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KADO SPESIAL: Strategic Innovation for Conservation Area Management in Pieh Island National Marine Protected Area, West Sumatra

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ABSTRACT

The Pieh Island National Marine Protected Area (NMPA) is managed by the LKKPN (National Marine Protected Area Office) Pekanbaru and includes distinct zones: a 197.34-hectare core zone, a 39,681.1-hectare limited utilization zone, and a 41.56-hectare anchoring and habitat rehabilitation zone. The largest, the limited utilization zone, highlights the importance of managing human interactions within the MPA. This research focuses on identifying and exploring strategies to address challenges faced by LKKPN Pekanbaru in managing the Pieh Island NMPA, specifically using the Bando Island area as a case study. Bando Island, a survival tourism destination within the MPA, needs to be more adequately managed. A literature review and data collection through focus group discussions (FGD) were conducted. Issues were explored and validated using the APKL (Aktual, Problematik, Khalayak, Layak) analysis, with priorities determined by the USG (Urgency, Seriousness, Growth) matrix. Fishbone analysis was used to identify root causes of top-priority issues, and alternative strategies were ranked using the McNamara approach. The research identified the lack of stakeholder collaboration as the primary issue, leading to the development of the "KADO SPESIAL" model—focusing on stakeholder involvement in every phase of the management process.

Keyword: Kado Spesial, Strategic Innovation, Conservation Area Management

INTRODUCTION

Pieh Island National Marine Protected Area (NMPA) is a national conservation area managed by Indonesian Ministry of Marine Affairs and Fisheries through the LKKPN (National Marine Protected Area Office) Pekanbaru. The area was first regulated by the Decree of the Minister of Marine Affairs and Fisheries Number 38 of 2014, and this regulation was updated by the Decree Number 31 of 2022, covering 39,920 hectares. This conservation area aims to maintain and improve the quality of marine and coastal biodiversity through various programs, including protection, conservation, and sustainable utilization. Coral reefs, sea turtles, and groupers are the primary focus of the conservation initiatives in Pieh Island NMPA.

LKKPN Pekanbaru is the Technical Implementation Unit (UPT) under the Directorate General of Marine Affairs and Spatial Management, responsible for the effective management

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https://ojs.umrah.ac.id/index.php/jmps

of the Pieh Island NMPA. The management of the MPA is conducted based on regulated zonations. There are three zones within the MPA: the core zone, the limited utilization zone, and other designated zone for anchoring and habitat rehabilitation.

Five core zones, covering 197.34 hectares, are allocated as fully protected areas and act as no-take zones, where no activities are allowed except for research and management purposes. The limited utilization zone, which spans 39,681.1 hectares and is the largest designated area within the MPA, provides for the sustainable use of MPA resources, primarily for tourism and fishing. Since the MPA is designed mainly for the utilization of marine and coastal resources, managing human interactions with the MPA is a primary concern for the management.

Conservation areas are crucial components of intricate ecological systems and serve multiple essential functions. They not only sustain ecosystem services and preserve biodiversity but also enhance the quality of social life and foster connections between society and nature across a broad spectrum of social actors (Maretti et al., 2023). Managing these areas represents an investment in the future aimed at improving environmental health, safeguarding biodiversity, and protecting both natural and cultural heritage. In the Anthropocene era, these areas face numerous threats, including climate change, invasive species, development pressures, and extreme environmental events. Conservation practitioners are tasked with proactively and responsively managing these areas to address contemporary challenges, ensuring that they continue to offer benefits to the environment and future generations (Worboys et al., 2015).

This research focuses on developing strategies to address the current management challenges faced by LKKPN Pekanbaru in overseeing the Pieh Island National Marine Protected Area (NMPA). The Bando Island area, a designated survival tourism destination within the MPA, has been selected as a case study. Bando Island is an uninhabited island located approximately 19.7 kilometers from Pariaman City. It provides habitat for a diverse array of coastal and marine species. By focusing on the Bando Island case study, the research seeks to uncover solutions that can enhance the management and conservation of this critical area. As a special interest tourism destination, Bando Island attracts many international visitors who, despite the island's limited resources, come to explore its rich ecosystems and abundant marine biodiversity.

Given the island's role as a tourist destination and its ecological significance, developing a robust management plan is crucial. This plan must address the challenges of balancing tourism with conservation, ensuring that the island's natural resources are protected while still accommodating the interests of visitors. However, the management of this area has yet to be thoroughly planned, designed, or implemented. By addressing current issues and exploring innovative solutions, the research seeks to contribute to more effective conservation practices and ensure that the island remains a vibrant and sustainable destination for both wildlife and visitors.

METHODOLOGY

This research adopts a qualitative approach, utilizing a literature review and focus group discussion (FGD). The FGD was conducted at the LKKPN Pekanbaru Office in June 2024, with participation from employees and leadership. The study aims to explore creative solutions to the organization's current issues. The research involved issue identification, validation, prioritization, root cause analysis, creative idea exploration, and solution prioritization. Issues were identified and validated during FGD using APKL (Aktual, Problematik, Khalayak, Layak) analysis (LAN RI, 2008), which assesses the actuality, problematicity, publicity/public relevance, and eligibility of each issue. This approach is known for helping researchers identify the fitting issue in research design (Pertapan, 2022). The APKL analysis has been applied to

Journal of Maritime Policy Science
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VOL 1 NO 2 AUGUST 2024
https://ojs.umrah.ac.id/index.php/jmps

various research topics, including state-owned enterprise development (Yurianto, 2021), community service programs (Effendi et al., 2021), and analyzing misconceptions in mathematics (Darmawan et al., 2024).

Once identified and validated, issues were further analyzed using the USG (Urgency, Seriousness, Growth) matrix (LAN RI, 2008) to prioritize them. The USG method allows for the systematic prioritization of issues by creating an ordered sequence based on their urgency, seriousness, and potential for growth (Ariyanti et al., 2020). The USG method ranks issues by priority, which has been applied in research on client registration optimization (Pertapan, 2022), employee dissatisfaction (Naser et al., 2022), and performance control strategies (Nurcahyo et al., 2023). This process helps determine the single priority issue to be addressed. The top priority issue was then analyzed using fishbone analysis, a root cause analysis method. Fishbone analysis, also known as the Ishikawa diagram, has been used in various studies, such as exploring causes of complaints in the distribution and transportation sector (Santoso, 2017), analyzing decision-making delays (Sakdiyah et al., 2022), and investigating turnaround time issues in laboratories (Lestari et al., 2014).

Finally, creative solutions were explored through FGD, guided by the root cause analysis results. The McNamara approach, or quantitative fallacy, was used to select the most effective solutions through quantitative observations or matrices. This method has been applied in studies on governance of state-owned enterprises (Yurianto, 2021) and pharmacy service waiting times in hospitals (Nazlinawaty et al., 2021).

RESULTS AND DISCUSSION

1. Issues Identification

An issue is the main topic or problem that can be discussed, talked, avoided, faced, and decision made. Issues that have been gathered through FGD are:

a. Lack of promotion for the Bando Island area as a tourism destination
b. Protection, preservation, and utilization activities in the Bando Island area are not yet integrated
c. Interactive collaboration among stakeholders in the management of the Bando Island area has not yet been established
d. The regulations for MPA management do not grant management authority over the island's land area to the LKKPN Pekanbaru
e. Limited number of human resources for managing the MPA

Table 1. APKL Analysis of the Identified Issues

No	Issues	Criteria			
		Actuality	Problematic	Publicity/Public Relevance	Eligibility
1	Lack of promotion for the Bando Island area as a tourism destination	Yes	Yes	Yes	Yes
2	Protection, preservation, and utilization activities in the Bando Island area are not yet integrated	Yes	Yes	Yes	Yes
3	Interactive collaboration among stakeholders in the management of the Bando Island area has not yet been established	Yes	Yes	Yes	Yes

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https://ojs.umrah.ac.id/index.php/jmps

No	Issues	Criteria			
		Actuality	Problematic	Publicity/Public Relevance	Eligibility
4	The regulations for MPA management do not grant management authority over the island's land area to the LKKPN Pekanbaru	Yes	Yes	Yes	Yes
5	Limited number of human resources for managing the MPA	Yes	Yes	Yes	Yes

Source: Author, 2024

The APLK analysis helps determine whether the issues collected during the FGD are genuinely significant. This analysis evaluates each issue based on its actuality (A), problematicity (P), public relevance (K), and eligibility (L). Actual means that the issue is still being discussed or has not been resolved up to the present time; Problematic means that the issue deviates from expected standards or regulations and causes concern, necessitating immediate investigation of its causes and solutions; Public relevance means that the issue directly affects the public interest and is not merely for the benefit of an individual or a small group of people; and Eligibility means that the issue is reasonable (logical), appropriate, realistic, and can be discussed in accordance with duties, rights, authorities, and responsibilities, ultimately becoming a priority issue.

Based on the APKL analysis presented in Table 1, all the issues discussed during the FGD have been validated. This validation indicates that the issues meet the criteria of actuality, problematicity, public relevance, and eligibility, highlighting their significance in the management of the Bando Island area. Each issue identified is pertinent to the current challenges faced and holds substantial relevance to the public and stakeholders involved. However, to address these challenges effectively, the organization needs to prioritize the most pressing issues. Therefore, the issues confirmed through the APKL analysis are subjected to a further evaluation process using the USG matrix. This matrix helps rank the issues by their urgency and importance, enabling the organization to focus resources and efforts on addressing the highest-priority concerns first. By systematically ranking the issues, the organization can develop a targeted approach to manage the Bando Island area more efficiently and address the most critical problems in a timely manner.

2. Ranking the Issue Priority

The method used to rank the priority of issues to be addressed was the Urgency-Seriousness-Growth (USG) matrix. This analysis will determine which issues should be prioritized among the many that have arisen (Naser et al., 2022). The USG matrix is often employed to pinpoint the primary issue among those identified in the APKL analysis (Yurianto, 2021). Urgency (U) evaluates how urgently the issue needs to be addressed, considering the available time and the level of time pressure to resolve the underlying problem. Seriousness (S) assesses how serious the issue is and the need for it to be addressed in relation to the consequences of delaying the resolution of the problem that caused the issue or the potential for it to cause other problems if not resolved. It should be understood that, under the same circumstances, an issue that could lead to further complications is more severe than one that stands alone. Growth (G) measures the likelihood of the issue escalating, considering the possibility that the underlying problem will worsen if left unaddressed.

Journal of Maritime Policy Science
e-ISSN: 3063-4245 p-ISSN: 3063-5705
VOL 1 NO 2 AUGUST 2024
https://ojs.umrah.ac.id/index.php/jmps

Table 2. USG Analysis of the Identified Issues

No.	Issues	Criteria			Score	Rank
		U	S	G		
1	Lack of promotion for the Bando Island area as a tourism destination	4	3	3	10	5
2	Protection, preservation, and utilization activities in the Bando Island area are not yet integrated	5	5	4	14	2
3	Interactive collaboration among stakeholders in the management of the Bando Island area has not yet been established	5	5	5	15	1
4	The regulations for MPA management do not grant management authority over the island's land area to the LKKPN Pekanbaru	4	5	3	12	4
5	Limited number of human resources for managing the MPA	4	5	4	13	3

Source: Author, 2024

Not all problems can be addressed simultaneously (LAN RI, 2008), despite the APKL analysis identifying five valid issues that require intervention. Addressing numerous problems simultaneously can strain resources, including human resources, budgets, and time. Therefore, it is essential to prioritize issues to ensure they are resolved effectively and efficiently. The USG matrix evaluates each issue based on three criteria using a rating scale of 1 to 5. A score of 5 in each criterion indicates that the issue is highly urgent, extremely serious, and has a strong likelihood of escalation. As shown in Table 2, the lack of interactive collaboration among stakeholders in the management of the Bando Island area is the top priority. It is also the only issue that received the maximum score in all USG criteria, underscoring the need for immediate intervention to achieve effective management of the Bando Island area. The matrix provides a ranking of the issues, which can be used as a guide to determine the order in which they should be addressed.

3. Root Causes Analysis of the Issue

The lack of interactive collaboration among stakeholders in the management of the Bando Island area has been identified as the most urgent issue that needs to be resolved. To develop effective strategies for addressing this issue, this research explored its root causes. The exploration began with an examination of the facts to understand why establishing interactive collaboration among stakeholders is essential. Based on input from participants during the FGD, there are at least seven reasons why this issue should be the top priority:

a. The budget required for managing the Pieh Island NMPA, including Bando Island area, as outlined in the 2022-2042 Management Plan, is IDR 9 billion in the first year. However, the budget allocation for 2024 is approximately IDR 4.081 billion, indicating that the available budget meets only 45% of the management needs. To date, budget support has

Journal of Maritime Policy Science
e-ISSN: 3063-4245 p-ISSN: 3063-5705
VOL 1 NO 2 AUGUST 2024
https://ojs.umrah.ac.id/index.php/jmps

solely come from the national budget (APBN), with no contributions from other stakeholders.

b. The sea turtle conservation program conducted by LKKPN Pekanbaru on Bando Island has not yet been able to fully optimize the necessary facilities or apply technology to control the sex ratio of hatchlings. This is due to the limitations of the organization's duties and functions. Currently, there is no support from other stakeholders, even though such support is crucial to enhance the success of the conservation program.
c. Capacity building for local community groups or organizations, facilitated by LKKPN Pekanbaru, has so far been limited to activities such as diving training, turtle conservation, and ecosystem monitoring. These local organizations have yet to receive other essential training, such as digital content promotion for tourism, snorkeling guides, food and beverage services, and others, which are expected to be supported by other stakeholders.
d. Data and information dissemination is still being conducted exclusively through the official website of LKKPN Pekanbaru and has yet to utilize other information channels from additional stakeholders.
e. Waste management in the Bando Island area has not been effectively implemented, with waste currently being burned to protect turtle nesting habitats. There is no collaborative waste management effort with other stakeholders.
f. The promotion of tourism potential and the biodiversity of the MPA, including the Bando Island area, has so far been carried out solely by LKKPN Pekanbaru, with no support from other stakeholders.
g. The revenue from Non-Tax Revenues (PNBP) generated by survival tourism activities remains low, at only around IDR 8 million per year, highlighting the need to strengthen collaboration with other stakeholders.

Root cause analysis was performed to address the issue more clearly using fishbone analysis or Ishikawa diagram. This diagram visualizes the root causes that are closely related to the issue or problem. This analysis is recognized for its effectiveness in pinpointing the key cause(s) of sentinel events or near misses. It aids in preventing the recurrence of unexpected incidents by examining system weaknesses, promoting voluntary event reporting, and moving the focus away from individual blame (Gupta & Varkey, 2009). Problem causes in the diagram are categorized into materials, machines and equipment, manpower, methods, mother nature or environment, and measurements. Participants during FGD identified the causes of the chosen issue or problem in every cause category.

Figure 1 illustrates the root causes of the lack of interactive collaboration among stakeholders. The analysis reveals that the root causes of this issue include:

a. Man: Limited human resources for managing the Bando Island area and low stakeholder involvement in its management.
b. Method: There is no interactive collaboration forum among stakeholders in the management of the Bando Island area to encourage increased participation and stakeholder initiatives. Additionally, the potential of the Bando Island area has minimal exposure and needs to be well known to the public.
c. Machine: The SEAPARK application, which serves as the MPA entrance permit system, needs to be optimized more effectively in the field.
d. Measurement: The evaluation of MPA management effectiveness (EVIKA) for the Pieh Island NMPA, including the Bando Island area, has yet to reach the sustainable category, which is the highest level in the EVIKA evaluation.
e. Environment: Protection, preservation, and utilization efforts in the management of the Bando Island area still need to be integrated.
f. Material: Conservation data and information have not been utilized to their full potential.

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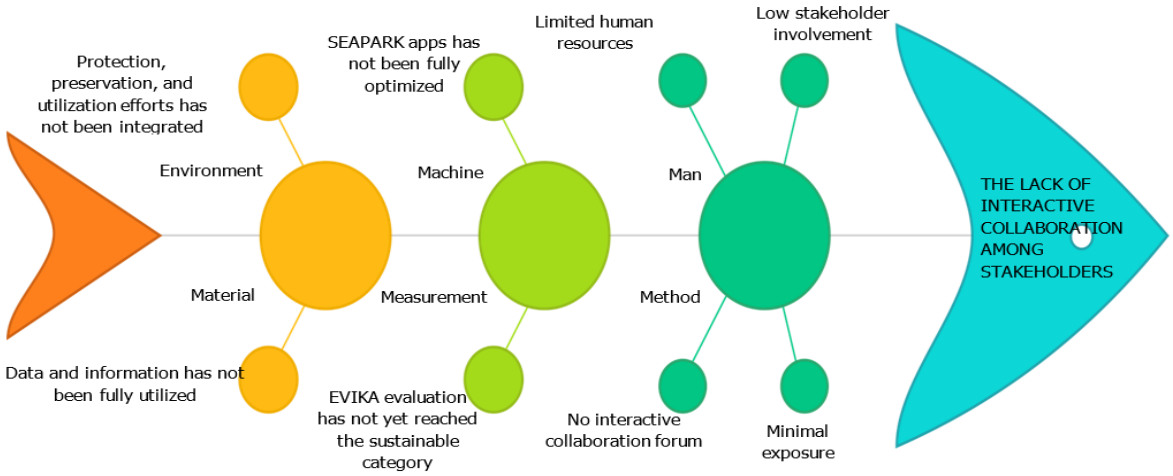
VOL 1 NO 2 AUGUST 2024
https://ojs.umrah.ac.id/index.php/jmps

Figure 1. Fishbone Analysis of the Issue



Source: Author, 2024

4. Creative Ideas Exploration

Through a comprehensive analysis, it has been identified that Pieh Island NMPA, particularly in managing the Bando Island area as a tourism destination, faces a critical issue: the lack of interactive collaboration among stakeholders. During the FGD, participants agreed to address this issue by developing a model called KADO SPESIAL. KADO SPESIAL stands for Kawasan Bando Spesifik Konservasi Alam Laut or Bando Area for Specific Marine Nature Conservation, and it aims to serve as a pilot project for a specialized management model within LKKPN Pekanbaru.

KADO SPESIAL is designed as a long-term project, with the expectation that it can be replicated in other areas within the LKKPN Pekanbaru working region. As both a model and a concept, KADO SPESIAL comprises three key strategies to address the issue of stakeholder collaboration. These strategies represent the initial tasks for LKKPN Pekanbaru in tackling the lack of interactive collaboration, including:

a. Conducting stakeholder mapping related to the management of the Bando Island area
b. Integrate protection, preservation, and utilization efforts for the Bando Island area into a single platform or model for more focused, effective, and sustainable management
c. Build interactive collaboration with various parties to achieve integrated protection, preservation, and utilization of the Bando Island area through the KADO SPESIAL model

These three main strategies were further evaluated using the McNamara approach to determine the priority for implementing the KADO SPESIAL model. The McNamara matrix uses three criteria to assess the strategies: Contribution (K), Feasibility (L), and Costs (B). The evaluation was performed using a rating scale of 1 to 5, with the following scoring references:

Score 5 = very high contribution / highly feasible / very low cost
Score 4 = high contribution / feasible / low cost
Score 3 = adequate contribution / moderately feasible / moderate cost
Score 2 = low contribution / not feasible / high cost
Score 1 = very low contribution / highly unfeasible / very high cost

Table 3 illustrates the ratings for the level of contribution, feasibility, and cost of each strategy. The table reveals that building interactive collaboration with various parties to achieve integrated protection, preservation, and utilization of the Bando Island area through the KADO SPESIAL model is the most reasonable approach in terms of contribution, feasibility,

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VOL 1 NO 2 AUGUST 2024
https://ojs.umrah.ac.id/index.php/jmps

and costs. This makes sense as it serves as the foundation of KADO SPESIAL, focusing on stakeholder involvement initiation, which is currently lacking in the management of the MPA within the LKKPN Pekanbaru working area.

Table 3. McNamara Ideas Filter Analysis

No.	Alternative Ideas	Criteria			Score	Priority
		K	L	B		
1	Conducting stakeholder mapping related to the management of the Bando Island area	4	4	3	11	III
2	Integrate protection, preservation, and utilization efforts for the Bando Island area into a single platform or model for more focused, effective, and sustainable management	5	4	3	12	II
3	Build interactive collaboration with various parties to achieve integrated protection, preservation, and utilization of the Bando Island area through the KADO SPESIAL model	5	4	5	14	I

Source: Author, 2024

5. KADO SPESIAL as a strategic innovation

KADO SPESIAL is an innovative approach to integrated conservation area management, offering a model based on interactive collaboration among stakeholders. Since its initial designation as a conservation area, the Pieh Island NMPA, which includes the Bando Island area, has not optimally engaged stakeholders in its management. However, it has been proven that the success of conservation areas heavily relies on the involvement and management of stakeholders, not only during the planning stage but throughout the entire management process (IUCN, 2004).

As the organizational unit responsible for managing Pieh Island NMPA, LKKPN Pekanbaru urgently needs effective stakeholder management to ensure that activities within the MPA zonations are conducted sustainably. Involving stakeholder's participation in all aspects – from planning and implementation to monitoring and evaluation – is crucial for the success of an MPA. Especially when managing tourism withing an MPA, managers must collaborate with a diverse range of stakeholders. This includes both terrestrial and marine-based groups, such as agricultural and fishing interests, waste management agencies, forestry experts, recreationists, and other relevant parties. The level of participation can range from passive (where stakeholders are merely informed through unilateral announcements by administration or management), to informed and active (where stakeholders are given information, consulted, and may play an active role), and up to interactive and decision-making (where stakeholders play a significant role or even lead an initiative) (IUCN, 2004).

At the three levels of stakeholder participation in conservation area management (passive-active-interactive), KADO SPESIAL aims to encourage stakeholder involvement up to the levels of being interactive and involved in decision-making. KADO SPESIAL offers a

Journal of Maritime Policy Science
e-ISSN: 3063-4245 p-ISSN: 3063-5705
VOL 1 NO 2 AUGUST 2024
https://ojs.umrah.ac.id/index.php/jmps

collaborative cross-stakeholder approach to conservation area management. This collaboration addresses the gaps in the management of conservation areas, particularly in ensuring biodiversity conservation efforts, facing various threats, and providing benefits to the surrounding communities. The Bando Island area, part of the Pieh Island NMPA, serves as the pilot project for this concept in LKKPN Pekanbaru working region. The design of the KADO SPESIAL model, which was also adopted and modified from the conservation area/park management framework used by the New South Wales National Parks and Wildlife Service (Worboys et al., 2015), is illustrated in the Figure 2.

Figure 2 shows stakeholders at the center of the model, emphasizing the need for their role in each step of the conservation area management cycle. Multi-stakeholder involvement is believed to help bring different perspectives to light and elevate discussions from conflict to negotiation (Wallner & Wiesmann, 2009). This involvement is crucial, especially given the complex and dynamic nature of conservation areas, which are characterized by linkages and interdependencies, multiple stakeholders with diverse and often conflicting views, and a lack of control by any single group or individual (Jamal & Stronza, 2009). In addition, a well-functioning and effective governance system is marked by the ability of various stakeholders to coordinate, cooperate, and collaborate in decision-making and management processes that are efficient, transparent, and accountable (Islam et al., 2019). The conservation area must receive enhanced economic, political, and, above all, social support, considering the variety of partnership models with diverse stakeholders in multiple arrangements. Greater recognition, understanding, and participation of stakeholders in activities within the conservation area can help researchers and governmental agents develop and implement more collaborative solutions (Maretti et al., 2023).

Figure 2. KADO SPESIAL model

Source: Author, 2024

Protected area managers who are aware of both the full range of protected area benefits and the range of stakeholders affected have a far better chance of managing

successfully (Worboys et al., 2015). Stakeholders can include government agencies, NGOs, local communities and fishers, universities and research institutions, the private sector, management staff, international visitors, and more. These stakeholders are those who utilize and depend on the conservation area, engage in activities that affect or impact the conservation area, and have an interest in the conservation area (IUCN, 2004). Collaborative arrangements can function through both formal and informal agreements, as well as in less structured forms. For instance, networks and grassroots initiatives might emerge temporarily to address specific issues in the field. Social movements often involve coalition-building and joint actions that may occur without formal agreements (Jamal & Stronza, 2009).

CONCLUSION

In conclusion, our study emphasizes that the lack of interactive collaboration among stakeholders in managing the Bando Island area, part of the Pieh Island NMPA, is the top priority issue that LKKPN Pekanbaru must address. The research proposes the KADO SPESIAL model, which serves both as a framework and a guiding principle for tackling this critical issue and its underlying causes. This model stresses the importance of stakeholder involvement at every stage of the MPA management cycle. Its implementation in the field is crucial and should be continuously adjusted and refined, considering the dynamic nature of MPA management and the need to adapt to ongoing changes.

Recommendations for implementing the KADO SPESIAL model are structured into three phases: short-term, medium-term, and long-term. In the short term, the initial phase focuses on laying the groundwork for stakeholder involvement strategies. Key tasks include: (1) forming an effective team and holding stakeholder mapping discussion meetings; (2) meetings in addressing key issues and challenges in managing the conservation area on Bando Island, strengthening the database, mapping key stakeholders, building interactive collaboration, and developing the KADO SPESIAL information platform; (3) preparing the KADO SPESIAL information platform; (4) establishing interactive collaboration with key stakeholders through focus group discussions and the formation and declaration of the KADO SPESIAL Collaboration Forum; (5) launching and promoting the KADO SPESIAL Collaboration Forum and information platform; (6) creating KADO SPESIAL media publications; (7) implementing KADO SPESIAL interactive collaboration in the field; and (8) conducting monitoring and evaluation.

The medium-term involves: (1) discussing the budget plan and gathering input and suggestions for improving KADO SPESIAL; (2) implementing collaborative management with the KADO SPESIAL Forum; and (3) conducting ongoing monitoring and evaluation. Additionally, in the long term, activities include (1) refining the KADO SPESIAL information platform, (2) continuing the implementation of collaborative management with the KADO SPESIAL Forum, (3) expanding collaboration within the KADO SPESIAL Forum by increasing the number of participating stakeholders, and (4) replicating the interactive collaboration model.

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