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Analysis of Income of Motorboat Workers with a 5 GT Capacity on the East and West Coast, Sumatra Utara

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Abstract. Sumatra Utara has a coastline of about 1.300 km, consisting of an east coast of 545 km, a west coast of 375 km and Nias Islands is about of 380 km which has a very large diversity of marine and fishery resources. This potential fishery potential can provide maximum benefits in a sustainable manner for the people of Sumatera Utara. However, there are many issues in the management of capture fisheries in Sumatra Utara sea, both overfishing and underfishing. This study aims to analyze the differences in the amount of operating costs, revenues and income of labor fishermen on the east and west coasts of Sumatra Utara. Using the method of revenue analysis, income analysis and paired sample t test. The results showed that the operating costs, revenues and income of labor fishermen on the east and west coasts of Sumatra Utara were 0.00 < 0.05 it means that there was a significant difference between operating costs, revenues, and income of East Coast labor fishermen and operating costs, revenues and income labor fishermen on the west coast of Sumatra Utara.

Keywords: east and west coast, income, motorboat worker

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1. Introduction

Fishermen are a group of people whose lives depend directly on the sea, either by way of arrest or cultivation. They generally live on the beach, a residential area close to the location of their activities [1]. Seen of fishing gear ownership, fishermen can be divided into 3 groups, namely (1) Labor fishermen are fishermen who work with other people's fishing gear; (2) Skipper fishermen are fishermen who have been fishing gear operated by other people; (3) Individual fishermen are fishermen who have their own fishing equipment and do not involve other people in their operation [2].

Serdang Bedagai Regency is one of the potential areas for the development of the marine and fisheries sector on the East Coast of Sumatra Utara. Serdang Bedagai Regency has a considerable marine and fishery potential, both capture fisheries, aquaculture, and public waters with a coastline of 95 km. Sibolga City is a small town on the west coast of Sumatra that has a

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great potential in the field of fisheries. So far, the economy of Sibolga City has been very much supported by the large amount of yields from marine fisheries.

Fishery resources are the main potential that drives rural economic activities in coastal areas in particular. In general, the economic activities of coastal villages are fluctuating, because it is highly dependent on the high and low productivity of fisheries or catches. The number of catches will also show the amount of income received and this income is mostly for family consumption needs. So the level of fulfillment of family consumption needs and other physical needs are largely determined by the income received. This condition affects the level of welfare of labor fishermen.

Fishermen on the East and West Coast of Sumatra Utara are labor fishermen or fishermen who work for boat owners who cause people's lives to be at low welfare (poverty). The low level of life of coastal communities is caused by a lack of skills in the fisheries sector, business supporting infrastructure, and cultural influences. The phenomenon of low fishermen's welfare is a problem that often occurs, especially for traditional fishermen, thus hampering the development of the fisheries sub-sector, especially capture fisheries.

This research aims to (1) analyze the difference in amount of operational costs of 5 GT motorboat laborers on the East and West Coast of Sumatra Utara; (2) analyze differences in acceptance of 5 GT motorboat laborers on the East and West Coast of Sumatra Utara; (3) analyze the difference in income of 5 GT motorboat laborers on the East and West Coast of Sumatra Utara.

2. Materials and Methods

Fisheries are all fishing businesses and management activities to market of the results. Fishery resources are all animals and plants that live in waters, both on land and in the sea. Therefore, fisheries can be divided into land fisheries and marine fisheries [3]. Fishermen can be defined as a person or community of people who as a whole or part of their life depends on fishing activities [4]. The characteristics of a fishing community can be seen from various aspects, as follows:

1. In terms of livelihood, fishermen are those whose all activities are related to the marine and coastal environment, or those who make fisheries their livelihood.

2. In terms of way of life, the fishing community is a community of mutual cooperation and helping to feels very important at times to overcome situations that require large expenses and large expenditure of labor, such as when sailing, building houses or embankments to hold waves around the village.

3. In terms of skills, although fishermen's job is tough work, in general they only have simple skills. Most of them work as fishermen is a profession passed down by their parents, not professionally learned.

Fishing business income for fishermen, the general factors that affect the income of fishermen from fishing activities, the location of the arrest, the price of gasoline and fishing capital as well as intangible factors relating to the climatic conditions (in season), aged fisherman, fishing education, and experience of fishermen at sea. From physical and non-physical factors, it is suspected that there is a stronger influence on fishermen's income and fishing activities.

Sumatra Utara has a long coast of 1,300 km consisting of; east coast 545 km, west coast 375 km and Nias Islands and New Islands are 380 km. Sumatra Utara fishery production, consisting of pond culture of 20.000 ha and marine cultivation 100,000 ha, freshwater cultivation 81,372.84 ha and public waters 155,797 ha. The total fishery production in this area in 2017 was 751,986.09 tons or an increase of 4.1% compared to 2016 which was 722,209.8 tons. Capture fisheries production at sea in 2017 reached 439,314.89 tons, an increase of 0.15% from the previous year [5]. The coastal area of Sumatera Utara consists of two, namely the West Coast of Sumatera Utara which is directly opposite the Indian Ocean, while the East Coast is directly opposite the Malacca Strait.

East coast of Sumatera Utara has a coastline of 545 km which consists of 7 districts/municipalities, namely: Langkat, Medan, Tanjung Balai Asahan, Labuhan Batu district, Deli Serdang and Serdang Bedagai. The area of the coastal sub-districts in the eastern part of Sumatera Utara is 43,133.44 km² consisting of 35 coastal districts with a total of 436 villages.

The West Coast of Sumatera Utara has a coastline of 763,47 km (including Nias Island). The sustainable potential (MSY) of several types of fish in West Coast waters consists of: pelagic fish 115,000 tons/year, demersal fish 78,700 tons/year, reef fish 5,144 tons/year and shrimp 21,000 tons/year. The West Sumatra Utara Coast region consists of 6 (six) Regencies/Cities, namely: Central Tapanuli Regency, Sibolga City, South Tapanuli Regency, Mandailing Natal Regency, Nias Regency and South Nias Regency. The administrative area of the West Coast coast reaches 25,328 km² [6].

Fishermen's business income is the difference between revenue (TR) and all costs (TC). So, it can be formulated PId = TR –TC. Revenue from fishermen's business (TR) is the multiplication of the produced production obtained (Y) and the selling price. Fishing business costs are usually classified into two, fixed costs and variable costs. Fixed costs (FC) are costs that are relatively fixed in number and continue to be incurred even if the production is produced a lot or a little. Variable costs (VC) are costs that are influenced by the size of the production obtained. Example of cost for labor. Total costs (TC) are the sum of fixed costs (FC) and variable costs (VC), then TC = FC + CV [7].

This research conducted in Serdang Bedagai Regency which represents the east coast of Sumatera Utara and Sibolga City which represents the west coast of Sumatera Utara. Selection of research area done intentionally (purposive) with the consideration that the Serdang Bedagai is d aerah are considered overfishing. It can be seen from the decreasing number of capture fisheries production in the Serdang Bedagai sea, the increasing number of people who work as fishermen who use fishing gear that is not in accordance with the regulations. And Sibolga City is considered an underfishing area. It can be seen from the decreasing number of fishermen, the decreasing number of capture fisheries production in the Sibolga sea. And according to the data, it can be seen that there are still many fishermen who use simple fishing gear such as traps and fishing rods.

Sampling using in this research the Simple Random Sampling method, which is a random sampling technique, where each element or member of the population has the same opportunity to become a sample. The sample fishermen are based on labor fishermen who use a 5 GT motorized boat that comes from a different boat. The number of samples in this study were 30 people for each research area.

The data used in this study are primary and secondary data. Primary data were obtained by researchers through interviews, observations and discussions with labor fishermen directly using a prepared questionnaire. Secondary data can be obtained from various agencies related to this research, such as the Serdang Bedagai Marine and Fisheries Service, the Central Statistics Agency (BPS), the Serdang Bedagai District Fisheries and Marine Service and Sibolga City, as well as various literature, journals, books and the internet. support this research.

The collected data is then analyzed using the formula for total costs, revenues and revenues proposed by [8]. To analyze the operational costs of labor fishermen with a 5 GT motor boat, using the formula:

$$TC = VC \tag{1}$$

where TC = total costs incurred by labor fishermen in one month of fishing (Rp); VC = moving costs incurred by labor fishermen in one month of fishing (Rp).

To analyze the amount of income and income of fishermen with a 5 GT motor boat, using a profit sharing system with the formula :

1. Total Revenue

$$TR = P\ x\ Q \tag{2}$$

2. Total Income of Labor Fishermen (ABK):

$$PNB = 60\%(TR - TC) : n + 1 \quad (3)$$

where: TR = total revenue received by labor fishermen in one month of fishing (Rp); TC = total costs incurred by labor fishermen in one month of fishing (Rp); P = selling price of fish (Rp); Q = amount of catch (Kg); PNB = income of labor fishermen in one month of fishing (Rp); n = number of people in the boat.

3. Results and Discussion

The costs incurred by labor fishermen on the east and west coast are presented in Tables 1 and 2 below.

Table 1. Cost of Fishing for Motorboat Laborers with a Capacity of 5 GT East Coast and West Cost of Sumatera Utara, 2020

No	Labor Fishermen Cost/Month						Total Cost of Labor Fishermen/Month	
	Consumption		Fuel Oil		Ice Bars			
	East Coast	West Coast	East Coast	West Coast	East Coast	West Coast	East Coast	West Coast
1	766,667	2,066,667	600,833	1,533,333	300,000	600,000	1,667,500	4,200,000
2	700,000	2,133,333	515,000	1,600,000	200,000	546,667	1,415,000	4,280,000
3	570,714	1,600,000	437,750	1,300,000	194,286	440,000	1,202,750	3,340,000
4	700,000	2,200,000	515,000	1,600,000	300,000	580,000	1,515,000	4,380,000
5	660,000	1,700,000	540,750	1,200,000	360,000	425,000	1,560,750	3,325,000
6	700,000	1,828,571	450,625	1,428,571	300,000	514,286	1,450,625	3,771,429
7	766,667	1,650,000	600,833	1,150,000	266,667	425,000	1,634,167	3,225,000
8	766,667	2,100,000	600,833	1,566,667	266,667	533,333	1,634,167	4,200,000
9	714,286	2,000,000	515,000	1,314,286	257,143	457,143	1,486,429	3,771,429
10	558,571	1,828,571	500,286	1,371,429	291,429	457,143	1,350,286	3,657,143
11	766,667	2,266,667	686,667	1,666,667	266,667	500,000	1,720,000	4,433,333
12	714,286	1,700,000	515,000	1,150,000	228,571	400,000	1,457,857	3,250,000
13	700,000	1,750,000	450,625	1,250,000	200,000	410,000	1,350,625	3,410,000
14	690,000	1,650,000	540,750	1,275,000	270,000	400,000	1,500,750	3,325,000
15	700,000	1,942,857	515,000	1,400,000	225,000	428,571	1,440,000	3,771,429
16	700,000	2,166,667	515,000	1,666,667	300,000	533,333	1,515,000	4,366,667
17	700,000	2,066,667	450,625	1,706,667	300,000	580,000	1,450,625	4,353,333
18	700,000	1,625,000	515,000	1,200,000	300,000	450,000	1,515,000	3,275,000
19	733,333	1,550,000	600,833	1,175,000	300,000	410,000	1,634,167	3,135,000
20	700,000	1,828,571	515,000	1,314,286	200,000	491,429	1,415,000	3,634,286
21	630,000	1,771,429	463,500	1,411,429	180,000	508,571	1,273,500	3,691,429
22	766,667	2,066,667	686,667	1,533,333	266,667	580,000	1,720,000	4,180,000
23	766,667	1,828,571	600,833	1,371,429	266,667	497,143	1,634,167	3,697,143
24	690,000	1,600,000	540,750	1,160,000	240,000	450,000	1,470,750	3,210,000
25	766,667	2,066,667	600,833	1,533,333	300,000	600,000	1,667,500	4,200,000
26	625,000	1,625,000	450,625	1,150,000	300,000	440,000	1,375,625	3,215,000
27	700,000	1,885,714	450,625	1,314,286	225,000	457,143	1,375,625	3,657,143
28	700,000	1,600,000	515,000	1,175,000	275,000	440,000	1,490,000	3,215,000
29	714,286	1,625,000	588,571	1,200,000	228,571	410,000	1,531,429	3,235,000
30	651,667	1,942,857	583,667	1,354,286	226,667	497,143	1,462,000	3,794,286
Total	21,018,810	55,665,476	16,062,482	41,071,667	7,835,000	14,461,905	44,916,292	111,199,048
Average	700,627	1,855,516	535,416	1,369,056	261,167	482,063	1,497,210	3,706,635

Source: Research Results 2020

Costs incurred by labor fishermen both on the west and east coast consist of variable costs such as supplies. fuel and ice bars as fish preservatives. Meanwhile. fixed costs are considered to be

Rp0 because all fixed costs incurred are borne by the toke fisherman or fisherman who owns the fishing gear and the boat owner. Based on tables 1 and 2. it is known that the largest cost incurred by labor fishermen is the cost of supplies for fishermen's consumption. Costs incurred by east coast fishermen < costs incurred by west coast fishermen or Rp1,497,210 < Rp3,706,635.

The income received by motorboat labor fishermen with a capacity of 5 GT on the east coast and west coast of Sumatera Utara is presented in tables 3 and 4 below.

Table 2. Incomes of Fishermen for Motorboat Laborers with a Capacity of 5 GT East Coast and West Coast of Sumatera Utara, 2020

No	Income Worker of Sumatera Utara/Month					
	Cost		Revenue		Income	
	East Coast	West Coast	East Coast	West Coast	East Coast	West Coast
1	1,667,500	4,200,000	4,964,800	9,660,000	3,297,300	5,460,000
2	1,415,000	4,280,000	4,278,400	7,524,000	2,863,400	3,244,000
3	1,202,750	3,340,000	4,355,060	6,992,000	3,152,310	3,652,000
4	1,515,000	4,380,000	4,452,200	7,732,000	2,937,200	3,352,000
5	1,560,750	3,325,000	4,772,700	7,724,000	3,211,950	4,399,000
6	1,450,625	3,771,429	5,355,800	7,532,000	3,905,175	3,760,571
7	1,634,167	3,225,000	3,403,800	8,176,000	1,769,633	4,951,000
8	1,634,167	4,200,000	4,470,800	7,816,000	2,836,633	3,616,000
9	1,486,429	3,771,429	4,504,400	7,636,000	3,017,971	3,864,571
10	1,350,286	3,657,143	4,661,060	7,472,000	3,310,774	3,814,857
11	1,720,000	4,433,333	7,012,600	7,604,000	5,292,600	3,170,667
12	1,457,857	3,250,000	3,508,200	8,332,000	2,050,343	5,082,000
13	1,350,625	3,410,000	3,242,200	7,900,000	1,891,575	4,490,000
14	1,500,750	3,325,000	4,990,320	7,788,000	3,489,570	4,463,000
15	1,440,000	3,771,429	4,356,600	6,844,000	2,916,600	3,072,571
16	1,515,000	4,366,667	3,520,000	7,652,000	2,005,000	3,285,333
17	1,450,625	4,353,333	4,390,200	7,176,000	2,939,575	2,822,667
18	1,515,000	3,275,000	3,660,200	7,656,000	2,145,200	4,381,000
19	1,634,167	3,135,000	4,382,200	7,360,000	2,748,033	4,225,000
20	1,415,000	3,634,286	3,781,800	7,564,000	2,366,800	3,929,714
21	1,273,500	3,691,429	3,837,780	8,004,000	2,564,280	4,312,571
22	1,720,000	4,180,000	3,726,800	6,912,000	2,006,800	2,732,000
23	1,634,167	3,697,143	4,440,800	7,472,000	2,806,633	3,774,857
24	1,470,750	3,210,000	4,330,980	6,724,000	2,860,230	3,514,000
25	1,667,500	4,200,000	3,463,000	7,792,000	1,795,500	3,592,000
26	1,375,625	3,215,000	3,721,000	7,464,000	2,345,375	4,249,000
27	1,375,625	3,657,143	3,172,000	8,364,000	1,796,375	4,706,857
28	1,490,000	3,215,000	3,657,400	8,252,000	2,167,400	5,037,000
29	1,531,429	3,235,000	3,348,000	8,072,000	1,816,571	4,837,000
30	1,462,000	3,794,286	3,829,250	8,012,000	2,367,250	4,217,714
Total	44,916,292	111,199,048	125,590,350	231,208,000	80,674,056	120,008,950
Average	1,497,210	3,706,635	4,186,345	7,706,933	2,689,135	4,000,298

Source: Research Results 2020

The total income of motorboat laborers with a capacity of 5 GT on the east coast and west coast of Sumatera Utara is obtained from the difference between fishing revenue and costs for fishermen for one month at sea. Based on tables 1 and 2 it can be seen that the income of west coast labor fishermen > east coast labor fishermen income. That is Rp4,000,298 > Rp2,689,135. The amount of income of fishermen on the west coast is influenced by the many types of fishermen's catch and the high selling price of fish.

The significance results of the paired sample t test for differences in costs of fishing. income and income of motorboat laborers with a capacity of 5 GT on the east coast and west coast of Sumatera Utara is 0.00 < 0.05. which means that there is a real or significant difference between the cost of going to sea. Income of east coast and west coast labor fishermen. With the difference between the average cost of fishing for the east coast and west coast labor fishermen. which is Rp2,209,425. and the difference in income from the east coast and west coast labor fishermen is Rp3,520,588. as well as the difference in income from the east coast and west coast fishermen. which is Rp1,311,163.

Table 3. Results of the Analysis of Paired Sample t test Differences in Labor Costs, Revenue, and Income Fishermen Fishing Motorboat Capacity 5 GT on the East Coast and the West Coast of Sumatera Utara

	East Coast	West coast	t_{stat}	Sig
Cost	1,497,210	3,706,635	-26.513	0.000
Revenue	4,186,345	7,706,933	-20.065	0.000
Income	2,689,135	4,000,298	-6.947	0.000

4. Conclusion

There are significant or real differences in the cost of fishing. income and income of fishermen who work on a motorboat with a capacity of 5 GT on the east coast and west coast of Sumatera Utara. Income received by labor fishermen on the east coast <income received by labor fishermen on the west coast of Sumatera Utara.

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