Ilomata International Journal of Management
P-ISSN: 2714-8971; E-ISSN: 2714-8963
Volume 5, Issue 1, January 2024
Page No: 320-339

The Influence of Sustainable Captured Fish Supply Chain Management on the Quality of Sea-Caught Fish Exports

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Received : November 10, 2023
Accepted : January 24, 2024
Published : January 31, 2024

Citation: Ariffien, A., Sudirman, I., Juniati, A, T . (2024). The Influence of Sustainable Captured Fish Supply Chain Management on the Quality of Sea-Caught Fish Exports. Ilomata International Journal of Management, 5(1), 320-339.
https://doi.org/10.52728/ijjm.v5i1.1041

ABSTRACT: A report from the Ministry of Maritime Affairs and Fisheries explains that Indonesia's total fishery exports in September 2023 will reach US$ 4.1 billion (Rp. 64.1 trillion). This figure is still far from the target to be achieved, namely US$ 7.8 billion in 2023. The aim of this research is to accelerate the development of the National Fisheries Industry which is at the forefront. Take the example of the fisheries supply chain in Cilacap Regency which is the largest producer of caught fish on the island of Java. By using the Soft System Research Methodology (SSM), the efforts made are to outline solutions to unstructured problems, understand the actual problem situation and take action to improve it. From the survey results, there are six problems in the supply chain of capture fisheries industry activities in Cilacap Regency, namely lack of facilities and infrastructure, lack of understanding and knowledge of fishermen, limited capital for capture fisheries businesses, excessive fishing, fishing community culture and weak supervision/law. Meanwhile, the research results show that in an ideal marine fisheries industry supply chain system, Cilacap Regency must carry out coordination and communication activities between caught fish supply chain actors, provide facilities and infrastructure, build logistics networks, standardize production, control storage methods, build systems monitoring, quality assurance of fisheries, and building a capture fisheries trading system. The implications include providing education to fishermen regarding marketing, collecting information about consumers and their needs, developing and developing fishermen's competence, government supervision, building local fishermen's cooperatives and maintaining traditional values.

Keywords: Supply Chain, National Fisheries Industry, Soft Systems Methodology, Capture Fisheries, Ideal Marine Fisheries Industry Supply Chain System

INTRODUCTION

The report from the Ministry of Maritime Affairs and Fisheries explains that Indonesia's total fisheries exports in September 2023 will reach US$ 4.1 billion (Rp. 64.1 trillion). This figure is still far from the target to be achieved, namely US$7.8 billion in 2023. In an effort to meet this target,

it is necessary to accelerate the development of the National Fisheries Industry, which is the starting point for the government's efforts to realize an independent, advanced, and resilient Indonesian marine and fisheries sector. , and based on national interests.

The Ministry of Maritime Affairs and Fisheries stated that 93% of the total export value was consumption fish exports. By volume, exports reached 1.26 million tons. of which 1.06 million tons were consumption fish," most of the fisheries' exports were sent to the 5 main market countries for fishery products, namely to China, ASEAN, the United States, Japan and the European Union. "The highest (export) value was to countries The US, followed by China, ASEAN, Japan and the European Union,"

The increase in exports also occurred mainly in processed raw materials, retail supplies, ready-to-eat and durable fish such as canned fish. 19. As is known, before the Covid 19 pandemic occurred, China was the largest exporter of fishery products in the world. Because there are so many marine resources in the form of fish, making Indonesia one of the 10 countries that produce quality fish in the world. Even in one catch, the fish produced can reach tens or hundreds of tons with good quality. Quality fish that meet international standards will usually be sent abroad to meet market demand from several countries such as Japan, Thailand and even the United States.

Indonesia is actually more accurately called a maritime country. Indonesia's territory is 70% sea and 30% land, has more than 17,000 islands, with a coastline of more than 99,000 km. Indonesia's vast sea area makes Indonesia a country that has great potential in the maritime and fisheries sector. With sea area reaching 70% of Indonesia's total area, it turns out that the contribution of the marine and fisheries sector to gross domestic product is still less than 3%. In fact, the fishing industry is expected to be a sector that can increase the country's economic growth after tourism (Indrajit & Djokopranoto, 2002; Ketchen, 2007).

In the growth of the fish market, supply chains are carrying out sustainability initiatives to change markets and distribution channels. The drivers of sustainability should not be seen as originating solely from organizations as there appears to be a shift in consumer attitudes regarding environmentally friendly products, services and processes. the interaction between consumer attitudes, supply chains, and organizational relationships is evident in (Brindley & Oxborrow, 2014) product and service markets (Bogard et al., 2017; Susanto et al., 2020)

Currently what is happening is that the small-scale fisheries sector has historically been characterized by its diversity and capacity to adapt to various challenges, but its difficulties are increasing following the development of the fishing industry and world markets. Competition with larger fleets for resources and markets is one of these challenges, and the catches of the two fleets are often indistinguishable in the marketplace. Competition from recreational fisheries for resources is also a problem, as they target similar species and fishing areas. In addition, urban development and tourism influence many activities along the coast, on beaches or in harbor areas, thereby potentially taking over areas previously used almost exclusively for small-scale fishing. (Fernández-Morante et al., 2022; Jenkins, 2022; Macedo et al., 2019)

To date, efforts to collect and manage fisheries data have often focused on large-scale commercial fisheries, and given less attention to small-scale fishing activities, especially for household consumption (i.e. for subsistence needs), and in particular, small fish and invertebrates collected from the source. beach, also known as 'picking up'. Because these activities are often not considered 'fishing', and the people involved may not describe themselves as 'fishermen/fishermen/fisherwomen', designing fisheries surveys to account for these activities is a challenge (Harper et al., 2020).

As a research site in the southern part of Java Island, the largest fish producing area is in Cilacap Regency. The fish caught by fishermen every day can reach 90 tons. The most fish caught are skipjack tuna and squid. The fish produced do not only come from the sea, but some also come from inland waters or fresh water, namely ponds. Cilacap Regency is an exporting area of caught fish for the West Java region, exporting fish to Japan and Korea. This location is very suitable for research into sustainable caught fish supply chains in terms of the potential yield of caught fish. The existence of Presidential Instruction (Inpres) Number 7 of 2016 concerning the Acceleration of Development of the National Fisheries Industry is the starting point for the government's efforts to realize the marine sector. and Indonesian fisheries that are independent, advanced, strong and based on national interests. This policy has 3 (three) fundamental objectives, namely: (1) improving the welfare of fishermen, cultivators, processors and marketers of fishery products; (2) absorb labor; and (3) increase the country's foreign exchange. There are at least 4 (four) problems and challenges in national fishing industry policy, namely:

First, the quality, quantity and continuity of production is still low. This condition is a result of the dominance of the MSME business scale involved in the fishing industry. Second, accessibility and availability of infrastructure are still inadequate. This problem is caused by the fact that most of the production locations are located in remote areas. Third, even though export value data shows an increase from 2019 to 2022, currently fisheries exports are still dominated by raw materials. Fourth, national fisheries industry policies have not been able to develop as expected because they are influenced by the low quality of policy governance. Accelerating the development of the national fishery industry requires synergy and coordination of policies between relevant ministries/institutions(Chaliludin et al., 2022; Lawson & Martin, 2008; Pascual-Fernández et al., 2020).

This research uses the Soft System Methodology (SSM) approach as a problem analysis technique. A qualitative research approach is research that emphasizes understanding problems in social life based on holistic, complex and detailed conditions of reality or natural settings. Several previous studies as below show that this method is widely used as qualitative research.

Table 1 Research on Soft System Methodology (SSM)

N0	Research Title/Research Year	Methodology	Research Result
1	**Alfa Firdaus dan M Syamsul Maarif** (Alfa Firdaus, 2015) Application of Soft System Methodology (SSM) for Integrated Biofuel Planning in the Agricultural Sector and Energy Sector/2015	This research uses seven steps in accordance with the SSM approach. Research on the integration of biofuels in the agricultural sector and the energy sector was carried out in stages as follows: Situational analysis, finding problems, defining each role using the CATWOE (Client or Customer, Actors, Transportation, World View, Owner and Environment Constraint) approach, designing a conceptual model , Developing an activity agenda, Defining changes and finally corrective action	Build a conceptual model that describes the activity relationships between related components. Through the implementation of the SSM steps, an action plan has been prepared, namely integrated planning with LEAP which has been modified to accommodate the agricultural sector and the energy sector.
2	**Malikus Sumadyo** (Sumadyo, 2016) Use of Analysis Techniques in Information System Development Using Soft System Methodology (SSM)/2016	The research methodology used makes problem situations in an organization as part of the perspective of looking at a problem. The use of the CATWOE technique is one of the stages of SSM, especially in the structured disclosure of problem situations. However, not all parts of this research explicitly use this technique.	Application of techniques that do not use CATWOE can be done if there are other tools (programs or sub-organizations) to compile the root definition into a conceptual model that represents all supporting requirements. A very important element in building an information system using the CATWOE technique is creativity. Creativity will increase the ability to respond adaptively to the need to solve problems and determine existing problem maps.
3	**Heru Nugroho** (Nugroho, 2016) Soft System Methodology Approach to Building an Information	This research methodology is systems thinking, a new way of thinking that looks at problems as a whole (not separately). Systems thinking is a transdisciplinary field that emerged as a response to the	Soft system methodology is an implementation of systems thinking in Human Activity Systems. By using a Soft system methodology approach, creating an information system or PA Information System will more fully

N0	Research Title/Research Year	Methodology	Research Result
	System Final Project/2016	limitations of technical approaches in the reduction process to solve a particular problem. Consumer satisfaction is an indicator of achieving the expected goals of an organization.	describe the problems that occurred previously
4	**Neilin Nikhlis, Ade Iriani, Kristoko Dwi Hartono** (Nikhlis et al., 2020) Soft System Methodology (SSM) Analysis to Increase the Number of Prospective Students Soft System Methodology (SSM) Analysis to Increase the Number of Prospective Students/2020	This research methodology is descriptive qualitative and uses a soft system methodology approach.	Can model knowledge capture (KC) on the promotion strategy of "XY" university and produce knowledge documentation which provides benefits in making policy strategies and has an impact on increasing the number of prospective new students by optimizing digital marketing.
5	**Thalia Dorkas Septiana, Raymond Maulany** (Septiana & Maulany, 2021) Development of Data and Information Management Using Soft System Methodology Analysis at	This research is descriptive qualitative in nature, and uses the CATWOE technique which is one of the techniques in the SSM stage, especially in the structured disclosure stage of problem situations.	Obtain appropriate alternative methods in resolving the challenges and problems faced by Indonesian Adventist University students to facilitate registration and transfer of information in the dormitory.

N0	Research Title/Research Year	Methodology	Research Result
	Indonesian Adventist University / 2021		
6	**Bayu Waseso, Suhaeri, Tazkiyah Herdi** Final Project Information Systems Analysis Using a Soft Systems Methodology Approach/2021	These stages are adopted from the SSM stages which will be used as the basis for the research method for analyzing information systems for the final project. These stages are used in the following discussion section to carry out further analysis.	This research describes 7 SSM steps for analyzing problems and taking corrective action for department units managing final assignment administration. Stakeholder interviews, field observations and document studies were carried out to get an overview of the problems and business processes depicted in rich pictures. The results of the final project information system development model analysis are defined using UML, both with use case diagrams for practical design, as well as activity diagrams and display designs.
7	**Utan Sahiro Ritonga** (Ritonga, 2022) Soft System Methodology Analysis of Food Agro-Industry Development Based on MSME Development in Indonesia/2022	This research is action research with a qualitative research approach using Soft System Methodology (SSM) as a problem analysis technique.	Industry and the private sector need to be involved in providing business capital and assistance, providing goods and services for food agro-industry players and collaborating to support academic involvement through empowerment. For this reason, the overall food agro-industry development system needs to be regulated through MSME development policies that are in line with the needs and desires that are appropriate to the interests of all parties.
8	**Erly Krisnanik, Tri Rahayu, Kraugusteeliana** (Krisnanik et al., 2022) Soft System Methodology	The research methodology uses research techniques in SSM which consists of 7 (seven) stages	The contribution of this research is in the form of an Integrative Holistic Early Childhood Health Monitoring Information System (SIMOKAUD) which can be used by PAUD Kuntum Mekar to monitor the health development of its students.

N0	Research Title/Research Year	Methodology	Research Result
	(SSM) Approach to Building Integrative Holistic Simokaud		

Supply Chain Management

Business competition that is getting tougher in this globalization era requires companies to reconstruct their business strategies and tactics, in other words every company must compete to find ways and means to survive and develop in maintaining their market share. Industry players are starting to realize that in order to provide cheap products, quality and fast is what gave birth to a new concept, namely Supply Chain Management. In the SCM (Supply Chain Management) concept, coordination is required when moving raw materials/products, coordinating product transfers from upstream echelon locations to all downstream echelon locations aims to minimize costs.

The goal of supply chain management is to coordinate activities within the supply chain to maximize the competitive advantage and benefits of the supply chain for the end consumer. Like a championship team, a key feature of a successful supply chain is its members acting in the interests of the team (supply chain). As can be seen in the box below, how Two Men and A Truck company can increase the company's operational efficiency and customer satisfaction through good coordination and collaboration between all members of the supply chain – service providers, partners, suppliers, collaborators and advisers. Effective cost reduction can help a company to achieve its profit goals more easily than an increase in sales effort.

Supply chains are an area where structural changes often occur. When conditions of uncertainty occur, continuous planning is needed due to changes in the supply chain process. Supply chain management (SCM) is often in the spotlight in efforts to achieve competitive advantage, as it provides many opportunities to reduce operational costs and improve customer service and satisfaction. Therefore, a dynamic and integrated management system is needed to deal with these continuous changes. Managers are required to select the appropriate level of integration for a particular relationship in the supply chain and the appropriate level of information (Apak et al., 2013).

(Marimin, 2010) states that a supply chain management system is a series of approaches applied to efficiently integrate suppliers, entrepreneurs, warehouses and other places. Thus, the supply chain system will minimize transportation and distribution costs to inventory of raw materials, materials in process, and finished goods so that the entire system becomes efficient and effective.

Supply chain design is a process for building a supply chain which includes:

a. Selection of supply chain partners;
b. Identification of consumer segments;
c. Location of production and distribution facilities;
d. Identification of facility and transportation capacity

States that supply chain design is the basis for supply chain management, which integrates all units in the supply chain and coordinates the flow of materials, information and finance to meet consumer demands with the aim of increasing the competitiveness of the supply chain as a whole. Supply chain partners gain competitiveness and customer service capabilities through implementing their supply chain activities such as linkage management, establishing supply chain leadership and planning updates.

Distribution Channel

The supply chain is essentially an organizational network that involves upstream and downstream relationships, in different processes and activities and generates value in the form of goods and services in the hands of end customers (Bian et al., 2018). Conceptually, the supply chain of marine and fishery products is an economic system that distributes benefits and risks among the actors involved. The linkages of various processes must be able to create added value for marine and fishery products, so that each participant in the chain coordinates their activities both in quantity, location and at the right time to satisfy customer needs (Wang, 2010). Supply chain management will run optimally if there is a synergy between all components involved in each activity from upstream to downstream.

Marine and fishery products have different characteristics compared to other products. This product has a short shelf-life and a high level of vulnerability to weather, so special handling is required in the packaging and distribution process, in order to maintain the quality of the product. The process of distributing fisheries is closely related to supply chain management. The essence of supply chain management is integration, collaboration in managing supply and demand with all parties involved in business processes (C.S.C.M.P., 2010).

Supply chain strategy or design decisions are decisions about the structure of a supply chain and the processes to be carried out at each stage which include location, production, product design, and process optimization taking into account external factors such as politics, law, infrastructure governance, progress technology, and others.

Sustainability of the Capture Fisheries Industry

The push for a sustainable fisheries sector continues to resonate. Fisheries sustainability has become a crucial issue in line with the climate crisis, increasing world demand for nutritious food, and market demands. With increasing world food needs, providing nutritious food and sustainable supplies for the future is a human right that must be fulfilled. Currently, to maintain food security and at the same time preserve natural resources, the United Nations Food and Agriculture

Organization (FAO) states that the world population will reach 9.1 billion in 2050, this will lead to an increase in global food demand of 70%. In its report FAO in

In the midst of the increasing food needs of the world's population, ensuring proper nutrition and sustainable supplies in the future has become a human right that must be fulfilled. The world faces the challenge of maintaining food security while preserving natural resources. "The State of World Fisheries and Aquaculture 2022", catches of fisheries resources continue to decline due to overfishing, pollution and poor fisheries management. However, there is a trend of increasing catches from sustainable stocks. In 2019, 82.5 percent of fish landings came from sustainable stocks, an increase of 3.8 percent from 2017.

FAO projects fisheries production in 2030 to reach 202 million tonnes, sourced from the growth of sustainable aquaculture of 106 million tonnes and capture fisheries of 96 million tonnes. Capture fisheries in 2030 will increase by 6 percent from 2020 as a result of improved resource management, reduced fish stocks and reduced marine pollution. Effective fisheries governance is considered to be able to restore stocks

Fishery Product Processing Requirements To increase the selling value of non-economic fish, one way that can be done is through diversifying the processing of fishery products so that they are more acceptable to the community and according to market tastes to meet community needs. The community's nutritional needs are safe and healthy through nutritional/vitamin/protein intake from fisheries and food security. (Dirgantara, 2022)

Some considerations for the need for sustainable fisheries development include:

1. The utilization of sustainable fishery resources and their processing activities must be based on a particular and well-identified marine ecosystem.
2. Maintaining the carrying capacity of resources for utilization activities in the long term.
3. Supporting the workforce in the field of fisheries in the wider community.
4. Maintaining the level of health and integrity of marine ecosystems for other uses, including biodiversity, science, intrinsic value, tropical structures and other economic uses such as tourism and recreation.

The goals of sustainable development will be in line with the goals of fisheries development such as maintaining stocks of fishery resources and protecting their habitat. However, managing fishery resources for sustainable development is multi-dimensional and multi-level activities that must consider more aspects than the survival of fish and fisheries themselves. FAO has developed several examples of criteria for each dimension in the Sustainable Development Reference System (SDRS).

Table 2 Criteria for Dimensional Analysis of Sustainable Fisheries Development

Number	Dimensions	Criteria
1	Economy	- Production volume - Production value, Fishery contribution ti GDP - Fishery export value (compared to total export value) - Investment in fishing fleet and management facilities, - Taxes and subsidies - Workforce, - Income
2	Social	- Workforce/participation - Demographics - Education - Consumption of protein - Income - Tradition/culture - Debt - Gender distribution in decision making
3	Ecology	- Catch composition - Relative abundance of species - Utilization rate - Direct impact of fishing gear on habitat - Biodiversity - Changes in area and quality of important or critical habitats - Pressure from fishing (compared to untapped areas)
4	Interest Governance	- Compliance with the government system - Ownership rights - Openness and participation - Ability to manage - Good governance (Good Governance)

Source: FAO *Technical Guidelines for Responsible Fisheries No.8 Indicator for Sustainable Development of marine Capture Fisheries* (1999)

Soft System Methodology (SSM)

Soft System Methodology is a comprehensive method and has a number of concepts and tools that are developed explicitly. The fundamental idea behind SSM is that the process of investigating 'real world' complexity can be simulated as a learning process. The learning process starts from finding out about a problematic situation to defining it, and taking action to correct it. The 'real world' in SSM parlance refers to the flow of occurring and interacting events and ideas experienced in everyday life and this is differentiated from the world of systems thinking where conceptual models are the study of the 'real world' and how to improve it. situation is created. An important aspect of SSM is that it recognizes different societies' underlying assumptions about the world, that is, their different worldviews. These different world views influence their understanding of problem situations and potential solutions. Therefore, any universal solution, or even a unidimensional view of the problem at hand, will never approach the complexity of the real world. For SSM, an individual will always try to act with a specific goal in mind but will act based on his or her own point of view and thus will behave differently from other players (Augustsson et al., 2019).

SSM is also an aggregation or collection of objects that explain each other in interaction and are interdependent and work to achieve certain goals. The systems approach is an approach to solving problems by emphasizing the analysis of element interactions and system behavior as a whole or holistic. The systems thinking approach will provide an alternative analysis of quite complex problems that focuses not only on the core problem but also on the constituent components and the connectivity conditions between components. Systems thinking can lead us to enter a transition in looking at problems from a component perspective, but also being able to see the relationships between components, then seeing interconnected relationships, and finally seeing interdependent relationships between components. This ability allows humans to understand problems better, and better understanding can open up opportunities for better solutions. The systems approach begins by identifying stakeholder needs which are important factors in the system to obtain good problem solving solutions as well as creating a conceptual and quantitative model to assist rational decision making. (Bungsu & Rosadi, 2021). "Systems Thinking, Creative Holism for Managers", developed by Eriyatno (2007), states that SSM implementation can be carried out in 7 (seven) stages. Each stage of SSM is as follows:

Stage 1. Understanding the problem situation in a factual and actual framework

The aim of this stage is not to define the problem, but to elicit a number of developing thoughts, so that the range of possible decision options becomes open.

Stage 2. Expressing the problem situation (Problem Situation Expressed)

The results of the previous stage are used to build a rich picture of the problem being examined. This stage must be able to describe the activity process of each institution involved in the problem situation. Relationships between activities and institutions to illustrate problems, roles, and environmental elements that are easy to understand. This is the basis for further discussion.

Stage 3. Defining the root system associated with the problem situation

At this stage we leave behind the actual problem situation. This is the most difficult process. The root system definition should be built using CATWOE analysis.

C = Customers: Who will benefit from this purposeful activity?

A = Actor: Who carried out the activity?

T = Transformation: What must be changed for input to become output?

W = Worldview: What kind of perspective makes a system meaningful?

O = Owner : Who can stop the activity?

E = Environment: What constraints exist in the system environment?

Stage 4 Building a conceptual model (System conceptual model is mentioned in the root definition)

The conceptual model does not intend to describe a problem situation but is an attempt to understand the activities needed to achieve a change. Apart from that, the conceptual model also intends to design a system that represents the parties' perspectives about the desired system in their interaction activities. This stage helps participants to discuss what steps can be taken in real problem situations. The conceptual model is a presentation of the root definition of the system, using verbs as a modeling language so that the model represents what the system must do, as defined in the previous stage. Conceptual models do not describe events in the real world (facts) but are a structure of various activities to achieve transformations that are modeled in a logically interdependent sequence. So, in a model, an arrow from activity x to activity y shows that y depends on x.

Stage 5. Comparing the conceptual model with the problem situation (comparison of the model and real words)

The system model produced in stage 4 is an abstract description and description of various activities that logically must be shown in the system (what), while activities in the real world always indicate one way to do something (how). How is usually conveyed more implicitly, rather than what. The purpose of these models is to ask whether the various activities in the model can be realized in the real world, how they have performed so far, or what alternative methods can be taken to realize these activities.

Stage 6. Determine feasible and desirable changes (systematic, culturally feasible desired changes)

The goal of this step is to identify and seek changes that are systemically desirable and culturally feasible. These changes may occur in terms of structures, procedures, or people's

attitudes. The structure here concerns the organization of party groups, or the structure of functional responsibilities. Procedural changes include all activities carried out by the organization, such as in the perspective of goals in problem situations so that people will understand how they should behave in their relationships.

Stage 7. Making changes to improve the situation (action to improve the situation)

This is an implementation step. Who will implement it? What form of action is taken? Where? When? is important at this stage. Changes in attitudes and behavior should be considered as dimensions to drive the new system. Changes that disrupt change should be avoided. This stage requires the commitment and responsibility of actors to realize the action plan.

In practice, SSM applications have developed rapidly, not only those that are processed based on standard cycle rules as introduced by Peter Checkland. Various modifications of cycles and stages develop in the practice of soft system methods, including combinations with system dynamics known as the soft system dynamics methodology (SSDM). The application of SSM is not only oriented towards problem solving, but also for research purposes or what is often known as theoretical practice (theoretical research practice). (driver of change) to achieve production efficiency thereby reducing the level of danger to the environment. Porter (1993) states that technological renewal is needed if it is actually able to reduce production costs.

METHOD

In this research, data was obtained by conducting observations with the aim of obtaining more complete data regarding the current situation which has not yet been structured in order to find a better solution by producing ideal activities. Next, an interview is conducted to obtain information for research purposes by means of question and answer face to face between the questioner or interviewer and the answerer or respondent using an interview guide. In this study, researchers recorded all answers from respondents as they were. The interviewer occasionally interrupts the respondent's answers, either to ask for explanations or to correct them if there are answers that deviate from the question. The type of interview used in this research is a structured interview. This means that when conducting interviews, researchers have prepared research instruments in the form of written questions.

The method used in this research is Soft Systems Methodology (SSM). According to (Checkland & Poulter, 2010) stated that Soft Systems Methodology (SSM) is an approach to addressing unstructured problems and is a process of action in understanding the actual problem situation and taking action to fix it. SSM was developed to deal with management problems arising from human activity systems. Decision-making to reduce uncertainty and to design and manage supply chains depends on the ethical, moral and sustainability aspects that must be considered. Therefore, an approach is needed in designing a new system that builds and supports relationships between

supply chain actors. Below are the relevant methods used for sustainable supply chain problems, which can be seen in Table 3

Table 3 Relevant Methods in Sustainable Supply Chain Management

No	Methods	Shortage	Advantages
1	Hard System Methodology (HSM)	1. Requires professional practitioners 2. Losing contact with aspects outside the logic of the problem situation Allows use of powerful techniques	Can solve problems with low structure
2	Raffish	1. Only the sustainability index score is released 2. Can only be done in locations where supply chain activities are already running well.	Can analyze/evaluate the sustainability status of fisheries in a location
3	Engineering System Approach	The successful implementation of decision results can still be predicted.	Can solve problems with low structure. For example for selection of modes of transportation in sustainable SCM
4	*Supply Chain Operations Reference* (SCOR)	Cannot model ideal activities for sustainable SCM, only measures performance from SCM aspects	Can measure SCM performance to determine the level of achievement of targets set in the business plan
5	*Soft System Methodology*	Can only produce ideal activities resulting from the system -	Can be used based on the current situation Keep in touch with the human content of the problem situation

The Soft Systems Methodology method can help take into account various aspects of behavior, both organizational behavior and human behavior. This method can produce ideal activity options for a sustainable supply chain which are influenced by several factors, namely socio-economic, institutional, cultural, physical, and the supply chain actors themselves. To better understand in designing ideal activities to realize a sustainable supply chain, a situational analysis is carried out which will later produce several unstructured issues regarding existing problems to create a conceptual system model. After obtaining the conceptual model, a comparison is made with the reality and the desired changes are made and are feasible to implement.

RESULT AND DISCUSSION

The supply chain of the capture fisheries industry in Cilacap Regency shows a complex situation. Fishermen's activities as producers of raw materials for capture fisheries are faced with climate problems, the threat of scarcity of fish resources due to rampant acts of illegal fishing and overfishing, low skills and limited capital. This condition affects the performance of fishing companies in fulfilling the supply and quality of raw materials. This has an impact on low supply chain performance due to not achieving capacity and product quality. As a result, consumer demand for fishery products cannot be met.

Based on the results of the fish-bone diagram analysis, it is known that there are six issues along with problems and potential impacts that occur in the supply chain activities of the sustainable capture fisheries industry. The six issues are: (1) lack of infrastructure and facilities; (2) Understanding and knowledge of fishermen who are still lacking; (3) Access to capital for the development of capture fisheries business is limited; (4) overfishing in coastal waters; (5) Culture of fishing communities; (6) Weak supervision and law enforcement.

Furthermore, the results of the fish-bone diagram analysis are arranged as the main issues and problems in the capture fisheries industry supply chain in Cilacap Regency which impede the sustainable capture fisheries industry supply chain as can be seen in Table 4

Table 4 Issues and potential impacts on the sustainability of the capture fisheries industry

No	Issue	Problem	Potential Impact
1	Lack of means infrastructure and infrastructure	- The port isn't finished - - Cold Storage is not yet available	- No activity at the port walk - The port is used by ships from outside Cilacap to lean on - The quality of the fish is not guaranteed - There will be the use of hazardous materials for Preserve/process fish

No	Issue	Problem	Potential Impact
2	understanding and knowledge of fishermen who are still lacking	- Understanding level for - securing the quality of fish in fish fishermen is still lacking - Do not understand consumer desires - - Most fishermen do not pay attention to the quality of the fish they catch	- Will not reach market/consumer demands - Does not have a high selling price - The market/processing industry will not accept fish from fishermen - - The bargaining position of fishermen is weak
3	Access for capital for developing capture fisheries business is limited	- banking procedures - difficult to fulfill for small-scale fishermen - Relatively high loan interest rates - - There is no fishing cooperative	- Existing fishery will not develop - - There will be unbalanced and optimal utilization of fish resources
4	More catch (overfishing) in coastal waters	- Partial abilities most of the fishing fleets in Indonesia can only operate in coastal waters, due to their relative scale small - - The limited access policy has not been fully implemented	- SDI in coastal waters will degraded to extinction - - People's fishing business will experience degradation to the point of bankruptcy
5	Community culture Fisherman	- Fisherman profession still including informal and unconditional work - The wage system for labor fishermen is still on a daily basis by means of profit sharing - Most of the small-scale fishermen work independently - Don't think about famine	- Difficult to put into practice professional and responsible fishing practices - - The level of welfare of labor fishermen will be difficult to increase, because they do not have good financial management skills
6	Weak supervision and law enforcement	- Lots of ships from outside Cilacap leans on the port of Cilacap	- Cilacap fishermen will - lose competitiveness - Fishermen will not progress and develop

No	Issue	Problem	Potential Impact
		- Ships >5GT in size - Better catching tools - - Free entry and exit of the port without permission	- - Income is not proportional to operational costs

Stakeholder	
Fishermen, collectors, wholesalers, logistics service providerDistributor, industri pengolah (pabrik),	Distributors, processing industries (factories), retailers, logistics service providers

Figure 1 Components of Capture Fisheries Supply Chain Management in Cilacap Regency

At this time what is happening in the field is that the fisheries supply chain that occurs in Cilacap Regency is only at the procurement stage, there are no other stages such as storage, transportation to marketing. Fishermen only carry out production or procurement by catching fish in the sea, then the catch is brought to the Fish Auction Place (TPI) for an auction process with collectors. Therefore, it is necessary to improve the implementation of capture fisheries supply chain management in Cilacap Regency.

CONCLUSION

The ideal marine fishing industry supply chain management system in Cilacap Regency can be realized by carrying out the activities contained in the ideal system being built, such as: Designing coordination between supply chain actors, Building communication between supply chain actors, Providing facilities and infrastructure, Building logistics network, standardization of production and fishery handling methods, standardization of post-catch handling, control of storage methods, building a fisheries quality control and assurance system. Building a fishing trade system, Distributing products to out-of-town retailers/traders, Monitoring the distribution process, Providing education to fishermen regarding marketing, Collecting information about consumers and their needs. Guiding and developing fishermen's competence, government supervision, building local fishermen's cooperatives and maintaining traditional values.

REFERENCE

Alfa Firdaus. (2015). Syamsul Maarif Aplikasi Soft System Methodology (Ssm) Untuk Perencanaan Terintegrasi Biofuel Dalam Sektor Pertanian Dan Sektor Energi (2015. *Jurnal PASTI*, *IX*(1), 1–9.

Apak, S., Vayvay, Ö., & Feyzioğlu, O. (2013). A Decision Making Model for the Evaluation of Supply Chain Execution and Management Systems. *International Journal of Computational Intelligence Systems*, *6*(2), 293–306.

Augustsson, H., Churruca, K., & Braithwaite, J. (2019). *Re-energising the way we manage change in healthcare: the case for soft systems methodology and its application to evidence-based practice BMC Health Services Research* (Vol. 19, Issue 666). https://doi.org/10.1186/s12913-019-4508-0

Bian, J., Guo, X., & Li, K. W. (2018). Decentralization or integration: Distribution channel selection under environmental taxation. *Transportation Research Part E: Logistics and Transportation Review*, *113*, 170–193. https://doi.org/10.1016/j.tre.2017.09.011

Bogard, J. R., Farook, S., Marks, G. C., Waid, J., Belton, B., Ali, M., Toufique, K., Mamun, A., & Thilsted, S. H. (2017). Higher fish but lower micronutrient intakes: Temporal changes in fish consumption from capture fisheries and aquaculture in Bangladesh. *PLoS ONE*, *12*(4). https://doi.org/10.1371/journal.pone.0175098

Brindley, C., & Oxborrow, L. (2014). Aligning the sustainable supply chain to green marketing needs: A case study. *Industrial Marketing Management*, *43*(1), 45–55. https://doi.org/10.1016/j.indmarman.2013.08.003

Bungsu, R., & Rosadi, K. I. (2021). Faktor Yang Mempengaruhi Berpikir Sistem: Aspek Internal Dan Eksternal. *Journal Ekonomi Manajemen Sistem Informasi DOI*. https://doi.org/10.31933/jemsi.v2i2

Chaliludin, M. A., Khafiyya, N., Rizwan, T., Rianjuanda, D., Muklis, M., Bustami, B., & Sophia, L. (2022). Sustainability Analysisi Of Traditional Capyure Fisheries Based On Local Wisdow At Lhok Kuala Gigieng, Aceh Besar, Indonesia. *Kanun Jurnal Ilmu Hukum*, *24*(1), 1–13.

Checkland, P., & Poulter, J. (2010). Soft System Methodology. In *Published In Association with Springer-Verlag. https://devpolicy.crawford.anu.edu.au diakses tanggal 11 Agustus*.

C.S.C.M.P. (2010). *Council Of Supply Chain Management Professionals (CSCMP*.

Dirgantara, R. (2022). Empowerment Strategy Of Fishery Products As Economic Resilience In The Coastal Marine. *AKADEMIK: Jurnal Mahasiswa Humanis*, *2*(1), 37–45. https://doi.org/10.37481/jmh.v2i1.467

Fernández-Morante, C., Fernández-De-la-iglesia, J.-C., Cebreiro, B., & Latorre-Ruiz, E. (2022). ATS-STEM: Global Teaching Methodology to Improve Competences of Secondary Education Students. *Sustainability (Switzerland)*, *14*(12). https://doi.org/10.3390/su14126986

Harper, S., Adshade, M., Lam, V. W. Y., & Daniel Pauly, U. R. S. (2020). Valuing invisible catches: Estimating the global contribution by women to small-scale marine capture fisheries production PLoS. *ONE*, *15*(3), 228912. https://doi.org/10.1371/journal.pone.0228912

Harper, S., Adshade, M., Lam, V. W. Y., Pauly, D., & Sumaila, U. R. (2020). Valuing invisible catches: Estimating the global contribution by women to small-scale marine capture fisheries production. *PLoS ONE*, *15*(3), 1–16. https://doi.org/10.1371/journal.pone.0228912

Indrajit, & Djokopranoto. (2002). *Konsep Manajemen Supply Chain Cara Baru Memandang Mata Rantai Penyediaan Barang*. PT Gramedia Widiasarana Indonesia.

Jenkins, L. D. (2022). Power, politics, and culture of marine conservation technology in fisheries. *Conservation Biology*, *36*(3). https://doi.org/10.1111/cobi.13855

Ketchen. (2007). Toward greater integration of insights from organizational theory and supply chai management. *Journal of Operations Management*, *al*, 573–580.

Krisnanik, E., Rahayu, T., & Kraugusteeliana. (2022). *Pendekatan Soft System Methodology (Ssm) Untuk Membangun Simokaud Holistik Integratif Jurnal Teknologi Informasi dan Ilmu Komputer (JTIIK* (Vol. 9, Issue 5). https://doi.org/10.25126/jtiik.202295117

Lawson, H., & Martin, J. N. (2008). On the Use of Concepts and Principles for Improving Systems Engineering Practice". *Proceedings of the 18th Annual International Council on Systems Engineering (INCOSE) International Symposium*.

Macedo, H. S., Medeiros, R. P., & McConney, P. (2019). Are multiple-use marine protected areas meeting fishers' proposals? Strengths and constraints in fisheries' management in Brazil. *Marine Policy*, *99*, 351–358. https://doi.org/10.1016/j.marpol.2018.11.007

Marimin, M. (2010). *Aplikasi Teknik Pengambilan Keputusan Dalam Manajemen Rantai Pasok*. IPB Press.

Nikhlis, N., Iriani, A., & Hartono, K. D. (2020). Soft System Methodology (SSM) Analysis to Increase the Number of Prospective Students Soft System Methodology (SSM. In *Analysis to Increase the Number of Prospective Students INTENSIF, Vol.4 No.1 February 2020 ISSN: 2580-409X*. https://doi.org/10.29407/intensif.v4i1.13552

Nugroho, H. (2016). *Pendekatan Soft System Methodology Untuk Membangun Sebuah Sistem Informasi Proyek Akhir*. https://www.researchgate.net/publication/292383125

Pascual-Fernández, J. J., Pita, C., Josupeit, H., Said, A., & Rodrigues, J. G. (2020). Markets, Distribution and Value Chains in Small-Scale Fisheries: A Special Focus on Europe ©. In R. Chuenpagdee & S. Jentoft (Eds.), *Transdisciplinarity for Small-Scale Fisheries Governance, MARE Publication Series 21*. Springer International Publishing AG, part of Springer Nature. https://doi.org/10.1007/978-3-319-94938-3_8

Patawari, A. M. Y., Anna, Z., Hindayani, P., Dhahiyat, Y., Hasan, Z., & Putri, I. A. P. (2022). Sustainability status of small-scale fisheries resources in Jakarta Bay, Indonesia after reclamation. *Biodiversitas*, *23*(4), 1715–1725. https://doi.org/10.13057/biodiv/d230401

Ritonga, U. S. (2022). *Analisis Soft System Methodology Pembangunan Agroindustri Pangan Berbasis Pengembangan UMKM di Indonesia Jurnal Riset Ilmu Ekonomi* (Vol. 2, Issue 3, pp. 110 – 129 2776–4567).

Septiana, T. D., & Maulany, R. (2021). *Pengembangan Manajemen Data Dan Informasi Menggunakan Analisis Soft System Methodology Di Universitas Advent Indonesia Jurnal TeIKa* (Vol. 11, Issue mor 1).

Sumadyo, M. (2016). Penggunaan Teknik Analisis Dalam Pengembangan Sistem Informasi Menggunakan Soft System Methodology (SSM) Jurnal Penelitian Ilmu Komputer. *System Embedded & Logic*, *4*(1), 36–48.

Susanto, E., Othman, N. A., & Tahir, M. N. H. (2020). a Review of Collaborative Performance System Implementation in the Fresh Produce Supply Chain To Improve Performance. *Humanities & Social Sciences Reviews*, *8*(3), 1363–1382. https://doi.org/10.18510/hssr.2020.83138

Wang, Y. L. (2010). International Fishery Supply Chain Risk Management and Insurance. *Management of Innovation and Technology (ICMIT), IEEE International Conference*, 12–15.