

PERCEPTION OF ARTISANAL FISHERS ON SHARK AND RAY RESOURCES

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ABSTRACT

Sharks and rays are caught by fishers in Sabah, relatively the amount of the fishes caught form a small proportion of the total fish landing in the country. There is a suggestion by several parties to ban the catching of sharks and rays in Sabah in order to promotethe fishes as tourism attractions. The suggestion is strongly opposed by the sea-food restaurant operators and the fisherman associations. The study is aimed at determining the perception of the small artisanal fishers on issues related to the catching of sharks and rays. Data for the study are obtained using questionnaire which is designed through several steps including key informant surveys, focus group discussions and face to face surveys of the small artisanal fishers. The small fishers admit that they do catch sharks and rays but they assert that the fishes are not targeted but are caught bycatch only. Any sharks or rays caught will supplement their incomes; furthermore they know that the fishes are highly demanded for the fins, skins and meat for daily consumption or for further processing. Most of the small fishers do not really know the specific species nor the endangered species when the fishes are caught. To that extent, although a slightly bigger proportion of the fishers agree to the suggestion of establishing a sanctuary for sharks, many are also sceptical of the suggestion. On the other hand, in general the small fishers are less agreeable to the issues of the protection and conservation of sharks and rays due lack of awareness of the endangered species and their belief that sharks and rays are still in abundance.

Keywords: Artisanal fishers; by-catch; downstream products; livelihood





INTRODUCTION

In the Malaysia National Plan of Action 2 (MNPOA2) (2014) it has been emphasized the needs to address the issues of the negative perception of catching sharks and the misconception on shark finning. The main objective of the plan of action is to ensure the long term sustainable utilization of sharks and rays for the benefit of future generations in Malaysia (MNPOA2).

Although Sabah is considered as one the main producers of shark and ray products, however, the byproducts of the fishes are not meant for export but for local consumption. Relative to the total landing of marine species in Malaysia in 2016, the landing of sharks and rays in Sabah is still relatively small (between 0.09% and 0.16%).

The Department of Fisheries Malaysia (2017) has identified that the sharks and rays are mainly caught by trawl and gillnet fisheries; a small amount are taken in by long lines, purse seine and other gears like drift nets, portable traps, stationary gears, and barrier nets. Sharks are not targeted species but are caught with other commercial catch species. However, the species have considerable impacts on the livelihood of the traditional fishers who may happen to land the fishes.

In the state of Sabah, sharks and rays caught are fully utilized. The fish are mostly consumed as fresh meat, although some are processed as salted fish. A small number of shark jaws and teeth are sold as rare souvenir items to enthusiasts. Cartilage and some other discarded parts of the fish are used as bait for fish and crab traps. Small sharks, as well as those that are non-edible or unsuitable for bait are sold to fish mill factories for fertilizers. Rays are mostly consumed fresh (cooked or smoked) and salted. Sometimes, the traders outsource sharks from fishers to produce shark cuts and fish ball. The left over body parts are also processed into animal food (pellet) by a fishmeal factory (Fatimah *et al.*, 2017).

The main objective of the study is to determine the perception of the traditional artisanal fishers on the issues related to the shark and ray resources, on catching of the fishes and the impacts of a suggested ban of shark catching on their livelihoods. The data used in the analysis are obtained from small artisanal fishers in the districts of Sandakan and Semporna, Sabah.

MATERIALS AND METHODS

The instrument used to collect data on the small artisanal fishers who are catching sharks and rays are designed through several steps: “Key Informant Surveys” (KIS) and “Focus Group Discussions” (FGD) with relevant stakeholders who are involved in the activities. KIS is a qualitative in-depth interview with individuals who know what is going on in the community. In this study, the purpose of KIS is to collect information from a wide range of individuals including community leaders, traders, officials, prominent fishers, village heads who have first-hand knowledge about the fisher community and market. A FGD is a small group of six to ten individuals led through an open discussion by a skilled moderator. The group is large enough to generate rich discussion but not so large enough that some participants are left out.

The stakeholders involved in both the KIS and FGD were: fishers, members of the fishermen association, small time traders, wholesalers, processors, retailers (including restaurant, medicinal shops) and relevant departments associated with the small fisher communities. The study has selected two fishery districts, Sandakan (29.1%), and Semporna (35.6%) for the data collection on the small artisanal fishers (Department of Fisheries Sabah, 2014).

The face to face survey of the small artisanal fishers was carried at the local community centres and jetties which were the landing points for the small artisanal fishers. The respondents were also asked whether they were aware of certain formal and informal fishing rules and regulations. The final section asked questions on the respondent’s perceptions on sharks and rays issues. The respondents were also asked to state their opinions (level of agreement) on whether catching sharks and rays affected their livelihoods as small scale fishers and on the tourism industry. Perception of the fishers on the issues is measured using Likert scales ranging from 1 (strongly disagree), 2 (disagree), 3 (neutral), 4 (agree), 5 (strongly agree), DK (Don’t know). Descriptive analysis is used to analyse the perceptions of the small artisanal fishers on the statements related to the shark and ray resources.



RESULTS AND DISCUSSION

Results

Descriptive analysis of the data is carried out to determine the perceptions of the small fishers on several issues related to the utilization of the shark and ray resources.

Although shark and rays are not the targeted species for the traditional fishers in Sabah, the species if caught will make a significant contribution to the livelihood of the fishers. 44.8% of the fishers interviewed concur that any shark landed will supplement their income (average gross monthly income from all fishes, without sharks or rays is RM2,300) while 59.8% of the fishers consider that without the sale of the rays if caught will reduce their income obtained from fishing (average monthly income from shark is RM311 and from ray is RM275). Among the people of Sabah, sharks and rays are considered as a major source of food not only for their daily consumption but also for several festive occasions. Beside of consuming the fish fresh, the meat is often made into salted, dried products, while the internal organs of the fishes are also consumed in various forms. The significance of sharks and rays is shown by 59.8% the fishers who consider sharks as one of the main sources of food for them, and similarly 55.2% of them also consider rays as one of the important sources of food for the family. Even so, among the traditional fisher community, sharks and rays form a relatively small component of total catch.

Table 1. Perceptions on impacts of sharks and rays fishing on livelihood

Impact on livelihood	1	2	3	4	5	DK	Mean
	%	%	%	%	%	%	
Without the shark landing, your income will not be reduced	8.6	25.7	21.1	31.6	13.2	0	3.21
Shark forms one the main sources of food for local people	7.2	13.8	11.8	32.2	27.6	1.4	3.72
Ray forms one the main sources of food for local people	9.2	19.7	15.1	32.2	23.0	0.7	3.48
Shark is an important resource for the tourism industry in Sabah especially to attract international tourists	5.9	11.8	27.0	38.8	15.8	0.7	3.34
Ray is an important resource for the tourism industry in Sabah especially to attract international tourists	5.3	11.8	27.0	38.8	16.4	0.7	3.41
Return from sale of sharks is not profitable compared to sale of other types of fish	10.5	19.2	26.3	33.7	9.6	0.7	3.25
Return from sale of rays is not profitable compared to sale of other types of fish	11.1	22.1	26.2	30.2	9.7	0.7	3.19
Overall mean							3.37





Almost an equal proportion of the fishers agree that the two fishes can be important resources for the tourism industry in Sabah; 54.6% agree in the case of sharks and a slightly more (55.2%) of the fishers agree that rays can be important resources for the state tourism industry. In many countries around the world, the two species have been used as the products to attract tourists (Vianna, *et al.*, 2012; Maljkovic&Côté, 2011). In the study areas, further evidence are needed to support the impacts of shark/ray tourism to the communities.

In the study sites the sharks and rays are not the targeted species, thus, the fishers do not depend entirely on sharks and rays for their incomes from the fishing activities. Furthermore as supported by the perceptions of 43.3% of the fishers who agree that shark is not a profitable species; similarly, 39.7% of them also agree that returns from rays are not profitable relative to returns from other commercial fish species. As far as the fishers are concerned, their incomes are solely derived from the sales of the fresh sharks and rays caught since they are not involved in any processing beyond the sale of the fresh fish at the landing point (Ahmad, *et al.*, 2018).

It can be observed that the proportion of the fishers who are neutral is quite significant for the statements relating to the impacts of the two fishes; this situation is not unexpected for several reasons. For instance, the shark and ray are not the targeted species, any fish caught in the net will only add to the returns of the fishers who actually prefer to catch other better quality high priced species. The amount of the shark and ray landed is not consistent; the prices of the fish are dependent on specific species, size, seasons and demand. It should be noted that there is always demand for the two fishes and all parts of the fishes are consumed by the people of Sabah; thus if there is a catch, the small fishers will not waste but bring back to be sold to local consumers. The processing of the fish often involved salting or drying of shark and ray flesh which are sold in local markets, while the usable dried skin of rays are exported to Thailand to be further processed and made into fashion accessories such as belts, wallets and bags (Fatimah *et al.* 2017).

Table 2. Prices of sharks and rays at landing site

Item	Price	Remarks
Ray, small size	RM1 to RM5 per kg	Price set by wholesalers
Ray, big size	RM1.50 per kg	
Ray skin		
Less than 6 inches	RM4 per piece	Price set by processors of ray skin
More than 6 inches	RM5 per piece	
Reticulated whipray and leopard ray	RM6 per piece	
Shark fin		
Fin less than 15 inches in size	RM20 per set	Price set by fishers
Fin 15 inches in size	RM80 per set	
Fin 18 inches in size	RM130 per set	
Hammerhead shark fin		
9 inches	RM10/set	Price set by fishers
10 inches	RM20/set	

11 inches	RM30/set	
12 inches	RM40/set	
13 inches	RM50/set	
14 inches	RM80/set	
Shark skin from head area	RM6/kg	Used for local signature cuisines
Hammerhead shark meat	RM2.00- RM3.00/slice	Depending on price set by retailers at fish market

Source: Fatimah *et al.*, (2017)

It is found that in general the average number of years the fishers have been catching shark/ ray is 18.8 years. To the extent that the fishers do not target to catch sharks and rays, they feel less responsible to protect or conserve the species. To the statement on the conservation of sharks, only 19.7% of the fishers agree that their community do have methods or initiatives to protect and conserve the sharks as compared to 20.4% who agree with the statement in the case of the rays. In contrast a higher proportion of the community perceive that they actually do not have any initiatives to protect the shark nor the ray; this is indicated by 42.1% for the sharks and 40.8% for the rays. In both cases, 36.8% and 38.2% are neutral in their views towards the protection of sharks and rays, respectively.

More than half of the respondent fishers (53.2% for sharks and 57.9% for rays) do not agree with the statement that there are interested parties who have been persuading the fishers to not catch sharks and rays. As far as the fishers are concerned, their catching of sharks and rays do not break any rules nor regulations since in general, they do not have any information on any particular endangered species. The fishing license obtained by the fishers only prohibits them from finning the sharks on board. However, about 34.9% of the fishers interviewed acknowledge having information on certain endangered species which should not be caught, for example, hammerhead sharks and manta rays which have been shared by certain interested parties (Ahmad *et al.*, 2014). Besides, only a small percentage of the fishers also agree that special campaigns are being carried out by NGOs all over the state to ban shark and ray fishing, 15.8% and 14.5% respectively. More than half of the fishers (52.0% in case of sharks and 58.5% in case of rays) indicate that they do not agree that the NGOs are campaigning to ban the fishing of sharks and rays.

Empirical studies have indicated that the establishment coastal MPAs can result in a significant amount of the spatial distribution of mobile and wide ranging sharks (Knip *et al.*, 2012). Even though the fishers have not been made aware of the reasons for the prohibition on the catching of sharks and rays, 44.1% of them agree that a sanctuary for sharks and rays should be created to conserve the species from extinction. Yet 31.6% and 34.9% of them have a neutral perception on the issue of creating the sanctuary; this neutral perception could be explained since the species are not targeted for and the fishers feel that the species are not threatened by their activities. Also, some of the members of the communities are also concerned with the enforcement capability if there is any encroachment into the sanctuary, if established.

It has been shown that with regards to the total ban on shark and ray catching, 72% of fishers in Semporna do not agree with the suggestion of total ban. On the other hand, among the fishers in Sandakan district, a slightly lower proportion (51%) has similar opinion on the total ban on shark/ ray catching (Aswani *et al.*, 2018).





Table 3. Perceptions on protection of sharks and rays

Protection of sharks and rays	1	2	3	4	5	DK	Mean
	%	%	%	%	%	%	
Fisher community in your village has own initiatives and methods to conserve sharks	15.8	26.3	36.8	11.8	7.9	1.4	2.55
Fisher community in your village has own initiatives and methods to conserve rays	15.8	25.0	38.2	12.5	7.9	0.7	2.63
Some interested parties have come to your village to persuade you against catching sharks	24.3	28.9	27.6	12.5	6.6	0	2.38
Some interested parties have come to your village to dissuade you from catching rays	27.0	30.9	27.6	9.9	4.6	0	2.23
Campaigns by NGOs have been carried out all over the state of Sabah to ban shark fishing	28.3	26.3	28.9	11.2	4.6	0.7	2.04
There are parties who give information regarding the prohibition of shark catching in the State of Sabah	20.4	31.6	23.7	17.8	6.6	0	2.45
Campaigns by NGOs have been carried out all over the state of Sabah to ban ray fishing	27.6	30.9	27.0	9.9	4.6	0	2.04
A sanctuary for the conservation of sharks should be created in Sabah to protect the species from extinction	12.5	11.2	31.6	27.0	17.1	0.7	3.43
A sanctuary for the conservation of rays should be created in Sabah to protect the species from extinction	11.8	9.2	34.9	27.0	17.1	0	3.36
Overall mean							2.57

The fishers are adamant that they do not do finning of the sharks and rays in the boats; this is reflected by the mean values of the scales for the statements on finning; the mean values are 1.70 for both species. 65.2% and 66.0% of the fishers do not agree that there are fishers who do finning and discard the remains to the sea. It is also stated in their fishing license that they are prohibited from finning on board. Besides, as the fishers know that the fins of the sharks and the skins of the rays fetch high prices, they will bring the fishes to the jetties and separate the fins and skins on land. They also know that the meat of sharks and rays are highly demanded by the consumers for fresh meat as well as for dried and salted products, thus it is not rational for them to discard the bodies (Fatimah *et al.*, 2017).

Table 4. Perceptions on finning of sharks and rays

Finning of sharks and rays	1	2	3	4	5	DK	Mean
	%	%	%	%	%	%	
There are fishers in my area who do finning and bring the fins to land but discard the remains of the shark to the sea.	46.1	19.1	28.3	3.9	2.6	0	1.70
There are fishers in my area who do finning and bring the fins to land but discard the remains of the ray to the sea.	46.9	19.1	28.9	3.1	2.0	0	1.70
Overall mean							1.70

Discussion

The study has sought to determine the perception of the small fishers on issues related to the catching of the sharks and rays in the fishery districts of Sandakan and Semporna Sabah. The small fishers admit that they do catch the two fishes but they assert that the species are not targeted but are caught bycatch only. Any shark or ray caught will supplement their incomes; furthermore they know that the species are highly demanded for the fins (in case of sharks), the skins (in the case of certain species of rays) and the meat for daily consumption or for further processing. They know that finning is illegal and thus they are steadfast that they do not do such finning; the fishes caught are brought back whole and the fins and skins of the fishes are taken off at the landing points. Many of the small fishers do not really know the specific species nor the endangered species when the fish is caught. To that extent, although a slightly bigger proportion of the fishers agree to the suggestion of establishing a sanctuary for shark, many are also apprehensive of the suggestion especially in relations to the monitoring and preventing the encroachment of illegal fishers into the sanctuary. On the other hand, in general the small fishers are less agreeable to the issues of the protection and conservation of sharks and rays due lack of awareness of the endangered species and their belief that their fishing will not affect the resources because they believe that the both species are still in abundance.

CONCLUSION

The results of the study give the implication that any suggestion to ban the catching of sharks and rays by the small artisanal fishers must be further evaluated to determine the effects on the socio-economic livelihoods of the small fishers since the incomes of the small fishers are supplemented by the sales of sharks and rays.

It is necessary that knowledge and awareness of the endangered shark and ray species should continuously be given to the small fishers so that they will become more sensitive to the protection and conservation of the endangered species. NGOs must work with the relevant departments to educate the fishers on conservation and protection of endangered species and not to simply blame the small fishers as the only cause of the reduction of the shark and ray resources.



To enable monitoring of the activities of the fishers, practical techniques on data collection should be made available to facilitate the small fishers to record their catches of sharks and rays, especially the endangered species. Incentives can be given to small fishers who report catches of endangered shark/ray species. On the part of the department capacity building of the staffs has to be enhanced to monitor the catches of endangered sharks and rays. Close cooperation and collaboration among relevant agencies and stakeholders are needed to achieve the conservation and protection of the species.

Studies have proven that sharks are migratory in nature, the establishment of a sanctuary will require extensive research to determine the suitable location, the impacts on the fishers, the capacity to enforce control on encroachment and the cost and benefits of the establishment. This study has also solicited the agreement by the small artisanal fishers that they do not do finning of the sharks and rays, the fishers have suggested that proper communication and information should be relayed to the relevant agencies to avoid misunderstanding when fishers do catch sharks and rays.

Market demand for the shark and ray products do induce the small fishers to continue catching sharks and rays; thus utilization and market traceability of the downstream products of sharks and rays must be monitored and managed to identify inclusion of endangered species. The framework for establishing and coordinating effective consultation involving stakeholders in research, management and educational initiatives within and between States must be developed.

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