Role of national fish logistics system (SLIN) based on the fishing port in supporting food security in Simeulue Island, Aceh Province, Indonesia

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Abstract. The aim of this study is to know the national fish logistics system as an effort to support sustainable food security. One of the potential that Indonesia has is capturing fisheries which reached 6.4 million tons of fish per year. However, it has not been managed properly in an effort to support food security. Besides, the fish production in certain fishing ports often excess supply and limited of fish in several other fishing ports. This will lead to practices that suppress fish prices when overproduction, even fishermen/cultivators dispose of their products to maintain price stability, without taking into account the sustainability aspects. This issue can be resolved immediately with a study that leads to SLIN, but having a commitment to support this business has developed the concept of connectivity between regions. The study was taken in 10 fishing ports at Simeulue Island which used type D. The result showed that from the aspect of development goals, it is necessary to provide supply continuously, to utilize the potential optimally and to coordinate the integration of fish availability in production centers and/or collection centers or distribution center, obstacle elements include; lack of PP facilities and infrastructure, no integration between PPs, and lack of diversification of HT and products.

1. Introduction

Indonesia is one of the largest archipelagic countries in the world that has a manageable sea of 5.8 million km² with a huge potential and diversity of marine and fisheries resources. Another potential is the capture fisheries which reaches 6.4 million tons of fish/year. This potential is a big capital for economic development which in the end can be utilized to improve people's welfare. However, it has not really been managed and utilized properly, responsibly and sustainably for the welfare of the community. This is due to the lack of knowledge and information from the actors on the importance of utilizing and processing sustainably and continuously. Just as in certain seasons, the fish production in certain fishing ports often excess supply and limited of fish in several other fishing ports. This can be partially anticipated by utilizing available fish storage in the form of cold storage and/or chilling rooms. Meanwhile, the lack of fish now is mostly filled with imports from other regions/countries. Imports of fish for consumption and fish as raw materials from other countries are basically illogical [1].
These problems indicate that fishing ports still cannot manage fisheries logistics systems properly in an effort to support food security. This will continue to lead to practices that suppress fish prices when overproduction, even fishermen/cultivators dispose of their products to maintain price stability, without taking into account the sustainability aspects.

Simeulue Regency is one of the islands that has become a new regency of West Aceh which has 2,051 km² with a distance of 105 miles from West Aceh and abundant fish resources with fish production of 14,998 tons [2]. However, fisheries development in Indonesia in the Aceh region, still has a connectivity with each fishing port in supporting sustainability in the food sector. This issue must be resolved immediately with a study that leads to SLIN, but having a commitment to support this business has developed the concept of connectivity between regions. One effort to encourage the implementation of this connectivity is to develop a logistics system.

The National Fish Logistics System (SLIN) is a form of government intervention that will act as a buffer. Meanwhile the production system will be carried out by fishermen and capture fisheries business actors who have been oriented to the productivity approach and added value to have competitiveness. The use of technology and the existence of financial support is the keys to SLIN's success. Globally, it is expected that SLIN can guarantee the availability, price stability, food security and support the growth of the processing industry and the economic growth of the Simeulue community.

If SLIN can be realized, then chronic and acute problems of fisheries can be addressed. The consequence is the availability of adequate facilities such as docks, TPI, cold storage, the palkah with refrigerator support, a fleet of fishing vessels with exploring not only the territorial sea, but also to the EEZ. Therefore, it is urgent to study the national fish logistic system in supporting the connectivity between fishing ports to maintain food security. Aim of this Research is to know the national fish logistics system in an effort to support sustainable food security. Meanwhile the benefit of this study is to obtain information about national fish logistics systems based on fishing ports in supporting food security.

2. Materials and Methods

2.1 Research method

The research was conducted in 10 fishing ports in Simeulue Island, Indonesia. All of the fishing ports are categorized in type D. The data collection was conducted on February to April 2018.

The research method used is descriptive research method, as the basic principle of a holistic research method. In general the research method used is the survey method at the Fisheries Port. Systematic field research techniques include personal interviews, observations, and surveys through questionnaires and are more directed towards qualitative research.

| Research Objective | Technique of Data Collection | Analysis of Data Requirements |
|--------------------|------------------------------|------------------------------|
| Logistic System    | Questionnaire, library research | Type of fish, volume, Total, library support |
| Fish Distribution System Fishing Port | Fish Marketing Data (SSM) Interview | Management Strategy |
| Source System Method Analysis | | |
2.2 Data analysis

The data obtained in this study was analyzed descriptively to clarify the relationship of the national fish logistics system in the Simeulue Regency and to use SIM (Interpretative Structural Modeling) analysis to examine contextual relationships/relationships between elements and sub-elements in the integration strategy of marine fisheries management in Barsela was used Interpretative Structural Modeling (ISM) method. The development system element includes actors or institutions that play a role in development goals, program implementation needs, program constraints, benchmarks for assessing each goal, and stakeholders needed for planning actions for SLIN development between fishing ports in an effort to support food security[3]. However, based on the recommendations at the time of the beginner research, environment and accommodated from various multi-dimensional aspects and problems in each research chapter, the elements that are suitable for the development of SLIN in Simeulue Regency include; elements of development goals, elements of development constraints, and elements of SLIN development activities between fishing ports using the Interpretative Structural Modeling (ISM) method. It is clearer for the SLIN-based fishing port research flow as follows:

ISM Model (Interpretative structural modeling) is a method that can be used in analyzing complex problems in the system [4]. ISM provides a good and clear basis for guidance to researchers or agencies so that using ISM can develop models from each field of different and clear elements to improve the performance of each field [5]. This happens because ISM has a connection between each element. The basic ideas of theory, conceptual, and computing are used to build efficiency through graphics, or network representations between ISM elements [6]. Then ISM is a method that is relevant in the interpretation of each object system theory and graph.

3. Results and Discussion

The National Fish Logistics System (SLIN) is a national policy issue launched by the Ministry of Maritime Affairs and Fisheries in order to overcome the inequality of fish availability and prices. One of the causes of the inequality of fish availability and prices is the lack of adequate infrastructure in marketing fish from production areas to consumers and there has not yet integrated between fishing ports. Based on the results of research obtained in the implementation of SLIN for food security surveyed in Simeulue, it shows that it has not been effective in supporting good SLIN. It was found that the number of fishing ports carried out by the study showed that around 80% had not been
implemented properly in the logistics system, so that it needed assistance, guidance and facilities to be
effective in a well-integrated and sustainable logistics activity. To be more clear about the national fish
logistics system in Simeulue, which is based on fishing ports in supporting food security, are as
follows:

![Fish logistic connectivity system between fishing ports](image)

**Figure 2.** Fish logistic connectivity system between fishing ports

The ISM technique (interpretative structural modeling) relates to the interpretation of a complete
object or representation system through the application of systematic theory and iterative graphics [7]
[8]. ISM is a process that transforms mental models that are not bright and weak in explanation, into a
visible and clearly defined system model for a variety of purposes. ISM techniques analyze system
elements, and solve them in graphical form from direct relationships between elements and
hierarchical levels [9].

Based on the result from Focus Group Discussion (FGD) with stakeholders in the field, 12 sub-
elements must be done to achieve the goal in developing institutional KUB of gillnet fishermen in
Barsela Aceh. while the sub-elements are as follows:

1. Elements of the purpose of PP-based SLIN development:
   - T1 Existence of supply continuosly
   - T2 Make optimal use of potential
   - T3 Increase the income and welfare of fishermen
   - T4 Coordinate the integration of fish availability in production centers and/or collection
     centers or distribution centers
   - T5 Pressing logistic costs
   - T6 Increased interest in providers of logistics services for commodities
   - T7 Increase investment
   - T8 Increase revenue
   - T9 Availability of information on supply and demand for fish commodities in real time/online
The figure shows that matrix element of development objective of National Logistic System.

2. P-based SLIN Development Constraints
Based on the results of the survey (interviews and FGD) and observations in the field, it can be formulated that there were 10 sub-elements of constraints that needed to be addressed to realize the development of fisheries-based SLIN reinforcement in Simeuleu District. These obstacles include:

- K1 Lack of PP facilities and infrastructure
- K2 No integration between PPs
- K3 management of production and marketing is low
- K4 Coordinate fish availability in PP
- K5 HT and product are less diversified
- K6 Interaction and communication between stakeholders
- K7 Provide guidance on the implementation of a system of quality assurance and safety of fishery products
- K8 HR and professional quality is relatively low
- K9 Low Carry out socialization about SLIN
- K10 Low uptade of price information, marketing, etc.

Figure 3. DP-D matrix element of development objectives

Figure 4. DP-D matrix element of development obstacles
3. PP-based SLIN development actors/stakeholders
The elements of development of fishing port-based SLIN in an effort to support the resilience of the sea are determined by 13 (thirteen) sub-elements of the behavior that must be addressed to achieve its development. The thirteen sub-elements are as follows:

- P1 Ministry of Maritime Affairs and Fisheries (KKP)
- P2 Fisheries Port Manager
- P3 Panglima Laot
- P4 District Marine and Fisheries Agency (DKP)
- P5 Provincial Marine and Fisheries Agency (DKP)
- P6 Collector traders / agents / wholesalers
- P7 Fisheries extension agents
- P8 Financial and banking institutions
- P9 Fisheries education and training institutions
- P10 Fisheries cooperative institutions
- P11 Research institute / College
- P12 Fishery product industry
- P13 Indonesian Fishermen Association (HNSI)

4. Conclusion
Based on the results obtained, the effort to develop a national fishery-based logistic fisheries system to support food security, from the aspect of development goals, it is necessary to provide supply continuously, to utilize the potential optimally and to coordinate the integration of fish availability in production centers and/or collection centers or distribution center, obstacle elements include: lack of fishing port facilities and infrastructure, no integration between PPs, and lack of diversification of HT and products. The element actors expected from the development of fisheries port-based SLIN in Simeulue Regency are the Ministry of Marine Affairs and Fisheries, Management Board of the Fishing Port, Panglima Laot and Department of Marine Affairs and Fisheries of Simeulue Regency.

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