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Economic Mapping of Small-Scale Fishers in Dadap Village, Juntinyuat District, Indramayu Regency, Indonesia

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Authors' contributions

This work was carried out in collaboration between both authors. Both authors read and approved the final manuscript.

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ABSTRACT

Small-scale fishers (SSF) are essential to providing employment and food security worldwide. This is especially true in coastal countries like Indonesia. However, despite being so important, often the economic and social characteristics of SSF are not well documented. Thus, this research focused on the small-scale fishers of Dadap Village, which is located in the Juntinyuat District, Indramayu Regency, Indonesia. Specifically, through qualitative research methods and economic mapping, this study investigated various aspects of the fisher's characteristics, economic activities, and factors affecting their development. The research found that fishers were between 20-54 years with a relatively low level of education, and many relied on customers for social support due to high fishing supplies costs. The economic mapping of Dadap Village revealed that fishing activities dominated the local economy, with small scale fishers using various fishing gear and vessels, ranging from 2-4 Gross Tonnage to 5-10 Gross Tonnage (GT). The catches varied depending on the fishing gear used, and the income also differed based on the selling price of the catch and the duration of fishing trips. Several supporting factors for the development of small-scale fishers were identified, including the high production of catches and the presence of fish auction facilities. On

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the other hand, inhibiting factors included selling catches outside the auction place, low education levels, lack of technology usage, and consumptive behavior of fishermen. In conclusion, the study sheds light on the characteristics and economic activities of small-scale fishermen in Dadap Village. The findings highlight the need for support in terms of technology adoption and educational improvements to enhance the development of the fishing community. Additionally, better market access and reduced reliance on middlemen could positively impact the economic growth of small-scale fishers in the area.

Keywords: Small-scale fishers; fishing gear; supplies cost.

1. INTRODUCTION

Economic mapping is a picture of the economy in a region. Economic mapping aims to determine the potentials that exist in the region. Knowledge of local potential will help in maximizing and improving the regional economy. Local economic potential, namely identifying sectoral economic potential, so that it can be utilized in the development of each sector or region [1].

The economic activities of coastal communities are dominated by capture fisheries activities based on their geographical position. Common occupations carried out in capture fisheries activities, namely fisherman. Article 1 paragraph (10) of the Fisheries Law Number 45 of 2009 states that fishermen ias a person whose livelihood is fishing [2]. The definition of small-scale fishers is stated in article 1 paragraph (4) in Law Number 7 of 2016 which states that small-scale fishers are fishermen who catch to fulfill their daily needs, both those who do not use fishing boats and those who use large fishing vessels with a maximum size of 10 Gross Tonnage (GT) [3].

In Indonesia, the economic activities of coastal communities revolve around capture fisheries due to their strategic geographical positioning. Among the key actors in this domain are small-scale fishers, defined as individuals who rely on fishing to fulfill their daily needs, whether operating fishing boats or engaging in traditional fishing practices. The Fisheries Law of Indonesia recognizes the vital role of these small-scale fishers in sustaining local livelihoods and preserving marine resources.

Indramayu, a regency in West Java Province with an extensive coastline spanning 147 km2, serves as an illustrative example of the importance of small-scale fishers. This region significantly contributes to the nation's capture fisheries, accounting for an impressive 40% of the total catch. To support the livelihoods of these fishers, Indramayu has established four fish auction sites (TPI) strategically located across the region, including Dadap Village in Juntinyuat District, TPI Eretan Kulon, TPI Eretan Wetan in Kalianhaur District, and TPI Karangsong in Indramayu District.

Economic mapping proves indispensable in shedding light on the critical role of small-scale fishers within regions like Dadap Village. Dadap Village is one of the villages in Juntinyuat District with an area of 2,418 km^2. With a population of 6,558, the majority of Dadap's inhabitants rely on fishing as their primary occupation. Around 4,964 people work directly as small-scale fishers, and an additional 535 function as boat owner fishers, making fishing a significant economic activity in the village.

However, there are challenges in accurately recording the production of capture fisheries by small-scale fishers. Sales transactions often occur outside the official fish auction sites, leading to unrecorded production figures in the Village Unit Cooperatives (KUD). This discrepancy not only affects fishery resource allocation and boat productivity but also results in an uneven distribution of small-scale fishers across different districts and business groups.

By leveraging economic mapping techniques, policymakers and stakeholders gain valuable insights into the complex dynamics of small-scale fishing communities. Understanding the economic contributions of these fishers can lead to more targeted policies, resource allocations, and development initiatives, ultimately empowering small-scale fishers and fostering sustainable growth in coastal regions like Dadap Village.

2. METHODOLOGY

2.1 Research Methods

The research method used is survey method through quantitative data analysis. The survey

method is a form of research approach activity with respondents to obtain some data, not in the form of the author's opinion but natural data [4]. Generally, the collection of this information is limited to a sample that can represent the entire population by using a questionnaire as a means of collecting data on the required variables.

The sampling technique to fulfill primary and secondary data is using purposive sampling. According to Sugiyono (2017), purposive sampling is a data sampling technique based on certain considerations [4]. Respondent criteria include "Fishermen": (1) Residing in Dadap Village, (2) Working as small fisherman owners or crew members (3) Ships operated with sizes ≤ 10 GT (4) Owner fishermen or labor fishermen, (5) Want to be interviewed and fill out a questionnaire Criteria for respondents. “Stakeholders”:(1) Community heads or staff in the management sector (Dadap Village stakeholders, managers and port administrators), (2) Willing to be interviewed and fill out a questionnaire.

2.2 Data Analysis

The data analysis in this research is quantitative descriptive analysis. Quantitative descriptive use to find out the value of the independent variable without making comparisons using numbers, starting from data collection, data interpretation, and data appearance [5]. Analysis of research on economic mapping using descriptive analysis. Descriptive analysis is a description of the situation of phenomena including natural phenomena, and man-made phenomena in the form of activities, forms, changes, relationships, characteristics, similarities, and differences between one phenomenon and another [6]. The descriptive method is used to describe the general economic condition of small-scale fishers in Dadap Village, Juntinyuat District, Indramayu Regency.

Research analysis to determine the economic factors that influence the development of small-scale fishermen using a quantitative approach is carried out by giving an assessment of the results obtained. Assessments can be given by people who are considered experts at the research location in order to strengthen the results of the researcher's observations. Assessment of the measurement scale using a Likert scale.

The Likert scale according to Sugiyono [4], the Likert scale is a scale used to measure attitudes, opinions, and perceptions of individuals or groups related to phenomena that occur somewhere [4]. There are two forms of questions on the Likert scale, namely positive and negative questions with the following scores: positive questions are given a score of 4, 3, 2, 1 while negative questions are given a score of 1, 2, 3, 4. The answer form consists of strongly agree choices , agree, disagree, and strongly disagree.

Determination of scoring criteria using the following formula:

a. Determine the highest percentage
   Highest percentage $=\frac{\text{Highest Score}}{\text{Highest Score}} \text{x } 100\%$
b. Determine the lowest percentage
   Lowest percentage $=\frac{\text{Lowest Score}}{\text{Highest Score}} \text{x } 100\%$

To find out the response or assessment of respondents using the following formula:

a. Determine the maximum total score = Highest score x Number of respondents
b. Determine the minimum total score = Minimum score x Number of respondents
c. Score presentation$=\frac{\text{Obtained total score}}{\text{Maximum total score}} \text{x } 100\%$

Furthermore, after obtaining the score results, an interpretation of the score is carried out which includes each analysis of the data obtained from the respondents as follows:

Table 1. Percentage of scoring

intervals (%)	Criteria	
	Positive	**Negative**
0-25	Very Unsupportive	Very Inhibiting
26-50	Does not support	Hinder
51-75	Support	Not Inhibiting
76-100	Very Supportive	Very Uninhibited

2.3 Validity Test

In this study, the concept of credibility (internal validity) was applied with the aim of obtaining a level of confidence in the suitability between data and facts in the field. Testing the credibility of the data is done by extending observations, increasing persistence in research, and triangulation

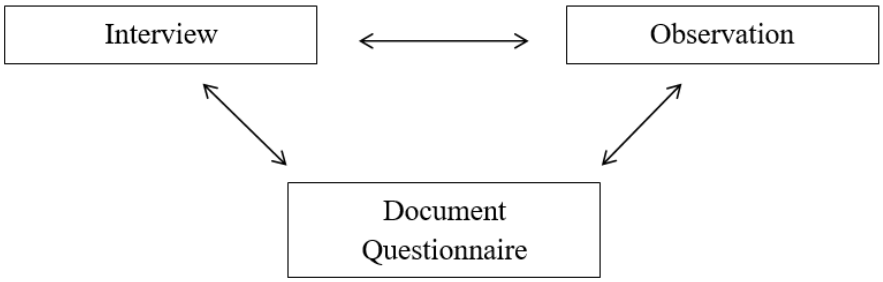

Fig. 1. Triangulation with three data collection techniques

Triangulation is a technique of checking the validity of data by utilizing a multiple method approach or the presence of other data collection (various paradigms). In principle, triangulation is used to determine whether a data is appropriate in describing a phenomenon in a study. The type used in this triangulation method is the data collection technique. The data collection triangulation technique is as follows in Fig. 1.

Transferability (external validity) is a research finding carried out in a group or area that can be applied to other groups. High transferability can be seen from the understanding of other people in reading research reports both in obtaining an overview and a clear understanding of the contents of the report [7].

3. RESULTS AND DISCUSSION

3.1 General Condition of Research Area

Geographically, Dadap Village is located between 6.436173'-6.450860' South Latitude and 108.452640'-108.473261' East Longitude (Fig. 2). Administratively, Dadap Village is included in the Juntinyuat District, Indramayu Regency, with a village area of ± 215 Ha and is located between the boundaries of the government administrative areas as follows:

• North	:	Bordered by the Java Sea
• East	:	It borders Sendang Village, Karang Ampel District
• South	:	It is bordered by Benda Village, Karang Ampel District
• West Side	:	It borders with Junti Kebon
• To the northwest	:	It borders with Juntinyuat Village

(2022 Village Profile Data)

The northern area of Dadap Village which borders the Java Sea has had a positive impact on activities in the fisheries sector. The Java Sea area (WPP NRI 712) is one of the fishing areas with the most dense number of small-scale fishing fleets [8].

3.2 Characteristics of Small-Scale Fishers

According to respondents, the characteristics of small-scale fishers in Dadap Village include age, education level, employment status, fishing experience, number of family members, and work outside fishermen.

3.2.1 Fisherman age

The age of small-scale fishers in Dadap Village who are of productive age aged 20 to 54 are 23 people (76.6%), followed by fishermen aged 55 to 64 years who are 6 people (20%), and finally 1 person (3, 33%) of fishermen who are no longer productive (Table 2). According to Astiyani's statement (2022) ages 20 to 54 years are considered to have excellent physical condition and ability so they can work optimally [9].

3.2.2 Fisherman education level

The level of education influences the fishermen's mindset [10]. There were 70% of the small-scale fishers who graduated from elementary school (21 people), 23.33% junior high school graduates (7 people), 3.33% high school graduates (1 person), and 3.33% bachelor graduates (1 person) (Table 2).

Judging from the existing data, the education of small-scale fishers in Dadap Village is classified as low. The low education level of fishermen has an impact on the mindset and quality of fishermen who are less than optimal. This can affect fishermen's understanding of receiving the latest information and using the latest technology. [11].

Fig. 2. Location Map

Fishermen's understanding of determining the selling price of fish in the market is still low because fishermen are based on prices that have been determined by customers. This resulted in fishermen having difficulties in obtaining profits commensurate with the effort expended. In accordance with Astiyani's statement (2022), where the level of education is an indication of the level of poverty in society [9].

3.2.3 Job status

Employment status affects the position and income of fishermen [12]. Fishermen in Dadap Village are divided into three groups, namely business fishermen (langgan), mixed fishermen (labor fishermen or ABK), and full-time fishermen (owner fishermen).

Based on the employment status, many small-scale fishers rely on customers as the main support for fishing activities, due to the high cost of fishermen's supplies. In line with Muninggar's statement (2013) the dependence of fishermen on customers is one of the facts found in fishing ports and almost all traditional fishermen experience a lack of capital [13]. So many of the small-scale fishers or ship owners make loans to customers.

3.2.4 Sea Experience

Sea experience becomes an influence on the performance of fishermen in fishing. The longer the experience of going to sea, the more knowledge and skills fishermen will have in getting to know the characteristics of fish and the terrain at sea [14]. Most of the small-scale fishers have been fishing for more than 21 years (Table 2). This explains that the small-scale fishers in Dadap Village are very experienced in fishing.

The length of experience that fishermen have can affect the catch of fishermen. In accordance with Indara's statement (2017) the longer the fisherman's experience, the greater the fish catch and income earned [15]. Judging from the catches of fishermen at the study site, it is clear that boats measuring 2-6 GT can bring home catches of up to 300 kg as listed in the data in the appendix.

Table 2. Data on the characteristics of small-scale fishers respondents

No	Characteristics of Small-scale fishers	Amount	Percentage (%)
1	Age (years)		
	15-24	1	3.33
	25-34	7	23.33
	35-44	5	16.67
	45-54	10	33.33
	55-64	6	20
	≥ 65	1	3.33
2	Level of education		
	Elementary School	21	70
	Junior High School	1	3.33
	Senior High School	7	23.33
	S1	1	3.33
3	Job status		
	crew	12	40
	Ship Owner	18	60
4	Sea Experience		
	0	2	6.67
	6-20	11	36.67
	21-35	7	23.33
	36-50	8	26.67
5	Number of Family Members		
	1-2	3	10
	3-4	14	46.67
	5-6	13	43.33
6	Jobs outside Fishermen		
	There isn't any	21	70
	Chairman of the organization	2	6.67
	Laborer	7	23.33

Source: Researcher Questionnaire Data 2023

3.2.5 Number of family members

The large number of family members influences the fishermen's household economy. From Table 2, of the 30 respondents, 3 fishermen have 1-2 family members, 14 fishermen have 3-4 family members, and 13 fishermen have 5-6 family members. The number of small-scale fishers's family members is relatively large, so that it affects the expenditure of money in fulfilling daily life. The biggest monthly expenditure for small fishing families is up to 4,500,000 rupiah according to the results of interviews with fishermen and fishermen's wives.

The more the number of family members, the greater the responsibility of the household. This makes it difficult for fishermen to save money. Vice versa, the fewer family members are able to provide smaller dependents so there is an opportunity for fishermen to set aside money or savings. In line with Adiana's statement (2012) that the larger the household size, the more household members are able to increase the burden on the household in meeting their daily needs.

3.2.6 Jobs outside fishermen

Work as a fisherman is often not able to meet the needs of daily life. Many of the labor fishermen do more than one job to meet their needs. Most of the owner fishermen do not work outside fishermen (Fig. 3), while labor fishermen choose to look for other jobs.

The search for another job is a form of business carried out by fishermen in fulfilling their daily needs. As many as 7 out of 12 crew members do other jobs as farm laborers and casual laborers. This shows that small-scale fishers in Dadap Village have strategies to fulfill their lives by utilizing their physical strength and skills. As stated by Tambulon (2022) that the basic perspective of human adaptation strategies is being able to manage life to deal with various possibilities of everyday life [16].

3.3 Dadap Village Economic Mapping

The economy in Dadap Village is dominated by fishing activities, especially capture fisheries because of the village's position on the coast. The village community utilizes existing resources to fulfill their daily lives by doing work as fishermen. Economic mapping includes fishing infrastructure and fishing productivity.

3.3.1 Fishing facilities

Fishing facilities are supporting tools used in fishing activities. Fishing facilities include the type of vessel, size of vessel, type of fishing gear, and fishing technology

3.3.1.1 Ship type and size

The type of vessel has a positive and significant effect on fishermen's production [17]. The types of ships in Indramayu are divided into 4 types, namely sope types, jegong types, dorit types, and asko types. Small-scale fishers in Dadap Village use the sope type. The sope ship is a type of wooden ship with a short and slightly rounded shape.

Fishermen in Dadap Village have two small fisherman groups based on the size of the vessel, namely 2-4 GT boats (small-scale fishers) and 5-10 GT boats (medium fishermen) (Table 3).

Table 3 shows that vessels measuring 5-10 GT have long fishing distances. The larger the boat will affect the ship's ability to carry nets and the fishing ground range will expand [18]. A 5 GT boat with white pomfret fishing gear is the ship that has the farthest sea distance, namely ± 37 miles in the Eretan area. Vessels measuring 2-4 GT make the closest fishing at a distance of ± 4 miles in the Indramayu area. The choice of fishing location is one of the reasons fishermen choose long distances to go to sea. Each WPP has different characteristics in fish resources based on the environment [19].

3.3.1.2 Type of fishing gear

Based on observations, the types of fishing gear used in Dadap Village were arad, white pomfret nets, rajungan nets, purse seine, gill nets, and gemplo used by vessels <10 GT (Table 4). Most of the small-scale fishers in Dadap Village use three different fishing gears. The fishing gear used is selected based on the most types of fish in a particular season according to Mr. Su'I as chairman of KUB.

The fishing gear used by fishermen has different mesh sizes and shapes. The size of the mesh and the length of the net can have an effect on the catch [20,21]. Generally, the nets carried by fishermen are adjusted to the catch target and the size of the boat. Fish catches based on the fishing gear used are shown in Table 4.

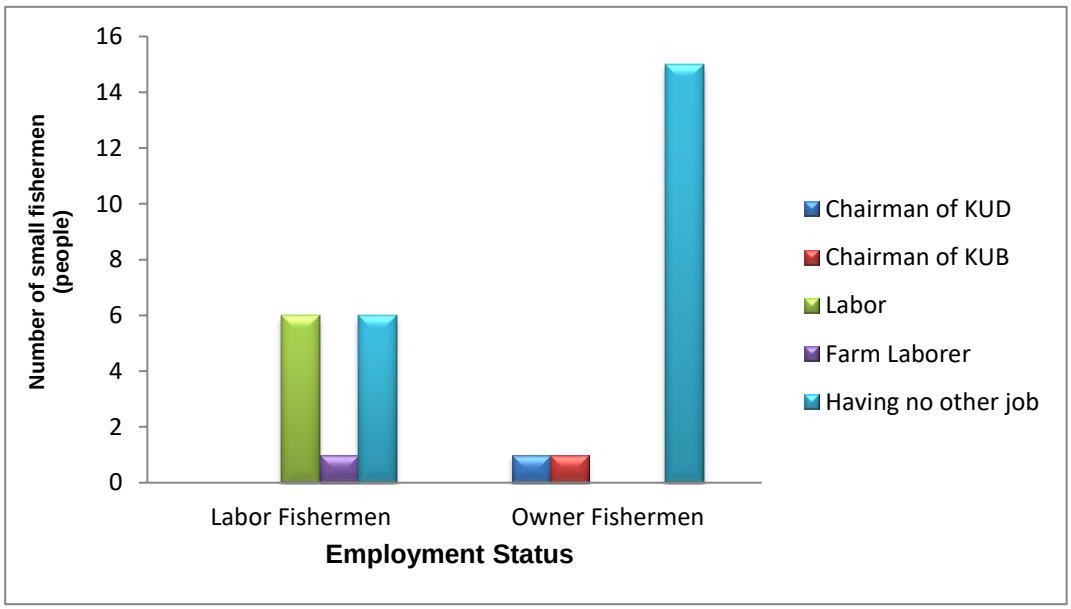

Fig. 3. Bar diagram of work outside fishermen

Table 3. Ship type and size

Ship Type Sope	Ship Size	
	2-4 GTs	**5-10 GTs**
Type of Fishing Gear	Arad Rajungan nets Gemplo *Gillnets*(gill net)	White Pomfret Nets *Purse Seine*(Ring Seine)
Distance and Sea Area	± 4 miles (Indramayu Area)	• ± 37 miles (sledding range) • ± 27 miles (Cirebon Area)

Source: Researcher Questionnaire Data 2023

Table 4. Fish catches based on fishing gear

Catching tool	Gear Size (meters)	Catch
Arad	15-20	Squid (Loligo sp.), Cuttlefish (Sepia sp.), and Shrimp (Caridea)
White pomfret net	2000-2500	White pomfret (Pampus argenteus), Pari (Urogymnus polulepis), and Kuro (Polydactylus Octonemus)
Rajungan nets	100-500	Rajungan (Portunus pelagicus), Cuttlefish (Sepia sp.), and Anchovies (Stolephorus tri)
Purse seine(ring seine)	180-400	Tembang (Sardinella fimbriata), Cob (Euthynnus affinis), Kuro (Polydactylus Octonemus), Talang (Scomberoides lysan), and Mackerel (Scomberomorini)
Gill net(gill net)	1500-2100	Kuro (Polydactylus Octonemus), Mackerel (Scomberomorini), Cob (Euthynnus affinis), and Talang (Scomberoides lysan)
Gemplo	100	Anchovies (Stolephorus commersonnii), anchovies (Stolephorus indicus), and gutters (Scomberoides lysan)

Source: Researcher Questionnaire Data 2023

The fishing gear that is widely used by small-scale fishers in Dadap Village is the Gemplo fishing gear with catches such asAnchovy (Stolephorus commersonnii), Anchovy (Stolephorus indicus), and Talang (Scomberoides lysan) according to port data for 2022. Anchovy is one of the catch commodities for small-scale fishers in Dadap Village because the catch is always available. Anchovy is a fishery commodity that has production availability throughout the year [22].

3.3.1.3 Fishing aids

Fishing aids are tools used to facilitate the fishing process [23]. The implementation of fishing for small-scale fishers in Dadap Village still relies on instinctual abilities based on experience, such as determining where to catch fish, weather conditions, wind conditions, and what types of fish will appear in a certain month. Fishermen's knowledge is derived from the ability of their ancestors which facilitates and harmonizes fishermen with natural phenomena and symptoms when fishing [24].

Small-scale fishers in the river flow use tools in the form of boat engines (Dongfeng) and net pulling machines. The ship's engine used is a diesel engine with a power capacity of 24 PK (Fig. 4).

Unlike the small-scale fishers (5-10 GT) who are at the port, many are already using technology such as GPS and Yukom. GPS is a satellite navigation system that can help find the exact geographical position of objects and show directions to coordinate locations that have been recorded [25]. GPS makes it easier for fishermen to find and catch fish without destroying the marine ecosystem.

Yukom is a useful tool for providing information on fishing grounds. In addition, yukom can function to inform weather conditions, send emergency signals, and can record fishermen's catches in the form of a digital logbook [26]. The following is the GPS and Yukom documentation attached in Fig. 5.

Fig. 4. Small fishing boat technology (2-4 GT)
(Source: Personal documentation)

Fig. 5. Small fishing boat technology (5-10 GT)
(Source: Personal documentation)

The lack of technology used by small-scale fishers in Dadap Village has resulted in frequent catches that do not match the targets set prior to departure. It is not uncommon for fishermen who own boats to experience losses due to fishing income that does not cover departure capital. Of course, the development of modern technology is very helpful for small-scale fishers in achieving the desired target. In accordance with Yasrizal's statement (2017) the use of modern technology is very supportive in earning more catches [27].

3.3.2 Capture productivity

Fishing productivity is a measure of the production capacity of a fishing gear against fishing effort [28]. The fishing productivity that will be explained is trips and length of time at sea, supplies costs, total income, and the selling price of the catch.

3.3.2.1 Trip and long fish catching

Many sea trips undertaken by small-scale fishers are determined by the boat owner. The number of trips carried out was reviewed from several aspects including the provision of capital, ship condition, crew condition, and weather conditions according to the ship owner's statement. The following is the average monthly trip implementation according to the research results shown in Fig. 6.

Fishermen with purse seine (ring seine) fishing gear are the most active fishermen in fishing with an average of 21 trips per month, followed by fishermen using gemplo fishing gear with an average of 20 trips per month. The number of trips made by small-scale fishers illustrates that fishing activities in Dadap Village apply a one day fishing system or a daily go system. Fishing

time is done in the morning (05.00 – 16.00 WIB) or afternoon (17.00 – 04.00 WIB).

3.3.2.2 Supplies Cost

The cost of supplies is often a problem for some ship owners. The cost of supplies can be seen from the number of fishermen who sail, the amount of diesel fuel needed, and the need for ice cubes. The following is the average cost of supplies in terms of fishing gear and vessel size, shown in Table 5.

The data attached in table illustrates that the larger the size of the ship, the more supplies costs that must be prepared, such as fuel requirements, consumption, and clean water requirements on board [29]. White pomfret net fishermen in Dadap Village spend a very large fee in one trip to sea, the cost of supplies that are spent reaches 3,500,000 rupiah. This happens because the duration of going to sea is quite long, namely 5-7 days. The high cost of supplies at sea reflects the length of time at sea [30].

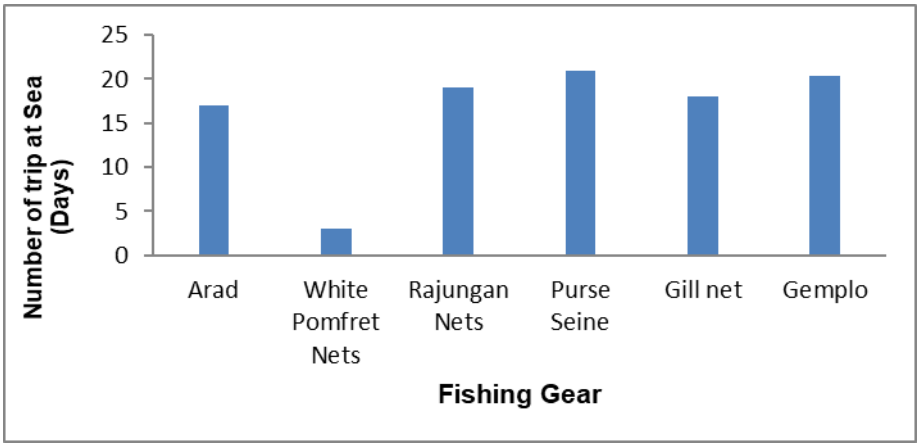

Fig. 6. Average fishing trips for small-scale fishers

Table 5. The average cost of equipping small-scale fishers in Dadap village

No	Catching tool	Ship Size (Gross Tonnage)	Average Supplies Cost (Rp)
1	Arad		
		2	316,666.67
		3	316,666.67
2	White Pomfret Nets	5	3,500,000
3	Rajungan nets		
		2	175,000
		3	237,500
4	Purse Seine (Pukat Ring)		
		5	375,000
		6	525,000
5	Gill net		
		3	300,000
		4	325,000
		5	350,000
6	Gemplo		
		3	350,000
		4	425,000
		5	400,000

Source: Researcher Questionnaire Data 2023

3.3.2.3 Total revenue and selling price of the catch

The total income from sales of fishermen's catch varies according to the commodity caught and the place where the catch is sold. Dadap village has two locations for selling catches, namely at the customer base and TPI. Generally the selling price of fish at customers is cheaper when compared to the selling price at TPI.

According to KUB chairman Mr. Su'i's statement "The difference in the selling price between customers and TPI is only about one thousand to three thousand rupiahs". The selling price of the catch can be different because sales at TPI use an auction system where the selling price of fish can increase from the initial selling price that has been set. Following are details of the selling price of fishermen's catch to customers and TPI, presented in Table 6 .

Based on the results of interviews, different fishermen's income is influenced by several factors, namely fishing gear and weather conditions that occur during the implementation of fishing activities. In line with Lukum's statement (2023) that seasonal changes often hinder fishermen from achieving maximum income [31].

The income once out to sea for small-scale fishers with arad fishing gear ranges from Rp. 870,000 to Rp. 5,050,000, rajungan fishing gear ranges from Rp. 650,000 to Rp. 2,650,000, purse seine fishing gear ranges from Rp.1,774,000 to Rp.2,645,000, gill net fishing gear ranges from Rp. 780,000 to Rp. 2,650,000, and gemplo fishing gear ranges from Rp. 1,426,000 to Rp. 2,000,000. Meanwhile, income with white pomfret nets is approximately Rp. 14,200,000, a very significant difference in income occurs due to the length of time fishermen have been at sea. In line with Aryanto's statement (2017) that the variables of work experience, working hours, and mileage have a significant effect on fishermen's income [32].

3.3.3 Economic stratification

Stratification based on wealth is seen from the economic aspect owned by the fishing community in Dadap Village (Fig. 7). People with high incomes can be seen from the type of vehicle and the size of the house. The position of the top fishermen's wealth stratification is occupied by customers with an income of more than 60 million per month. At the middle level, fishermen who own boats measuring 2-4 GT with monthly income range from IDR 6,500,000 to IDR 50,500,000. The last position was occupied by crew members with a monthly income ranging from IDR 450,000 to IDR 14,500,000. according to the statements of 30 respondents from owner fishermen and labor fishermen (ABK).

Table 6. The selling price of fishermen in Dadap Village

No	Catch Commodity	Selling Price (Rp/kg)
1	Subscribe	
	Squid	35,000
	Cuttlefish	52,000
	Rajungan	78,000
	Shrimp	30,000
	White Pomfret	270,000
	Pari	5,000
	Mackerel	62,000
	Cob	16,000
	Kuro	30,000
	Gutters	20,000
	Teri Nasi	37,000
	Teri Jengki	13,000
2	Fish auction	
	squid	58,500
	Cuttlefish	-
	Rajungan	-
	Shrimp	-
	Bawal/lowang	38,000
	Pari	-
	mackerel	35,500
	Cob	19,000
	Kuro	-
	Gutters	-
	Anchovy Rice	-
	Teri Jengki	16,500
	song	5,000
	Pepetek	3,000
	Ask	3,500
	Petek / petek	3,000
	Three Faces/drop	8,140

Source: 2023 Researcher Questionnaire Data and March 2023 Catch Production Data

Fig. 7 presents social stratification based on fishermen's income or wealth. The difference in the element of wealth among fishing communities causes a very visible difference in lifestyle. In accordance with Alfian's statement (2015) the level of wealth of community members shows quite clear differences [33].

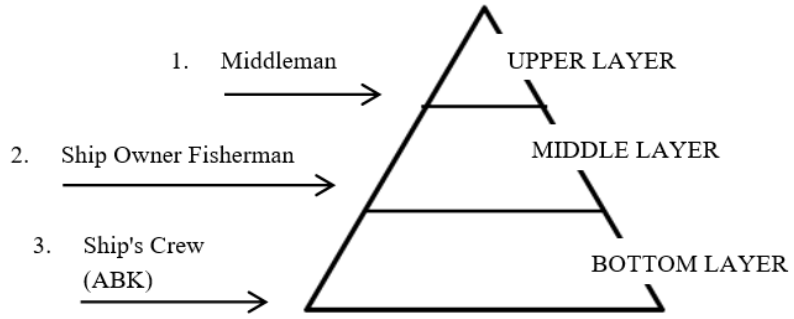

Fig. 7. Wealth stratification pyramid

3.3.4 Social economic conflict

The system for selling catches in the small fishing environment in Dadap Village begins with an agreement between the boat owner and the customer. The agreement strated with the lack of money to do fishing. Lack of money encourages fishermen to seek loans quickly and easily. The Middleman makes an offer of easy money loan with the terms free fee repayment and the fishermen have to shell their fishing catch to the middleman until their loan paid.

This agreement gave rise to the emergence of power in the fishing trade sector. The emergence of middleman power in Dadap Village has had an impact on the sales of fishermen's catches. The fixing of the selling price of fish is based on the number of fish caught by fishermen. Example of a case that occurs is when there is a harvest on one of the caught commodities resulting in a decrease in the selling price. The refusal of middlemen from outside Dadap Village who wanted to buy the catch from the fishermen by middleman of Dadap Village was one of the reasons for the unstable selling price of fish catches according to village administration staff.

3.4 Supporting and Inhibiting Factors for the Development of Small-scale Fishers

Social and economic conditions in an area can be influenced by cultural conditions, religion, behavior, and community priority goals. Social and economic conditions can support or inhibit the development of small fishing communities in Dadap Village.

Several factors that support or inhibit the development of fishing communities can be caused from within the fishing community (internal) or from outside the fishing community (external). Based on the results of research in Dadap Village, there are several influencing factors listed in Tables 7 and 8.

3.4.1 Supporting factors for small-scale fishers development

Factors supporting the development of small-scale fishers according to research resultsseen from the economic and social factors of small-scale fishers. According to the results of interviews and observations, the economic factors that can support the development of small-scale fishers in Dadap Village are fish catches and fish auction facilities. social factors that can have a positive impact on the development of small fishermen in the village.

Dadap is the age of the fisherman, fishing experience, and kinship by fishermen.

1. Fish Catch

The catch of small-scale fishers in Dadap Village can reach 300 kg for one trip. This illustrates that small-scale fishers in Dadap Village are able to get large catches only by using boat engine technology. The fish catches of small-scale fishers in Dadap Village will be maximized if they use the latest technology by government support. In line withYasrizal's statement (2017) that the use of modern technology supports more catches [34].

2. Fish Auction Facility

The fish auction facility provided by the government helps to collect data on the production of fish catches in Dadap Village. Of course this can help the development of fishermen through economic growth of fishermen. In line with Palilah's statement (2020) that economic growth can advance people's quality of life [34]. So that the existence of a fish auction has an effect on the

development of small-scale fishers in Dadap Village.

3. Age Of Fisherman

The age of small-scale fishermen in Dadap Village is included in the productive working age namely in the age range of 20 to 54 years based on research results there were as many as 76.6% of people (Table 2).

4. Fishing Experience

Small fishermen in Dadap Village have long experience at sea. Fisherman's experience at sea can help the fishing process because the expertise possessed by fishermen is able to have an impact on results catch. Longer experience of fishermen given the catch of fish obtained is getting bigger [15].

5. Fishermen Kinship

There is mutual cooperation that is embedded in the individual community fishermen have a positive impact on future development carried out by both the village and regional governments in involving the people. The nature of mutual cooperation and mutual help that is owned fishermen in Dadap Village are urgently needed when something bad happens can't be solved alone.

The following are 18 points of effort that can support development according to researchers based on the results of observations that have been made in the field. The number of points listed is an assessment given by government staff of Dadap Village, extension workers of Juntinyuat District and Indramayu Regency, Head of TPI business development sector of Indramayu Regency, and Head of KUD Dadap Village are shown in Table 7.

In Table 7, through the calculation of the Likert scale, it is stated that the attempt at code FM1 is the most supportive first rank, followed by FM2, then in third place, namely FM3; FM14; FM16, in fourth place is FM10. In the fifth rank, there are 6 efforts that can support, namely FM4, FM8, FM11, FM13, FM15, and FM17. For efforts that are considered not very supportive, there are the last rankings, namely FM9 and FM18.

Table 7. Assessment of efforts that can support the development of small-scale fishers in Dadap Village

Code	Efforts That Can Support Development According to Research Observation Results	Criteria Score
FM1	Production of catches by small-scale fishers in Dadap Village	3.8
FM2	Performance of small-scale fishers in Dadap Village	3.6
FM3	The quality of the catches of small-scale fishers in Dadap Village	3.4
FM4	Income from the sale of fish caught by small-scale fishers in Dadap Village	3
FM5	Fishermen capacity building Improving fishermen's skills in carrying out fishing	3
FM6	Fishermen capacity building Increasing knowledge of fishermen on fisheries and trade	2.8
FM7	Fishermen capacity building Increased motivation to work fishermen	3.2
FM8	Improvements to fisheries systems (sale of fish caught and many fish that can be caught on the sea) in achieving existing policies (Law of the Republic of Indonesia number 45 of 2009 and Republic of Indonesia government regulation number 11 of 2023)	3
FM9	Improvement of fishing activity facilities in Dadap Village	3
FM10	Improved condition of the fishing fleet	3.4
FM11	Use of fishing technology	3
FM12	Improving fishery business services	3.4
FM13	Increasing access to information for small-scale fishers in Dadap Village	3
FM14	Management of Fish Resources (SDI)	2.8

Information: 4) Highly Supportive; 3) Support; 2) Not Support; 1) Highly Unsupportive.

Table 8. Assessment of the inhibiting factors for the development of small-scale fishers in Dadap Village

Code	Development Inhibiting Factors According to Research Observation Results	Criteria Score
FP1	Selling the catch of small-scale fishers outside the Fish Auction Place (TPI)	1.8
FP2	Sales of fishermen's catch to customers or subscribers	1.4
FP3	The education of small-scale fishers is still low	1.8
FP4	Lack of technology used by small-scale fishers	1.6
FP5	Agreement to loan money to customers to meet the needs of sea supplies	1.8
FP6	Consumptive behavior of small-scale fishers	2
FP7	The condition of the fishing fleet is small	2.6
FP8	Occupational status of fishermen (between fisherman owners and fisherman workers)	2.6
FP9	Prohibition of entry of customers from outside Dadap Village by local customers	2.6

Information: 1) Very Inhibiting; 2) Inhibit; 3) Not Inhibit; 4) Highly Non-Inhibitory.

The production of fishermen's catches is considered to be the main factor that can support the process of efforts to develop small-scale fishers in Dadap Village. The higher the catch of fishermen, the higher the income of fishermen. Fishermen's income has a positive effect on increasing fishermen's economic activities [35]. The performance of fishermen is the second point that is considered important in the process of developing small-scale fishers. The quality of fishermen's work is one of the factors that can increase catches, one of which is the fishing experience of fishermen. Sthe longer the experience the fisherman has, the greater the fish catch obtained [15].

3.4.2 Factors inhibiting the development of small-scale fishers

The inhibiting factors for the development of small-scale fishermen according to the results of the research and the number of points from the assessment of the government staff of Dadap Village, extension officers of Juntinyuat District and Indramayu Regency, Head of TPI business development sector of Indramayu Regency, and Head of KUD Dadap Village are shown in Table 8.

In Table 8, through the calculation of the Likert scale, it is stated that the factor in the FP3 code is ranked first, which is the most inhibiting, followed by FP5, then in third place, namely FP2; FP4; FP6, in fourth place, namely FP7. For factors that are considered not too inhibiting are in the last ranking, namely FP8, FP9, and FP10.

According to the results of the assessment in Table, the sale of fish catches to middlemen is considered to be very detrimental to small-scale fishers. This is because the sale of fishermen's catch outside TPI does not exist in port production data and the selling price of fishermen's catch at customers is below the TPI's price. The relationship between small-scale fishers and customers creates a sense of dependence on fishermen for loans that are easy to get [16]. So that the attachment between fishermen and customers is difficult to break.

4. CONCLUSION

Small-scale fishers in Dadap Village have two divisions of small fisher groups based on vessel size, namely 2-4 GT boats (small-scale fishers) and 5-10 GT boats (medium fishermen). The fishing gear commonly used are arad, rajungan nets, white pomfret nets, purse seine, gill nets, and gemplo. Small-scale fishers in Dadap Village are one day fishing fishermen (once a day sailing). The technology used by fishermen with boats measuring 2-4 GT boat engines (24 PK) and net towing machines, while many vessels > 5 GT already use GPS or Yukom. Operational or supply costs for fishermen at sea are 316,000–3,500,000 rupiah with income ranging from 650,000-14,200,000 rupiah according to fishing gear, length of time at sea, ship size, technology, and season.

Factors supporting the development of small-scale fishermen in Dadap Village are based on economic factors, namely the catch of fishermen and the existence of fish auction facilities. The

main inhibiting factors that occur are the sale of catches by small-scale fishers to customers and the lack of technology used.

CONSENT

As per international standard or university standard, Participants' written consent has been collected and preserved by the author(s).

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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