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A Supply Chain Approach to Mapping the Distribution of Marine Catch: A Case Study on the Constraints of Wonorejo Fishing Village

Pemetaan Distribusi Hasil Tangkapan Laut dengan Pendekatan Rantai Pasokan: Studi Kasus Kendala Kampung Nelayan Wonorejo

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Abstract

This research aims to understand the supply chain of marine catches from fishermen to consumers in the Wonorejo village area. Data was collected through in-depth interviews with three fishermen and two collectors in the area. The findings indicate that the limited number of collectors can significantly impact the distribution of marine catch and, subsequently, the fishermen's income. Moreover, variations in the type of fish caught play a pivotal role in influencing the distribution dynamics within the market. While there's an apparent need for interventions to enhance the supply chain's efficiency and promote a more equitable distribution of income, it's vital to note that this study's limitations, including sample size and geographic scope, necessitate its results to be viewed as preliminary. Future research in a broader setting must confirm and expand upon these findings.

Keywords: Supply Chain, Marine Catch, Fishermen, Collectors, Distribution Mapping

Abstrak

Penelitian ini bertujuan untuk memahami rantai pasokan hasil tangkapan laut dari nelayan ke konsumen di kawasan Kampung Wonorejo. Data dikumpulkan melalui wawancara mendalam dengan tiga nelayan dan dua pengepul yang beroperasi di daerah tersebut. Temuan menunjukkan bahwa terbatasnya jumlah pengepul dapat berdampak signifikan terhadap distribusi hasil tangkapan laut dan pendapatan nelayan. Selain itu, variasi jenis ikan yang ditangkap berperan penting dalam mempengaruhi dinamika distribusi di pasar. Meskipun terdapat kebutuhan nyata akan intervensi untuk meningkatkan efisiensi rantai pasok dan mendorong distribusi pendapatan yang lebih adil, penting untuk dicatat bahwa keterbatasan penelitian ini, termasuk ukuran sampel dan cakupan geografis, mengharuskan hasil penelitian ini untuk dilihat sebagai data awal. Penelitian di masa depan dalam konteks yang lebih luas sangat penting untuk mengkonfirmasi dan memperluas temuan ini.

Kata kunci: Rantai Pasokan, Hasil Tangkapan Laut, Nelayan, Pengepul, Pemetaan Distribusi

1. Introduction

Wonorejo Fishermen Village, a fishing community in East Java, faces specific challenges in the distribution of their catch. Despite abundant fish catches, fishermen often need help distributing them to local and regional markets. This research aims to understand and address this issue by utilizing mapping technology. Previous studies have examined the distribution and marketing margin of fish catches (Hapsari, 2014), distribution patterns and management technology of catch in fishing ports (Gumilang et al., 2014), and the development of the local economy in the coastal area of Wonorejo (Haryosiswanto & Umilia, 2015). Global distribution has also been identified through mapping the export of fishery products (Achsa et al., 2020), while local distribution landed at TPI Puger Jember Selatan has been studied by Salmiya et al. (2020). This research is different because it focuses on using mapping technology to improve fish distribution caught in Wonorejo Fishermen Village.

This research aims to evaluate fish distribution patterns in Wonorejo Fishermen Village and develop a more effective distribution concept by utilizing mapping technology. The hypothesis is that digital mapping and better market information will make it easier for fishermen to expand their distribution range. This study will use qualitative and quantitative methods, including surveys, in-depth interviews with fishermen and other stakeholders, and geospatial data analysis to develop digital mapping. This data will be interpreted and presented through digital maps and market information.

Digital mapping and market information can help fishermen better understand and navigate the market, allowing them to distribute their catch more efficiently. This will increase fishermen's income and the stability of fish supply to the market. The distribution mapping in this research refers to using digital mapping technology to identify patterns and routes of fish catch distribution. Market spot refers to a specific location where fish are sold or bought, including traditional markets, supermarkets, and restaurants. The information presented in digital maps and market information includes data on sales volume, types of fish sold, and consumer preferences. Through observation and data analysis methods, this research aims to develop information presented in digital maps and market information to facilitate fishermen in distributing their catch.

2. Material and Method

2.1. Time and Place

The research was conducted in Wonorejo Fishermen Village, located in the eastern part of Surabaya City, East Java (Figure 1). This location was chosen due to its unique conditions: the area has experienced a decline in Mangrove forests of up to 10-20 meters (Adiwijaya, 2019), and the village does not have a proper dock construction, so the fishermen use makeshift bamboo docks (Figure 2). To better understand the impact of these conditions on the fishermen's activities, demographic data of the fishermen and the types of boats and fishing tools they use were also collected and analyzed.

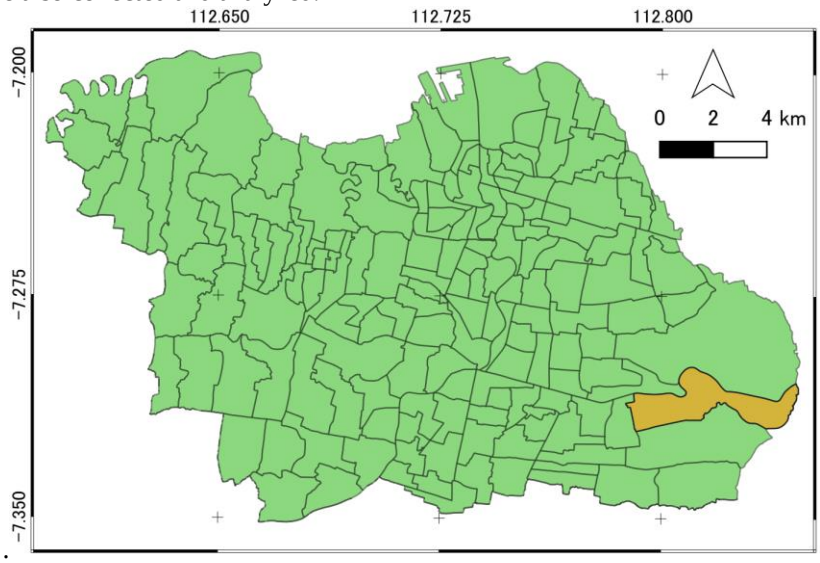

Figure 1. Administrative boundary of Surabaya City and Wonorejo Village

2.2. Participant Interviews

The interview participants were selected using the purposive sampling method (Flowler, 2013), considering their experience and knowledge about fish distribution. Three fishermen and two fish collectors with different experiences and knowledge about fish distribution were interviewed. In addition, other stakeholders, such as fish market managers and local government officials, were also interviewed to gain a broader perspective.

Figure 2. Construction of bamboo pier on Wonorejo River

2.3. Data Collection

Data was collected through questionnaires administered to the fishermen and fish collectors. The questionnaire questions were designed to gather information on how the fishermen and fish collectors choose locations to distribute their catch, the challenges they face in the distribution process, and how they believe mapping technology can assist them.

2.4. Mapping Design

Data from the interviews and surveys were used to create a digital map showing fish distribution patterns. Data from Google Maps (Figure 3) and field surveys were combined and analyzed using QGIS 3.16 software. The results of this analysis were then transformed into a digital map showing the patterns of catch distribution.

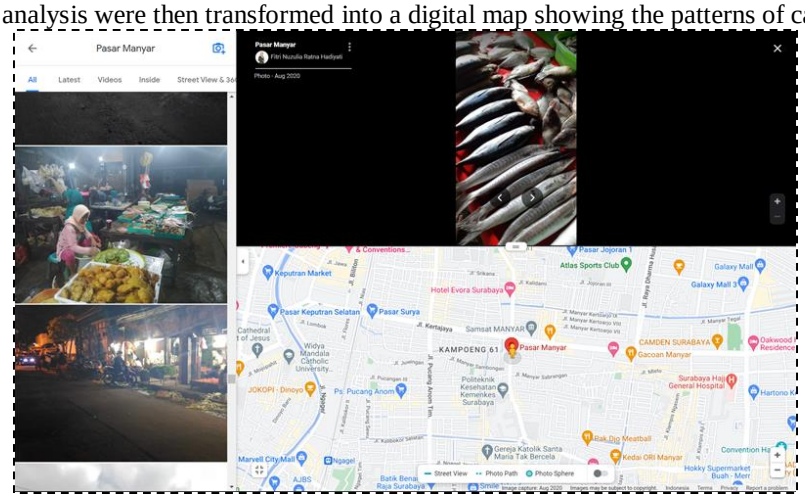

Figure 3. Data from Google Maps reviews at Manyar Market, Surabaya

2.5. Data Analysis

The interview data was analyzed using the content analysis method (Krippendorff, 2018), focusing on the main themes that emerged in the interviews, such as types of fish and distribution locations

3. Result and Discussion

The survey results conducted on three fishermen and two fish collectors in the Wonorejo fishing village can be seen in Table 1 and Table 2. Based on the survey results, it can be observed that fisherman three only catches crab species. This may be due to personal preferences, skills, or equipment possessed by the fisherman. However, this can also affect the distribution of seafood catches, as collectors may prefer certain types of catches

Table 1. Fisherman Survey Results

Fisherman	Catch Type	Number of catches per day (kg)
Fisherman 1	Fish, Crab	100, 5
Fisherman 2	Fish, Crab	25, 8
Fisherman 3	Crab	4

Table 2. Collector Survey Results

Collector	Number of Catches Purchased per Day (kg)
Collector 1	80
Collector 2	60

Based on the evaluation of catch types and distribution schemes by Hapsari (2014), it is known that fish capture usually takes place for two days per trip, with a peak in November. However, fishermen often choose to avoid sailing during the moon month due to reduced catches, affecting their income as they cannot cover operational costs. In this context, this study aims to understand the challenges fishermen face in distributing their catches, focusing on the role of collectors in the supply chain. The survey results on three fishermen and two fish collectors in the Wonorejo fishing village (Table 1 and Table 2) show differences in the types and volumes of catches.

Furthermore, this study notes unique differences in the supply chain (Figure 4), where the limited number of collectors only covers the Wonorejo village. It only shows distribution patterns in specific markets and Fish Auction Places, or TPI (Figure 5) in Surabaya and Sidoarjo. This limitation allows large traders to transport catches through small fish traders (using motorcycles). However, the operational costs of this process may differ from the income, which is the main focus of this study. Based on the concept of supply chain, the distribution of seafood catches can be explained through the following flowchart diagram (Figure 4):

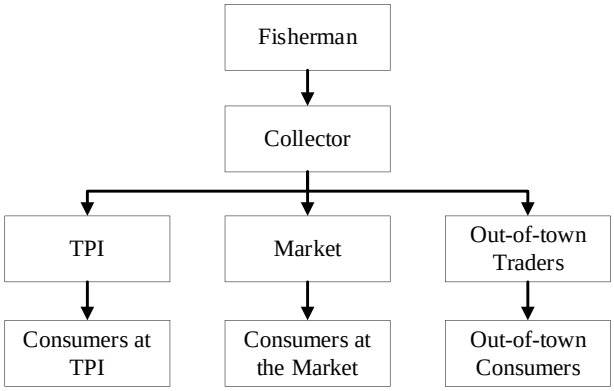

Figure 4. Supply chain distribution of Wonorejo Village's catch

In this context, collectors are essential in connecting fishermen with wholesale suppliers. With a limited number of collectors, the distribution of seafood catches may become inefficient, affecting fishermen's income and the availability of seafood catches in the market.

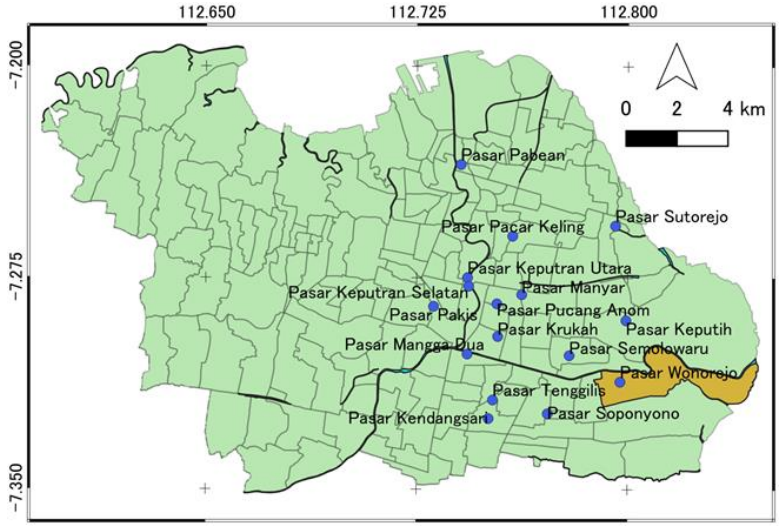

Figure 5. Distribution of markets in East, North, and South Surabaya

For example, fishermen who catch crabs may earn a lower income if collectors prefer to buy fish rather than crabs. Additionally, consumers may find fewer crabs in the market, affecting consumer preferences and market dynamics.

Distribution analysis shows that the problem does not lie in the lack of retailers. Figures 6 and 7 show the fish supply chain involving various entities, from fishermen, Fish Auction Places (TPI), large traders, and retailers to end consumers. Collectors have no role in this supply chain, as fishermen can directly dock at the

TPI dock. However, in the case study of Wonorejo Village, the main challenge lies in the limited number of collectors. There are only three collectors, and each can handle a maximum of 80 kg of catch daily.

This study found that the limited number of collectors can affect the distribution of seafood catches. However, it should be noted that other factors may affect the distribution of seafood catches, such as weather conditions, government regulations, and so on. As an alternative, government interventions or non-governmental organizations can help improve the efficiency of seafood catch distribution. For example, they can assist in establishing fishermen cooperatives, which can help fishermen sell their catches directly to wholesale suppliers or consumers, thereby reducing the role of collectors. Using technology can also help improve the efficiency of seafood catch distribution. For example, mobile applications can connect fishermen with wholesale suppliers or consumers, which can help reduce the role of collectors.

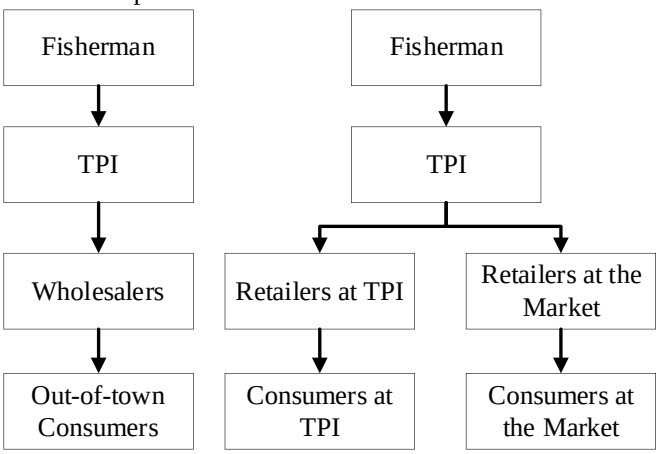

Figure 6. Supply chain distribution of fish at Ujung Batu Fish Landing Site
Source: Hapsari (2014)

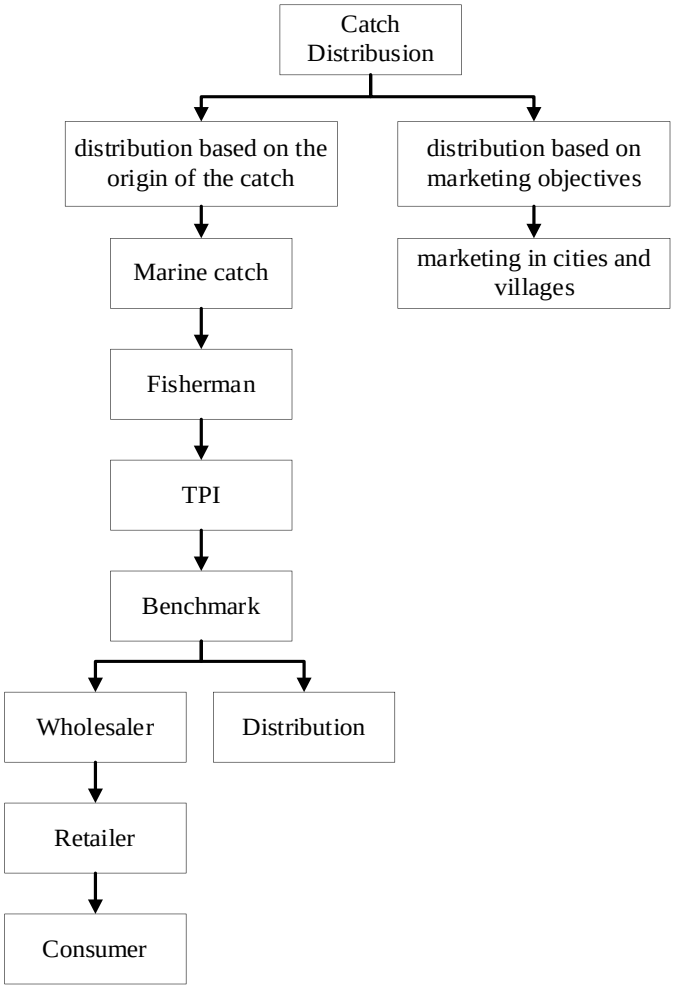

Figure 7. Supply chain distribution of fish from Ujung Baroh Fish Landing Site
Source: Bukhari (2013)

4. Conclusions

From the data and subsequent analysis, it can be concluded that a restricted number of collectors can shape the marine catches' distribution and influence fishermen's earnings. Furthermore, the specific fish species caught have a pronounced effect on market distribution patterns. Given the potential implications, it becomes vital to devise a strategy that enhances distribution efficiency and guarantees equitable earnings for fishermen. However, the outcomes should be cautiously approached, primarily as preliminary insights, prompting further expansive research.

5. Suggestion

A strategy is needed to improve the efficiency of the distribution of marine catch and ensure fair income for fishermen. However, this study has limitations regarding sample size and geographic scope. Therefore, the results of this study should be used as a starting point for further research in a broader context.

6. Acknowledgment

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