Academy of Food and Nutrition
Indonesian Academy of Sciences
(AIPG – AIPI)

Policy Brief

Utilization of the Sea for Food and Future Life

Indonesian Academy of Food and Nutrition – Indonesian Academy of Sciences
(AIPG - AIPI)

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Executive Summary

- **Increasing the institutional capacity of fishermen to achieve sea food self-sufficiency**. Small-scale fishermen's institutions are very important in increasing fishermen's bargaining power in fisheries management, especially for capital access, fuel subsidies and other social assistance. In accordance with Law No.7/2016, small-scale fishermen are fishermen who have boats measuring < 10 GT, and currently of the 543,845 national fishing boat fleet, 96.3% of them belong to small-scale fishermen. To that end, strong fishermen's institutions can contribute to increasing national fishery production to achieve sea food self-sufficiency and as alternative sources of community nutrition.
- **Revamping the cold supply chain for distribution and ensuring domestic price stability**. The quality of sea food is closely related to the readiness of cold supply chain systems, especially distribution from areas close to fishing grounds throughout Indonesian archipelago, to Java Island where 60% of the total national population is concentrated. The output of a good cold supply system is expected to provide consistent supply of fresh fish, increased prices for fishermen and affordable prices for consumers.
- **Improving food quality and nutrition** can be achieved by KIE (communication, information, education) of food and nutrition, including changes in behavior into fish-loving culture, and to empower women and the younger generation so that they would be more active in the production, consumption, and education of Eat Fish Campaign. Strengthening accurate fish consumption data per capita is a key requirement in the formulation of policies to meet people's nutrition.

Background and Challenges

The Ministry of Marine Affairs and Fisheries (KKP) was first established in 1999 during President Abdurrahman Wahid administration, followed by the establishment of the Coordinating Ministry for Maritime Affairs in 2014, which later became the Coordinating Ministry for Maritime Affairs and Investment in 2019. The perspective and management of marine and fishery resources is still revolved around institutional strengthening, making marine and fisheries issues as public issues, and limited to potential narratives. Therefore, after 2021, it is time for the management to move to a strategic and tactical level to encourage the acceleration of the utilization of marine and fishery potential.

So far marine and fisheries sectors have been focused on economic value and exports. AIPG-AIPI proposes additional focuses i.e. strengthening fishing capacity, and the value of fish consumption especially in fishing families/villages. The cases of stunting and child hunger mostly occur in fishing families, so there has to be a shift in behavior and

diet to consume high protein food such as fish. The value of consumption, economy, and exports, in turn will provide increased employment, increased added value in the region, and competitiveness of the nation.

Indonesians spend 50 % of their expenses on food and drink. In this current pandemic situation, the food and beverage industry is still growing positively. Consumers are becoming more concerned about aspects of food safety and nutrition (immunity). The main problems of domestic market development include the fact that people's consumption preferences for fish are lacking. In certain areas there are difficulties in distributing fish, both in fresh and frozen conditions. Until now fish products have not been as popular as chickens, and fish are still considered more expensive. On the other hand, there has been a surge of demand for ready-to-eat and ready-to-cook foods, especially in online market.

A diet that includes sea food to fulfill food and nutritional needs has a central role in the achievement of food and nutrition security. Per capita fish consumption per year is currently around 55.95 kg, and is expected to reach 62.50 kg by 2024. However, there is still a difference in per capita fish consumption data between KKP and BPS, due to the calculation method approach used. Other than being important source of protein, sea food is also rich in micronutrients such as iodine, vitamin B12 and vitamin D, Omega 3 fatty acids, calcium, iron, zinc and vitamin A.

Indonesia's huge marine resource potential has not been explored, exploited and managed optimally because of inadequate human resource (HR) support. Therefore, in the framework of the utilization of the sea for food and future life, support from the education sector and manpower are needed in order to provide competent and competitive human resources in all supply chains of marine products, especially education and manpower related to the exploration of marine resources for food, increased production and export, product development and increased consumption. With better marine and fisheries governance from upstream to downstream, and also the aspects of food and nutrition, as well as the human resources involved in it, the sea will provide more optimal benefits, both in terms of biodiversity, economy and exports that contribute to the nation's competitiveness, along with nutrition and food that nourish the people of Indonesia in accordance with the vision of "Indonesia Maju" (Indonesia Onward).

Facts

1. The Indonesian Sea has an area of 6.4 million square kilometers (including EEZ) with a coastline length of 108,000 km, with the largest archipelago biodiversity in the world.
2. Indonesia is the second largest fish producer in the world, but it is not on the list of the top ten of the world's fish exporters.
3. Indonesia's EEZ area has great potential for tuna, but the quotas for certain types of native Indonesian Tuna allocated by Regional Fisheries Management Organizations (RFMO, such as: IOTC, CCSBT and WCPF) have never been utilized to the maximum.
4. Aquaculture in Indonesia is growing following world trends, especially for seaweed, shrimp, tilapia, and silver catfish.
5. The superior commodities for wild fisheries are tuna and skipjack tuna, while for aquaculture are shrimp and lobster. Currently, Indonesian fisheries export commodities are still dominated by wild fisheries, with volume of 65% and value at 62%, while actually the potential for aquaculture development is still very large, including marine cultivation and the application of intensive cultivation technology.

Recommendations

Innovation in production and marketing

Downstreaming and the needs for innovation

During Covid19 pandemic, the retail businesses of marine and fishery products grow by 20-30%, based on AP5I data. Operational recommendations are: product quality improvement, compliance with food hygiene and safety standards, and marketing strategies.

Development of fisheries business (upstream and downstream, Figure 1)

Banking (and nonbanking) financing constraints need to be solved in a structured and systematic manner. For example, to increase the scope of financial inclusion, more operational policy recommendations need to be addressed at

Bank Indonesia (BI) and the Financial Services Authority (OJK). In strategic field, there is a need for a quick review on the impact of policy (regulatory impact assessment-RIA) or regulations that are not harmonious and even conflicting. The nuances and national macro nature of each regulation need to be explained in more detail and associated with the problems faced by the region (province), local and district/city. Regulations and policies need to be supported by or provided to stakeholders who are directly involved in and closest to marine and fisheries businesses.

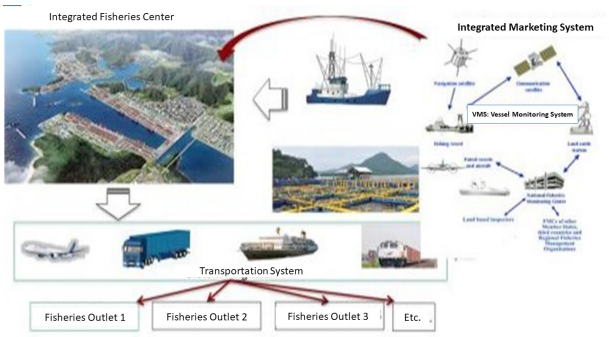

Figure 1. Revamping the cold supply chain for the development of upstream-downstream fisheries business

Marine and fisheries financing policies

Financing of marine and fisheries businesses and the realization of subsidized credit (credit program) in the field of fisheries are still small. Operational recommendations on sharpening social assistance programs (Bansos) and people's business loan (KUR) specifically for fishermen and fish farmers need to be associated with regional priorities and uniqueness, as well as the economy that surrounds the business development path in the field of marine and fisheries. Support for innovation and utilization of research results need to be accommodated in a business incubation, which should be fully supported by the government and/or State-Owned Enterprises (SOEs). Business incubation and entrepreneurial development will be able to cultivate potential young entrepreneurs who will spearhead the development of fisheries businesses going forward. The government needs to develop district/city-level infrastructures and even at the village level, such as power grids, cooling chains and the transportation of cold products.

Improved distribution of fishery products

Distribution needs to be improved so that it becomes more affordable for the community (supply side) by: (i) reducing the amount of loss and waste of fishery products (loss and waste) which is still high, with improvements in fishing, handling, processing and marketing technology, (ii) providing supply chain-based financing assistance (supply chain incentives), (iii) increasing the diversity of processed fish products to maintain the availability in between times and consumer reception.

Improvements in budgeting and institutional systems

Improvements of budgeting and institutional systems related to the development of fishery products could be done through: (i) government budget management emphasizing preventive health efforts, for example in developing fishery products for nutritional and health improvement, through strategic cooperation between the Ministry of Health and the Ministry of Marine Affairs and Fisheries, (ii) institutional support and synchronization of the fisheries development potential starting from upstream to downstream (e.g. for financing and transportation), (iii) encouraging the creation of social enterprise-based applications as a public investment policy, (iv) preparing fisheries industry and trade to meet international standards which are increasingly concerned about the environment (eco-label), food safety, and human rights.

Science diplomacy

Science diplomacy needs to be driven nationally, especially for outer islands such as Natuna. This science diplomacy can be done through cooperation with the Ministry of Research & Technology and LPDP. Reinforcement/providing more oceanographers and climatologists to understand not only marine products and fisheries but also the physicality of the ocean. On a broader scale, Regional-based Research Strategies and Priority Topics are needed.

Marine Food Innovation for Consumption and Nutrition

Consumption of fishery products for food and nutrition improvement

The principle of *demand-driven strategy development* or *supply follows demand* as an alternative to the development of marine and fishery products also has great implications to the efforts to increase the consumption of fish and fish products in order to increase food security and improve nutrition; In economic terms, the elasticity of demand for fishery products is quite high, and they are barely affordable for poor urban consumers. The slightest price increase will affect demand and in turn will affect the welfare of fishermen and marine and fisheries businesses.

Fish-based food strategy for food security and nutrition policies

Fish caught in wild fisheries acts as a source of macro and micronutrients. Sources of macronutrients are proteins with essential amino acids and have high biological value, while micronutrients as the source of various minerals includes phosphorus, calcium, iron, zinc, and iodine. Also as a source of essential fatty acids PUFA- Omega-3. Species that live in colder temperatures have higher content of omega-3 fatty acids. Fish from tropical waters and small fish species have higher content of micronutrients. For farmed fish, the focus is not only on productivity, but also the quality, namely nutritional content. In order to do that, it requires the development of superior fish seeds and brood, feed technology and cultivation.

In the context of overcoming stunting, fish is very important as a source of nutrition to increase intelligence and to overcome anemia, obesity, and iron deficiency. In fishing villages, this program can be combined with anti-poverty programs as well as economic improvement of local communities, for example providing a way so that fish caught do not rot easily and can be consumed by school children. Fish processing could be done by a family as a supplier. This will set the family's economy in motion.

Socially, fish consumption in the community is closely related to behavior, availability, and affordability. For this reason, we need to develop a sustainable and healthy diet model for Indonesia based on the potential and healthy habits of the community (such as Mediterranean diet). Gibson et al. (2020) showed that in Komodo District, more than 50% of mothers and children observed failed to meet the minimum dietary diversity. Even though fish became the main food in this area, toddlers and children consume fish when they are older due to the mothers' concerns that their children would experience allergies and pain.

Proper processing technology is needed to be able to maintain the nutritional quality of fish so that it can be used to overcome nutritional problems in Indonesia. As a source of nutrients, marine products must be further studied, for instance, the production of hydrolysate or fish protein concentrate, as raw materials for aquaculture feed, and as food (for example: egg whites from discarded flying fish eggs contain up to 75% protein with vitamin content, minerals and essential fatty acids). Utilization of marine processing industry byproducts is the application of a zero-waste system processing (green environment and sustainability).

In accordance with the ASEAN Food Safety Policy, the one responsible for food safety is business actors. By building the independence of food industry/business actors, the government's burden to monitor will also decrease. Thus, the policy of making business actors self-reliant through "risk base internal inspection". Good governance is connected to standardization, conformity assessment, and international recognition, so that marine and fishery products can be accepted and competitive. Infrastructures related to laboratories also need to be strengthened.

Innovation in the field of Education and Security

To identify and estimate the potential of fish resources, including deep sea fish resources, in Indonesian waters with a high level of accuracy, the availability of experts in this field with various scientific competencies (such as fishery biology, assessment of fish resource stocks, oceanography, fishing technology and fisheries statistics) needs to be pursued through formal education and training (Figure 2), In addition, a strengthening of education in related study programs is also needed.

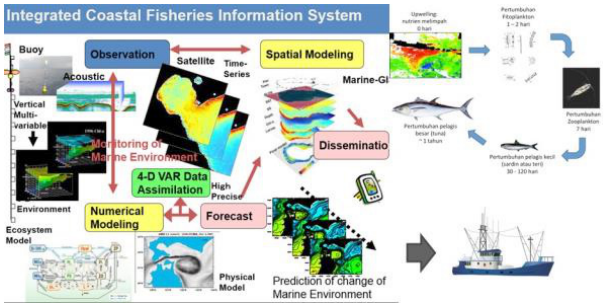

Figure 2. More accurate estimates of fishing areas supported by latest marine resources and science and technology

The availability of aquaculture experts (such as nutrition, disease, pond engineering, genetics) is needed to identify, map, quantify potential marine/coastal aquaculture resources and investment needs, as well as to strengthen education in the field of aquaculture. The availability of marine biotechnology experts with a variety of scientific competencies (such as pharmaceuticals, chemistry, microbiology) is needed to explore the potential of marine biotechnology resources that can be used for food, cosmetics, pharmaceuticals and others, as well as to strengthen education related study programs. The involvement of millennials is needed for all fisheries activities, namely fishing (millennial fishermen), cultivation (millennial fish farmers), processing (millennial fish processor) and marketing. In addition, it is also necessary to provide skillful experts with various scientific competencies for the implementation of WPP-NRI-based fish resource management, as well as the strengthening of education in relevant study and training programs. On the other hand, no less important is the preparation of competent crews through certified training or formal education (field of fishing and shipping technology) to anticipate the deployment of fishing vessels in the North Natuna Sea EEZ and high seas.

Preparation of experts and skilled personnel

Preparation of experts and skilled personnel through formal education and certified training is necessary (i) for the countermeasures and eradication of IUU fishing practices (including destructive fishing) as well as the development and strengthening of supervisory community groups through training and socialization; (ii) to support programs to increase the production and export of cultivated commodities, especially shrimp and lobster, through formal education, training, extension and mentoring; (iii) to support the operationalization of logistics corridors and direct flight connectivity to export destination countries, as well as strengthening of education in related study programs; (iv) to develop food and non-food products, including quality competencies and product safety, as well as data collection and statistics in order to optimize the utilization of marine/fisheries resources and meet the demands of market or consumers (such as ready-to-eat, ready-to-cook and frozen foods) through formal education (food technology, fishery and nutrition processing technology) and certified training.

CPIB training and certification (Good Fish Handling Method) in accordance with ministerial regulation KP No. 7/ PERMEN-KP / 2019 on Requirements and Procedures for Issuing Certificates of Good Fish Handling, is also needed especially for tuna fish in order to improve quality so that all tuna catches meet export quality, because tuna is the main export commodity of fishing.

To accelerate the process, if it is considered necessary, we could cooperate with institutions abroad, including bringing in experts from countries that excel in mastering technology for certain commodities, such as lobster cultivation.

Experts who would become delegates that attend RFMO meetings (especially IOTC, CCSBT, and WCPFC) need to be better prepared so that they could play more active roles in fighting for Indonesia's interests, as well as strengthen the education in related study programs.

Public and consumer education

In order to improve the level of fish consumption, there needs to be public education about the benefits of eating fish and processed products so that they would be interested in consuming fish and making fish as the main choice of animal protein sources in the household. To do this, we need to provide experts and skilled personnel through formal education (e.g., food technology, nutrition and fishery processing technology) and training so that they could be the implementer of community education. This includes the involvement of fishery field instructors and nutrition cadres.

Consumer education needs to be done by involving various stake holders, especially from private sectors to encourage well-implemented

social marketing, including more intense communication with consumers explaining that fish consumption can reduce the risk of various non-communicable diseases, reduce fortification, and improve food based aspects.

The role of women in fisheries and marine areas needs to be intensified. Increased fish consumption and understanding of nutrition are needed by housewives so that children, families and communities could change their culture, eating more fish and become fish-loving communities.

List of Laws and Regulations

1. Law No. 17/ 1985 on Ratification of UNCLOS-1982
2. Law No. 45/ 2009 on Fisheries.
3. Law No. 32/ 2014 on Marine
4. Presidential Decree No. 9/ 2007 on Ratification of indian ocean tuna commission (IOTC) membership.
5. Presidential Decree No. 109/ 2007 on Ratification of Membership of the Commission for the Conservation of Southern Bluefin Tuna (CCSBT).
6. Presidential Decree No. 61, 2013 on Ratification of membership of the Western Central Pacific Fisheries Commission (WCPFC).
7. Presidential Decree No. 56/ 2018, on Acceleration of National Strategic Projects.
8. Presidential Decree No. 7/ 2016 on Accelerating the Development of the National Fisheries Industry.
9. Presidential Decree No.16/ 2017 on Indonesian Marine Policy
10. Law No. 12/ 2018 on Food
11. Government Regulation No.17, 2015 on Food Security and Nutrition
12. Law No. 7/ 2016 on Protection and Empowerment of Fishermen, Fish Farmers, and Salt Farmers
13. Decree of the Director General of Aquaculture No. 272/KEP-DJPB/2020 dated July 30, 2020 on Strategic Plan 2020-2024 Directorate General of Cultivation
14. Regulation of the Minister of Marine Affairs and Fisheries of the Republic of Indonesia Number 17/PERMEN- KP/2020 concerning the Strategic Plan of the Ministry of Marine Affairs and Fisheries 2020-2024
15. Regulation of the Head of Marine and Fisheries Research and Human Resources Agency Number 12 /PER-BRSDM/2020 On Changes to The Regulation of the Head of Marine and Fisheries Research and Human Resources Agency Number 8/PER-BRSDM/2020 On Strategic Plan of Marine and Fisheries Research and Human Resources Agency 2020-2024.

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Indonesian Academy of Food and Nutrition – Indonesian Academy of Sciences (AIPG-AIPI)
AIPG-AIPI was established based on Law No.8 of 1990 on AIPI.

AIPG-AIPI aims to assemble leading Indonesian scientists in the field of food science and nutrition to provide opinions, suggestions, and considerations on their initiatives and/ or requests regarding the mastery, development, and utilization of science and technology, especially in the field of food and nutrition to the Government and the public to achieve national goals by always prioritizing: a) values and ideals from Pancasila and the Constitution of the Republic of Indonesia 1945; b) the value of humanity; c) awareness and ethical responsibility; d) improving the quality of human and people's lives; e) the integrity of the personality of the nation; and f) the balance of the environment in sustainable development.