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Evaluation of the Marine Space Utilization Program in North Kalimantan Province

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Abstract

To carry out marine space utilization activities, every individual or entity operating permanently in territorial waters and jurisdiction must have a Conformity for Marine Space Utilization Activities (KKPR). Marine KKPR is a document that measures planned activities for suitability with the marine environment and seawater quality. This research aims to analyze the evaluation of marine space utilization programs in North Kalimantan Province. This research uses a descriptive qualitative approach with data collection methods, namely observation, in-depth interviews, and documentation. The informants in this research are the authorities and are directly involved in strategic management in the use of marine space in North Kalimantan Province. The results of the research show that the evaluation of the marine space utilization program in North Kalimantan Province still needs to be improved. This is because people still often ignore the legality of the business permits, they are running. Therefore, the government must continue to increase awareness regarding the importance of paying attention to business permits and also seaweed cultivation areas, so as not to disrupt shipping lanes.

Introduction

The sea is a water space on the face of the earth that connects land with land and other natural forms, which is a geographical and ecological unity along with all related elements, and whose boundaries and systems are determined by statutory regulations and international law. The use of coastal area space is a process that will bring about a change in the ecosystem. These changes will have an impact on the environment. The higher the intensity of management and development carried out means the higher the level of resource utilization, the higher the environmental changes that will occur in coastal areas (Dahuri, et al, 2001).

Marine space has great potential for business actors, especially in fisheries, sea transportation, tourism, and other business activities such as seaweed cultivation. Utilization of marine space is an important activity for almost all sectors of life in the world (Iglesias-Campos et al., 2021). In the use of marine space as part of a general-use zone. It should be noted that this utilization must be carried out by paying attention to applicable rules and regulations and maintaining the sustainability of marine resources and the marine environment. Implementing environmentally sound space utilization and controlling the wise use of natural resources is the main objective of environmental management (Islam & Managi, 2019). This means that in carrying out

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development, the principle of preserving the function of natural resources is applied without damaging the ecological system caused by development. Marine Space Utilization is an important topic in Law No. 6 of 2023, which replaces Law No. 2 of 2022 concerning Job Creation. Article 47A of this law outlines several activities that require permits for the use of marine space.

To carry out marine space utilization activities, every individual or entity that operates permanently in territorial waters and jurisdiction must have a Conformity for Marine Space Utilization Activities (KKPR). Marine KKPR is a document that measures planned activities for suitability with the marine environment and seawater quality. The Marine KKPR aims to ensure that marine space utilization activities pay attention to the preservation of the marine environment and the natural resources within it (Obradović et al., 2023). The importance of this regulation is to regulate and supervise the correct use of marine space, by the principles of sustainability and preservation of the marine environment (Willaert, 2020; Lodge, 2023). This is in line with the commitment to maintain the sustainability of the marine ecosystem and utilize the potential of marine resources wisely. Thus, Law No. 6 of 2023 has an important role in regulating and supervising the use of marine space in Indonesia, as well as maintaining the sustainability of marine ecosystems for future generations (Widayanti et al., 2022; Setyagama et al., 2023).

Managing ocean space is an inseparable part of the administration ocean (Ocean Governance) as explained in the Republic of Indonesia Law Number 26 (2007) concerning Spatial Planning, that spatial planning is essentially a public policy that intends to optimize the use of space for all the interests of development actors in an integrated, efficient and efficient manner effective, harmonious, balanced and sustainable.

This is the case in North Kalimantan Province (Kaltara) as the 34th province in Indonesia, whose capital is Tanjung Selor, has very abundant natural resource (SDA) potential. This natural resource potential is what makes North Kalimantan predicted to become the largest industrial area in Indonesia (Kurniawan et al., 2022; Sari et al., 2023). North Kalimantan Province itself is known to have an ocean area of 11,579 km2 (13% of the total area). The Space Allocation for Coastal Areas and Small Islands in North Kalimantan Province is as presented in the following figure:

Picture 1. Space Allocation Plan for Coastal Areas and Small Islands of North Kalimantan Province for 2018 – 2038

Source: North Kalimantan Province Maritime and Fisheries Service (2022)

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In article 12 of the Regional Regulation of North Kalimantan Province Number 4 of 2018 concerning the Zoning Plan for Coastal Areas and Small Islands of North Kalimantan Province for 2018-2038, it is stated that the Public Utilization Area (KPU) in North Kalimantan Province includes 9 (nine) zones, namely tourism, settlements, ports, mangrove forests, mining, capture fisheries, aquaculture, energy, and the use of seawater other than energy. One of the zones regulated in the Public Use Area is the Aquaculture Zone, especially for seaweed cultivation.

One of the waters used for seaweed cultivation in Kalimantan North are Tarakan waters in Tarakan City and Nunukan waters in the Regency Nunukan. Because seaweed is a commodity that has economic value high the number of seaweed cultivators in Tarakan and Nunukan is increasing increases and the use of marine space to cultivate seaweed is increasingly widespread. As a result, the allocated marine space zone has exceeded the limit set.

Currently, most seaweed cultivators in North Kalimantan do not have permits. This can be understood because seaweed cultivation activities in North Kalimantan have been widespread since 2005, while the legislation requiring seaweed cultivators to have permits to use marine space was only issued later. Based on Law Number 27 of 2007 concerning Management of Coastal Areas and Small Islands as amended by Law Number 1 of 2014 (hereinafter referred to as the WP3-K Management Law). In Article 16 of the WP-3-K Management Law, every person who uses space from some coastal waters and permanently uses some small islands is required to have a location permit, where the location permit is the basis for granting a management permit. Furthermore, Article 17 strictly stipulates that location permits are granted based on the zoning plan for coastal areas and small islands (RZWP-3-K) where the RZWP3K North Kalimantan Regional Regulation was issued in 2018. After the publication of Law Number 11 of 2020, the term location permit changed become Approval of Conformity of Marine Spatial Utilization Activities (KKPRL).

The importance of evaluation in implementing the Marine Space Utilization program is intended to increase supervision and assess the performance of employees in carrying out supervision of compliance and licensing related to marine space utilization as well as monitoring compliance of business actors and cultivators in utilizing marine space for the development and cultivation of seaweed in Kalimantan Province. North. Musa (2005) defines program evaluation as an activity to obtain an overview of the condition of an object which is carried out in a planned, systematic manner with clear direction and objectives. Evaluation is an effort to collect, compile, manage, and analyze facts and information, evaluation is always related to decision making because the results of the evaluation are a basis for assessing a program and deciding whether the program can be continued or still needs improvement (Yazdi et al., 2020).

With the problems that have been explained regarding the importance of evaluation in marine space utilization programs, it is a good step to study this problem in more depth by evaluating the marine space utilization program in North Kalimantan Province by focusing or measuring the evaluation using input, process, output criteria. And outcomes, to collect information related to the results of the implementation evaluation of the marine space utilization program in North Kalimantan Province.

Methods

This study therefore used a qualitative research approach in order to critically assess the marine space utilization program in the North Kalimantan Province. The qualitative paradigm was justified because it would help to identify differences, complexities and peculiarities of the program. Such a design is specifically useful when analyzing social objects of study, providing

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a sound mechanism to capture the voices and views of the actors involved in marine space management.

The study was carried out in North Kalimantan Province in Indonesia characterised by a large marine area measuring about 11579 Km2. The following areas are used for many various marine spatial uses such as aquaculture both commercial and small scale, tourism, and other public uses. Due to the specific geographical and socio-political conditions of North Kalimantan, the investigation of the multifaceted nature of marine space management was possible. They recruited a range of participants involved in the on-going implementation and monitoring of the program. These participants were the government representatives from the Maritime and Fisheries Service of Russia, business representative from seaweed farming industry and some representatives from the local community. Increased informants' knowledge and experience formed the basis of choosing purposive sampling for the study. This methodological decision allowed extending the participants involvements in the formulation of the compliance policies and regulation, monitoring processes and usage of the marine space to analyse the effectiveness of the program.

Upon achieving the data collection instrument, the gathering of data was done in a very systematic manner to enable its collection ens[e]uring that all the valuable information was collected. The principal source of collecting the information was semi-structured interviews, which allowed to provide sufficient coverage of the participants' attitudes, both positive and negative, towards the program related to the use of the marine space. Included in all interviews was a semi structured guide with broad aimed at allowing the interviewee to provide detailed information on aspects of program delivery, issues faced, and perceived effects. Besides these interviews, field observations were made in major marine areas such as Tarakan and Nunukan seas. Such observations recorded current practices and evaluated compliance with the zoning rules along with efficiency of the functional facilities. Furthermore, a comprehensive document review process was conducted; whereby few policy documents, official reports and legislative texts were critically examined. This involved a study of the Zoning Plan for Coastal Areas and Small Islands (RZWP-3-K) as well as the Marine Space Utilization Plan as an effort to triangulate the data that was collected.

The data collection process was conducted systematically so that methodological credibility can be achieved. The first meetings with the key representatives of bodies and with representatives of potential participants defined the subject of the research. Further, semi-structured interviews were conducted with twenty purposefully sampled informants with experiences in policymaking, business operation and community-level. All the interviews were conducted face-to-face with each participant and their carer and lasted about 60 min; the interviews were audio-taped with a verbal informed consent for purposes of accurate transcription and analysis. Field trips supplemented the data collection effort by providing and observational assessment of marine resource usage and conformity to the set policies. As for the secondary information, modern and archaic official reports as well as regional zoning plans and maps were scrutinized thoroughly in order to present the profound background information for the study.

Data analysis was conducted in a manner described by Miles and Huberman (1994) with steps of data collection, data reduction, data display and finally conclusion drawing. First, all the interview notes, and all the documents have been collected in one database that contains everything. Further on, some additional data were excluded as less helpful to understanding the major concerns of program evaluation for postsecondary adults' learners. The collected data were then sorted using matrices and graphic displays in order to make it easier to find out

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relationships. Thematic analysis helped in synthesising the findings into themes in concordance to the research objectives and to triangulate them.

Result and Discussion

Marine utilization in North Kalimantan Province is implemented through programs or activities carried out by the North Kalimantan Province Maritime and Fisheries Service. The program is the Marine, Coastal, and Small Island Management Program which is carried out with two types of activities, namely Management of Marine Space up to 12 miles outside Oil and Gas and Empowerment of Coastal and Small Island Communities.

Marine Space Utilization in North Kalimantan Province was analyzed using evaluation measurements proposed by Bridgman and Davis (2000) which consist of 4 (four) indicators in evaluation measurements, namely input, process, outputs, and outcomes. The description of the research results for each element of strategic management will be explained as follows.

Input

Input indicators focus on assessing supporting resources and basic materials needed to implement policies. These indicators can include human resources, money, and other supporting infrastructure. This research identifies the capacity of employees to carry out supervision in the use of marine space, especially regarding permits related to seaweed cultivation and the availability of guidance and training as well as understanding for business actors/seaweed cultivators. Furthermore, this research identifies the budget related to implementing the program.

The results of the research findings show that the capacity of employees to carry out supervision related to permits in the use of marine space is always being improved through training and institutional development. Furthermore, it is related to increasing capacity and providing understanding to business actors/seaweed cultivators, namely through outreach, training, and coaching to groups. The aim of providing training and coaching is to increase public awareness, in this case, business actors/seaweed cultivators, of the importance of regulating the use of marine space and also processing business permits. Then, the research findings include the total budget and budget realization for empowerment activities for coastal and island communities. The small marine space utilization program in North Kalimantan Province from 2020 to 2022 can be seen in the table below.

Table 1. Total Marine Space Utilization Program Budget for 2020-2022

Activities / Year	2020	2021	2022
Community Empowerment and Small Islands	Rp. 512.650.000	Rp. 499.758.296	Rp. 943,000,000
Management of Marine Space up to 12 miles outside Oil and Gas (Conservation Area Regional Waters)	Rp. 693.855.000	Rp. 545.953.092	Rp. 292,710,000

The table above, shows the total budget for implementing the marine space utilization program from 2020 to 2022. The largest budget is for community and small island empowerment activities in 2022 with a total budget of IDR. 943,000,000. Meanwhile, for Marine Space Management activities up to 12 miles outside Oil and Gas (Regional Water Conservation Areas), the largest budget in 2020 is IDR. 693,855,000.

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Process

This indicator focuses on assessing how a policy is transformed into direct services to the community. This indicator covers aspects of the effectiveness and efficiency of the methods or methods used to implement certain public policies. This research identifies the licensing services provided to business actors/seaweed cultivators. The results of the research findings show that providing direct services to the community is in the form of outreach to fish farming business actors in the fish farming zone. This is done so that fish farming business actors and cultivators comply with regulations and cultivation zones. Apart from that, outreach is carried out not only to fish farming business actors but also to capture fishery vessel business actors.

Outputs

This indicator focuses on assessing the results or products that can be produced from the public policy system or process. For example, this indicator is in the form of people who have successfully participated in a certain program. This research identifies the extent to which the marine space utilization program in North Kalimantan Province has an impact on business actors/seaweed cultivators related to processing business permits. The results of the research findings show that the impact produced through the marine space utilization program is providing education through socialization regarding Legislation in the marine and fisheries sector in the fisheries management area of North Kalimantan Province, carrying out integrated operational activities, supervision of marine and fisheries business activities and prevention of IUU Fishing (Ilegal, Unreported, and Unregulated Fishing) as well as other illegal activities that are considered detrimental to the state in the North Kalimantan Province region.

Outcomes

This indicator focuses on questions about the impact received by the wider community or parties affected by the policy. In this research, it was identified that the deliberations carried out produced strategies or effects that were more desirable for learning about the use of marine space in North Kalimantan Province. Outcomes This research relates to community business activities, especially fish cultivation, starting to pay attention to business legality. Next, there are steps taken to reduce conflicts of interest in the use of marine space. Conflicts of interest in the use of marine space can occur between various interest groups, such as the community, investors, and the government. The resulting conflict is also related to the struggle for marine space between society and monopolizing industry, fishermen who suffer losses due to the use of marine space by other parties. So, the government needs to take firm steps to prevent and reduce conflicts that occur.

The results of the field findings show that the community is expected to pay attention to the legality of business in utilizing marine space and business actors and cultivators can pay attention to planting areas and grass development sea, so as not to exceed the designated planting area and not disrupt shipping lanes. Furthermore, regarding reducing conflicts of interest and business legality, the government and stakeholders are taking firm steps in enforcing supervision and law enforcement against activities that violate the provisions of the Small Island Coastal Area Zoning Plan. Furthermore, the implementation of programs/activities carried out by the Department of Maritime Affairs and Fisheries with assistance in the form of facilities and infrastructure supporting fisheries cultivation can be right on target so that it can meet the needs of the cultivating community.

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Community Awareness and Participation in Marine Space Management

> *"Many community members expressed limited awareness of marine spatial planning policies, emphasizing the need for targeted educational campaigns."*

This fact shows that there is missing link in public awareness specifically about the marine spatial policies. However, despite the government's outreach, it seems that the information dissemination conducted by the government does not seem to expand to the necessary level. The authorities could utilize local media together with community-based workshops and demonstrations in order to promote the understanding of regulations and increase compliance with them. Programs of this nature must be in a position to fit into the cultural linguistic diversification of North Kalimantan with ease for the benefit of the people. Furthermore, educational campaigns could include aspects such as use of models and actors depicting activities and other situations that could demonstrate how those entities across the outlined communities benefited from compliance and participation. This assessment should also entail a strong evaluation system capable of gauging the success of these campaigns as wells as updating the outlooks of the groups on the basis of feedback from the community.

> *"Community leaders noted that participatory approaches in policy implementation are lacking, leaving local stakeholders feeling excluded from decision-making processes."*

This undermines the legitimacy and efficacy of the M.S.P. all the more, if there are no mechanisms for some level of public participation. Perhaps, the best way to overcome such a gap is to engage the community leaders and make them act as a link between policymakers and the actual stakeholders. Tackling community opinions when it comes to the zoning strategies as well as the changes in the polices might improve the perceived equity as well as the feasibility of such programmes. Other than official consultation then civic engagements like local cultural events or similar social events could be utilized in building trust and seek consultation. It is shown that, to involve the community, decision makers should make more efforts in providing clear time frames and expected results of problem solving.

> *"Some seaweed cultivators admitted to operating without permits due to confusion over licensing requirements and processes."*

This goes to show that previous regulatory structures have made compliance an almost impossible task thus discouraging the effort. Addressing this problem involves simplifying the permitting process as well as providing specific directions in the process. An optimised system which is backed by technology would increase chances of compliance and at the same time decrease formality. Also, there should be an option of conducting focused training sessions that target some important issues and questions of the cultivators. Subsequent visits to the cultivators to ensure that they are in harmony with and compliant to the processes could escalate compliance. Probably, reporting these interventions could involve involving non-governmental organizations to help out hence coming up with impartial options that will gain the trust of the affected communities.

> *"Youth involvement in marine conservation efforts is minimal, with many expressing a lack of opportunities for engagement."*

The sidelining of the youth in conservation is a disservice to sustainable human development. Initiatives involving youths, prospecting, interning or volunteering or working on didactic modules, could do much to energise marine conservation initiatives. Specificity of outreach to schools and universities would guarantee results and foster the change of generation towards sustainability. Some of the by-products of collaborative partnerships with educational

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institutions entails incorporating concerns of marine conservation to their curriculum could develop the much needed long-term passion in their students. Besides, the development of the opportunities for the youth to present their ideas and implement the solutions on the pressing problems of marine conservation may enhance the sense of participation in policies' enactment.

Economic Impacts of Marine Space Utilization Programs

> *"Small-scale fishers reported financial difficulties due to competition with industrial players occupying prime fishing zones."*

This indicates that the availability of nature goods and services specifically from marine systems is nearly distributed fairly but has a very negative impact to sensitive populace. Mitigating these challenges could also be enhancing an exclusive area for point≦ε\e⟩ sources for small-scale fishers and/or offering monetary incentives for similar beneficiaries. Partnership models could also be visualised within which industrial actor partner with the local fishing communities or share revenues from producing fish. Developing a regulatory environment capable of motivating industrial stakeholders to participate in the improvement of people's living standards in regions could contribute to the equity perspective. Further, a scenario in which small scale fishers receive better fishing equipment and skills will improve the competitiveness forcing them to venture deeper and less exploited waters.

> *"Seaweed cultivators noted an increase in yield following training sessions but lamented insufficient market access and price stability."*

Though there has been an improvement in technicality, the market still presents constrains to economic gains. Formation of a cooperative system for seaweed producers could enhance the bargaining thus ensuring favorable prices. Furthermore, development of cold storage and transportation facilities would add value to the marketing system and consequently improve profitability to the cultivators. Choosing foreign clients and orientation on the conclusion of contracts for years could ensure the constant demand and better price stability. On a similar note, the formulation of a central hub for marine products in North Kalimantan would also improve awareness and push producers to the subsequent level to gain access to more market outlets.

> *"Tourism operators highlighted potential growth in eco-tourism but cited regulatory uncertainties as a barrier to long-term investments."*

Unexplored opportunities are also seen are in the field of eco-tourism which could stimulate new economic activities in North Kalimantan. This includes policy developments for creditor nations to set clearer rules for expressions of interest in real estate development while focusing on the equilibrium for ecological tourism development. Integration with other Environmental NGOs may well provide additional support to eco-tourism ventures with special regard to sustainability. They suggest the formation of a regional eco-tourism board responsible for coordinating activities may offer stability in outlook and guidance. In addition, stimulating the tourism market, focusing on the unique features of North Kalimantan's marine and cultural resources, can become an effective tool for stimulating the development of domestic and international tourists.

> *"Women's groups involved in small-scale aquaculture expressed enthusiasm but identified limited access to capital as a constraint."*

Women's involvement in the marine-derived economic sectors is still limited. It implies that micro financial services targeting women's groups could help unleash a huge economic opportunity while at the same time empowering women. To achieve stakeholder-driven

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inclusion of diverse groups in the economy, these endeavours should be linked to other community upliftment efforts. Creating a kind of women's community where senior women entrepreneurs help junior or new ones to start could drive progress. Public credit-risk guarantees could also reduce some risks for financial institutions and prompted them to finance female-led activities.

Environmental Challenges and Sustainability

> *"Environmental activists observed that mangrove deforestation continues despite zoning regulations aimed at conservation."*

Through persistence in mangrove deforestation, one Realizes that there are issues of enforcement and biophysical reuse as well as economical conflict. Perhaps, through community-based monitoring systems the problems can be handled by enhancing the regulatory surveillance. Concerning carbon credit utilization as a tool of payment for the reforestation of mangrove ecosystems, such forms of encouragement should be adopted in order to optimize the benefits of economic growth as well as the restoration of weakened ecosystems. While many reforestation projects could be implemented through public private partnership to enhance efficiency, integrating public and private capital to fund reforestation projects could also be highly informative. Further, better use of sat images & remote sensing to compliment surveillance & possibly improve early intervention.

> *"Field observations revealed significant pollution in key aquaculture zones, with stakeholders attributing this to inadequate waste management systems."*

Pollution of water in aquaculture areas has a negative impact on marine life and the population's economy. It is necessary to impose tighter waste disposal requirements along with efficient investments in waste treatment plants. Increasing the level of awareness in the stakeholders on sustainable practices could as well help reduce impacts on the environment. Cooperating with environmental engineers to implement non-costly and efficient elimination of waste might help to solve the problems on the system level. Annual pollutions surveys and accreditations may even guarantee compliance with environment standards.

> *"Local fishers reported a decline in fish stocks, attributing this to illegal fishing practices and habitat destruction."*

The reefs are therefore under threat of degradation through the unscrupulous exercise in the fishing activity, thus was noted to be economically irrational and ecologically unsustainable. Other methods of surveillance that included the use of drones or hired neighborhood watch could help prevent the activities. The enforcement of the existing maritime laws would enhance governance if international organizations are to be involved in its collaboration. The formation of community-based fisheries management councils might mean asking for the locals to be at the forefront in the responsibility of conserving the resources. Policy prescriptions include a public health campaign on sustainable fishing practices to support enforcement at the local level.

> *"Climate change impacts, including rising sea levels and changing fish migration patterns, are increasingly evident in the region."*

Marine spatial planning is affected by climate change threat in the long run. To these ends, concepts of dynamic zoning and climate-resistant infrastructure must form part of the policy toolkit. These framed awareness campaigns might increase community uptake of climate resilience interventions. Sometimes collaboration with climate scientists could go a long way in developing models that would assist policy makers in predicting long-term challenges.

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Making use of renewable energy in marine industries could also play part in reducing climate change impacts.

Institutional and Policy Effectiveness

> *"Government officials acknowledged challenges in inter-agency coordination, leading to overlapping responsibilities and inefficiencies."*

There is need to facilitate enhanced inter-agency cooperation with regard to marine spatial management. The publication indicates that one reason could be Subaru's lack of a centralized key task force together with mitigated mandates and responsibility structures. Other improvements will be more frequent inter-agency meetings to help eliminate overlap in the process of designing and implementing proposals. A systematic cooperation between agencies could be enhanced by the creation of a digital database that would be available to all the involved agencies. A study of agency roles and responsibilities at specific intervals could familiarise the imbalances and loophole in governance.

> *"Stakeholders criticized delays in the issuance of permits, which they attributed to bureaucratic inefficiencies."*

Efficient working requires the reduction of bureaucratic procedures for enhancement of service provision. Automating and/or ACLS-digitizing the permit issuance procedures and replacing the reward and punishment-based system of bonuses with performance-based driven system of bonuses could act as effective noise reduction tools. It has been mentioned the clearance for new projects may be achieved by implementing a single-window clearance. Other studies showed that enhanced training seminars for both the government officials and other stakeholders on effective service provision can also help increase outcomes.

> *"Community members expressed skepticism about the effectiveness of penalties for non-compliance, citing inconsistencies in enforcement."*

It, therefore, evokes concerns that when penalties are applied irregularly, the regulatory framework loses all credibility. The legal frameworks would have to be reinforced coupled with standard-setting encroachment and the code compliance penalties would have to be applied equally without compromising. The authors suggest that making examples of good enforcement t cases could be effective and enhance confidence in governance structures. A possible solution is creating an independent regulatory authority that would supervise the compliance and enforcement process, thereby increasing accountability and transparency of the activities conducted by LBMA.

> *"Policy analysts highlighted the lack of comprehensive impact assessments prior to implementing marine spatial policies."*

Lack of robust impact analysis hampers the possibility to predict and prevent negative effects. If more stringent regulations were made where any marine spatial policy would have to undergo the impact assessment test, their planning and implementation would be enhanced. These assessments should involve those in the different fields of discipline in order to achieve a comprehensive examination. Constructing a general guideline that would be used to conduct impact assessment evaluations could increase the reliability of such evaluations regarding the different projects.

Using the Bridgman and Davis (2000) evaluation framework, the study shows that the inputs, processes, outputs, and outcomes are related in the management of marine resources. These aspects are critically discussed in this discussion and to accentuate the implications of the study,

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along with the insights and criticisms from a varied body of literature, lengthy elaborations on each critical theme are provided below.

Challenges in Compliance and Licensing

Among the more urgent findings is the failure to abide by the marine space laws with seaweed farmers. This problem reflects a range of issues within the larger institutional context of Indonesian marine management. According to Fauzan et al. (2023), some reasons for non-compliance include uncertainties generated by licensing requirements and insufficient diffusion of regulatory data. These challenges are compounded by historical antecedents in North Kalimantan; seaweed culture was already established before the legal provision of licensing under the provision of the WP3-K Management Law. Opening issues such as these have effectively meant that many a cultivator remains uninformed of or misinformed about the contemporary laws, thus perpetuating noncompliance.

Education targeted and somehow culturally suitable is crucial for covering these gaps. According to Latifa et al. (2019), facets could entail regional targeted awareness campaigns by using community leaders in passing information about prescribed zoning ordinances. As such these efforts can counteract cultural and language issues which in other cases might prevent larger government directed consciousness raising programs from reaching out. The conclusions of this study support this, underlining a necessity of the engagement approach in MSP. In this study, Arafat and Kusumarani (2024) call for policy integration that involves both the regulators and the concrete stakeholders that are being regulated to improve commitment in specified policy areas and to also boost the credibility of regulatory policies. At the same time, this participatory process must also incorporate clearly sensible information flows, through which people can express their concerns and get answers immediately.

Governance and Policy Implementation

The work recognizes severe gaps in the policy implementation with emphasis on role confusion and inter-agency communication breakdowns resulting from overlapping jurisdictions. Anwar (2012) notes that inefficiencies resulting from overlapping jurisdictions are not a rarity in Indonesia's bureaucratic structure whose regulations result in the misallocation of resources and stagnation. Small-scale fishers and industrial players claim such inefficiencies in North Kalimantan when sharingmarine resources. Such conflicts not only affect some economic occurrences but also undermine the population trust into governmental bodies – the critical factor in marine governance.

The cooperation between the agencies should be improved. In their study, Latifa et al. (2019) discover that systematized and short-cropped task forces lower bureaucratic insurgencies due to the determination of obligation and liability. More to that, it is equally important to ensure all these agencies engage on the same digital environment since this can ease data sharing and arriving at more holistic decisions. An effective application of such solutions includes technological monitoring platforms based on satellite technology enabling better tracking and compliance. Dahuri et al. (2001) consider that due to the fact that remote sensing technologies can delivered real time data it has the advantage of early interference. Focusing on the recommendation suggested by Fauzan et al. (2023), additional administrative activities will be helpful to implement technologies in digital platforms for permit issuance and tracking. When these technological tools are integrated with infrequent audits of enforcement actions, it would be possible to guarantee that the policies are rigidly and equitably enforced.

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Economic Impacts of Marine Spatial Policies

The article reveals that there are deep economic consequences of marine spatial policies with reference to small-scale fishers and seaweed cultivators. Effectiveness of training programmes has been evident in areas such as productivity but problems such as regula market access and price control persist. The importance of infrastructures like cold storage and online markets that are highlighted by Laole et al. (2023) are likely to greatly enhance the economic value of marine resources. These investments are especially important in North Kalimantan, because geographic factors will sometimes prevent growers from marketing their products at a very high price.

As such, it becomes important to prioritize equity in the use of resources available in the development of such frameworks. There is a lot of competition according to the industrial forms, which results in the violation of the economic rights of small-scale fishers. Arafat and Kusumarani (2024) have also opined for setting up of special areas for the PSOs engaged in fishing activities at a small scale and provision of some monetary grants for overcoming of operational barriers. In addition, one can name further measures for fair utilization of resources; for example, joint ventures between industrial participants and local communities aiming at sharing revenue. The followers of such models guarantee that stakeholders will be placed on the same functional economic level, however, they also support the agreement that everyone shall bear responsibility.

They indicated that cooperative models may well work for seaweed cultivators. According to Garuan and Suranto (2016) bargaining power can be improved in cooperation with cooperatives and fairly pricing can be guaranteed. Cooperating with the foreign customers and obtaining long-term sales agreements adds predictability to prices, which conforms with the economic theories of Dahuri et al. (2001). When accompanied by appropriate investments in the basic structures of the marine market, such measures can indeed catalyze the development of the North Kalimantan marine economic potential. Also, formation of cooperative also helps decreasing the transaction cost for cultivators so that more attention can be paid for enhancing quality of produce.

Environmental and Social Outcomes

The deforestation of mangrove and the pollution of aquaculture mentioned in this study call for stronger sustainability measures as the inherent environmental issues. Mangrove deforestation however still occurs due to missed enforcement and counter strategic economic experiences in the context of zonation ordinances. According to Latifa et al. (2019), it is of the view that the challenges mentioned above can be solved by public private Partnership. Afforestation programmes that are underpinned by policies such as carbon credits help tip ecological and economic benefits into a harmony. In particular, the carbon trading programs could bring additional incomes for the communities that are involved in the conservation activity.

Sign on aquaculture produced 2 fold threats that affect the marine ecosystem as well as cultural economy. As for Garuan and Suranto (2016) emphasize the key wastes management policies-sound policies that entail increased investments in transport and treatment infrastructure. This can be done through sensitization of the stakeholders in various practices that would lead to a minimal impact on the environment. Consultation with environmental engineers in the development of low-cost and effective systems of waste management is also important. These attempts should be accompanied by periodic environment scans to check on compliance to set sustainability indicators.

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The analysis of the study points out a shocking lack of public engagement in MSP. Laole et al. (2023) note that the reliability of these interventions can only be achieved if community stakeholders are actively involved in the process and take responsibilities for the outcomes. Policy intermediaries, namely the key persons in the local stakeholders, whose roles would be to bridge policymakers and the communities, can be helpful in strengthening the legitimacy and numerous practical applications of marine spatial policies. Also, involving youths and women in the management of conservations and resources help them inclusiveness as well as the sustainability of the assignments. This means that bright ideas could be brought to bare in combating social vice like climate change impacts in youth-led conservation programs.

Climate Change and Adaptive Management

For these reasons, the overall management of fisheries within the Great Barrier Reef requires adaptive management approaches due to climate change impacts such as increased sea levels and changes in fish stocks migration. Dahuri et al. (2001) rather point out that dynamic zoning approaches can help achieve this goal by providing climate change considerations. Technical cooperation with climate scientists to construct forecast models, as Cited by Fauzan et al. 2023, will allow the policy maker to foresee and manage new problems as they develop. Such models can also be used in defining new higher risk areas that may need severe measures taken to address the problem.

Action points also include encouragement of marine industries to become involved in the use of renewable energy sources. According to Garuan and Suranto (2016), renewable energy has the potential to decrease the carbon impact of the marine industry. This paper will provide evidence to support awareness campaigns aimed at climate resilience in order to gain community support for adaptation measures. This can be complimented with the proposals described by Latifa et al. (2019) where climate-resilient infrastructure can be incorporated into MSP and thus; building the regions' resilience to climatic change. Such infrastructure should include anti flood barriers and any type of structures of culturing fish and other aquatic animals that can withstand any water instabilities.

Institutional and Policy Effectiveness

Efficiency of institutions is therefore one of the critical contributors to marine spatial management. Hear say that delays in issuing permits reduce the ability of institutions to implement conceived policies on time impairs the implementation process. Administrative activities have to be integrated and centralised to increase their effectiveness and accountability according to Fauzan et al. (2023). The use of performance incentives for the officials also reform the delivery of services within the government sector. These incentives should depend on aims and objectives that make it easier for authorities to hold certain individuals accountable.

Irregular approach to imposing penalties for the abuse of regulatory measures undermines people's confidence in government systems. Following the work of Arafat and Kusumarani (2024) penalties should be applied uniformly to ensure that non-compliance is discouraged. Every now and then, the government publishes enforcement successes to deter people and ensure adherence to MSPs. Further, using mandatory impact assessments also recommended by Garuan and Suranto (2016), it enhances policy formulation since it predicts negative implications that may result once the policy is taken into practice. These assessments should normally require the involvement of teams that combine members of different disciplines to allow for a cross-sectional consideration of environmental, social and economic effects.

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Conclusion

This paper uses the North Kalimantan Province to analyze the marine space utilization program to obtain the set objectives and provides an understanding of the challenges and opportunities that are fundamental to sustainable management of the identified resources. Problems of non-compliance with licensing and ineffective governance and environmental criteria and recommendations reveal the lack of systematic changes. To ensure that the public complies top educational campaigns need to be carried out with emphasis on specific demographics. Better co-ordination between agencies and better technological tools such as digital permit systems; remote sensing and information technology tools have to play a special role in the improved governance and accountability.

Politically, the results identify how post-1990s internationalization disadvantaged small-scale fishers and seaweed cultivators due to unpredictable markets and unfair distribution of resources. These groups can only be enabled through the proper cooperative models as well as the necessary financial support and cooperative infrastructures such as cold chain facilities as well as wholesale markets. Environmentally, the solutions for mangrove loss, aquaculture pollution, and climate change factors are challenging and essential, such as P-M applications, community-based methods, and the combination of climate-proof structures. Largely, this paper shows that a complex and people-centred approach is necessary at the heart of coastal ocean management. When the current regulatory development plan integrates equity, sustainability, and resilience, North Kalimantan Province can turn microscopic into macro in its marine resource, thereby providing overall and lasting value addition to its economy and environment. Partnership driven proactive objectives and strategies will facilitate conservation and management leading to MSP, which meets contemporary requirements and future contingencies.

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