*Original Research Article*

General Profile and Human Capital of Small-Scale Gillnet Fisherman in the Coastal Area of Karangsong, Indramayu Regency

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ABSTRACT

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| This study aims to analyze the general profile and human capital condition of small-scale gillnet fishermen in the coastal area of Karangsong, Indramayu Regency, West Java. The research adopts the Sustainable Livelihood Framework (SLF), focusing on five types of livelihood assets, with a particular emphasis on human capital. This study was conducted between January and February 2025 using a descriptive quantitative approach through surveys and interviews with 50 purposively selected fishermen. The results indicate that most fishermen are within the productive age group (31–50 years), yet have low formal education levels and limited access to training and healthcare services. Overall, the human capital score was relatively low (57.85%), as measured using a five-point Likert scale based on indicators of education, health, skills, and training, making it the most vulnerable asset compared to others. The score was derived using a five-point Likert scale across selected indicators including education, training, health access, and adaptive capacity. Although fishermen possess strong local knowledge, their limited education and skill development hinder their ability to adapt to technological and market changes. Therefore, enhancing human capital through non-formal education, locally tailored training programs, and integration of traditional knowledge with modern fishing technologies is a strategic effort to support the sustainable livelihoods of small-scale fishermen. |

*Keywords: small-scale fishermen, human capital, gillnet, Karangsong, sustainable livelihood*

**1.** **INTRODUCTION**

Coastal communities play a significant role in supporting national food security and the economy (Yulianda & Prihanto, 2019). Indramayu Regency is one of the main coastal areas in West Java, where the majority of the population depends on the marine sector, particularly small-scale capture fisheries. Karangsong Village, located in this region, is recognized as the largest center for capture fisheries production on the northern coast of West Java, with Karangsong Fishing Port recording a total catch of 25,500 tons in 2024 (Dinas Kelautan dan Perikanan Jawa Barat., 2024).

Most fishermen in Karangsong use gillnet fishing gear and fall under the category of small-scale fishermen, operating vessels under 10 GT. Despite its abundant fishery potential and support from the development of a mangrove-based ecotourism area (Arwani, 2021), small-scale fishermen in this area face various challenges, including limited formal education, lack of access to training and technology, and a strong dependence on inherited, traditional skills (Triyanti & Firdaus, 2016)

These issues have a direct impact on the low quality of human capital, which is a key component of the Sustainable Livelihood Approach. Human capital refers to the skills, knowledge, health, and education possessed by individuals to carry out productive economic activities (Masud et al., 2017). In the context of small-scale fishermen, low human capital limits their ability to adapt to environmental, technological, and market changes (Triyanti & Shafitri, 2017)

To address these challenges, the sustainable livelihood approach offers a strategic solution that emphasizes the optimization of various livelihood assets, including human, natural, social, physical, and financial capital (Scoones, 2015). Understanding the general characteristics and human capital condition of small-scale gillnet fishermen in Karangsong is expected to support the formulation of relevant and applicable strategies for strengthening coastal human resource capacity.

This study aims to describe the general profile of small-scale gillnet fishermen in the coastal area of Karangsong and to analyze the current state of their human capital. The research is expected to provide factual insights into the socio-economic conditions of gillnet fishermen in Karangsong and serve as a basis for developing more inclusive and sustainable human resource development policies for coastal communities.

2. material and methods

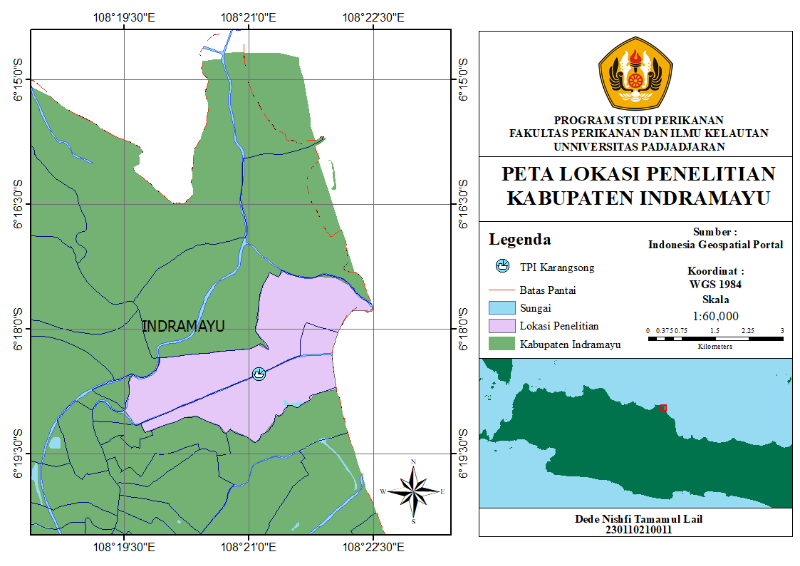
This research was conducted in Karangsong Village, Indramayu District, Indramayu Regency, West Java. Karangsong was selected as the study site because it serves as a major center for capture fisheries along the northern coast of West Java, with most small-scale fishermen using gillnet fishing gear. In addition, the area faces various environmental and socio-economic pressures that are relevant for analysis in the context of fishermen’s livelihoods.

The study was carried out from October 2024 to February 2025 using a descriptive quantitative approach. This method was chosen to systematically depict actual field conditions, particularly regarding the general profile and human capital status of small-scale gillnet fishermen. Data collection techniques included direct observation, interviews, and questionnaires administered to fishermen respondents.

A total of 50 fishermen were selected through purposive sampling, with the main criteria being that the respondents were active fishermen who used gillnet gear and operated vessels under 10 GT. Data sources consisted of both primary data, collected through questionnaires and direct interviews, and secondary data obtained from relevant institutions such as the Department of Marine and Fisheries of Indramayu Regency, as well as scientific literature and official statistics from the Central Statistics Agency (BPS, 2024).

The data were analyzed descriptively using percentages, averages, and scoring interpretations based on a five-point Likert scale. Score interpretation referred to predefined interval criteria. In addition, qualitative data from interviews were used to support and enrich the quantitative findings.

To strengthen understanding of the study’s geographical context, a research location map of Karangsong Village was also presented, showing the coastal area where fishing activities take place.



**Fig 1. Map of the Research Location in Karangsong Village, Indramayu Regency**

The map illustrates the strategic location of Karangsong, which directly borders the Java Sea and is situated near the Karangsong Fishing Port, a central hub for gillnet fishermen’s activities, including fishing operations, fish landing, and distribution.

3. results and discussion

**3.1 General Overview**

Astronomically, Indramayu Regency is located between 6°15'–6°40' South Latitude and 107°52'–108°36' East Longitude. Karangsong Village, situated in the Indramayu District, is one of the main centers of marine and fisheries-based economic activities and serves as the site of an important regional fishing port. The population of Karangsong Village is relatively balanced in terms of gender composition, with 3,082 males and 2,952 females.

**3.2 Respondent Characteristics**

Respondent characteristics play a crucial role in capture fisheries activities, particularly in relation to labor capacity and seafaring experience. The main aspects considered in this study include age, education level, and ownership status. According to (Gai, 2020), these characteristics significantly influence fishers' ability to manage and optimize their livelihood assets. For instance, age can affect productivity levels and physical endurance, while seafaring experience contributes to the development of skills and efficiency in fishing operations. The age distribution of respondents in this study is presented in Table 1 below.

**Table 1. Distribution of Respondents by Age**

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| --- | --- | --- |
| **Age Range (Years)** | **Number of Respondents** | **Percentage (%)** |
| <30 | 4 | 8% |
| 31-40 | 25 | 50% |
| 41-50 | 16 | 32% |
| >51 | 5 | 10% |
| **Total** | **50** | **100%** |

Table 1 shows that the majority of respondents are fishers aged 31–40 years (50%), who generally have considerable experience in capture fisheries and demonstrate better mastery of fishing technologies. The 41–50 age group (32%) tends to be more mature in decision-making and more open to adopting new ideas and innovations in the fisheries sector. Meanwhile, fishers over the age of 51 (10%) typically possess long-term experience and are more established in terms of ownership of production assets such as boats and fishing gear.

On the other hand, fishers under the age of 30 (8%) tend to have less experience compared to other age groups. However, this group often excels in utilizing technology and has quicker access to current information and innovations in capture fisheries. These differences in experience and skills indicate that age is a critical factor influencing fishers’ efficiency and adaptability to changes and developments in the fisheries sector.

Table 2 presents the distribution of respondents based on their educational level, which is an important factor in determining their capacity to manage fishing operations more effectively..

**Table 2. Distribution of Respondents Based on Last Education**

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| --- | --- | --- |
| **Education Level** | **Number** | **Percentage (%)** |
| No Schooling | 204 | 3.38% |
| Did Not Complete Elementary | 1,980 | 32.81% |
| Completed Elementary | 2,422 | 40.14% |
| Junior High School | 1,207 | 20.00% |
| Senior High School | 122 | 2.02% |
| Higher Education | 99 | 1.64% |
| **Total** | **6,034** | **100%** |

Table 2 indicates that the majority of fishers in Karangsong Village have a basic education level, with 40.14% of respondents having completed primary school and 32.81% not having completed primary education. Meanwhile, 20% of the fishers have attended junior high school, while only 2.02% and 1.64% have attained senior high school and higher education, respectively. Additionally, 3.38% of respondents have no formal education at all.

The low level of formal education among coastal communities limits their knowledge and access to technological innovations (Salmiah, 2016). Although education plays an important role in decision-making and understanding fisheries-related issues, most fishers still rely heavily on experience in carrying out fishing activities.

**3.3 Human Capital**

Human capital is a vital component in the sustainable livelihoods approach, as it directly relates to individuals’ abilities to implement, develop, and sustain livelihood strategies. In the context of small-scale gillnet fishers in Karangsong, human capital is one of the most vulnerable assets. The research findings show that the average human capital score is only 57.85%, making it the lowest-ranked asset compared to physical, financial, social, and natural capital. This figure indicates that fishers' basic capacity to cope with economic, technological, and environmental challenges remains limited.

One of the key factors contributing to the low level of human capital is the generally low level of formal education. The majority of respondents completed only primary school (46%), while others reached junior high school (32%), and only a small percentage attained senior high school or its equivalent (8%). Limited education restricts fishers’ abilities to absorb information, attend training, or adapt to technological changes in the fisheries sector. This aligns with the findings of Kusumaningrum & Karjono (2020), who emphasize that educational limitations are a major barrier to enhancing the adaptive capacity of coastal communities.

Moreover, training and skills development among fishers are still very minimal. Most fishers have never participated in formal training on fishing techniques, post-harvest processing, or entrepreneurship. This lack of capacity is further entrenched by unequal power structures within fishing communities, where fishermen often work under the control of more economically dominant patrons. Similar dynamics are found in Bandar Lampung, where small-scale fishers operate under a patron-client system that restricts their autonomy and reinforces poverty cycles Rajab et al. (2025).On the other hand, health conditions among fisher communities also require attention. Although healthcare facilities are present in Karangsong Village, many fishers face barriers to access, including distance, financial limitations, and time constraints. Health is a critical issue because fishing activities demand high physical endurance, especially under extreme weather conditions or during long working hours. Limited healthcare access further weakens the overall labor capacity of fishers.

Despite limitations in education and training, Karangsong fishers demonstrate strong command of traditional ecological knowledge. They have an in-depth understanding of fish seasonality, ocean currents, appropriate fishing gear, and potential fishing locations. This knowledge forms part of local wisdom passed down through generations and remains an important asset in their survival strategies(Satria, 2015). However, without adaptive and innovative capabilities, such knowledge risks becoming stagnant and disconnected from contemporary developments.

One of the key issues arising from low human capital quality is the problem of regeneration. Many children of fisher families are not interested in continuing their parents’ profession due to its perceived lack of economic promise. This phenomenon poses a serious threat to social sustainability within fishing communities. If not addressed, it could lead to a generational gap in small-scale fisheries, ultimately affecting both local and national food security.

In many coastal communities across Indonesia, such as those in Bandar Lampung, the persistence of patron-client structures further discourages youth from entering the fishing sector. These systems maintain economic dependency and limit the development of independent, sustainable livelihoods for the next generation of fishers (Rajab et al., 2025)

Based on the above explanation, strengthening human capital is an urgent necessity to improve the welfare of small-scale gillnet fishers in Karangsong. Strategies that can be undertaken include improving access to non-formal education, organizing locally-relevant training programs, providing more equitable healthcare services, and integrating local knowledge with modern fishing technologies. Without investment in this area, small-scale fishers will remain trapped in a cycle of vulnerability that is difficult to break (Sanjaya & Radyati, 2022)

**4. CONCLUSION**

The research findings indicate that small-scale gillnet fishers along the Karangsong coast are predominantly in the productive age group (31–50 years), possessing sufficient experience and a relatively high openness to innovation within the fisheries sector. However, low levels of formal education, limited access to training, and inadequate healthcare services remain major challenges in strengthening human capital. The relatively low human capital score (57.85%) highlights the urgent need to improve fishers’ adaptive capacity and overall productivity. Although the fishers possess strong local knowledge regarding marine conditions and fishing techniques, their ability to access and utilize modern technologies remains limited. The issue of fisher regeneration is also a significant concern, given the low interest among younger generations in continuing the fishing profession. Therefore, strengthening human capital is a crucial aspect in promoting more sustainable livelihoods. Efforts that can be undertaken include expanding access to education and locally tailored training, providing more equitable healthcare facilities, and integrating traditional knowledge with modern technological approaches.

Consent

" All authors declare that informed consent was obtained from all research participants involved in this study. Participation was voluntary and confidentiality was ensured throughout the research process.."

**Disclaimer (Artificial intelligence)**

Author(s) hereby declare that generative AI technologies such as Large Language Models (e.g., ChatGPT, OpenAI) have been used during the revision of this manuscript. The AI was used to assist in language polishing, grammar correction, and structuring of certain sentences under the supervision and final editing of the authors. No AI-generated content was accepted without review or modification by the authors.

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