

Examining The Economic Value and Awareness for Recreational Fishing: A Study Case of Kuala Nerus, Terengganu

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Abstract. In numerous countries, recreational fishing is a favored leisure activity. Recreational anglers employ conventional fishing methods, including pole-and-line, nets, and traps, in salt and fresh water. In Malaysia, the recreational fishing sector engages around 2.2 million individuals, with nearly half of this population participating in oceanic recreational fishing activities. Meanwhile, recreational fishing activities in Malaysia are unregulated. This means that neither a license nor a permit is required to carry out such activities, in addition to the lack of guidelines and rules surrounding the industry. Considering its open-access nature, there is no limit to how much one can fish. This may lead to overfishing and the subsequent collapse of certain fish species. As a result, this study aims to determine fishers' willingness to pay and awareness of conservation and rehabilitation for recreational fishing. We distributed a face-to-face survey to 210 recreational fishermen in Kuala Terengganu. However, only 200 questionnaires were available for analysis. Using a contingent valuation method (CVM), recreation fishers are only willing to pay RM10 for conservation, and most of the fishers are aware of environmental conservation and the rules and regulations of recreational fishing. The findings of this research will provide insightful information for the Ministry of Agriculture and Food Security to decide whether it is necessary to establish a license for recreational fishing in the future, which together will help to achieve SDG Goal 14 and avoid overfishing.

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1 Introduction

Recreational fishing is one of the most favoured activities practiced globally. According to The Food and Agriculture Organization (FAO), recreational fishing refers to the act of catching aquatic animals, primarily fish, that are not the primary source of food for the individual and are not typically sold or exchanged on export, domestic, or illegal markets [1]. Recreational fishing, usually referred to as sport fishing, is pursued for the goal of leisure and pleasure, rather than for commercial or subsistence reasons. Fishing normally entails the utilisation of angling equipment such as fishing rods, reels, hooks, and lures to capture fish, which are subsequently released back into the water. Recreational fishing can be conducted from several locations such as the coast, boats, pier, or dock. Angling can be pursued individually or in a collective manner, and can be conducted in several environments, including both freshwater and saltwater habitats. Recreational fishing can be accomplished through several fishing techniques, including fly fishing, bait casting, and spin fishing. Recreational fishing, in contrast to the commercial fishing business, does not include catching large amounts of fish for financial gain. Instead, it is pursued for personal enjoyment or competitive purposes.

Nevertheless, if left unchecked, this can lead to significant environmental consequences. When it comes to saltwater, recreational fishing is recognized as a significant factor that puts pressure on marine ecosystems, leading to adverse effects on biodiversity, species populations, and ecosystem services. Under certain circumstances, it can result in population decreases of specifically targeted species and ultimately result in the extinction of animals within an ecosystem. Besides, a few concerns have arisen regarding to the impact of recreational fishing in Malaysia, and in line with previous study such as the ecological and socioeconomic impacts of recreational fishing [2], lack of management system such as poor monitoring [3] and lack of regulations toward fisher's behaviour and activity [4].

In Europe, Australia, and New Zealand, the enforcement of bans on recreational fishing and limitations on regional mobility led to significant decreases in recreational fishing [5]. Different with the United States and Canada, there is little to no government intervention to limit fishing activities [6,7]. Besides, by promoting a recreational fishing, they able to increase sales for fishing gears [8]. Even though fishing help in mental wellness [9]. Currently, almost 2.2 million Malaysians are involved in recreational fishing, and nearly 50% are involved in recreational; fishing in the ocean. Even though it is believed that by doing a leisure activity such as recreational fishing will help in balancing a well-being, however this activity will slowly destroy a certain fish species and its habitat because till today, recreational fishing activities in Malaysia are unregulated, means neither a license nor a permit is required to carry out such activities.

Until now, in Malaysia there is still no fishing license for recreational fishing, but bringing anglers for the purpose of recreational activities is under the jurisdiction of the Peninsular Malaysia Marine Department and fishermen can apply for a permit from the agency. However, the permit is not a permission license for you to carry out fishing activities using fishing equipment other than bringing anglers. These situations will lead to a negative impact on the fish stock [10, 4]. As regard to the issues arise, thus it is crucial to make research on the awareness among recreational fisher towards the environmental conservation and the acceptance of fisher if the authority would implement license for recreational fishing in future. Therefore, this research aims to determine the willingness to pay and the awareness among fishers for conservation and rehabilitation for recreational fishing. This study demonstrates the need for agencies to be highly responsive and have capability to provide data to government to support policy decisions in future.

2 Methodology

2.1 Study area

Kuala Nerus, the eighth district in Terengganu with an area of almost 40,000 hectares, with a population of around 157,900 people has various attractions of its own. Based on the Special Area Plan 2014 - 2025 of the Federal Department of Town and Country Planning (JPBD), this area is planned with the concept of Modern and Green City with a layout plan that is friendly to leisure and recreation activities including water activities [11]. The area which becoming a famous port for angler in Kuala Nerus is Seberang Takir. Based on the data set in questionnaire, on average, fishing method used by recreational fishers in Kuala Nerus, Terengganu is by using fishing rod brand Shimano (54.5%) and Daiwa (28%). Most anglers choose to fish in coastal areas (85%), fishing from bridges (51%), and 76.5% of recreational fishers fish in rivers. Only 25% of recreational anglers do a recreational fishing using a boat, while the rest of recreational anglers (75%) choose to fish through the shore or river. This information is important to differentiate between recreational fisher and commercial fisher.

2.2 Survey of recreational fisher

A face to face to estimate the economic value and awareness for recreational fishing in Kuala Nerus, Terengganu was conducted between August to November 2022. The survey was administered to the recreational fishers in Kuala Nerus, Terengganu. A random sampling was used as a sampling technique when collecting a data. Three (3) well-trained enumerator was hired during the data collection. Following a sampling table from Krecjie and Morgan (1970), the data collection was set until 384 respondents, however, due to time constraints (because of the rainy and flood seasonal in Terengganu started in mid-October), causing the researcher not getting the number of respondents as planned. The recreational fishers were approached by trained enumerator in the study area and those who available and willing to answer the questionnaire is counted as respondents. A number of 210 survey was collected, but after the data screening and cleaning processed, only 200 responses was able to use for data analysis.

2.3 Questionnaire design and statistical analysis

The multiple-choice questionnaire was initially prepared by consulting an experienced researcher and was later modified after the presurvey involving four anglers in Seberang Takir, in mid-2022. The questionnaire comprised five (5) sections and a total of thirty questions, encompassing demographic information, technique used for fishing, fishing preferences, willingness to pay and awareness towards recreational fishing. Most of the questions is a closed-ended question and was designed using a Likert scale with 5 scale starting with scale 5 strongly disagree and 1 strongly agree. Researcher also prepared an open-ended question to provide an opportunity for angler to give answer based on their opinion or experience. A Contingent Valuation Method (CVM) was used to estimate the value of willingness to pay among angler to get a license for recreational fishing using a statistical software for data science, Stata 17, and a descriptive analysis was used to calculate

the frequency and percentage of awareness towards recreational fishing. Using a Logit Model, recreational fishers were asked whether they are willing to pay for certain amount to get a license or permit for recreational fishing activity. The CVM method will help in quantifying the maximum amount of money that respondents willing to pay for conservation, based on the scenario provided in questionnaire [12,13,14]. An enumerator explained that they money paid for license will be used for conservation and rehabilitation purposes, to ensure the habitat and ecological of fish in Kuala Nerus is protected, and to avoid overfishing.

3 Result and Discussion

3.1 Demographic profiling

Table 1 demonstrates the result of socio-demographic characteristics for recreational fishers in Kuala Nerus, Terengganu. Based on the data collected, only 1% of anglers is a female, and 99% are male. The result obtained show that fishing activity majority being done by male. 22 recreational fishers (11%) believed that fishing could help them to reduce stress, 77.5% (155 recreational fishers) reported that fishing is a hobby and to utilise needs, and other reason such as try something new and followed family and friends (23 recreational fishers). Surprisingly, among 200 recreational fishers, all of them are Malay, and according to our trained enumerator, through out the data collection, they never met any other race, other than Malay do a fishing activity. A variety of education level accomplished by respondents, 32.5% (65 recreational fishers) from secondary school, 36% (72 recreational fishers) obtained diploma, 30% (60 recreational fishers) have a degree level and only 1.5% (3 recreational fishers) having a master's degree. Most of the recreational fisher in Terengganu received an income below RM4,849.00 (90%), only 4.5% obtained a highly level of income which is RM10,960.00 and above, and 5.5% received a middle income RM4,850.00 till RM10,595.00.

Table 1. Socio-Demographic Characteristics

Sample (n=200)		
Demographic		Percentage (%)
Gender	Female	1.00
	Male	99.00
Marital Status	Single	42.50
	Married	50.00
	Divorce	7.50
Race	Malay	100.00
Age	15 – 24 years	19.00
	25 – 54 years	79.50
	55 – 64 years	1.50
Income	Below RM4,849	90.00
	RM4,850 – RM10,959	5.50
	RM10,960 and above	4.50
Education Level	Secondary School	32.50
	Diploma	36.00

	Degree	30.00
	Master	1.50

3.2 Recreational fisher's awareness

The question used in questionnaire is reliable to use as the value of reliability is 0.90. Most of the recreational fishers explained that fishing is a part of their hobby (77.5%) and to reduce stress (11%), however not many of them are aware regarding to the impact of recreational fishing activity done by them. The researcher did prepare a question regarding to the environmental conservation when doing a recreational fishing activity. More than 50% of recreational fisher are aware and willing to conserve the environment while fishing. Based on Table 2, only 14.5% of recreational fishers did not release the catch, while 52.5% of them will catch and release the fish. 42.5% of fishers will bring back the trash or waste after fishing and only 2.5% will throw the waste nearby. Besides, 74% of fishers know the difference between local and foreign species, and it is important to protect the species from become extinct.

Table 2. Recreational fisher's awareness towards environmental conservation

Variable	Percentage (%)				
	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Environmental conservation					
1) I practice the concept of catch and release	14.5	18	15	18	34.5
2) I know the difference between local and foreign species (not native to national waters)?	2	2.5	21.5	37	37
3) I bring back trash/waste after fishing	0	2.5	16	39	42.5

Table 3 show the result on recreational fisher's awareness towards rules and regulations of recreational fishing in Malaysia. Based on the result obtained, overall recreational fisher in Kuala Nerus Terengganu is aware about rules provided. Most of them are agree and aware of the existence guidelines (82%) and on the health and safety warning notices (83.5%). Not only aware in terms of the notice, but also obey the sign provided at the fishing area (82.5%). However, only a low number of fisher (2%) disagreed or disobeyed with the rules for health and safety when fishing. Lastly, 75.5% are aware about the needs of permit requirements and only 4.5% are not aware with the requirements.

Table 3. Recreational fisher's awareness towards rules and regulations of recreational fishing

Variable	Percentage (%)				
	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Rules and regulation of recreational fishing					
1) I am aware of the existence of guidelines issued by relevant agencies.	0	2	16	30	52
2) I am aware of the existence of health and safety warning notices/signs at fishing places from the authorities	0	1.5	15	40.5	43
3) I obey the health and safety warning notices/signs in the fishing area	0	2	15.5	40	42.5
4) I am aware of the recreational fishing permit requirement	2.5	2	20	36	39.5

3.3 Recreational fisher’s willingness to pay for license

Table 4 show the result obtained from survey regarding the willingness to pay among recreational fisher to get a license or permit to do fishing. Out of 200 fishers, only 34% are agreed and willing to pay for license, because they acknowledge that fishing activities will slowly destroy habitat and ecological of fish in shore and river, if and only if the money paid for license will be used to conserve and rehabilitation for recreational fishing purposes. Another 66% did not agree and unwilling to pay for license and for conservation because fishing is a part of their hobby and to improve their well-being. Thus, they are against to any payment.

Table 4. Socio-Demographic Characteristics

Are you willing to pay for certain amount to get a license or permit for recreational fishing activities?	
Yes	34%
No	66%

Even though most of the recreational fishers are unwilling to pay to get a license or permit, researchers able to calculate the amount that they are able or willing to pay if the government

want to propose the license for recreational fishing in future. Based on the answer given in open-ended questions, the median amount calculated are †RM10.00.

4 Conclusion and Recommendation

This study provides initial insights the Ministry of Agriculture and Food Security to decide whether it is necessary to establish a license for recreational fishing in the future. The main objective of this study is to determine the amount of money that recreational fishers are willing to pay to get a license or permit, and the awareness among fishers for recreational fishing activity. Based on the result obtained, it is supported that recreational fishers in Kuala Nerus Terengganu are willing to pay ‡RM10.00 to get a license or permit and most of them are aware with the environmental conservation and the rules and regulations of recreational fishing because recreational fishing will slowly destroy the ecological and habitat of the fish. It is proven that this study able to achieve the objective of the study. This study is believed will provide insightful information for the Ministry of Agriculture and Food Security to decide whether it is necessary to establish a license for recreational fishing in the future, which together will help to achieve SDG Goal 14 and avoid overfishing.

There are other factors that may have restricted the amount of data obtained during our search. These considerations include limitations in the search method used and the availability of the information. The first limitation occur during data collection is language barrier. Researcher unable to train a local enumerator for data collection, while most of the recreational fishers are local Terengganu people and they speak using Terengganu dialect. For the next data collection, researcher will train and hired a local people as enumerator, to minimize a dialect issue. The second limitation is time constrain. Researchers are unaware about the rainy and flood seasonal in Terengganu, and during these seasonal, people enjoying staying at home instead of going for any fishing activity. In future, the data collection related to marine field must be in middle of the year, to avoid any seasonal problem especially in east coast area. Lastly, the data collection must include the whole Malaysia, as in Malaysia we have more marine park and marine tourism. A recreational fishing not only focuses in Terengganu, but in Malaysia, and different state will have a different preference and awareness towards recreational fishing activity.

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† Convert to USD = \$2.31USD

1 MYR = \$0.231USD

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