Distribution Pattern of Capture Fisheries Industry in Southern of East Java Analysed from Operational Aspect and Interconnection Between Ports

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Abstract. East Java is one of the provinces that has the largest capture fisheries resources in Indonesia. It is recorded that the sustainable potential of East Java fisheries is more than 500,000 tons / year [1]. Capture fisheries production in the southern part of East Java Province is dominated by 3 Regencies, there are Trenggalek Regency, Pacitan Regency and Banyuwangi Regency [2]. As one of the Provinces that greatly contributed to the National income, East Java province is very potential if the government wants to make strategic plans related to the capture fisheries industry in East Java province. This strategic plan will determine a suitable development area for the capture fisheries industry on the southern part of East Java by considering operational aspects and interconnection between ports. By considering these two factors, it is hoped that the center for the development of the capture fisheries industry in southern of East Java will become more structured so can supports the government program, National Fisheries Logistics System (SLIN).

Keywords. capture fisheries, industry, operational, interconnection ports, logistics

1. Introduction

Indonesia has large sea areas, coastal areas and small islands which have strategic significance as pillars of national economic development. Apart from having economic value, marine resources also have ecological value, in addition, Indonesia's geographical condition lies in a strategic geopolitical position, namely between the Pacific and Indian oceans, which are the most dynamic regions in the flow of world politics, defence and security. These geo-economic and geo-political conditions make the marine sector an important sector in national development. One of the areas that has the largest capture fisheries products in Indonesia is East Java Province. East Java is surrounded by WPP-RI 573 and WPP-RI 712 which have the potential for sustainable fisheries, respectively 491.7 thousand tons / year and 836.6 thousand tons / year [3]. WPP-RI 573 has a wealth of resources that are abundant and have a variety of renewable and non-renewable natural resources. In terms of renewable natural resources, the potential that can be developed in WPP-RI 573 includes the capture fisheries sector, tourism, seaweed cultivation, salt ponds, ecosystem protection, development of ecosystem areas and the fishery industry. For the capture fisheries sector, WPP-RI 573 is the management area for kind of tuna, skipjack and mackerel in Indian Ocean. As the high seas, the Indian Ocean is connected to the Indian Ocean Rim countries so that...
their fisheries management is part of the Indian Ocean Tuna Commission / IOTC management area. Data on the potential and utilization of tuna, skipjack and mackerel are determined based on the best data that can be obtained from the Regional Fisheries Management Organization (RFMO) and / or the Ministry of Marine Affairs and Fisheries [4]. Based on the results of a study by the National Commission for the Study of Fish Resources which was carried out in 2016, the estimation of the potential of fish resource groups in WPP-RI 573 was dominated by large pelagic fish (tuna, skipjack and mackerel) where the production of fishery catch in the 2005-2014 period ranged from 127,815 - 218,359 tons / year with an average of 182,034 tons / year [5]. Another indicator that is no less important regarding fish resource stocks is the presence of larvae. A comprehensive and holistic larval study in the study of fish stocks is essential for sustainable fisheries resource management. Larvae study is needed to determine the optimum conservation and exploitation area so as to protect and enrich the environment [6]. UNESCO illustrates that larval studies can provide information on spawning areas and seasons, absolute stock abundance and subsequent interactions that can affect stocks. Larval studies are also useful in determining the recruitment patterns of fish populations. Based on this, increasing the understanding and utilization of fish resources in WPPN-RI 573 is very important to be studied in an effective, efficient, and sustainable capture fisheries management book.

2. Materials and methods

The methodology type of this research is descriptive statistics and the approach method is a qualitative approaches. Descriptive statistics were chosen because the form of the Research Method serves to present a complete picture of the Social Settings or for Exploration and Clarification, which is formed by describing a phenomenon of events that occur in the basis of the statistical results that have been recorded [7]. Meanwhile, qualitative approaches was chosen so that this research would broaden the point of view in determining the location for determining the capture fisheries distribution centre in the southern part of East Java by considering institutional and operational aspects. The methods for this research can be seen in figure 1 below.

![Figure 1. Methods.](image)

Designing and managing the capture fisheries industry supply chain is a complex matter, and it must take into social issues involved in it. This complexity is not considered in the process of designing a supply chain management system using quantitative methods. Quantitative methods are able to improve coordination and efficiency in the supply chain, but do not consider key aspects such as ethics, sustainability and human values in the supply chain [8]. Therefore this study aims to design a model of the capture fisheries industry supply chain system.
2.1. Literature review

Literature review is carried out by create a critical analysis of the relationship between journal articles from the work of previous researchers, and their relationship with the research to be proposed. bibliography includes all secondary sources of research, for example films, audios, presentations, lectures, handwritten diaries, archives, laws and regulations, artifacts, and others [9].

2.2. Situational analysis

The situational analysis stage is intended to obtain a portrait of the problem situation in the capture fisheries industry supply chain at the research location [10]. The portrait of the situational analysis is described as the profile of the fishery industry, the profile of the capture fisheries industry in the East Java region, especially in the southern coast. The profile image is made based on statistical data and policies and regulations related to the capture fisheries industry obtained through literature studies in the form of books, journals and other information obtained from related agencies.

2.2.1. Descriptive statistic

Data related to situational analysis is in the form of statistical data from third parties who provide credible data, such as Ministry of Marine Fisheries and Central Bureau of Statistics of Indonesia. Furthermore, primary data is obtained from questionnaires and in-depth interviews and / or expert / expert surveys are carried out to obtain opinions / thoughts and knowledge possessed by experts related to the capture fisheries industry supply chain management system [11]. The appointment of an expert as a source of knowledge or a respondent is based on the following considerations and criteria:

a. Existence, ease and willingness to be interviewed.
b. Reputation, position and credibility as an expert.
c. Expert expertise and experience that demonstrates the ability to give correct advice and can assist with problem solving.

The types of respondents used as primary data sources can be seen in table 1 below:

| No | Data source | Types of Data Required | Data Collection Techniques |
|----|-------------|------------------------|----------------------------|
| 1  | Respondents From Agencies Government : | Related matters | Questionnaire, expert survey; |
|    | Experts, Decision Makers, and / or | Directly or not | - Interview (in-depth interview); |
|    | Experts, Associated with the Supply | straight away, especially | - Field observations |
|    | Chain Management System | associated with : | |
|    | Marine Capture Fisheries Industry | A. Economics, | |
|    |                                 | B. Social, | |
|    |                                 | C. Environment, | |
|    |                                 | D. Technology, | |
|    |                                 | E. Resources, | |
|    |                                 | F. Institutional, | |
|    |                                 | G. Supply Chain, | |
|    |                                 | H. Operations, | |
|    |                                 | I. Interconnection between ports | |
| 2  | Respondents from business actors: | Related matters | Questionnaire, expert survey; |
|    | Business actors who are directly or indirectly related to the value chain of marine capture fisheries business activities. | Directly or not straight away, especially associated with : | - Interview (in-depth interview); |
|    |                                 | A. Economics, | - Field observations |
|    |                                 | B. Social, | |
|    |                                 | C. Environment, | |
|    |                                 | D. Technology, | |
|    |                                 | E. Resources, | |
|    |                                 | F. Institutional, | |
|    |                                 | G. Supply Chain, | |
|    |                                 | H. Operations, | |
|    |                                 | I. Interconnection between ports | |
| 3  | Respondents from stakeholders other related interests: | Related matters | Questionnaire, expert survey; |
|    | Other stakeholders who are directly or indirectly related to the marine capture fisheries industry supply chain. | Directly or not straight away, especially associated with : | - Interview (in-depth interview); |
|    |                                 | A. Economics, | - Field observations |
|    |                                 | B. Social, | |
|    |                                 | C. Environment, | |
|    |                                 | D. Technology, | |
|    |                                 | E. Resources, | |
|    |                                 | F. Institutional, | |
|    |                                 | G. Supply Chain, | |
|    |                                 | H. Operations, | |
|    |                                 | I. Interconnection between ports | |
2.2.2. Identification present situation
Identify a picture of the problem situation obtained at the situational analysis stage used as a reference in the process of making the rich picture analysis. In addition, in-depth interviews were conducted with experts and supply chain actors to explore and identify human activity systems related to the capture fisheries industry supply chain. The results of the analysis obtained are then poured out in order to obtain a rich picture, root definition and a conceptual model (purposive activity model) [12]. The results of this stage then become a reference in designing a supply chain management system for the capture fisheries industry in the Southern part of East Java.

2.3. Marketing distribution & interconnection relationship between ports
The next step is to analyze how marketing distribution and the effect of interconnection between ports in supporting the marketing distribution process. A fishing port is a support for the management and utilization of fish resources and the environment from pre-production, production, processing and marketing [13].

2.4. Conclusions and arrange action plans
The stages of planning an action plan are carried out after get the assumptions used to build a supply chain management system so as to realize a structured capture fisheries supply chain management system in accordance with the existing conditions of East Java. The identification of the modeling design structure is carried out based on the assumptions obtained by the elaboration process from the results of the Situational Analysis and identifying the effects of marketing distribution and interconnection between ports.

3. Results and discussion

3.1. Distribution Pattern of Catch Fishery in Southern of East Java
The first method to know the distribution pattern of catch fishery in Southern of East Java is describe the situational analysis using statistical data. The statistical data using credible data based on a survey issued by Central Bureau of Statistics of Indonesia [14], it concluded that the fishery production of East Java Province in the year was 414,644 tons during 2017. With dominated by 3 regency, there are Trenggalek Regency with its development center at PPN Prigi, Pacitan Regency with PPP Tamperan as its base and PP Muncar in Banyuwangi Regency. Production being in PP Muncar, which is in Banyuwangi district of 47,433 tons, followed by Trenggalek Regency with 18,472 tons and district Pacitan amounted to 11,054 tons. The volume map of the three districts can be seen in Figure 2 below.

![Distribution Pattern](image-url)

**Figure 2. Distribution Pattern.**
Based on production data from PP Muncar, it is stated that the total capture fisheries production from PP Muncar during 2017 amounted to 47,433 tonnes with money in circulation amounting to 958,929 billion. As for the amount of this production, the fish is distributed to local markets as well as international markets.

3.2 Distribution pattern of catch fishery analysed from connection between ports

After know distribution pattern of catch fishery in Southern of East Java, to know the connection between port is using descriptive statistic method. The descriptive statistic method based on situational analysis compared with primary data obtained from questionnaires and in-depth interviews from three parties, there are from government, business actor and stakeholders. From descriptive statistic know that based on the inter-port connectivity, the distribution of capture fisheries products that amounting to more than 32 thousand tons of capture fisheries products from PP Muncar are marketed in local markets which include East Java itself. As for the Bali market itself, PP Muncar supplied around 3 tons annually in 2018. As for the West Java, Jakarta, Central Java and surrounding areas, PP Muncar supplied approximately 11 thousand tons during 2018. As for the distribution of capture fisheries products and interconnection between ports, it can be seen in Figure 3 below.

![Distribution Pattern Connection Between Ports](image)

Figure 3. Distribution Pattern Connection Between Ports.

Based on Figure 3 above, the effect of interconnection between ports affects the marketing distribution around the southern part of East Java. From this figure, it can be explained that PP Muncar as a distribution center for capture fisheries products to export, local and long-distance, this is indicated by one-way connectivity means that PP Muncar only supplies market needs. Meanwhile, Pacitan Regency and Trenggalek Regency support a little need from PP Muncar which is shown by two-way connectivity. This means that capture fisheries products from PPN Prigi and PPI Tamperan go to PP Muncar to meet market demand in PP Muncar, but the capture fisheries production from PP Muncar also goes to both places.

4. Conclusions

The distribution of capture fisheries products is more than 73 thousand tons of captured fishery products from PPI Muncar are marketed in local markets covering East Java and Bali. PPI Muncar as a distribution center for capture fisheries products to export, local, long-distance and indicated by one-way connectivity means that PPI Muncar only supplies market needs. Meanwhile, Pacitan and
Trenggalek districts support a little need from PPI Muncar, which is shown by two-way connectivity. This means that capture fisheries products from PPI Tamperan and PPN Prigi in addition to PPI Muncar to meet market demand at PPI Muncar, but in marketing their capture fisheries production from PPI Muncar also goes to these two places. It can be concluded that the interconnection between ports is very influential on the marketing distribution of catch fisheries in Southeast of East Java, it is because the interconnection between ports will support the market needs of ports or other markets, this is indicated by two-way connectivity between ports.

Acknowledgements
It is hoped that the design of the capture fisheries industry supply chain management system can be used as input for policy makers, especially in building a capture fisheries industry supply chain management system based on regional situational conditions.

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