ECSOFiM: Journal of Economic and Social of Fisheries and Marine. 2024. 11(02): 166-179 e-ISSN: 2528-5939
Permalink/DOI: http://dx.doi.org/10.21776/ub.ecsofim.2024.011.02.02

DETERMINING CRITICAL POINTS IN FISH DISTRIBUTION AND CALCULATION OF INCOME UD. SUMBER REZEKI LAUT, TUBAN REGENCY

PENENTUAN TITIK KRITIS DALAM DISTRIBUSI IKAN DAN PENGHITUNGAN PENDAPATAN UD. SUMBER REZEKI LAUT, KABUPATEN TUBAN

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Received: November 9, 2023 / Accepted: April 29, 2024

ABSTRACT

This study aims to evaluate the fish distribution activities in UD. Sumber Rezeki Laut, alongside the fish handling during distribution, and critical points of fish quality decline during distribution. This research uses descriptive analysis, critical point analysis, organoleptic tests, and income analysis. Distribution handling is divided into two types, namely direct distribution handling and indirect distribution handling. The most important handling of both types of distribution includes maintaining the right temperature during the process, transferring fish to UD. Sumber Rezeki Laut, changing fish containers, cleaning and soaking fish, and distributing fish to Balekambang Market. However, the long travel distance required to distribute the fishes has the potential to reduce the quality of the fish, as evidenced by the decrease in fish quality observed during the distribution trials. Organoleptic test results showed that the quality of the fish decreased from when it was purchased until it reached the wholesaler. Meanwhile, when calculating distribution costs, the highest result for direct distribution was IDR1,335,987, and the lowest was IDR372,995. The highest income from indirect distribution was IDR1,544,001, while the lowest was IDR399,993. To ensure good fish quality, UD. Sumber Rezeki Laut needs to improve its human resource capabilities to become more efficient and produce quality products for consumers.

Keywords: fish quality, handling direct distribution, handling indirect distribution, critical point, organoleptic tests, income analysis.

ABSTRAK

Penelitian ini bertujuan untuk mengevaluasi kegiatan distribusi ikan UD. Sumber Rezeki Laut, penanganan ikan selama distribusi, dan titik kritis penurunan kualitas ikan selama distribusi. Penelitian ini menggunakan analisis deskriptif, analisis titik kritis, uji organoleptik, dan analisis pendapatan. Penanganan distribusi dibagi menjadi dua jenis, yaitu penanganan distribusi langsung dan penanganan distribusi tidak langsung. Penanganan yang paling penting dari kedua jenis distribusi tersebut antara lain menjaga suhu yang tepat selama proses, pemindahan ikan ke UD. Sumber Rezeki Laut, pergantian wadah ikan, pembersihan dan perendaman ikan, serta pendistribusian ikan ke Pasar Balekambang. Jarak tempuh yang cukup jauh ini berpotensi menurunkan kualitas ikan, terbukti dengan adanya penurunan kualitas ikan yang teramati selama uji coba distribusi. Hasil uji organoleptik menunjukkan bahwa kualitas ikan mengalami penurunan sejak dibeli hingga tiba di pedagang grosir. Sementara itu, ketika menghitung biaya distribusi, hasil tertinggi untuk distribusi langsung adalah Rp 1.335.987, dan terendah Rp 372.995. Pendapatan tertinggi dari distribusi tidak langsung adalah Rp 1.544.001, sedangkan yang terendah adalah Rp 399.993. Untuk menjamin kualitas ikan yang baik, UD. Sumber Rezeki Laut perlu meningkatkan kemampuan sumber daya manusianya agar lebih efisien dan menghasilkan produk yang berkualitas bagi konsumen.

Kata kunci: kualitas ikan, penanganan distribusi langsung, penanganan distribusi tidak langsung, titik kritis, uji organoleptic, analisis pendapatan.

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Cite this as: Iqbal, M.N *et al*. (2024). Determining Critical Points in Fish Distribution and Calculation of Income UD. Sumber Rezeki Laut, Tuban Regency. ECSOFiM: Economic and Social of Fisheries and Marine Journal. 11(02): 166-179. Available online at http://ecsofim.ub.ac.id/

INTRODUCTION

UD. Sumber Rezeki Laut is a company that is known for the procurement and selling of marine fishes at the Bulu Coastal Fisheries Port (known as PPP) in Tuban Regency. One of the most popular fishes that are regularly traded are Kembung banjar (*Rastrelliger kanagurta*), Kembung (*Rastrelliger brachysoma*), Selar bentong (*Selar crumenophthalmus*), and Selar kuning (*Selaroides leptolepis*). These fishes are sometimes referred to as "market fish" by local traders. UD. Sumber Rezeki Laut mainly obtains its fish by procuring them from fishermen in PPP Bulu which then sells them to wholesalers outside of PPP Bulu. One of the larger vendors whom receives its fish supplies from UD. Sumber Rezeki Laut on a regular basis mainly operates its business in Balekambang Market, Solo City. The results of the survey and interviews indicate that the market is situated 184 kilometers from UD. Sumber Rezeki Laut, with an estimated delivery time of around 4-5 hours. These "market fish" are then offered by large traders to small traders, restaurants, and the consumers in Solo and other surrounding regions.

Fish is a commodity that is considered as a type of perishable good, making it extremely prone to deteriorate in quality (Getu *et al.*, 2015). In relation to this, quality management must begin when the fish is captured using fishing gear aboard a fishing boat (Mustaruddin *et al.*, 2023). This issue further emphasizes the need for Quality handling which must be done rapidly and with tried-and-true post-catch handling practices (Hastrini *et al.*, 2013). Because of the perishable nature of the product, it is critical to pay close attention to the distribution process in the fisheries industry (Asogwa & Asogwa, 2019). Fish damage is usually caused by a range of different activities, beginning with the catch of the fish using fishing gear onboard a fishing boat and ending with the distribution of the fish towards the consumers (Mustaruddin *et al.*, 2023). The distribution process is the flow of commodities or services from producers to consumers (Anshari *et al.*, 2019). Distribution activities carried out by UD. Sumber Rezeki Laut begin with the process of purchasing fish from fishermen at PPP Bulu, followed by the sale of the fish to wholesalers at Balekambang Market in Solo.

Based on the results of the initial survey, fish sales at UD. Sumber Rezeki Laut had experienced losses because many traders did not want to buy fish due to a decrease in fish quality. The distribution procedure is one of the factors contributing to the deterioration in fish quality (Lestari *et al.*, 2015; Asogwa & Asogwa, 2019). As an example, (Afiyah *et al.*, 2019) if distribution procedures are not handled effectively, the quality of the fish will decrease. The role of distribution is crucial in getting a product into the hands of consumers, so it requires an efficient process (Morgan & Liker, 2020). This is to ensure the availability, sustainability, pricing, and quality of fish.

Fish quality is essential for all actors in the fisheries sectors, whether engaged in fishing, fish processing, or fisheries distribution and marketing (Mustaruddin *et al.*, 2023). Since it impacts whether or not the fish is marketable, an effective method is needed for maintaining fish quality during the distribution process from producers to consumers. It is crucial to find a method in which the quality of the fish is preserved during the process of distributing the fish from producers to consumers (Syafitri *et al.*, 2016; Prastyo *et al.*, 2018). In which case, this research aims to (1) identify

the fish distribution activities and fish handling during distribution carried out by UD. Sumber Rezeki Laut (2) knowing the critical point of decreasing fish quality during fish distribution activities by UD. Sumber Rezeki Laut (3) Identify costs during distribution was carried out by UD. Sumber Rezeki Laut. The results of this research can be used as material for evaluating UD. Sumber Rezeki Laut sustenance and minimize fish damage that occurs.

RESEARCH METHODS

Research Time and Location

This research was conducted at the Coastal Fisheries Port (PPP) Bulu, Tuban Regency (UD. Sumber Rezeki Laut), and Balekambang Market as fish distribution destinations in December 2022-February 2023.

Research Type

This research applies a case study method which makes use of previous studies with similar circumstances in their background. Furthermore, the approach used in this research is a quantitative-descriptive approach (Sidel *et al.*, 2018).

Data Collection, Respondent, and Sample

In this research, the types of data used are primary data and secondary data. Primary data was obtained from respondents, namely UD. Sumber Rezeki Laut, by conducting in-depth interviews regarding fish distribution activities, starting from the procurement of the fish, the handling of the fish, as well as the transportation shipment of the fish. Meanwhile, the secondary data or supporting data was obtained from books, scientific articles relevant to this research, and related institutions.

The Test results of the quality of the fish sample will be refered as SNI 2729-2021 (results can be seen in the Table 1) (Chotimah *et al.*, 2023). Testing is conducted at every stage of the distribution process, which is carried out by UD. Sumber Rezeki Laut. The sampling method used in the organoleptic testing uses random sampling, which is referred to SNI 2326:2010 (Hulalata *et al.*, 2013). The sampling stage is used to determine the number of containers need to be sampled, then determine the fish sample using random sampling. The number of fish samples that is taken from each selected container is six. Sampling was conducted five times at each stage of distribution handling activities with two different conditions.

Table 1. Organoleptic Test Criteria

Parameter	Quality Criteria and Specifications	Score
Eyes	The eyeballs are convex, the cornea and pupil are clear and shiny, specific to the fish species	9
	The eyeball is flat, the cornea is slightly cloudy and the pupil is slightly greyish, slightly shiny, specific to this type of fish	7
	The eyeballs are sunken, the corneas are cloudy and the pupils are greyish, not shiny, specific to this type of fish	5
Gill	The color of the gills is blood red or brownish red with a little slightly cloudy mucus	9
	The gills are dark red or reddish brown, bright with very little transparent mucus	7
	The color of the gills is gray or brown-gray with cloudy mucus	5
Surface mucus	The mucus layer is clear, transparent, brightly shiny	9

Parameter	Quality Criteria and Specifications	Score
Body	The mucus layer begins to become slightly cloudy	7
	The mucus layer is thick for saltwater fish, and changes color	5
Meat	The meat incision is very bright, specific type, the meat tissue is very strong	9
	The meat incision is less bright, specific to the type, the meat tissue is less strong	7
	The meat incisions are starting to fade, the meat tissue is less strong	5
Smell	Very fresh, specific type	9
	Fresh, specific type	8
	Neutral. Sour smell	5
Texture	Solid, compact	9
	Dense, less compact	7
	Not dense enough, not compact	5

Source: Chotimah et al., (2023)

Data Analysis

The data analysis method used to determine critical points during the fish distribution is done in two ways: first is by looking at the distribution activities and giving a score to each activity, and by carrying out organoleptic tests on fish. This is mainly done in the procurement, handling, and the shipping of the fishes. This was observed during the distribution activities which was carried out by UD Sumber Rezeki Laut. This critical point analysis aims to identify various potential dangers that have a large impact on quality degradation (Mustaruddin *et al.*, 2023). The criteria used are based on good fish handling practices (CPIB) (can be seen in the Table 2).

Table 2. Critical Point Assessment

Critical point	Criteria	Score
Purchase of fish	Based on CPIB	1-3
Fish handling	Based on CPIB	1-3
Fish delivery	Based on CPIB	1-3

Source: Mustaruddin *et al.,* (2023)

A score for each critical point will be given in a range between 1-3, which is referring to the criteria. Score 1 is not good, score 2 is good, and score 3 is very good. The data on the quality of the fish traded by UD. Sumber Rezeki Laut were obtained through organoleptic tests on fish samples. According to Mustaruddin *et al.* (2023), the stages for determining the critical point value are assigning a value, determining the RCL value, comparing the score with the RCL value, and finally giving status based on the results of the RCL value comparison. The following is the RCL formula in research:

$$RCL = \frac{x1+x2+xn}{n} \quad (1)$$

Note:

RCL = Relative Critical Limit.
x = Activity scores 1st, 2nd, up to n.
n = Number of values.

After calculating the RCL value, the activity score is compared with the RCL value to determine the treatment status. which the formula can be written as:

$$Critical \leq RCL \geq Non\ Critical$$

According to Stadtlander *et al.* (2017); Suryono, (2018), an organoleptic test is done to measure the quality of fish using human senses as the main measuring tool. This test is widely used to assess the quality of agricultural commodities, including fisheries and other related food products (Erungan *et al.*, 2005; Mailoa *et al.*, 2020; Anas & Jaya, 2021). The data obtained from the organoleptic test is then tabulated, in which the quality value will be determined based on SNI 01-2346-2015, and the value obtained will be compared with the value referring to the SNI 2729-2021 fish quality criteria (Sholehah & Hafiludin, 2022; Chotimah *et al.*, 2023). The following is the formula for determining the quality value of fish:

$$(\bar{x} - \left(1{,}96.\frac{s}{\sqrt{n}}\right)) \leq \mu \leq (\bar{x} - \left(1{,}96.\frac{s}{\sqrt{n}}\right) \cong 95 \quad (2)$$

$$(\bar{x} = \frac{\sum_{i=1}^{n} x_i}{n}) \quad (3)$$

$$S^2 = \frac{\sum_{i=1}^{n}(x_i - \bar{x})^2}{n} \quad (4)$$

$$S = \sqrt{\frac{\sum_{i=1}^{n}(x_i - \bar{x})^2}{n}} \quad (5)$$

Note:

$\bar{x}$ = average quality value.
x_i = quality score from panelist i.
n = number of samples.
S^2 = diversity of quality values.
S = standard deviation of quality values.
$1{,}96$ = standard deviation coefficient at the 95% level.

The next analysis will be using a business income analysis. This analysis aims to determine the input and output components involved as well as the amount of profit obtained regarding the financials of the business (Schuhbauer & Sumaila, 2016). According to Antika *et al.* (2014), generally used to assess whether a company's current actions can be considered successful or not, which can be obtained by using the formula:

$$\pi = TR - TC \quad (6)$$

Note:

Π = Profit.
TR = Total Revenue.
TC = Total Cost.

With the following criteria:

a) If TR > TC, the business activity earns a profit, and the business is worthwhile to continue.

b) If TR <TC, the business activity loses money, and the business is not worthwhile to continue.

RESULT AND DISCUSSION

Handling fish distribution activities at UD. Sumber Rezeki Laut to Balekambang Market Solo

Based on the observations done at UD. Sumber Rezeki Laut (hereinafter referred to as UD. SRL), fish distribution activities to the Solo Balekambang Market started with the procurement of fish

sourced from fishermen. The procurement is done during the fishermen's return after a fishing trip, which usually occurs at 3 in the morning. The fish handling distribution activities are then divided into two categories: handling direct and handling indirect distribution. Handling direct distribution is a delivery activity carried out on the same day**.** While handling indirect distribution is a fish delivery activity carried out on the following day. This usually occurs when the quantity of fish is insufficient in covering for the transportation costs, which must then be preserved and reserved for distribution along with the next scheduled fish delivery. Furthermore, each distribution activity has a different fish handling activity.

Handling distribution at UDSumber Rezeki Laut

There are two categories of distribution: handling direct distribution and handling indirect distribution (Grönroos & Gummerus, 2014; Jatmiko & Jatmiko, 2020). Handling direct distribution is a fish delivery activity carried out on the same day as the day the fish is purchased. The flow of fish handling activities during direct distribution can be seen in Figure 1.

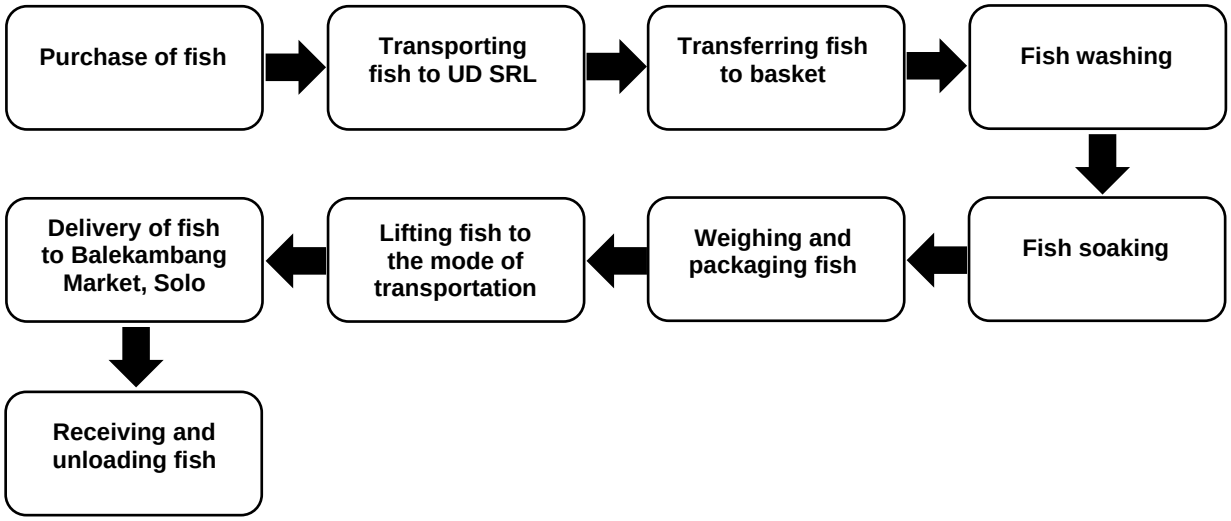

Figure 1. Flow of Handling Direct Distribution Fish Handling Activities

Indirect distribution handling is the handling of the distribution of fish in which it is not delivered the same day the fish was procured, rather it is reserved for the next shipment schedule. This can happen when the amount of fish scheduled to be shipped is still insufficient to cover the operational costs for transportation. The handling of indirect distribution is not much different from direct distribution. This difference lies in the fact that the fish must be stored first with ice before adding ice to the fiber box. Apart from that, on the following day, there will be another purchase of fish to increase the quantity that is lacking. The following illustration of the flow of fish handling carried out in indirect distribution can be seen in the Figure 2.

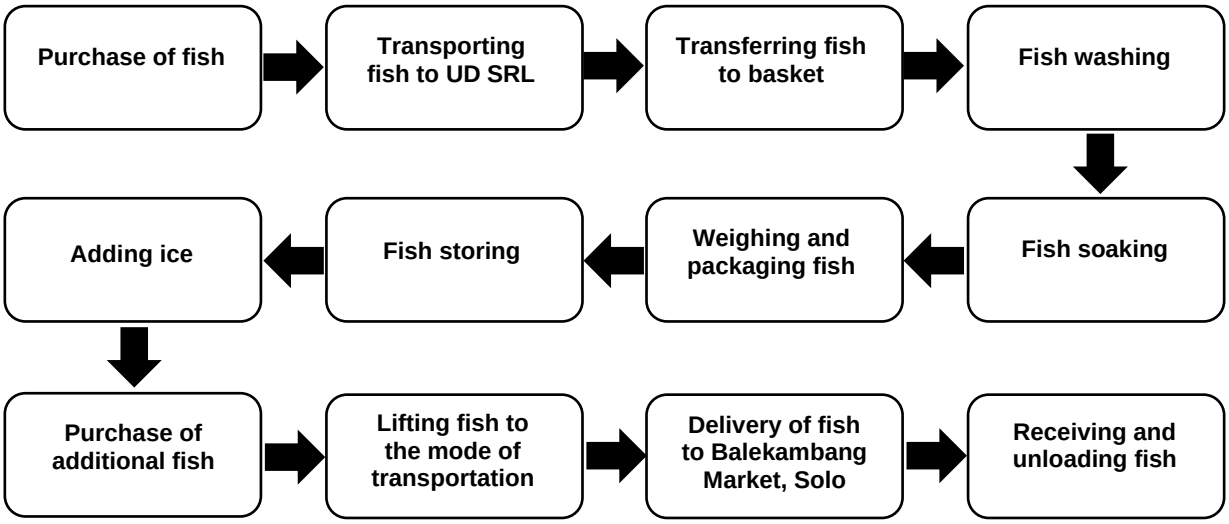

Figure 2. Flow of Handling Indirect Distribution Fish Handling Activities

Determining the Critical Point of Quality Decline During Fish Distribution Activities by UD. Sumber Rezeki Laut

Critical Point During UD. Sumber Rezeki Laut Distribution Activities

The distribution cycle at UD. Sumber Rezeki Laut starts with the procurement of the fish, the handling of the fish, and the transportation of the fish. Each stage of the distribution cycle may experience certain hindrance, which may be in the form of deterioration in fish quality, the formation of waste components, reduction of efficiency in the handling process, and unwanted pollution towards the environment, so it is considered essential to have full control over each stage of of the distribution cycle (Prastyo *et al.*, 2018; Hermanto *et al.*, 2019). According to Mustaruddin *et al.*, (2023), a critical point is a condition where controlled measures can be taken and implemented to eliminate hazards encountered or reduce it to an acceptable level. The results of the critical point assessment of the fish handling process in UD Sumber Rezeki Laut distribution can be seen in the Table 3.

Table 3. Critical Point Values

Value	Direct			Indirect		
Activity	**Average value**	**RCL**	**Status**	**Average value**	**RCL**	**Status**
Purchase of fish						
Grouping and placing fish based on type and size	3	2	Uncritical	3	1,9	Uncritical
Maintains the ideal temperature of the fish throughout the process	1	2	Critical	1	1,9	Critical
Transporting fish to UD. SRL	2	2	Critical	1,8	1,9	Critical
Fish handling						
Transfer of fish containers	2	2,5	Critical	2	2,6	Critical
Fish washing	2	2,5	Critical	2	2,6	Critical
Fish soaking	3	2,5	Uncritical	2,6	2,6	Critical
Weighing and packaging fish	3	2,5	Uncritical	3	2,6	Uncritical
Fish storage				3	2,6	Uncritical
Adding ice				3	2,6	Uncritical
Fish distribution						
Load/unload fish to/from transportation modes	2,8	2,6	Uncritical	2,6	2,5	Uncritical

Value	Direct			Indirect		
Activity	**Average value**	**RCL**	**Status**	**Average value**	**RCL**	**Status**
Delivery of fish to Balekambang market	2	2,6	Critical	2	2,5	Critical
Feasibility of a fleet transporting caught fish	3	2,6	Uncritical	3	2,5	Uncritical

Source: Primary Data (2023)

Based on Table 3, the critical point for direct distribution after purchasing the fish is maintaining the ideal temperature of the fish (value = 1) and transporting the fish to UD. SRL (value = 2), while the relative critical limit (RCL) is 2. Furthermore, the temperature of the fish during this process is poorly maintained. Since only a small amount of ice is used, the temperature of the fish tends to rise relatively quickly. Temperature is one of the requirements to prevent quality degradation for the reason that the rate of degradation is influenced by temperature (Herbowo *et al.*, 2016; Sipahutar *et al.*, 2019). Apart from that, the process of transporting fish to UD. SRL is considered as critical. This is usually caused by direct exposure to sunlight when the fish is brought in (Waluyo & Kusuma, 2017). Meanwhile, the process of purchasing fish using indirect distribution has an RCL value of 1.9; this value has decreased when compared to direct distribution. This happens because, during activities, purchases take longer. There are two activities whose value is below the RCL value or includes the critical point, namely maintaining the ideal temperature of the fish during the process (value = 1) and transporting the fish to UD. SRL (value = 1.8). Based on observations, efforts to maintain fish temperature at UD. Sumber Rezeki Laut are still lacking. This is usually caused by the lack of proper thermoregulators such as ice (Tolstorebrov *et al.*,2016) and direct exposure to sunlight will result in an increase in temperature, which may decrease the potential quality of the fish (Husni & Putra, 2018).

The process of handling fish in direct distribution in Table 3 has an RCL value of 2.5. In this process, what is lower than the RCL value is moving the fish container (value = 2) and washing the fish (value = 2). These two activities are below the RCL value since they were carried out haphazardly. When the fish is then transferred onto a container full of ice, it is usually done in a way that the impact of the fish towards the ice may damage its body (Lestari *et al.*, 2015; Tolstorebrov *et al.*,2016; Asogwa & Asogwa, 2019). Meanwhile, the fish handling process in indirect distribution is different from the direct distribution in the fish handling process; the difference lies in the presence of fish handling activities, namely fish storage activities and adding ice. The values that are below the RCL (value = 2.6) are the activities of moving fish containers (value = 2), washing fish (value = 2), and soaking fish (value = 2.6). These three activities are below the RCL value due to a lack of caution, which may induce physical damage to the fish. If done without care, this activity can physically damage the fish. According to Peterson & Hyldig (2010), fish texture is one part of the fish body that is often used as a parameter for fish freshness by consumers. The reduction in quality that occurs does not only depend on the type of fish but also on the treatment and storage conditions of fish products.

The fish distribution process in direct distribution in Table 3 has an RCL value of 2.6, while in indirect fish distribution the RCL value is 2.5. The value that is below the critical point is when the fishes are being transported towards Balekambang market (value = 2). The same thing also happens in the indirect fish distribution process. Fish delivery activities have a value of 2. According to Yavuzcan *et al.* (2017), This occurs on steep roads at the time of delivery. The decline in fish quality is caused by several activities, from catching to consumption, especially in the distribution chain process (fish distribution). This is supported by Kuriqi *et al.* (2021), who found that the decline in fish quality is influenced by distribution distance and time. The farther the distance between fish distributions, the longer it takes for the fish to reach consumers, and this reduces the quality of the fish distributed.

Quality of Fish in Distribution

Quality of Fish in Direct Distribution Handling

The results of organoleptic observations during direct distribution activities used a sample of 342 fish. This amount was obtained from four types of fish: Kembung banjar (*Rastrelliger kanagurta*), Kembung (*Rastrelliger brachysoma*), Selar bentong (*Selar crumenophthalmus*), and Selar kuning (*Selaroides leptolepis*). The sampling was carried out at three points, namely the point of purchase, packaging, and sales. The broad organoleptic test was carried out five times based on the UD. SRL. Organoleptic results can be seen in Table 4 below:

Table 4. Organoleptic Tests of Direct Distribution Handling

Type of fish	Note	Purchase	Packaging	Sale
Kembung (*Rastrelliger brachysoma*)	Average	8.67	8.59	8.46
	Deviation	0.13	0.19	0.26
	Interval	8.56-8.77	8.43-8.74	8.25-8.66
Kembung banjar (*Rastrelliger kanagurta*)	Average	8.57	8.57	8.26
	Deviation	0.25	0.31	0.36
	Interval	8.37-8.76	8.32-8.82	7.97-8.54
Selar bentong (*Selar crumenophthalmus*)	Average	8.46	8.09	8.68
	Deviation	0.27	0.30	0.31
	Interval	8.24-8.67	7.85-8.33	8.54-8.82
Selar kuning (*Selaroides leptolepis*)	Average	8.38	8.49	7.94
	Deviation	0.42	0.26	0.33
	Interval	8.04-8.71	8.28-8.69	7.67-8.21

Source: Primary Data (2023)

Based on the results of organoleptic tests of fish distributed by UD. SRL, the quality value of almost all types of fish has decreased from the point of purchase to the point of sale. This is caused by the activities carried out. The selar fish has the lowest average fish quality on the market, with a quality value of 7.94 and a deviation value of 7.67–8.21. This can happen because several processes are at a critical point that can reduce the quality of fish, such as time (Kuriqi *et al.*, 2021), maintaining temperature (Tolstorebrov *et al.*, 2016), and during the process of shipping (Kuriqi *et al.*, 2021).

Fish Quality in Indirect Distribution Handling

The results of organoleptic observations during indirect distribution activities used a sample of 492 fish. This amount was obtained from four types of fish: Kembung banjar (*Rastrelliger kanagurta*), Kembung (*Rastrelliger brachysoma*), Selar bentong (*Selar crumenophthalmus*), and Selar kuning

(*Selaroides leptolepis*). Sampling was carried out at four points: purchase, packaging, repackaging, and sales. The organoleptic test was repeated five times based on the UD. SRL. Organoleptic results can be seen in Table 5 below:

Table 5. Organoleptic Tests of Indirect Distribution Handling

Type of fish	Note	Purchase	Packaging	Repackaging	Market
Kembung	Average	8.15	8.46	8.29	8.21
(*Rastrelliger*	Deviation	0.20	0.09	0.24	0.25
brachysoma)	Interval	7.99-8.31	8.38-8.53	8.10-8.48	8.01-8.41
Kembung banjar	Average	8.60	8.38	8.44	7.64
(*Rastrelliger*	Deviation	0.10	0.30	0.41	0.44
kanagurta)	Interval	8.52-8.68	8.14-8.61	8.11-8.77	7.29-8
Selar bentong	Average	8.38	8.00	8.20	7.53
(*Selar*	Deviation	0.39	0.19	0.29	0.41
crumenophthalmus)	Interval	8.07-8.69	7.85-8.15	7.97-8.43	7.20-7.87
Selar kuning	Average	8.59	8.33		8.01
(*Selaroides*	Deviation	0.37	0.51		0.11
leptolepis)	Interval	8.29-8.89	7.92-8.74		7.93-8.10

Source: Primary Data (2023)

Based on the results of organoleptic tests that have been carried out, the bentong fish has the lowest average fish quality on the market, with a quality value of 7.53 and a deviation value of 7.20–7.87. Based on SNI 2729-2021 (Sholehah & Hafiludin, 2022; Chotimah *et al.*, 2023), the quality of the fish is classified as good since the value is above 7. The results of the organoleptic test show a decrease in the quality of the fish from the initial purchase to the sale. This mayhappen because there are several critical points that occur (Table 3). Activities that are considered critical can cause a decrease in fish quality, such as poor handling processes, efforts to maintain adequate temperatures, and long delivery times.

Identify Costs During Distribution Carried Out by UD. Sumber Rezeki Laut

A cost is a component of a necessary expenditure. Fixed costs and variable costs are the two types of costs in the fishing industry. UD. SRL fixed costs include venue charges, safety, cleanliness, water, and equipment depreciation (see Table 6). Meanwhile, variable costs (which can be seen in Table 7) incurred by UD. SRL include operational costs (purchasing fish, ice, salt, and shipping costs) and labor.

Table 6. Fixed Cost

No	Name	Price (IDR)
1	Venue charges	30,000
2	Safety	5,000
3	Cleanliness	5,000
4	Water	5,000
5	Equipment depreciation	94,956
	Total	139,956

Source: Primary Data (2023)

The amount of fixed costs that UD. SRL amounting to IDR 139,956. The largest fixed cost that must be incurred in this business is depreciation costs, amounting to IDR 94,956. Depreciation costs are calculated by dividing the initial capital by the economic life (Ningsih *et al.*, 2013; Waileruny *et al.*, 2022).

Table 7. Variable Cost

Time	Purchasing Fish (IDR)	Purchasing Ice Cubes (IDR)	Purchasing Salt (IDR)	Shipping Costs (IDR)	Labor (IDR)	Total (IDR)
1	12,192,000	150,000	264,000	30,000	953,000	13,589,000
2	12,450,000	150,000	264,000	30,000	953,000	13,847,000
3	14,130,000	225,000	396,000	48,000	953,000	15,752,000
4	13,121,000	150,000	330,000	18,000	953,000	14,572,000
5	14,440,000	150,000	330,000	18,000	953,000	15,891,000
6	13,938,000	225,000	396,000	24,000	953,000	15,536,000
7	12,622,000	225,000	363,000	30,000	953,000	14,193,000
8	11,601,000	150,000	264,000	30,000	953,000	12,998,000
9	23,299,000	300,000	561,000	60,000	953,000	25,173,000
10	23,995,000	300,000	594,000	60,000	953,000	25,902,000

Source: Primary Data (2023)

The biggest variable cost that must be incurred is the purchase price of the fish. The average cost incurred for purchasing fish amount IDR 15,179,000. The size of the cost is influenced by the volume of fish purchased and the price of the fish at the time of purchase. However, the price of fishes usually fluctuates. The amount of fish purchased affects other costs, such as employee costs, ice cubes, salt, and shipping costs. Apart from the number of fish, the length of time the fish are in UD SRL can affect other costs, such as salt and ice cubes. The amount of salt and ice cubes used also fluctuates because the remaining salt is still stored for reuse, although the amount of salt is influenced by the number of fish. However, shipping costs are relatively fixed. This is because, when shipping, the factors that incur costs are relatively the same.

Total costs (see Table 8) are obtained from the sum of fixed costs and variable costs. Fixed costs are obtained from the sum of space costs, safety, cleaning, water, and equipment depreciation. Meanwhile, variable costs are obtained from the sum of operational costs (purchasing fish, ice, salt, and shipping costs) and labor.

Table 8. Total Costs

Time	Status	Fixed Costs (IDR)	Variabel Costs (IDR)	Total Costs (IDR)
1	Direct	139,956	13,589,000	13,728,956
2	Direct	139,956	13,847,000	12,986,956
3	Indirect	139,956	15,752,000	15,891,956
4	Direct	139,956	14,572,000	14,711,956
5	Direct	139,956	15,891,000	16,030,956
6	Indirect	139,956	15,536,000	15,675,956
7	Indirect	139,956	14,193,000	14,332,956
8	Direct	139,956	12,998,000	13,137,956
9	Indirect	139,956	25,173,000	25,312,956
10	Indirect	139,956	25,902,000	26,041,956

Source: Primary Data (2023)

Revenue is obtained from the sales of UD. SRL fish, which is influenced by the large number of fish sold and the price formed when sold to traders. Fish distribution activities at UD. SRL are divided into two categories: direct and indirect distribution. UD. SRL direct distribution average revenue amounts to IDR 15,055,543. Meanwhile, the average income for indirect distribution is IDR 20,352,749. In the fish procurement and selling business, income is highly contingent on the number of fish traded. This is influenced by the fishing season, and the water conditions in the fishing area

exert a significant influence on the species composition of the fish caught. The most dominant fish in this study was Kembung (*Rastrelliger brachysoma*). This study coincided with the west wind season, namely January–February.

The goal of the fish purchasing and selling business is to maximize profit. According to (Ningsih *et al.*, 2013) Profits from the fishing business are obtained after deducting the total expenditures incurred from the revenue from selling fish (see Table 9), with the assumption that if the results are good, the revenue and profits will be good as well. Aside from largerevenues, higher profits can be generated by reducing operational costs.

Table 9. Profit

Time	Status	Total Revenue (IDR)	Total costs (IDR)	Profit (IDR)
1	Direct	14,524,937	13,728,956	795,981
2	Direct	14,627,939	13,986,956	640,983
3	Indirect	16,505,940	15,891,956	613,984
4	Direct	16,047,943	14,711,956	1,335,987
5	Direct	16,565,944	16,030,956	534,988
6	Indirect	16,113,946	15,675,956	437,990
7	Indirect	14,732,949	14,332,956	399,993
8	Direct	13,510,951	13,137,956	372,995
9	Indirect	26,856,957	25,312,956	1,544,001
10	Indirect	27,553,962	26,041,956	1,512,006
Total				**8,188,908**

Source: Primary Data (2023)

UD. SRL received a profit of IDR 8,188,908 from 10 distributions (5 direct distributions and 5 indirect distributions), the profits were not much different. The highest profit in direct distribution was IDR 1,335,987, while in indirect distribution the highest profit was IDR 1,544,001. These results are influenced by differences in time, the volume of fish sold, and increases in variable distribution costs.

CONCLUSION AND SUGGESTION

Conclusion

Based on the research results, it is of paramount importance to identify and address activities that have the potential to negatively impact the quality and efficiency of the process. This can be achieved by conducting a comprehensive critical point analysis of all activities related to the handling of captured fish and its supporting activities, beginning with the boat, continuing at the landing dock, and extending to the TPI and marketing. In the critical point analysis, various potential hazards will be identified, with a particular focus on those that have a significant impact on the quality of the product. An overview of the critical point analysis that occur in handling direct distribution and handling indirect distribution was also presented and discussed in this article. Findings from organoleptic tests show that the quality of the fish decreases from the time the fish is purchased until it is received by the wholesaler. Meanwhile, when calculating the distribution cost, direct distribution gives the highest result of IDR 1,335,987 and the lowest of IDR 372,995. The highest income from indirect distribution is IDR 1,544,001, and the lowest is IDR 399,993.

Suggestion

To avoid a decrease in fish quality, a decrease in prices, or consumer rejection, good fish handling must be implemented from the time the fish is caught and landed at the port until it reaches the consumer. Therefore, UD. Sumber Rezeki Laut needs to improve its human resource capabilities, including knowledge of the fishing industry, logistics management skills, understanding of fish quality, communication skills, risk management skills, technology skills, and marketing skills. Increasing human resource capacity can be done by providing CPIB consultation or training so that handling the distribution of fresh fish can be more efficient and produce quality products for consumers.

ACKNOWLEDGEMENT

The author would like to thank UD. Sumber Rezeki Laut, traders, and officers at the Bulu Coastal Fisheries Port (PPP), Tuban Regency, who have helped carry out this research smoothly.

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