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Comparative Perspective Decisions of Traditional Fisherman by using Outboard Motor and Non-Powered Motor in Choosing Empower Capture Fish Processing Business

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***Abstract*—The government assistance policies program in Barru District include policies for fishing gear for outboard motor fishermen and outboard engine for the non-powered motor. However, those policies do not run well. It can be seen where the income is not sufficient for household economic needs. Therefore, it is necessary to empower the role of fisherman's wife to meet their needs. The purpose of this study is to estimate the difference between traditional fishermen's fishing decision (outboard motor and non-powered motor), in choosing business empowerment of capturing fish processing. The method used is the estimation of the logic model or qualitative responses. The results showed that the decision of traditional fishing wife using outboard motor boats was influenced by positive household income and the age of wife, while wives' educational background, working family members, and regions had no significant effect. On the other hand, the decision of using non-powered motor was influenced by wives' age, formal educational background, working family members, and regions.**

Keywords—fishing decision, traditional fisherman's wife, empowerment

I. INTRODUCTION

The way of survival of traditional fishermen in the western coastal area of Barru District, South Sulawesi, in fulfilling their basic needs is by using outboard powered knot (PK) and non-powered motor with simple fishing gears (longline and gill nets) [1]. It is influenced by uncertain climatic conditions [2], changes in the fishing season [3] that will have an impact on marine organisms and ecosystems, and also fisheries [2][4].

The policy of supporting program from the local government in the form of fishing gear for outboard motor fisherman and outboard engine for fisherman non-powered motor has been done [5], but the change of catching and earnings of catching business [1] has not been sufficient to fulfill household requirement that gives impact to economic household [6].

Women's contributions to small-scale fisheries worldwide are ignored in policy making [7], yet, millions of women are involved in the small-scale fisheries sector [8]. For instance, they do fishing activities [9] or doing reproduction [10]. They also conduct postharvest handling, preservation and processing, and even selling seafood products [11][12]. These roles have profound implications for management and rural poverty alleviation policies, including worldwide fisheries economic development [13]. Hence, the fisherman wife plays a critical role in family decision making. Their role can improve the household economy through empowerment [14].

The objectives of the International Fisheries Policy through the Fisheries Committee (COFI) and the Subcommittee are to support sustainable development and small fisheries protection. Small-scale fisheries generate two-thirds of all catches targeted for direct human consumption and provide 90% of employment in this sector [15]. In Indonesia, the objectives of fisheries development are to improve the welfare of fishermen, fish farmers, and other coastal communities, through the development of economic activities, and quality improvement in resources [5].

This paper aims to estimate the factors that influence the decision of the wife of the fishermen to use the traditional outboard motor and non-powered motor in choosing business empowerment of captured fish processing in the western coastal area of Barru District of South Sulawesi Province, by using estimation of logit model [16] or also known as a qualitative response model [17].

II. METHODS AND MATERIALS

The research was conducted in February 2018 to May 2018 in the western coastal area of Barru District of South Sulawesi. The location of the research is selected purposively where with consideration of having traditional fisherman's wife (outboard motor and non-powered motor)

in every sub-district and village directly adjacent to the western coastal area and Sulawesi Strait.

The type of research used in this research is explanatory method [18]. This method is used to estimate the decision factors of fisherman wife in choosing the way to empower household business. Variables in this study are household income, wife age, wife educational background, and a number of the family member who works. This study also looks at the type of family members in responsibility and regional differences.

This study is based on the primary data using time dimension data, *cross-section* data with 34 respondents, 22 of them are outboard motor fishermen wives, and 12 are wives of the non-powered motor (Table 1). The entire population is working on the fishing business on the scale of household business.

TABLE I. WOMEN BUSINESS GROUP OF TRADITIONAL FISHERMEN OUTBOARD MOTOR AND NON-POWERED MOTOR IN BARRU DISTRICT, SOUTH SULAWESI INDONESIA

No.	Sub-District/ Village	Business Group	Outboard Motor Fisherman Wife	Non-powered Motor Fisherman Wife
1	Barru/ S. Binangae	*Sejahtera*	6	3
2	Balusu/ Madello	*Konya*	2	2
3	Soppeng Riaja/ Lawallu	*Asoka*	5	2
4	Tanete Rilau/ Likupasi	*Istana Sunu*	7	4
5	Mallusetasi/ Kupa	*Berkah*	2	1
	Total		22	12

To test and analyze the estimates that influence the decision of traditional fishermen wife to choose fish-catching business is done by using an estimation model of multiple regression equation by referring logit model estimation [16] as follows:

$$KITrNPMT = \left(\frac{Pi}{1-Pi}\right) = \beta_0 + \beta_1 \pi RTNPMT + \beta_2 AIN + \beta_3 EdFI + \beta_4 QAKB + \beta_5 QATK + \delta_1 DmKTR + \delta_2 DmKB + \delta_3 DmKSR + \delta_4 DmKBls + \mu_1 \quad (1)$$

$$KITrNPTM = \left(\frac{Pi}{1-Pi}\right) = \beta_6 + \beta_7 \pi RTNPTM + \beta_8 AIN + \beta_9 EdFI + \beta_{10} QAKB + \beta_{11} QATK + \delta_5 DmKTR + \delta_6 DmKB + \delta_7 DmKSR + \delta_8 DmKBls + \mu_2 \quad (2)$$

Where:

$KITrNPMT$: Decision of traditional fishermen wife of outboard motor, Probability $Pi = P(Y = 1)$ when choosing a fishing capture attempt;

$KITrNPTM$: Decision of traditional fishermen wife of non-powered motor, Probability $Pi = P(Y = 1)$ when choosing an empowerment effort;

$\beta_0, \dots, \beta_6$: intercep/constanta;

$\beta_1, \dots, \beta_5$; $\beta_7, \dots, \beta_{11}$: independent variable regression coefficients;

δ_1, ..., δ_8,: coefficients of dummy variable;

$\pi RTNPMT$: household income of outboard motor fishermen (IDR);

$\pi RTNPTM$: household income of non-powered motor fishermen (IDR);

AIN: Wife's age (year);

$EdFI$: Wife of formal education (year);

$QAKB$: Working family Members (people);

$QATK$: Members of the family are covered (people);

Dummy regional differences;

$DmKTR$: 1, for Tanete Rilau Sub-district; 0, for others;

$DmKB$: 1, for Barru Sub-district; 0, for others;

$DmKSR$: 1, for Soppeng Riaja Sub-district; 0, for others;

$DmKBls$: 1, for Balusu Sub-district; 0, for others;

μ_1 and μ_2: error term.

Measuring the appropriateness or suitability of the model (goodness of fit) is calculated by adjusting R^2. According to Gujarati and Porter [17]:

$$Adjusted\ R^2 = 1 - (1 - R^2)\frac{(n-1)}{(k-1)} \quad (3)$$

where:

Adjusted R^2: coefficient of determination adjusted;

k: the number of variables did not include intercept;

n: number of samples.

Hypothesis testing of regression coefficients together used the F-test with a certain level of confidence, following Gujarati and Porter [17]:

$$F\ test = \frac{ESS/(k-1)}{RSS/(n-k)} \quad (4)$$

$$F\ table\ [(k-1):(n-k);\alpha] \quad (5)$$

where:

α : level of significance or specification error

Testing of individual regression coefficients (partial) used t-test with a certain level of confidence. According to Gujarati and Porter [17]:

$$t\ count = \frac{\beta i}{S\beta i} \quad (6)$$

$$t\ tabel\ [(n-k);\alpha/2] \quad (7)$$

where:

β_i: regression coefficient of i,

$S\beta$: standard error of regression coefficients to-i.

III. RESULT AND DISCUSSION

Geographically, Barru District is located between 4°05'49 "- 4°47'35" and 119°35'00 "- 119°49'16" Latitude about 102 km from the capital of South Sulawesi, Makassar. Area This area covers 1,174,72 km^2 (contribution 2,56 % to South Sulawesi area). The total population is 170,316 people by 2014, and the population density is 144.98 people per km$^{2.}$ The area is adjacent to Pare-Pare City in the North, Sidrap, Soppeng and Eastern District bones, Pangkep District in the Southern Part, and Makassar Strait in the West. In addition, these districts are seven sub-districts,

including Tanete Riaja, Pujananting, Tanete Rilau, Barru, Soppeng Riaja, Balusu, and Mallusetasi [1].

This area has a coastline of about 78 km and the dry season runs between October and March when the wind blows from the West. The rainy season occurs between April and September when the wind blows from the East, with monthly average rainfall is 235 mm in 2014. In addition, wind speeds are around 5-20 knots, and the sea wave's height is between 0.75 and 2 meters with surface temperatures fluctuated between 26°C and 32.4°C [1]. The research area consists of 5 sub-districts directly adjacent to the West Coast Coastal Area or Makassar Strait waters, namely Tanete Rilau, Barru, Soppeng Riaja, Balusu, and Mallusettasi sub-districts (Figure 1).

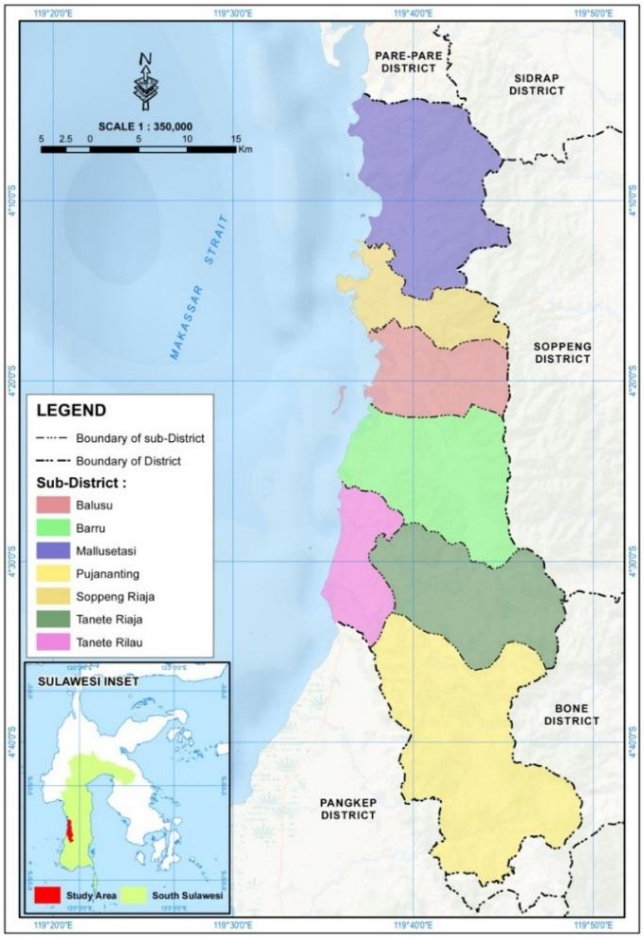

Fig. 1. Map of Research Sites in Barru District, South Sulawesi Indonesia

The analysis of decision estimation of traditional fisherman wife in choosing the empowerment of catch fish farm in Barru District was done by using multiple regression analysis. The result of F-test shows that decision estimation of traditional fisherman wife in choosing empowerment in the western coastal area of Barru District significantly influence a 1% error rate or 99% confidence level (Table 2). It can be interpreted that all independent variables (household income, wife age, wife educational background, number of family members who work and their responsibility, and difference of residence area) simultaneously have an effect on the decision of traditional fisherman wife. In addition, a t-test was also used to measure individual influence (partial) from each independent variable to the decision of traditional fisherman wife in choosing the empowerment of catch fish catching household business.

The income variable of traditional fisherman households in West coastal area of Barru District has a significant and positive effect on 5% error rate or 95% confidence in the decision of the wife of outboard motorboat fisherman in choosing the empowerment business on the scale of fish processing households, such as tuna and " *Jabu-jabu* "in the West Coast Coastal Area of Barru District. This is similar to the findings of Nurlaili and Muhartono [19] in the Jakarta Bay Coast, where women's position is very central in the decision-making process in the processing of fishery products. Otherwise, the decision of non-powered motor fisherman wife is not significantly influenced by household income.

Empirically the average of catching fisherman's income per trip before *Sapras* aid program assistance of outboard motor fisherman is IDR 468,066, and the non-powered motor is IDR 191,474. After the program, the income increased to IDR 486,390 for outboard motor and to IDR 221,939 for the non-powered motor. The changes in income are not sufficient for the needs of traditional fishermen so that the impact on the household economy is not significant [1], especially the consumption expenditure.

Age level effects the ability of fishermen wife is basically on the products related to physical strength and work experience as a fisherman's wife. The average age of all respondents of traditional fisherman wife in the coastal area of Barru District is 21 – 62 years (22 respondents) and 22 – 55 years (12 respondents). United Nation classifies productive workers, in general, are in the age 15-64 years [20].

This study found the negative effects of wives' educational background to the decision of the fisherman wife at a 5% error rate or 95% confidence level. This result is different from the assumption, the higher the formal education level of the fisherman's wife, the lower the decision to choose the empowerment of the household business. This result differs from the empowerment of women in Rwanda who are influenced by positive and significant education background [21].

The benefits of education should be seen as an investment [22] for income and consumption improvement and welfare [23]. The higher the level of education, the decision will be more rational and lead to the improvement of the economic welfare of their families. According to Murphy-Graham [24], the participation of women can lead to an innovative educational program in rural areas.

The number of traditional fisherman's wives in Barru District who did not finish primary school (PS) or at the same level with the public school (PBS) is higher than those who completed primary school (junior and senior high school). The number of outboard motor fishermen wives who did not finish elementary school is 11 respondents (50%) from 22 respondents, that is higher than wives of the non-powered motor is 7 respondents (58.33%) from 12 respondents. The low level of education is because since the age the children, they followed their parents looking for fish. Another factor is due to the limited infrastructure and educational facilities in the area.

The variable of the number of family members who work is found to relate positively and significantly at 5% error to the decision of traditional boat wife without motorboat in choosing household business empowerment. This means that the higher the number of working family members, the stronger the tendency of the decision of traditional boat fisherman without a motor to choose the empowerment effort, while for the traditional boat fisherman with motorboat, there is no significant effect. According to Kiran and Dhawan [25], family size has a significant impact on household consumption expenditure which also affects the decision of family members in the household.

This study also analyzed the impact of regional difference where the fishermen live. It is found that Tanete Rilau Sub-District Likupasi village has a positive influence on the decision of traditional boat fisherman wife without a motor in choosing the empowerment of fish processing business at 1% error. It means there is a tendency of the decision of wife of traditional fisherman to be more dominant in a certain area than those of other areas. For instance, the decision of fisherman wife at Tanete Rilau sub-district of Likupasi Village of fish processing business group of *Istana Sunu* is done by 4 people, which is higher than the area of Mallusetasi Sub-district, Kupa Village, where only 1 business group *(Berkah)* involved (Table 1) while dummy differences in other areas (Barru Sub-District, Sumpang Bianangae Village, Soppeng Riaja Sub-district, Lawallu Village, and Balusu Sub-District, Madello Village) has no significant effect on the decision of traditional fishermen wife outboard motor and non-powered motor.

TABLE II. ESTIMATION OF COMPARATIVE DECISIONS OF TRADITIONAL FISHERMAN OF OUTBOARD MOTOR AND NON-POWERED MOTOR IN CHOOSING EMPOWER CAPTURE FISH PROCESSING BUSINESS IN BARRU DISTRICT SOUTH SULAWESI INDONESIA

Independent Variable	E.S	Outboard Motor Fisherman Wife		Non-powered Motor Fisherman Wife	
		β_i	t-test	β_i	t-test
Household income	+	1.474**	2.237	1.621	1.419
Wife age	+	-0.029*	-1.794	0.066*	3.832
Wife of formal education	+	-0.025	-0.366	0.328**	5.103
Working family members	+	-0.109	-0.662	0.923**	4.902
Members of the family are covered	+	-0.265**	-2.464	-0.452**	-6.532
Dummy of Tanete Rilau Sub-district	+	-0.224	-0.563	0.981*	3.246
Dummy Barru Sub-district	+	0.016	0.041	0.553	2.119
Dummy of Soppeng Riaja Sub-district	+	- 0.590	-1.430	-0.026	-0.100
Dummy of Balusu Sub-district	+	-0.218	-0.457	0.879	2.933
Intercept			1.731		-4.429
F-test			1.949		11.063
Adjusted R^2			0.689		0.892
n			22		12

Source : Primary Data Processed (2018)
** = Significant error rate of 5% (0.05);
* = Significant error rate of 10% (0.10);
E.S is an expectation sign

IV. CONCLUSIONS

The findings indicate that the decision of the traditional fishing wife of the outboard motorboat in the western coastal area of Barru District was influenced positively by household income and the age of wife, and negatively by family members who were covered. This study also reveals that formal education of the wife, the working members of the family, and the regional differences had no significant effect. On the other hand, the decision of traditional boat wife without motorboat is influenced positively by wife age, formal wife education, a family member who work and regional differences.

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