

## Technical and Financial Analysis of Squid Fishing

Abdul Hafidz Olii

oliihafidz@gmail.com

Department of Aquatic Resources Management, Faculty of Fishery and Marine Sciences  
Universitas Negeri Gorontalo

### Abstract

This study aims to determine the technicality of catching and to analyze the finances of the squid fishing effort in Luwoo Village, Posigadan District, Bolaang Mongondow Selatan Regency. The method used in this research is descriptive method. Sampling using survey and interview methods. Primary data obtained through direct observation and conducting interviews with respondents using a questionnaire. Technically, the fishing gear used by fishermen in Luwoo Village still uses relatively traditional technology by relying on knowledge from generation to generation. The use of the squid fishing gear is the result of a modification between the roller, fishing line, light-stick, swivel and squid fishing gear. The *totabito* or squid fishing line is extended 3-5 meters using a light-stick as an attractor to attract the squid. Financially, the squid fishing business has an average R/C value of 2.2 ( $> 1$ ), a payback period of 0.8 years and an average net profit of Rp. 11,959,200 per year or about 121.77%. So, from a financial perspective, the squid fishing business in Luwoo Village can be said to be profitable.

**Keywords:** Squid; squid fishing; technical; financial.

### I. Introduction

Bolaang Mongondow Selatan Regency is one of the districts in North Sulawesi Province. Administratively, Bolaang Mongondow Selatan Regency consists of 7 (seven) sub-districts and one of them is Posigadan District which is directly adjacent to Gorontalo Province. Luwoo Village is one of the villages in Posigadan District. Based on the observation that Luwoo Village is located in a coastal area and of course it has the potential for biological resources. According to Kepel's study (2007) through the SUSCLAM Project (IUCN-CIDA), it shows that all districts have marine and fishery potentials that are prospective for development. North Sulawesi's squid production reaches 439.2 tons / year and Bolaang Mongondow Selatan Regency has 869 fishing units (Noegroho, 2013). Efforts to catch squid use traditional fishing gear.

The large availability of resources provides a great opportunity for fishermen in Luwoo Village to carry out fishing business with the aim of making a profit. However, so far the fishing effort carried out by fishermen has no certainty of profit. In fact, fishermen in running their effort based solely on the principle that

their business can run smoothly regardless of the amount of costs incurred, profit receiving, and the efficiency of the fishing business.

The purpose of this study was to determine the technical and financial aspects of the squid fishing and to analyze the profit value of the squid fishing in Luwoo Village. The benefits of this research are as information material for fishermen for the value of profits during the squid fishing and as information material for fishermen and local government in developing smallholder fisheries to improve the community's economy.

### II. Research Methods

The research was conducted in Luwoo Village, Posigadan District, Bolaang Mongondow Selatan Regency. The method used in this research is descriptive method. In taking samples or data, the authors used survey and interview methods as techniques to determine respondents. Data collection is carried out by making direct observations of the object of research, following fishing operations and conducting interviews with fishermen.

The sampling procedure used in the opinion of Arikunto (2002) is data collection if the subject is less

than 100, it's better to take all of them. Based on the observation that the number of fishermen who are in Luwoo Village is 33 people (Village Profile), then the sample/respondent taken is 33 people with the consideration that the researcher considers that they have information related to the research objectives and only active fishermen are sampled.

Data concerning the technical aspects of each capture fishery business were analyzed descriptively. According to Sugiono (2013), descriptive research aims to reveal events or facts, circumstances, phenomena, variables, and circumstances that occurred during the study.

According to Mohu (2016), also supported by Markonah and Riwayatati (2014), data analysis is intended to simplify data into a form that is easy to understand. The data and information that have been obtained are then analyzed using financial analysis which includes analysis of expenses, revenue analysis, business profit analysis, revenue-cost ratio (R/C Ratio) and payback period (PP).

### III. Results and Discussion

#### 3.1 Description of research site

Luwoo Village is a village located in the Posigadan District, Bolaang Mongondow Selatan Regency, North Sulawesi Province. The area of Luwoo Village is 5552 Ha, administratively Luwoo Village consists of four hamlets and eight neighborhood. Based on village government administrative data, the number of people who are administratively recorded is 1.151 people. With details, the male population is 577 people, while the female population is 574 people (Luwoo Village Profile, 2017).

In general, the livelihoods of the people of Luwoo Village can be identified into several areas of livelihood, such as: farmers (63,19%), farm laborers (10,73%), civil servants / police officer (3,06%), private employees and traders and entrepreneurs (2,76%), retirees (0,30%), and construction workers / masons (8,58%) and fishermen (10,28) (Village Profile, 2017)

#### 3.2 Technical Analysis

##### Description of squid fishing gear

In general, squid can be caught using various types of fishing gear. However, the fishing gear used

by fishermen in Luwoo Village still uses relatively traditional technology by relying on knowledge from generation to generation. The fishing gear used is called *totabito* in the local language. The use of the squid fishing gear is the result of a modification with a reel, fishing line, light-stick, swivel and squid jigs. As shown in Figure 1.

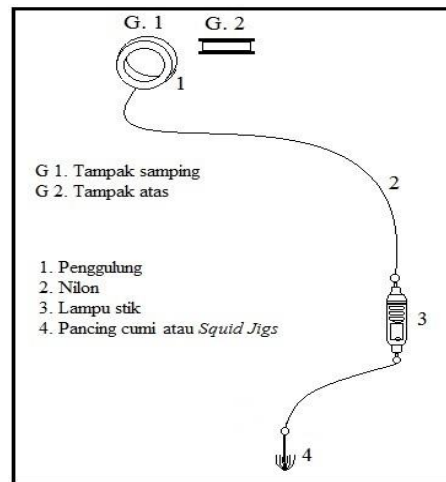


Figure 1. The totabito with light-stick.

##### The Reel

The reel functions to wrap the fishing line for the squid, this is because fishermen can make it easier to operate the fishing gear properly. The reels used by fishermen are made of wood and are round in shape and vary in size, depending on the comfort of the fishermen and the length of the fishing line to be used. This is in line with Jula (2017) that the reel is made of wood which has been modified to be round and long and this roller is made according to the length of the fishing line used and the comfort of the fishermen.

##### Light-stick

Light-producing device in squid fishing have been developed in various forms and types from simple to somewhat complex. The fishing aid used by the fishermen is a modified syringe, circuit board, LED lamp, calculator battery, and wax glue which is then formed into a fishing aid device called light-stick by the local community.

The light-stick is one type of mini underwater light (LACUBA) which is designed in such a way as to get light. However, the most important thing in making a light-stick is the color of the LED that will

be used. Because the color of the LED lights greatly affects the catch that will be obtained.

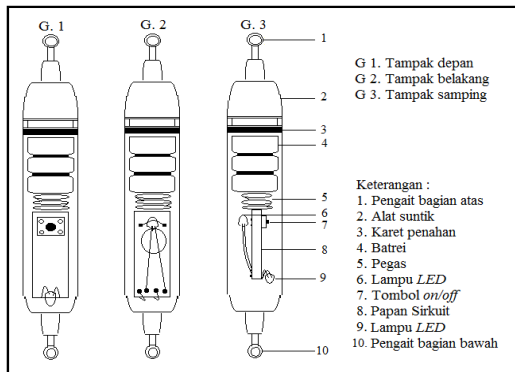


Figure 2. The light-stick structure.

Based on observation, the color of light sticks most widely used by fishermen to attract squid is the blue light-stick. According to Nikonorov (1959) blue light has a lower wavelength of 4,550-4,920 Angstrom (A) so that a lot of it is emitted because of the nature of the shorter wavelength of light that will be depicted more than other wavelengths. The penetration is deeper so that the scope of the illuminated space is larger which in turn creates a greater chance of being seen by fish that are located at a distance and in the end more fish will be collected.

### The Swivel

The swivel is a useful part of connecting the nylon monofilament rope to the light-stick and the *totabito* jigs. According to Anggawangsa (2008) special swivels are made to prevent the pulling rope and base rope from getting twisted or tangled during the fishing operation process. The swivel used is made of stainless which is resistant to rust, so that it can last long. The swivel is also a tool to balance the squid jigs when it rotates, both when exposed to water currents and when the bait is eaten.

### The Squid Jigs

The *totabito* or squid fishing jigs used by fishermen almost resemble squid jigs in general. The *totabito* used by fishermen is made of stainless with a length of between 6,5 - 9 cm and has 10 - 12 return hooks in the form of round claws which are integrated into one jigs. The same thing was also explained by Maryam, et al (2012) that squid fishing uses artificial

bait shaped like shrimp, fish or other forms with a lot of hooks on the tail.

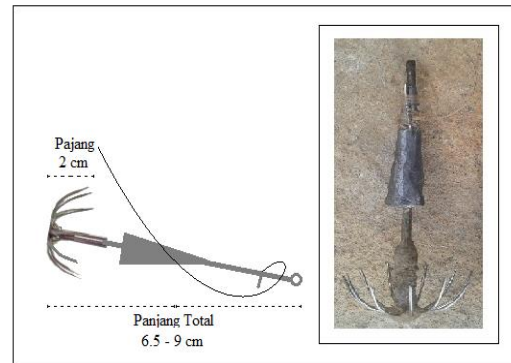


Figure 3. The jigs of the *totabito*

In addition, at the top of the squid fishing rod is given a hole to tie the nylon monofilament rope and there is a ballast made of tin which functions to maintain the stability of the jig to remain in a horizontal position when used. On the jig there is also a rope with a length of 30 cm which is used to tie the bait for fish or squid so that it does not come off easily when eaten.

### The Boat

The boats used by fishermen in Luwoo Village, Posigadan District, are boats made of wood which are designed in such a way that they are suitable for fishing in marine waters and vary in size. However, the size of the boats in Luwoo Village is averagely 5.75 m long, 35 cm wide and 60 cm high.

Based on its size, it is known that the boats used by local fishermen are classified as small boats. This is in accordance with the classification according to Ayodhya (1972) that for small fishing boats, the length ranges from 6 - 15 meters, widths between 1.45 - 3.30 meters and height between 0.55 - 1.40 meters.

### 3.3 Fishing Operation

Before the fishing effort is carried out, there are several things that must be prepared, including: preparation of boat and its engine, fishing gear preparation and supplies preparation.

The boat is a means of transportation used by fishermen to go to the fishing ground and use a *ketinting* engine as a means of driving the boat. If a system does not function, fishing activities will be hampered.

The number of fishing gears prepared must be more than one, this is meant if in the activity of catching squid, there is a fishing line or fishing aid that is damaged, it can be replaced immediately.

In the operation of catching squid, fishermen can spend hours so that provisions are needed. These supplies include foodstuffs, plain water and cigarettes for connoisseurs only.

After all the preparations have been made, the fishermen will go to the fishing area where there are squid. Kasmudin (2014) explains that the distribution of squid is almost all over the seas in the world, from the coast to the high seas and from the surface to a depth of several thousand meters. So that it can make it easier for fishermen to get the right location for fishing.

The squid fishing is carried out at night using a light-stick as an attractor. This is in accordance with the opinion expressed by Sudirman (2003) that the use of light for fishing activities has the aim of collecting fish, including squid, because fish have an attraction to light. This property is generally referred to as positive phototaxis.

The fishing line is extended 3-5 meter into the water. When the bait is eaten, the fisherman will quickly pull the line to the surface and then place the catch in the container provided. This is done repeatedly so that fishermen can produce more catches.

### 3.4 Catch

Squid is one of the commodities that can support the fishermen's economy. Its abundance and availability can encourage fishermen to flock to catching activities.

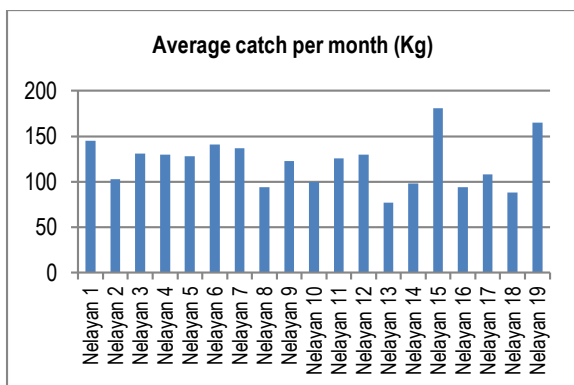


Figure 4. Average catch of 19 fishermen

### 3.5 Squid marketing

Marketing is an activity related to the distribution of services from producers to consumers. The production obtained from the squid fishing business in Luwoo Village is sold at a price of 15,000 / kg. Fishermen sold their catch to a rather big collecting reseller wick in turn distribute the catch to vendors that will sell the squid in the market or vendoring around houses. According to Mardjudo (2014) the results of production are the catch of fishermen, while the price is the exchange rate of the catch which is stated in currency value and agreed between the seller and the buyer.

### 3.6 Financial analysis

The amount of fixed costs does not depend on production activities (Sutrisno, 1982). The average fixed costs incurred by fishermen can be seen in Table 1.

Tabel 1. Average annual fixed cost.

	Fixed cost (Rp)
Minimum	1.210.000
Maksimum	2.380.000
<b>Average</b>	<b>1.747.957,895</b>

Fixed costs referred to are costs incurred for an investment in the procurement of boats, engines, fishing gear and depreciation costs.

Variable costs are costs incurred by fishermen during the fishing operation. Mohu (2016) explains that operational costs (variable costs) are costs that vary in each fishing operation, namely fuel, supplies, ice cubes and bait. Variable costs are costs that run out in one production. The variable costs are presented in Table 2.

Tabel 2. Average variable cost.

	Variable cost (Rp)
Minimum	3.840.000
Maksimum	14.040.000
<b>Average</b>	<b>8.072.842,105</b>

Total cost is the total cost of a business unit. Total costs are the sum of fixed costs and variable

costs. The total costs invested by fishermen in the squid fishing business are presented in Table 3.

Table 3. Annual total cost

	cost/year (Rp)
Fixed cost	1.474.957,895
Variable cost	8.072.842,105
<b>Total annual cost</b>	<b>9.820.800</b>

The revenue of the squid fishing unit depends on the amount of catch that can be obtained which is then expressed in rupiah. According to Mohu (2016) revenue is the amount of rupiah of the selling price per unit times the quantity sold. The number and average revenue of respondents is shown in Table 4.

Table 4. Revenue analysis

	revenue/year (Rp)
Minimum	13.860.000
Maksimum	32.580.000
<b>Average</b>	<b>21.780.000</b>

The average revenue value of fishermen in a year is obtained from the amount of catch and multiplied by the price per kg

Profits are obtained from the revenue which is the sale of the catch and deducted by all the total costs incurred in operating the catch. Details of the profits from the squid fishing are presented in Table 5.

Table 5 Annual profit

Total revenue	21.780.000
Total cost	9.820.800
<b>Average</b>	<b>11.959.200</b>
Minimum	8.140.000
Maksimum	21.110.000

Based on the processing of research data, the value of income is twice as large as the total costs incurred. So that the fishermen's catch can provide a profit value of 121.77% per year.

Revenue-Cost Ratio analysis is an analysis to measure the feasibility of running a business. The average R/C Ratio value from the results of research on squid fishing can be seen in Table 6.

Tabel 6. *Revanue-cost Ratio (R/c ratio)*

Total revenue	21.80.000
Total cost	9.820.800
<b>R/c ratio</b>	<b>2,2</b>
Minimum	2,0
Maksimum	2,8

Based on the criteria used by Soekartawi (1995), the results of the analysis in Table 6 indicates that the squid fishing business in Luwoo Village is feasible to develop.

Payback Period is one of the measuring tools to determine the speed of return on investment capital expressed in years. In other words, the calculation of payback periods (PP) is used to find out how long it will take to cover the investment capital. According to Wismaningrum (2013), the faster the payback period is compared to the predetermined maximum time period, the more feasible the proposed business project will be. The payback period (PP) value of squid fishing in Luwoo Village can be seen in Table 7.

Table 7. *Payback Period of squid fishing*

Total cost	9.820.800
Total profit	11.959.200
<b>Payback period</b>	<b>0.8</b>
Minimum	0.5
Maksimum	1.2

The squid fishing business in Luwoo Village shows a fast return on capital, so it is feasible to continue.

#### IV. Conclusion

Technically the squid (*totabito*) fishing gear in Luwoo Village is a relatively traditional fishing tool made by fishermen. *Totabito* is operated in the same way as other hand line gears that is by extending the fishing line 3-5 meters using a light stick to attract the squid. Financially the business of squid fishing in Luwoo Village can be said to be profitable. The income earned can reach twice the total investment cost and provides a profit of 121.77% where the R/c ratio is 2.2 (> 1) and the payback period is 0.8 years, which means that the return on business capital is relatively fast.

### Acknowledgement

The author would like to thank all fishermen and the village head of Luwoo Village who made this

research possible and for the information related to the research objectives, also to all friends who helped for the completion of this research.

### References

- Anggawangsa R, F et all. 2013. *Pengaruh Iluminasi Atraktor Cahaya Terhadap Hasil Tangkapan Ikan pada Bagan Apung*. Pusat Penelitian Pengelolaan Perikanan dan Konservasi Sumber Daya Ikan.
- Arikunto. 2002. *Prosedur Suatu Penelitian Pendekatan Praktek*. Rineka Cipta. Jakarta.
- Ayodhya, A. U. 1972. *Craft and Gear. Correspondence Course Centre*. Jakarta.
- Jula. I. 2017. *Efektivitas Alat Tangkap Cumi Totabito di Desa Lamu Kecamatan Batudaa Pantai Kabupaten Gorontalo*. Skripsi, Fakultas Perikanan dan Ilmu Kelautan. Universitas Negeri Gorontalo.
- Kasmudin. 2014. *Perbandingan Hasil Tangkapan Cumi-Cumi (Loligo sp) Berdasarkan Perbedaan Kombinasi Warna Umpan Buatan pada Alat Tangkap Hand Line di Perairan Morowali Sulawesi Tengah*. Skripsi, Fakultas Ilmu Kelautan dan Perikanan Program Pascasarjana Universitas Hasanuddin Makassar.
- Kepel, R.C. 2007. *Geliat Perikanan di Bolaang Mongondow Selatan*.
- Mardjudo, A. dan Agus, R.A. Rahman. 2014. *Usaha Perikanan Ikan Teri (Stolephorus, Spp) dengan Alat Tangkap Bagan Tancap di Desabukit Aru Indah Kecamatan Sebatik Timur Kabupaten Nunukan Provinsi Kalimantan Utara*. Jurnal Ilmiah AgriBA No.2 Edisi September Tahun 2014.
- Markonah dan Riyawati. H. E. 2014. *Matematika Terapan untuk Bisnis dan Ekonomi*. In Media. (55-58).
- Maryam, et all. 2012. *Pengaruh Perbedaan Pancing Jigs Beradium dan Berlampu terhadap HasilTangkapan Sotong di Perairan Pantai Sario Tumpaan Kota Manado*. Jurnal Ilmu dan Teknologi Perikanan Tangkap 1 (1): 18-21, Juni 2012.
- Mohu, J. 2016. *Analisis Finansial Usaha Perikanan Tangkap Pancing Ulur Pulau Dudepo Kecamatan Anggrek Kabupaten Gorontalo Utara*. Skripsi, Fakultas Perikanan dan Ilmu Kelautan. Universitas Negeri Gorontalo.
- Nikonorov. I. V. 1959. *The Basic Principle of Fishing for the Caspian Kilka by Under Water Light, In Modern Fishing Gear of The Word Volume I*, Fishing News Books Ltd, London.
- Noegroho. A. 2013. *Profil Kelautan dan Perikanan Provinsi Sulawesi Utara untuk Mendukung Industrialisasi Kp*. Pusat Data Statistik dan Informasi Sekretariat Jenderal Kementerian Kelautan dan Perikanan.
- Soekartawi. 1995. *Analisis Usahatani*. Universitas Indonesia Press. Jakarta.
- Sudirman, et all. 2013. *Efektivitas Penggunaan Berbagai Jenis Lampu Listrik Untuk Menarik Perhatian Ikan Pelagis Kecil Pada Bagan Tancap*. Fakultas Ilmu Kelautan dan Perikanan Universitas Hasanuddin, Makassar.
- Sugiono. 2013. *Mengenal Alat dan Metode Penangkapan Ikan*. hal ; 106. Rineka Cipta. Jakarta.
- Sutrisno. 1982. *Pengantar Studi Kelayakan suatu Proyek*. BPFE, Yogyakarta.
- Wismaningrum, K,E, P. 2013. *Analisis Finansial Usaha Penangkapan One Day Fishing dengan Alat Tangkap Mutigear di Pelabuhan Perikanan Pantai (PPP) Tawang Kabupaten Kendal*. Journal of Fisheries Resources Utilization Management. 2 (3): 263-273.