Opportunities and Strategies for the Blue Economy Through the Empowerment of Sumatera Coastal Communities in Supporting the Realization of the National Food Security

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Abstract. A strategic step on food security was directed by president to the Ministry of Defence. Coastal communities are key actors in the realization of the blue economy and are the determinants of the successful implementation of Indonesia's policy to becoming the Global Maritime Fulcrum. There are ten provinces on Sumatera which have marine coastal areas with abundant fishery potential. However, that potential has not been fully utilized. This article aims to review opportunities and strategies in realizing the blue economy by empowering coastal communities in the Sumatra. The method was a qualitative exploratory method with SWOT and combined with SSM analysis. The data sources were obtained through secondary data from literature studies, comparisons through multi institutions data. The study found that community empowerment can be done by considering the potential of fishery resources and the community's interest in managing the fisheries sub-sector. The development of national food barns should be focused on the Blue Economy sector and can be started through the Sumatra region. Stakeholder synergy can be integrated in fostering, supervising and mobilizing coastal communities in supporting their welfare.

1. Introduction

Geographically, Indonesia is in a strategic cross position between two oceans (India-Pacific) and continents (Asia-Australia). Indonesia consists of a group of islands stretching from Sabang to Merauke. The term maritime country is also often pinned to Indonesia. However, a maritime state is a designation for a country that has a water area larger than its land area and can manage and prosper the lives of its people through its maritime sector.

This is a strategic step in which President Joko Widodo's mandate to the Minister of Defense of the Republic of Indonesia is to immediately realize the construction of a national food barn. Currently, the development of the land agricultural sector has become the first step that is realized by the development of agricultural ecosystems. In 2014, the government opened up an important idea that Indonesia would carry out the initiation of the Global Maritime Fulcrum.

As a large maritime country, Indonesia should be able to improve the nation's welfare through the maritime sector as a key sector. In line with the development of the Green Economy which had previously been carried out, the idea of a blue economy began to emerge. Blue Economy is an optimization concept that focuses on optimizing fishery resources by utilizing existing resources to the
fullest. This will undoubtedly have a significant impact on the progress of the Indonesian nation. The maritime sector has the potential to become one of the national food barns [1].

As an area located in the westernmost part of Indonesia, Sumatra has 10 provinces located in the territorial unit of the large island of Sumatra and the surrounding islands. Amazingly, all of these provinces have marine areas with the potential of abundant resources. Geographically, Sumatra is located in WPP 571, 572, and 711 which have extraordinary fishery potential. Not to mention other maritime potentials such as marine ecotourism, shipping, to the opportunity to carry out scientific research. For this reason, it is fitting for the development of the maritime sector to start from the western part of Indonesia.

However, nowadays it is necessary to realize that issues related to the development of the maritime sector in the western region of Indonesia seem to be a thing of the past which only ends up as a concept without any real implementation. The Sumatra region is famous for its maximum utilization of the land sector through oil palm plantations and other agricultural commodities. In fact, with optimal utilization of its maritime resources, Sumatra will undoubtedly become a pillar of national economic development.

Sumatran coastal communities have an important role as a key factor in the management of fishery products. The current condition shows that the public's interest in working in the fishery sector is still very small. This is due to community stereotypes with the paradigm that the lives of coastal communities are classified as low economic communities.

In fact, not optimal fisheries management is directly proportional to the low welfare of the people who are in direct contact with the fishery sector. According to [2], if national development is focused on the blue economy, the welfare of the Indonesian nation may be reflected in the advanced maritime sector. Through this article, hopefully, it can be the basis for determining policies for stakeholders in developing a blue economy as a key factor in improving the welfare of the nation which can be started from the western region of Indonesia.

The blue economy can be interpreted as the industrialization of fisheries as an idea issued by the Ministry of Maritime Affairs and Fisheries. According to [3] fisheries industrialization puts forward a sustainable business activity model with an export market orientation. [4] added that the main requirement for products sold in the export market is traceability of fishery products and securities which are always properly integrated.

Komariah [5] added that the Blue Economy is in the form of optimizing maritime resources to increase innovative and creative economic growth by prioritizing conservation principles in an advanced maritime sector. The Blue Economy prioritizes Sustainable Development as a reflection of the Green Economy concept and is applied to the maritime sector with the motto "Blue Sky-Blue Ocean" where the economy can grow, people prosper, but the sky and sea remain blue [6].

The Blue Economy appears one of which is a reminder of the importance of managing waste from fishery activities so that it does not harm the environment. The expected result of implementing the Blue Economy is the addition of economic value with zero waste [7]. Kundori [8] reveals that the Blue Economy can open up new business opportunities and is directly proportional to the increase in the number of jobs needed. The Blue Economy is believed to be able to encourage economic growth and provide a large portion for the community if the government can provide empowerment for people who live and live on the coast by enjoying natural resources without destroying the existing ecosystem values.

The application of the Blue Economy concept in coastal areas will have a positive influence on national development, the development of self-reliance, and national food security. The optimal application of the Blue Economy concept is to focus on improving the welfare of coastal communities. They live side by side and are at the forefront of the fishery's economic development [9].

According to Marsaulina & Silaban [10], food barns are a strategic concept in preparing food reserves and play a role in overcoming food insecurity. The existence of food barns currently tends to decline, one of which is because of inconsistent community development activities and the community
tends not to get proper assistance, causing the training carried out to be ineffective. Institutional development can take the form of infrastructure improvement and human resource development [11].

Food security can be achieved if food access can be easily reached by all elements of society and meet domestic needs. The construction of a national food barn is considered capable of meeting Indonesia's food reserves in the next few years. According to [12], the implementation of the Blue Economy concept in community empowerment in coastal areas can be done by revitalizing sustainable development by using the concept of digitalization of aquaculture to support food independence and food security in the maritime sector through the development of competitive and innovative downstream fishery products to support Indonesia's sustainable national development.

2. Methodology
This study uses an exploratory qualitative method. Qualitative exploratory is research that aims to map an object relatively and in-depth. This type of research is qualitative research with an exploratory analysis level. Qualitative exploratory aims to explore, describe the situation factually. Data obtained through literature study and comparison through multi-field secondary data. The collected data were analyzed using SWOT analysis.

The SWOT analysis method is a tool to find problems from four different sides, where the application is: How strengths can take advantage of an existing opportunity. How to overcome weaknesses (weakenesses) that prevent profits. As well as analyzing the possibility of threats (Threats) that could potentially arise [13]. Furthermore, data analysis is combined using SSM analysis [14]. In contrast to SWOT, SSM (Soft System Methodology) is a systematic method of developing information systems using a structured approach to understand a problem, build a conceptual model, obtain feasibility and desired changes and implement them.

According to Checkland [15], SSM contains a logical explanation for scientific applications which is divided into 7 stages as follows:
- Problem situation which is a structured problem and becomes key when the process is defined to start the analysis and review phase.
- Structures and processes by which specific management processes and hardware technologies, are reviewed using specific techniques.
- The relevant system is overcome by using the root definition to reveal the main purpose of the selected activity system and also using the CATWOE technique, which is a technique in which several elements are used to understand the analysis of the root definition sentence.
- A conceptual model that is built to be a model of strict human thought patterns according to the root definition using a minimal set of activities that can be drawn by applying systems thinking.
- Comparing conceptual models with reality. Back to the real world, thinking on adoption patterns. Conceptual models (stage 4) must be compared with real-world expressions (stage 2).
- Carry out appropriate and desirable system development as well as make changes, must be identified and discussed so that the next action steps can be taken.
- Actions to correct the problem situation in order to prepare a solution and determine how to implement according to step 6.

3. Result and Discussion
3.1 The Strategy for the Blue Economy Through the Empowerment
3.1.1 Blue Economy
Blue Economy is a general term used as a study of the integrated utilization of fishery and marine products potential. The term Blue Economy was first used by Prof. Gunter Pauli [16]. In his book, Pauli [17] states that "Blue Economy is a collection of innovations contributing towards the creation of a global consciousness rooted in the search for practical solutions based on sustainable natural systems".

The essence of the blue economy consists of 1) Learning from nature which means imitating nature and how ecosystems work according to what nature provides and how to work with high efficiency, 2)
Ecosystem Logic with how ecosystems work is used as a Blue Economy model, namely only with energy gravity distributed efficiently and evenly without stopping and without external energy extraction, 3) Innovation and creativity, where the Blue Economy can develop through innovation and creativity.

There are at least 100 practical economic innovations that inspired the Blue Economy with the principle of modeling the way ecosystems work. Ecosystems are always working towards higher levels of efficiency to deliver nutrients and energy without waste to meet the basic needs of all contributors in a system. Furthermore, the Blue Economy has become increasingly popular with its inclusion in the maritime security matrix launched by Christian Bueger [18].

Blue Economy is seen as one of the sectors that must be developed for every maritime country. The maritime sector is one sector with great potential in Indonesia's economic development. The maritime sector has Multiple and Chain Effects (MCE) which can drive many sectors such as trade, shipping, industry, to education.

### 3.1.2 Fishery Potential

In 2020, President Joko Widodo mandated the management of strategic food reserves (the National Food Barn) as the responsibility of the Ministry of Defense as stated in the Jakumhanneg to achieve food security. With this instruction, it is hoped that the motivation and enthusiasm of the community will be built to cultivate and utilize the potential of the area. This is expected to be one form of contribution in realizing the success of the National Food Barn.

The potential for fisheries in the western region of Indonesia is extraordinary. All areas have marine areas and are incorporated into the Fishery Management Area (WPP). There are at least 10 provinces located on the unity of the large island of Sumatra and the group of islands around Sumatra. According to Ambarini et al., [19], all of these provinces are scattered and incorporated into the WPP:
- WPP 571 located in the waters of the Malacca Strait and the Andaman Sea covering the areas of Aceh, Riau, and North Sumatra.
- WPP 572 is located in the waters of the Indian Ocean west of Sumatra and the Sunda Strait covering the areas of Aceh, North Sumatra, West Sumatra, Bengkulu, Lampung, Banten
- WPP 711 is located in parts of the waters of Riau, Riau Islands, Jambi, Bangka Belitung Islands, West Kalimantan, South Sumatra.

Based on the results of the inventory, the following are potential fish resources that can be utilized (fishery quotas) issued by the government through the KKP:

| Table 1. Sumatran Fish Resources Annual Quota |
|---------------------------------------------|
| **Fish Resource Potential (ton/year)**      |
| **Region**                                  |
| Aceh                                        | 5611 | 17035 | 230 | 424 |
| Riau                                        | 1972 | 2550  | 52  | 187 |
| Sumatera Utara                              | 7178 | 16201 | 221 | 703 |
| Sumatera Barat                              | 453  | 2565  | 34  | 83  |
| Bengkulu                                    | 287  | 1625  | 22  | 52  |
| Lampung                                     | 974  | 5515  | 74  | 178 |
| Kepulauan Riau                              | 3500 | 7340  | 193 | 107 |
| Jambi                                       | 925  | 1939  | 51  | 28  |
| Kepulauan Bangka Belitung                   | 2684 | 5627  | 148 | 82  |
| Sumatera Selatan                            | 160  | 335   | 9   | 5   |
The data above is the overall data on the potential for capture fisheries from the sea. These results show very diverse data according to the evaluation of catches from the previous year for each region. The capture fisheries potential is also supported by the large number of conservation areas that are spread across the three WPPs. The health of the aquatic ecosystem will be directly proportional to the maintenance of the number of fish stocks in the area.

### Table 2. Area of Conservation and Distribution of Coral Reefs in WPP 571, 572 and 711

| WPP  | WPP Area’s (ha) | Conservation area (ha) | Coral Reefs Area (ha) |
|------|-----------------|------------------------|-----------------------|
| 571  | 14009132        | 87.708                 | 2629,01               |
| 572  | 93605689        | 1137606                | 165510,46             |
| 711  | 65821917        | 4673704                | 307987,4              |

*Sources: Badan Pusat Statistik, 2017*

The inventory above show that the potential for fisheries in Sumatra and its surroundings is very large. Various types of aquatic biota that live in it are natural products that have the potential to be utilized. Optimal utilization of this area will be the beginning of the initiation of the preparation of a national food barn with the concept of the Blue Economy.

### 3.2 The Strategic of Coastal Communities Empowerement

The existence of coastal communities is an important factor in fisheries management. Coastal communities live in strategic areas and are a key factor in the sustainable use of maritime resources. Lack of access to information, motivation, and education makes the lives of coastal communities often shown as conditions below the poverty line and far from prosperous. Even though their presence at the forefront of the maritime sector deserves proper attention.

The following data shows that the results of capture fisheries, aquaculture, and marine aquaculture appear to have an uneven distribution. If we look at the fish resource quota according to Table 1 issued by the KKP, each region has fisheries potential that is almost evenly distributed.

### Table 3. The Averages of Fisheries Production 2014-2019 in ton

| Region             | Capture Fisheries | Estuary Aquaculture | Salt Water Aquaculture |
|--------------------|-------------------|---------------------|------------------------|
| Aceh               | 161861,25         | 53354,00            | 265,40                 |
| Sumatera Utara     | 503000,00         | 41326,40            | 3219,60                |
| Riau               | 286010,52         | 1253,20             | 4375,20                |
| Kepulauan Riau     | 812792,00         | 30,60               | 36778,40               |
| Sumatera Barat     | 224327,30         | 332,60              | 221,00                 |
| Jambi              | 189064,50         | 661,80              | 49554,50               |
| Sumatera Selatan   | 47172,75          | 60607,40            | 483236,33              |
| Bengkulu           | 70829,00          | 10173,40            | 42,00                  |
| Kepulauan Bangka Belitung | 179843,78    | 2336,00             | 975,20                 |
| Lampung            | 156038,10         | 66063,80            | 4591,80                |

*Source: Kementerian Kelautan dan Perikanan dan Badan Pusat Statistik, 2020*
In the context of utilizing fishery resources in the Sumatra region, according to data held by the Indonesian Ministry of Industry, there are at least 109 industries with fish commodities spread across Sumatra and the surrounding islands. The distribution of the existence of the fishing industry below shows the condition of the utilization of the fishery sector and the interest of the community in these areas towards the fishery sector. The utilization of the above resources can also be said to be far from optimal.

The uneven distribution and presence of fishing industries throughout Sumatra and surrounding areas is evidence that the fisheries sector has not been optimally utilized. The community, in this case, needs to be made aware again that with abundant resources in their area, welfare can be started by managing the Blue Economy as an alternative to the National Food Security. Various kinds of training, guidance processes, and monitoring are important things that must always be carried out.

The first thing that can be done is to empower with a facilitation program. This strategy can be used by prioritizing the awareness of coastal communities in maximizing the potential of their resources. Optimization of resource utilization can be started from the use of data on the majority of fishery production in an area. The existence of companies or industries in fishery commodities in the region also has an important role in empowerment efforts. The central government in this case can coordinate with local governments in the utilization of existing resources.

Through SWOT analysis, a review can be drawn regarding the provision of access to information and licensing as one of the roles of the government in implementing this policy. Communities can carry out economic activities by looking at resource opportunities that can be utilized as well as market demand in each province. Meanwhile, the government can open the widest possible access to the public regarding information and policy products to encourage maximum utilization of resources.

Fadli [20] explain two forms of management of fisheries and marine resources, namely community-based fisheries resource management (PSPBM), fishery resource management by the government, and co-management (integration of PSPBM and management of fishery resources by the government).

The second thing, empowerment through the process of mentoring and training (educative). The government in this case can cooperate with various fields in providing educational services to coastal communities. This strategy can provide new knowledge and skills to the community to be empowered.

According to Firdaus et al., [21], community empowerment strategies can be implemented by prioritizing economic principles according to factual conditions. Where if supply is smaller than demand, the strategy can be focused on providing basic training in improving new skills. Then if supply equals demand, this strategy is focused on increasing sales business skills (entrepreneurship),
and the third strategy if supply is higher than demand, strategy can be focused on business facilitation or facilitation of finding alternative developments.

Through the root definition and conceptual model from the SSM analysis stage, the community empowerment strategy is believed to be able to support the performance of coastal communities in utilizing existing resources in an optimal and integrated manner. Some things that can be done include: 1) Development of alternative livelihoods, 2) Access to Capital, and 3) Access to Markets. The concept of implementing the Blue Economy is actually carried out by applying the concept of appropriate fisheries resource management, where there are clear boundaries and divisions of authority between the government and the community. This concept also minimizes the weaknesses that exist in community-based fisheries resource management and fisheries resource management by the government.

The blue economy concept can be realized by applying various strategies and methods. All concepts that are in line with the economic theory and development model of Indonesia are formulated as new concepts and can be packaged into a concept that empowers coastal communities in providing National Food Barns through the fisheries sector. Policies and plans for the economic empowerment of coastal communities continue to pay attention to and consider the value of resource utilization and the value of the resulting externalities.

So as to achieve equal distribution of welfare in coastal communities. Empowerment policies and plans must also preserve resources to achieve sustainable development and ensure prosperity. The implementation of alternative policies and plans in each region is based on a priority analysis, taking into account the potential and needs of the region so that the priority of policies or plans for each region can be different, as a form of decentralization to deal with the forces that hinder development. As the largest maritime country, Indonesia must be able to prosper its people through a blue economy.

4. Conclusion

Community empowerment can be done by considering the potential of fishery resources, community interest as indicated by market demand, and efforts that can be made appropriately. The development of national food barns should be focused on the Blue Economy sector. The Sumatra region as an area that is rich in potential fishery resources can be a pioneer in the implementation of the Blue Economy. The synergy of all stakeholders in each region in Sumatra can be integrated with fostering, supervising, and mobilizing coastal communities in supporting their welfare. The welfare of coastal communities is a very important factor in the sustainability of the Blue Economy program towards the provision of National Food Barns through the fisheries sector.

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