread rejection. The village elder, Mr. Musa Budiman, acknowledged his instrumental role in driving this resistance and faced detainment by the authorities.

According to the informant, the community possessed an understanding of the underlying purpose of the sonation policy. Yet, the field operatives pursued an ineffective approach. Challenges persisted regarding accommodating the increasing village population and determining alternative economic livelihoods for the residents. The overarching concern was whether the local population would be left to face the depletion of high marine natural resources, solely focusing on the welfare of future generations.

The facilitator proposed an alternative solution by providing three rambutan trees, although the community had requested a fishing boat. This decision stirred dissatisfaction within the community, as they did not perceive it as a viable solution. The residents had initially sought a boat with a 40 HP engine, enabling them to engage in offshore fishing, rather than utilizing the designated core sona location. Although the informant had accompanied NRM during the initial stages of socialization, witnessing irregularities led him to spearhead the rejection of the sonation policy. Nevertheless, between 2005 and 2009, a more effective approach was adopted, resulting in a change of attitude. The community recognized the necessity of marine area protection and eventually accepted the sonation policy.

Prior to 2015, instances of fish bombing were rampant in the sea, but they significantly declined afterward, particularly with the establishment of a navy post in Arakan village, which led to a reduction in such activities. The logging of mangrove trees has ceased, even though these trees were previously employed for constructing houses and boats due to their durability and waterproof nature. It was suggested that fishing groups replant mangroves using seeds sourced from the local area, as many imported mangrove seeds fail to thrive in their habitat due to incompatibility.

Another conservation effort revolves around the protection of dugongs, also known as dugong fish, which frequently inhabit the waters surrounding Arakan village. The area where they surface is referred to as the "dugong pond," although the presence of numerous

fishermen has caused the dugongs to relocate. Fishermen demonstrate awareness by releasing dugongs entangled in fishing gear, although there are instances of individuals clandestinely catching these trapped creatures and consuming them as a delicacy, often selling them discreetly.

Between 2017 and the present, the monitoring system has weakened. While there used to be resources such as speed boats for monitoring purposes, they are no longer available due to budget constraints. Incidents arose involving individuals using compressors to catch fish around Arakan village, prompting residents to respond through community-funded efforts or collective cooperation to address the situation. The village head conveyed to the center that if budget allocations were directed towards community groups, intensive supervision would be implemented, ensuring regular reporting. However, the expectation of robust supervision from the national park office is hampered by inadequate funding.

Given the multiple instances of conservation knowledge dissemination, there is no longer a need for socialization within the Arakan village community about conservation practices. The current challenge pertains to enhancing the economic prospects of fishermen, aligning their livelihoods with the local habits and cultural practices.

According to the informant, Arakan village fishermen are accustomed to pursuing independent enterprises. When conducted within a group framework, these endeavors frequently fall short of success, as individual fishermen are accustomed to conducting their fishing activities autonomously or within their family units. Each fisherman owns their own boat and equipment, leading to limited efficacy when assistance is rendered at the group level. Certain informants have suggested that boat facilitation assistance should be extended to all members, rather than benefiting only a single individual.

Ultimately, fishermen's groups seem to be established or activated solely in response to assistance offerings. Following this period, their activity wanes, and assistance is sometimes even sold off. In the case of the fishermen's group, only one "catinting" boat was provided. Although the center solicited proposals for assistance and received submissions from six groups, only one group received the grant. However, the assistance did not yield the intended outcome; the boat was sold, and the proceeds were shared among the group members.

The residents of Poopoh village have diverse tribal backgrounds, including the Minahasa people, especially the Tombulu sub-ethnicity, and the Sangihe Talaud people. Additionally, there are some Buton people living in the vicinity or jaga 7, originating from Buton and having settled there; most of them are Muslims.

The Minahasa people primarily engage in farming or plantation activities. Some are involved in fishing, either seasonally or occasionally, similar to the Sangihe Talaud people. Among the smaller group of Buton people, fishing is the predominant occupation.

Arakan village is predominantly inhabited by the Bajo and Sangihe people. Jaga 5, 6, and 7 are occupied by Bajo people, many of whom migrated from the island of Nain. In jaga 1 and 2, the majority are Sangihe people, with origins traceable to the larger Sangihe Island in Manganitu. The remaining jaga areas are characterized by a mixture of ethnicities. Nearly one percent of the entire village population relies on fishing as their main livelihood. Some engage in daytime gardening, cultivating crops like milu corn and coconuts. Arakan Village is renowned as a hub for marine products within the Bunaken

National Park area. The village also has a presence of Bugis people, who are involved not only in fishing but also in rice cultivation.

According to data from the Bunaken National Park Center, serious and hazardous violations have been reported in the area, including incidents of fish bombing and the capture of protected marine animals. The park's security patrol system incorporates special operations managed by professional officers. These operations are not conducted regularly; rather, they target specific illegal activities that have been identified and reported by the community and the patrol team. Over the past two years, several successful special operations have taken place, leading to arrests and legal processing of offenses such as fish bombing, cyanide fishing, and mangrove logging. These covert special operations are conducted to prevent information leaks to the targeted violators.

The implementation outcomes of the Nature Resources Management (NRM) Program, a collaboration between the Indonesian Government and the United States Government through the United States Agency for International Development (USAID), have been notable. The NRM Program was executed in Bunaken National Park, North Sulawesi, from 2001 to 2004. The program showcased satisfactory and excellent results for the park's management. The success of the NRM program can be attributed to various aspects, including the training system introduced by the Bunaken National Park Management Board. Notably, the joint patrol system implemented between 2001 and 2004 represented a marked improvement over the preceding system. Key indicators of this progress include:

1. A significant reduction in explosive and cyanide fishing cases within Bunaken National Park. Residents from the southern region reported that explosive fishing had become nearly non-existent. Legal action was taken against nine groups of explosive fishing offenders and four groups of cyanide offenders, resulting in 20-month imprisonment sentences.
2. The active involvement of villagers in the patrol team, while sometimes contentious, proved highly effective in promoting awareness of the patrol system and park regulations within Bunaken National Park. Many community members, including villagers, joined the patrol team.
3. A substantial increase in revenue from the entrance fee system during the program's first year of operation. Estimated revenue reached 90% by the end of December 2001. In 2002, the entrance fee system generated \$110,000 from 25,000 visitors. This revenue was directed towards funding Bunaken National Park's management activities, including patrol operations.
4. Enhanced coordination between the Bunaken National Park Management Board, the patrol teams, and the provincial and district Fisheries Offices. Whereas previously the Fisheries Office did not consider Bunaken National Park in the permit issuance process, all fishing permits now include a clear clause specifying compliance with Bunaken National Park regulations.

## 2) Environmentally Friendly Fishing Equipment and Sea Activities

The conservation of the surrounding sea is bolstered by the practices of local fishermen, who adhere to the use of traditional and environmentally friendly fishing equipment that minimizes harm to the marine ecosystem. They employ fishing gear such as fishing rods with fishing eyes or gomala to catch a variety of fish, including surface fish, reef fish, and bottom fish. Different fishing rod models are utilized for targeting each

specific type of fish. Additionally, trawls or soma nets are used for fishing at deeper depths, with the preferred type being soma paka or tompaka.

During the skipjack season, fishermen target these fish using skipjack pajeko boats. However, this practice is more common among fishermen from neighboring villages in the central area of the Tombariri sub-district, particularly Borgo village. Poopoh village fishermen do not commonly use Pajeko boats, as their fishing patterns remain rooted in tradition.

Boat types in Poopoh village are often described as relatively simple, including *pelang* boats and *pelang gantong* boats equipped with engines ranging from 40 HP to 15 HP. Another type is the bogo boat, a canoe with outriggers or *sema-sema*. These boats measure 60 centimeters in width and 4 meters in length, and they are typically propelled using engines as small as 1 HP.

The Poopoh Village community maintains a subsistent approach to fishing, primarily for their daily sustenance rather than for commercial purposes. The majority of villagers identify as farmers or planters, and fishing is not an everyday or scheduled activity, but rather done based on need or specific times. In dusun 7 of Poopoh village, a portion of the community has Buton ethnic roots, relying heavily on sea fishing for their livelihoods. In contrast, Arakan village within the Bunaken National Park area mainly comprises Bajo people and individuals of mixed ethnicities. Fishing is the dominant profession for most, and gardening is not a primary activity due to the lack of available land and farming expertise. Consequently, Arakanese fishermen primarily catch fish for sale, whereas in Poopoh, fishing is oriented toward daily meals.

Even though the village enjoys a plethora of marine products, these are often sold within the community due to high local demand. Purchasing fish from fishing groups costs around 20 thousand rupiahs per kilogram.

The fishermen's group also engages in salt fish production, employing drying technology. The fish are first boiled or steamed in a stainless steel pot without water to preserve their integrity. Afterward, the fish are laid out in the sun on a medium, and within two minutes, they are ready to be dried. The dried fish are promptly transferred to tarpaulins. The drying process reduces heat and moisture content, allowing the fish to be packaged the following day, usually within a two-hour timeframe, for sale.

The group has also ventured into processing nutmeg syrup and grilled fish using the *tempunrung* method. Nutmeg skin is spread over the white fish during processing to counteract rancid odors and deter ants. The group previously processed tuna fish into various products, including sticks, but these activities ceased during the COVID-19 pandemic.

Poopoh village boasts expansive plantations, with many dedicated to field rice cultivation (*temo* rice). Planting a large area requires only three belek seeds. Minahasa and Sangihe people regularly tend to their gardens and forests, cooking Sudha rice once the rice harvest is complete. The community also tends to their pets and occasionally engages in sea fishing using *mangail* techniques.

#### **4.4. Conservation Efforts of Bunaken National Park**

##### **4.4.1. Participatory Conservation**

The establishment of marine protected areas has been a gradual process involving active community participation, although initial conflicts of interest between fishermen

and the government managing Bunaken National Park existed. Ultimately, collaborative efforts have led to the identification of marine protection zones. These zones comprise core areas, designated as no-take zones or KLA, where all activities are prohibited. Additionally, there are utilization zones allowing for controlled activities using traditional fishing gear. The core sona, known as the no-take area, is also referred to as KLA.

Adjacent to the village, in front of the Muslim settlement complex, there exists a core zone that has evolved into a utilization zone. This transition was governed through decisions made collectively by the community, village government, Minahasa Regency government, and the Regency People's Representative Council. The zone still permits mangail fishing. A core tourism site, "spot *betlehem*," is within sona aini. This diving spot, associated with Lembeh Strait, is often called the "best of *Lembeh*" due to its marine biota's similarity to the renowned *Lembeh* Strait, a popular destination in the diving world. Some even assert that this area surpasses the Lembeh Strait in terms of marine life richness. Sona inti encompasses sub-locations like *sona inti malkon*, *betlehem 1*, *betlehem 2*, *betlehem 3*, and fish house.

In collaboration with the center and the NGO Rare, the Cahaya Trans group established a savings center in 2015-2017. This site, rich in fish, serves as a spawning ground. Construction of the savings sona was a joint effort involving community and religious leaders.

Arakan village no longer necessitates conservation socialization due to the community's familiarity with the concept. The present challenge centers on enhancing the fishermen's economy to align with local habits and culture. According to informants, individual fishing practices tend to be more successful for Arakan village fishermen, as group-based approaches often prove less effective. Several respondents advocated for boat facilitation assistance to be extended to all members rather than a select few.

Remarkably, the fishermen's group tends to become active only in response to assistance offers; afterwards, activity wanes, and the assistance is often sold. The group usually receives a single *catinting* boat. In one instance, the center solicited assistance proposals, receiving submissions from six groups, yet only one received assistance. However, the initiative didn't come to fruition, as the boat was sold and proceeds were shared.

The policies for fisheries access management include a zone extending 50 meters seaward from the shallowest point, designated for community use and various activities, including aquaculture.

A unique initiative involves the creation of a fish house constructed from iron frames and coral seeds. This collaborative project aims to foster new coral growth, creating a habitat for fish. The frames are shaped in desired forms, such as Christmas trees or tunnels to facilitate diving.

Community awareness about regulated marine protection areas is prevalent in Poopoh village, with locals and even outside fishermen being informed about these zones. These marine protected areas, known as sonations, comprise extensive coral reefs, referred to as *nyare*. In the Arakan area, there are also napo reefs, which form their own islands unconnected to the mainland.

Protection areas encompass mangrove zones, crucial for marine fish nesting. The community recognizes the mangroves' role in mitigating strong winds and waves, thereby preventing tidal waves in the region.

#### **4.4.2. Conservation through the Role of Religious Leaders**

The head of the GMIM Petra Poopoh congregation, Mr. pdt. Danny Mawuntu, emphasized the pivotal role of religious leaders in marine conservation efforts. They provide announcements and invitations to the Poopoh village community, urging them to protect the marine environment by adopting a lifestyle that tackles waste through community service programs and mangrove planting activities. These initiatives stem from church programs and collaborations with the government. Additionally, religious leaders deliver socialization messages through sermons during worship services. While there aren't stringent sanctions from the church, it may offer advice and guidance, with potential government intervention if unresolved issues persist.

Several solutions are being explored to counteract the disposal of waste into the sea. These include the placement of trash bins around the beach by students involved in KKT (Student Community Service), community agreements to burn personal waste, and the practice of disposing of some waste in gardens due to some locals working as farmers. However, these solutions face limitations, such as insufficient trash bins leading to scattered garbage along the coast and the absence of a proper final disposal site (TPA).

Regarding local knowledge and beliefs, especially among fishermen, Pastor Danny Mawuntu clarified that the traditions aren't rooted in magic but rather natural conditions. Passed down through generations, these traditions guide activities such as fishing based on good or bad times. Magic-related beliefs and rituals are not recognized among the fishing community. Fishermen primarily catch fish for personal food needs, with any excess being sold in the market.

Imam Amirulah Labula, on the other hand, highlighted the role of religious leaders within the Bunaken National Park area. He described how they organize community service programs like beach cleaning in collaboration with the National Park Office, garnering strong community support. The leaders also engage in socialization efforts, emphasizing marine cleanliness through sermons in mosques and religious events. Given that many villagers are fishermen, these efforts are vital, as the sea is the life source for the local community. The mosque actively participates in coral preservation, even conducting joint worship sessions with the hall on Fridays when prayers coincide.

Fishermen in Poopoh village utilize specific criteria to predict white fish season. This season coincides with the appearance of the dead moon or "tadu," counting how many tadu occurrences determine the white fish presence, typically up to the fourth tadu.

Fishermen engage in mangail fishing during the afternoon (17:00 - 19:00) or in the morning (15:00 - 17:00). They set up nets or "*soma smabil mangail*" for fishing and usually return home shortly afterward. The fishing area isn't far from the village, as the reefs around the village offer high fish potential.

From December to March, known as wave season, especially during the north wind period, the village experiences strong north winds due to its northern-facing location. However, the Cape Kalapa shields the Poopoh sea area from the intense west winds affecting other regions. It's important to note that the knowledge passed down through generations is facing challenges due to global changes, such as climate change and environmental degradation. These changes have disrupted the predictability of climate and weather patterns. For instance, the occurrence of white fish in the month of "beret" has shifted to December. Unexpected events like omba (currents) and strong winds during months when they were previously absent have caused confusion among fishermen.

While the accuracy of predictions has declined, fishermen attribute these changes to human sins without fully understanding the underlying reasons.

#### **4.4.3. Conservation Through Community Wisdom (Beliefs, Poso, and Heavenly Bodies Knowledge)**

The community's understanding of nature, intertwined with daily activities, remains closely linked to the lives of fishermen. While traditional communal beliefs have waned due to the influence of religion (Christianity and Islam), the connection between celestial bodies like the moon and stars and earthly events persists. Locals still rely on these connections to determine propitious times for planting, fishing, and recognizing unfavorable periods. Their adherence to natural indicators, such as observing favorable moon and star patterns for specific activities and the appearance of certain fish, underscores their traditional practices.

The concept of "abstinence" or "*poso*" still lingers within the community, albeit weakened by religious teachings. Rituals like those performed in the past, such as creating mock boats laden with offerings and prayers to appease sea deities during extended bad weather, have diminished. These ceremonies aimed to placate the sea gods in anticipation of good catches. Similar ceremonies have taken on new forms, such as the Sangihe people's New Year entry tradition, now conducted through Christian prayers in the church. When embarking on sea journeys, fishermen pray in accordance with their religious beliefs. Nevertheless, some still adhere to ancestral traditions, holding on to their customs.

The fishermen in Arakan Village uphold ancestral beliefs to a certain extent, although most have transitioned to Islamic religious beliefs embraced by the majority. Traditional beliefs are often viewed as "shirk" (idolatry). Among them, practices like house construction, boat building, and boat lowering are carried out with prayers. For those influenced by religion, observing nature is referred to as "*falak science*" or "*falakiah*." This knowledge is possessed by religious leaders and is associated with assessing the appropriateness of activities based on natural signs.

The belief in sea rulers or inhabitants persists among the coastal communities, whether on reefs or high seas. The Bajo people, for instance, hold that the "*mbo madialo*" are guardians of the sea realms, influencing their behavior at sea. A sense of caution prevails, as harming coral or polluting the sea could result in severe consequences like strong waves. This belief serves as a form of local wisdom, safeguarding the marine environment from harm. Over time, religious influence replaced the belief in "*mbo madialo*" with faith in God. There's also a fusion of beliefs among the Bajo and Sangihe communities, with language influences and some shared taboos. For instance, discussing fish yields with fishermen is taboo before setting sail, as fortune is believed to come from a higher power, leaving outcomes to the Almighty. Likewise, if misfortune, referred to as "*soe*," befalls them, it's considered an individual responsibility.

#### **4.4.4. Conservation Efforts by the Navy**

In 2015, fish bombing incidents surged in the sea, only to disappear completely after the establishment of a navy post in Arakan village and subsequent arrests. However, it's important to note that such actions, if they occur, are carried out by individuals from outside the village. Fish bombing has adverse effects on local fishermen who primarily

use fishing arrows (*bajubi*) and nets. Bombs not only pose a threat to the nets and arrows but also jeopardize the safety of both the archers and net users.

There exists an irresponsible group that continues to employ bombs for fishing, headquartered in Arakan Village. However, the Navy, stationed in Arakan Village, has taken measures to curtail such activities carried out by this group. This group's activities have led to the construction of a Navy post in Arakan Village. This step was taken due to the considerable damage inflicted upon the coral reefs in the coastal vicinity of Arakan Village, which is particularly evident during low tide. In contrast, Poopoh Village showcases a different approach, with the community actively engaging in initiatives like planting mangrove trees and coral seeds on the seabed. This proactive stance contributes to the favorable reputation of "Bunaken II" in Poopoh Village, as the mangrove trees and coral reefs remain in relatively good condition.

#### **4.5. Impact of Conservation Efforts**

##### **4.5.1. Shift in Community Behavior Towards Nature Interaction**

In the past, the practice of fish bombing (known as "*babom*") was rampant and severely damaging to the coral reefs that served as fish habitats. However, due to socialization and interventions by various institutions, notably the Bunaken National Park Management Center, this harmful behavior has largely ceased. While occasional reports of fish bombing still surface from distant villages, the practice has greatly diminished in Poopoh village. Notably, the presence of a center post in Poopoh village, along with water police patrols and community vigilance, has played a significant role in curbing fish bombing incidents.

Stringent measures have been taken against fish bombing culprits, including arrests and prosecutions. Such actions have instilled fear and acted as a deterrent for potential bomb users. In 2016, during the tenure of the Poopoh Elder Law, two incidents occurred, resulting in strict punitive actions, including a one-year prison sentence for residents of Poopoh village involved in the practice.

The bombs used in fish bombing were typically homemade concoctions of potassium and other ingredients, enclosed in bottles with plugs. Detonating these bombs caused fish to surface, damaging coral growth in the process.

##### **4.5.2. Logging of Mangrove Trees**

The logging of mangrove trees, which was previously practiced, has ceased. Historically, mangrove wood was favored for constructing houses and boats due to its remarkable strength and water-resistant properties. Encouragement has been given to fishing groups to engage in mangrove replantation using locally sourced seeds. This approach is preferred because imported mangrove seeds often struggle to adapt to the local habitat.

##### **4.5.3. Awareness and Reporting**

Community awareness has grown regarding the critical role of mangrove forests as breeding grounds for fish and other marine organisms that contribute to biodiversity. Additionally, there is an increased willingness to report any activities detrimental to the marine ecosystem to the appropriate authorities.

## **5. CONCLUSION**

The research conducted has led to the following conclusions:

In Participatory Conservation, the process of designating marine areas with active community involvement has led to significant achievements, despite initial conflicts of interest between fishermen and the park management authorities. Collaborative efforts have resulted in the establishment of marine protection zones, comprising core zones where no activities are allowed, and utilization zones designed for sustainable use, incorporating traditional fishing methods. The core zone, also known as the No Take Area or KLA, is a pivotal component of this participatory approach.

In conservation through Religious Leaders, Religious leaders play an integral role in advocating for marine conservation. They effectively communicate with formal leaders and engage the community through announcements in churches or mosques. This outreach encourages the community to safeguard the marine environment by refraining from polluting the sea, participating in clean-up initiatives, preserving mangrove trees, and understanding the vital role of mangrove forests in marine conservation.

In conservation through Community Wisdom (Beliefs, Poso, and Celestial Knowledge), despite the gradual decline of traditional beliefs due to religious influences (Christianity, Islam), the community's knowledge of nature remains intertwined with their daily lives, particularly for fishermen. The connection between celestial bodies, such as the moon and stars, and terrestrial events persists. Local knowledge guides favorable times for activities like rice planting and fishing, showcasing the continued relevance of community wisdom.

In conservation Efforts by the Navy, reinforced by rigorous monitoring and enforcement, have transformed the attitudes, behaviors, and mindset of the communities residing in the buffer zone of Bunaken National Park. These efforts foster the protection of mangrove forests as crucial fish spawning grounds, the mitigation of wave-related disasters during high tides, and the preservation of vulnerable species like seahorses and dugongs.

To ensure the enduring success of marine conservation in the buffer zone of the Bunaken Marine Park, the following recommendations are put forth: Continue to develop and enhance the current conservation efforts, including participatory conservation models, the involvement of religious leaders, and the perpetuation of community wisdom values (beliefs, Poso, and celestial knowledge). Sustain the conservation endeavors led by the navy. Additionally, explore opportunities for further research, such as inventorying the local wisdom values that remain intact amidst the challenges of globalization. This step is vital in preserving the unique ecological balance of the Bunaken Marine Park.

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