



Bajau Laut customs, viewpoints and perceptions concerning marine resource use in Semporna, Sabah

Habibah Yusah and Elizabeth Wood
2014



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Summary

Key results

- The Bajau Laut are highly dependent on marine resources both for family consumption and sale. Fishing and gleaning is a way of life for this community and defines their socio-economic and cultural well-being.
- Most use the resources about equally for family subsistence and for sale. Although questions about marketing were not included in the survey, previous studies by SIP reveal that the Bajau Laut generally sell locally to middlemen (normally Bajau and Suluk) who sell in Semporna, Tawau and further afield.
- The average number of members in a Bajau Laut family is 6 with up to 4 families sharing one roof. They were originally a migrating community but in more recent times some have built more permanent settlements on land/ beach.
- They typically start fishing in the age bracket 5-10 years and it is a traditional way of life inherited from parents/ grandparents. Dependency on marine resources is very high, both for family consumption and sale.
- More than 70% of respondents said that it was either a bit more difficult or much more difficult to find reef fishes than in earlier days. This may lead them to travel further away from the original fishing grounds although around half the respondents said there were no changes in the distance travelled.
- 55% of respondents said that resources were 'less' or 'a lot less' in places where there is a more fishing/gleaning but a third reported no difference.
- This study indicates that the main method the Bajau Laut use in order to bring in a sufficient supply of marine resources is to move to new fishing grounds if and when local supplies dwindle.
- 54% said that if the number of fishermen continues to increase, marine resources will not be enough. However, 30% said there will still be plenty of fish in the sea, regardless of the increasing number of fishermen. They believe it is all fated by God and that the level of catch depends on effort.
- This community believe in several mighty powers that influence their lives; ancestor's spirit, nature spirit and a bit of influence from Islam.
- 87% of respondents said that prayer was important to them and of these, 66% said they did a prayer before fishing. But even if prayers are said, there is a strong belief that a good catch depends on personal effort.

- Spirit belief was quite strong, with just over half the respondents believing good spirits played a part in successful fishing activities while just under 50% thought bad spirits played a part.
- It was difficult to get clear answers regarding personal views about fish bombing, possibly due to anxiety about saying the wrong thing.
- 80% of respondents said that they go fishing every day and do not have any local rules or customs regarding time or occasion. Just over one third of respondents said that they still go fishing and/or gleaning in no take zones.
- 77% of respondents experienced not being allowed to fish in areas where they used to catch fish/ glean before. Taken overall, the majority of respondents (63%) said that they did not know the reason why. When the reasons were explained by the interviewer, just over one third thought the concept was a 'very good idea' while slightly under a third that it was 'not such a good idea'.
- 64% of respondents, including the majority of those who live in or close to TSMP or on the mainland, said that they knew about the existence of Marine Parks around Semporna. The rest (36%) said that they did not know of Marine Parks in the area – these were mainly Bajau Laut who lived outside the park boundary.
- When asked their opinion about marine issues in the Semporna area such as pollution, fish bombing, fish poisoning, too many people and/or big boats fishing and tourists diving on the reefs, between 60-80% of the respondents said they had 'never heard' about the issues or they were 'not much of a problem'.
- Most of the households visited are dependent on coral reefs for their living and 44% said it was important to keep the reefs in a healthy condition. However, 40% gave their answer as 'not important' and 16% of them said they did not know.
- Reasons for the answer 'not important' included the view that it is the resources that are important, not the reef itself, that the 'survival' of the resources is not connected with the health of the reef and that the health of the reef is fated by God.
- When asked if they had their own ideas about what could be done to help make the reefs stay healthy, 31% (58 out of 190 respondents) gave suggestions.
- The suggestions included more frequent patrolling by the authorities to catch and deter fish bombers, use of reef-friendly/ non-destructive fishing methods, catching fish further away from reef areas, introduction of more tourist/ diving sites and appointment of respected community leader(s) who would set up a community reef watch and be responsible for controlling his people and area.

Conclusions and next steps

- **Appoint/elect Bajau Laut ‘reef champions’/community leaders**

This suggestion came from within the Bajau Laut community and if it could be taken forward would be a major achievement. Currently, the Bajau Laut are ignored or side-lined in discussions about management. A more inclusive approach could greatly help to promote a sense of stewardship and ultimately provide benefits to those who commit to help look after ‘their area’.
- **Maintain and expand outreach work**

There is still a relatively high proportion of Bajau Laut (particularly those living outside the Park) who are unaware of the existence of the Park or the aims and benefits of the no-take zones. Public awareness campaigns need to continue and expand to provide a greater level of awareness. There is also a need to better explain the potential long-term consequences of environmental impacts on people’s lives and livelihoods and the benefits of taking action to tackle issues such as pollution, destructive fishing and over-fishing.
- **Awareness programme covering basic fishery principles**

Awareness programmes are needed to provide simple explanations and examples of how fish stocks respond to fishing and what can be done by fishers to promote long-term productivity and food security. This could include a visit to a functioning fishery reserve such as Sipadan, which provides a live demonstration of the outcome of establishing a no-take zone.
- **Joint monitoring programmes**

The Bajau Laut are highly skilled fishers and also very knowledgeable about the resources on which they depend. A joint monitoring programme, perhaps with NGOs, the private tourism sector or Sabah Parks, could help to provide useful information as well as stimulating more interest in/ understanding of the reef ecosystem.
- **Improved livelihood opportunities**

More needs to be done to ensure that the Bajau Laut community benefit from the existence of the Park, not just through measures to promote sustainable fishing, but also through improved livelihood opportunities. Renewed efforts need to be made to investigate alternative and supplementary livelihoods including in the rapidly-developing tourism sector.

1. Introduction

1.1 Rationale for the study

Semporna town is situated on the south-east coast of Sabah (4°29'N 118°37'E) within the Celebes Sea and borders with Kalimantan, Indonesia to the south, and Mindanao, the Philippines to the east. Based on a census carried out in 2010 by the District Office, the population in Semporna is 113,000 coastal inhabitants (Semporna Priority Conservation Area, WWF) including 6,000 Bajau Laut.

Semporna is known for its extremely rich marine biodiversity and as one of the hotspots in the coral triangle. The seas in Semporna support livelihoods through fisheries and tourism activities which alone are calculated to generate RM 34.3 million per year (net value) (Yeo, 2011)

Appreciating the existing and potential value of the area and the current critical status of Semporna's seas and reefs, the Marine Conservation Society through the Semporna Islands Project has been working with local communities since 1998 to promote conservation and increase awareness of the value of sustainable use of marine resources

The most serious threats to coral reefs and other marine resources in the Semporna area are overfishing, fish bombing, climate change and pollution. Overfishing and bomb fishing have been going on for decades and are key issues that need to be addressed through awareness programmes and other measures. Those who contribute to damaging Semporna's reefs and marine resources may also be severely impacted by the negative outcomes of these practices. The communities most likely to be impacted include the Bajau Laut. The Bajau Laut are nomadic throughout Southeast Asia, and many live in the Semporna area. They are heavily dependent on marine resources for their survival.

Various awareness programmes have been conducted targeting people in and around Semporna and in the Tun Sakaran Marine Park, including the Bajau Laut community. However, given their dependency on the sea and critical role in marine resource use, it is vital that future outreach and awareness programmes take into consideration Bajau Laut customs, viewpoints and perceptions. In order to ensure meaningful engagement with the Bajau Laut it is crucial to fully understand their customs and practices.

It is hoped that this survey will lead to a better understanding of the belief systems of the Bajau Laut and make it possible to recommend ways of bringing members of this community together to play a role in promoting conservation in the Semporna area.

1.2 Significance, aim and objective of the study

As fishermen who dwell on or at the margins of the sea, the Bajau Laut in Semporna may contribute to the degradation of marine ecosystems, as suggested by observations and recorded data about destructive fishing practices in the area. On the other hand, they are the community who depend on marine resources for survival and who will be severely impacted if these resources decline.

It is likely that the Bajau Laut may see and value the marine environment from different perspectives than other people. The overall aim of this study was to learn about Bajau Laut customs, viewpoints and perceptions and to use this information a) to improve two-way communication and better understanding between resource users and managers and b) to help develop pragmatic and focussed solutions to conservation issues.

To achieve this goal the survey team consulted the Bajau Laut community on the mainland and remote areas in Semporna waters using a questionnaire designed to meet the specific objectives and divided into five (5) parts as follows;

- i. Background – to obtain information about households and migration; to evaluate fishing experience by checking when they started fishing and whether they are from a traditional fishing community (to test public perceptions that all Bajau Laut are fishers) and to better understand the level of dependency on marine resources.
- ii. Perception – to investigate the fishing practices of this community and their personal perceptions of changing patterns in Semporna waters.
- iii. Belief – to discover more about the belief systems of the Bajau Laut.
- iv. Marine Parks – This part of the questionnaire aimed to quantify the level of awareness of the Bajau Laut towards the Tun Sakaran Marine Park (TSMP) and its zoning system. TSMP was gazetted in 2004 with several areas inside the park designated as No-Take-Zones in subsequent years. However, some fishermen are still fishing in the no-take zones. Previous campaigns in and around the park suggest that not everyone is aware of the existence of the park and the zoning system.
- v. Marine issues and what to do – This section aimed to investigate the views and level of engagement of the Bajau Laut and to assess their interest and willingness to reduce human-driven impact. Different communities may have different opinions about issues that affect the marine environment and it is vital that these are understood.

In summary, the survey is expected to:

- i. Strengthen our understanding of the Bajau Laut community in Semporna in terms of their background, fishing practices, perceptions, belief system and their sensitivity/ knowledge of local marine issues

- ii. Provide information about the needs of the community and how these needs may affect the health of the marine environment and its resources.
- iii. Generate ideas about how best to ensure that the needs of the Bajau Laut community can be met within the framework of protected area and resource use management.
- iv. Provide an assessment of the level of Bajau Laut awareness towards marine issues and their willingness to participate in reducing human-driven impacts.
- v. Provide insights into the Bajau Laut community that will help in the design of an awareness and outreach programme that is compatible with and builds on local knowledge and beliefs.
- vi. Enable recommendations for conservation of coral reefs to be made from the perspective of the Bajau Laut community.
- vii. Generate ideas for further collaborative research and collaborative programmes with the Bajau Laut community.

1.3 Study outline – challenges and lessons learnt

Key to the success of this survey was to find appropriate people to conduct the questionnaires. Our aim was to bring members of the Bajau Laut community onto the survey team, but the need for interviewers to be able to read and write proved an obstacle because most Bajau Laut have not had the opportunity to learn these skills. As an alternative, we engaged Bajau who speak Bajau Laut to do the survey.

Obtaining data on the general status and the number of households and population of Bajau Laut in targeted areas was another challenge. We arranged to see the village head first for his permission before proceeding with the survey and interviewed him regarding the population status of Bajau Laut in his area. However, in many cases, even the village head did not know the number of his people and could not provide an estimate.

Some issues on the questionnaire made the interviewees a little nervous. For example, questions about fish bombing made them startled and they become extra careful (as shown by their expression). However, they were assured that answers would be completely anonymous, with no consequences to them in any way. With this assurance, we hoped to get honest feedback, rather than answers that the Bajau Laut community thought they should give in order to avoid disapproval or trouble.

2. Methodology

2.1 Survey planning and method

Prior to its use in the field, a full briefing was carried out by the Team Leader to ensure that the questions were understood and the interviews would be carried out correctly. The interviewers were also provided with notes to help explain the questions and put the interviewees at their ease (see Appendix 1).

To clarify and further demonstrate how the survey should be conducted, a training and pre-test was carried out at Selakan with 4 households picked at random. Modifications were made to the form following this trial and then a pilot survey was carried out at Bangau-Bangau to test the final form. These exercises also enhanced the potential interviewers understanding of the survey format and familiarised them with the questionnaire.

The survey was done mostly in coastal and island areas, so a boat had to be mobilized. For areas distant from Semporna, a Sabah Parks boat was used but was not taken right up to the targeted community. Instead, the survey team moved onto a smaller boat hired locally. The smaller boat was purposely used in order not to raise anxiety or wariness by the presence of Sabah Parks. In addition, it was an easier way to access individual houses and lepa-lepa (house boats). Locations were recorded using a hand-held GPS unit.

Using the small boat, the survey team went first to meet the village head or community leader to seek his permission to interview people and to get an overview of the population in the area. A letter of introduction from SIP was shown to clarify our presence and objectives. After a brief consultation with the village head, the team spread out randomly to consult with Bajau Laut households. Most of the interviews were conducted privately inside the house/ lepa-lepa in order to avoid influence from peers or onlookers.

The survey was conducted on a one-to-one basis in the Bajau Laut language. At each location, we greeted the household, introduced ourselves and briefed them about the survey before asking for their willingness to participate. 99% of households approached expressed a willingness to participate in the survey – only 2 out of 190 households declined. Each session took about 30 minutes to complete. To show our appreciation towards their contribution in the survey, each participating respondent was given a token of a jar with a Semporna Islands Project logo and filled with crackers (Figure 1b).

The interview followed a set of questions so in this respect was fairly structured (Appendix 1), but the approach was kept as informal as possible and the interviewees were encouraged to talk freely about any topic. The households interviewed included all dwelling types with no bias or favour to particular dwellers. The aim was to try and ensure that each interview was representative of the family being surveyed. One person (sometimes the head of the household) provided the answers but other members of the family joined in with some of the discussions and their comments were recorded where relevant (e.g. examples of good and bad spirits).

Information was transferred to a Microsoft Excel datasheet at the end of each day. The work programme was designed to have gaps between data collection days so that any errors which occurred could be rectified and there was spare time to discuss issues with team members.



Figure 1. Survey team on the way to a Bajau Laut settlement (left) and carrying out the survey (right).

2.2 Survey team

Below is the full list of those who have contributed to the completion of this survey. Not all of the team members were present in the field.

No	Name	Job	Organisation
1	Dr Elizabeth Wood	Planning, advisor	MCS/ SIP
2	Jamie Valiant Ng	Planning	SIP
3	Habibah binti Mohd Yusah	Field team leader; interviewer	SIP
4	Salmiah binti Amir Salleh	Interviewer	SIP Volunteer
5	Basir Amat	Interviewer	Sabah Parks
6	Samie Angkusong	Logistics	Sabah Parks
7	Abd Nasir bin Malail	Boatman	Sabah Parks
8	Raziah binti Amir Salleh	Interviewer	Sabah Parks
9	Salihawadang bt Salanra	Interviewer	SIP Volunteer
10	Mohammad Nazifuddin bin Sidin	Interviewer	SIP Volunteer
11	Ali Mara bin Paka	Interviewer	Sabah Parks

2.3 Study sites

Date	Location	Details
1/8/2013	Selakan	Search for potential interviewers, Pre-test and training
14/8/2013	Bangau-Bangau	1 st pilot survey
26/8/2013	Bodgaya	Search for potential interviewers
3/9/2013	Bangau-Bangau	2 nd pilot survey (appointed confirmed team member)
7/9/2013	Halo	Data collection
9/9/2013	Mabul	Data collection
9/9/2013	Gusungan	Data collection
14/9/2013	Kulapuan	Data collection
15/9/2013	Sibuan	Data collection
15/9/2013	Sirongol	Data collection
18/9/2013	Labuan Haji	Data collection
21/9/2013	Semporna	Data collection
22/9/2013	Selakan	Data collection
5/10/2013	Maiga	Data collection
5/10/2013	Boheybual	Data collection

Table1. List of survey locations

11 locations including mainland and islands were selected for the survey. The locations were based on available information about the distribution of Bajau Laut in the Semporna area.

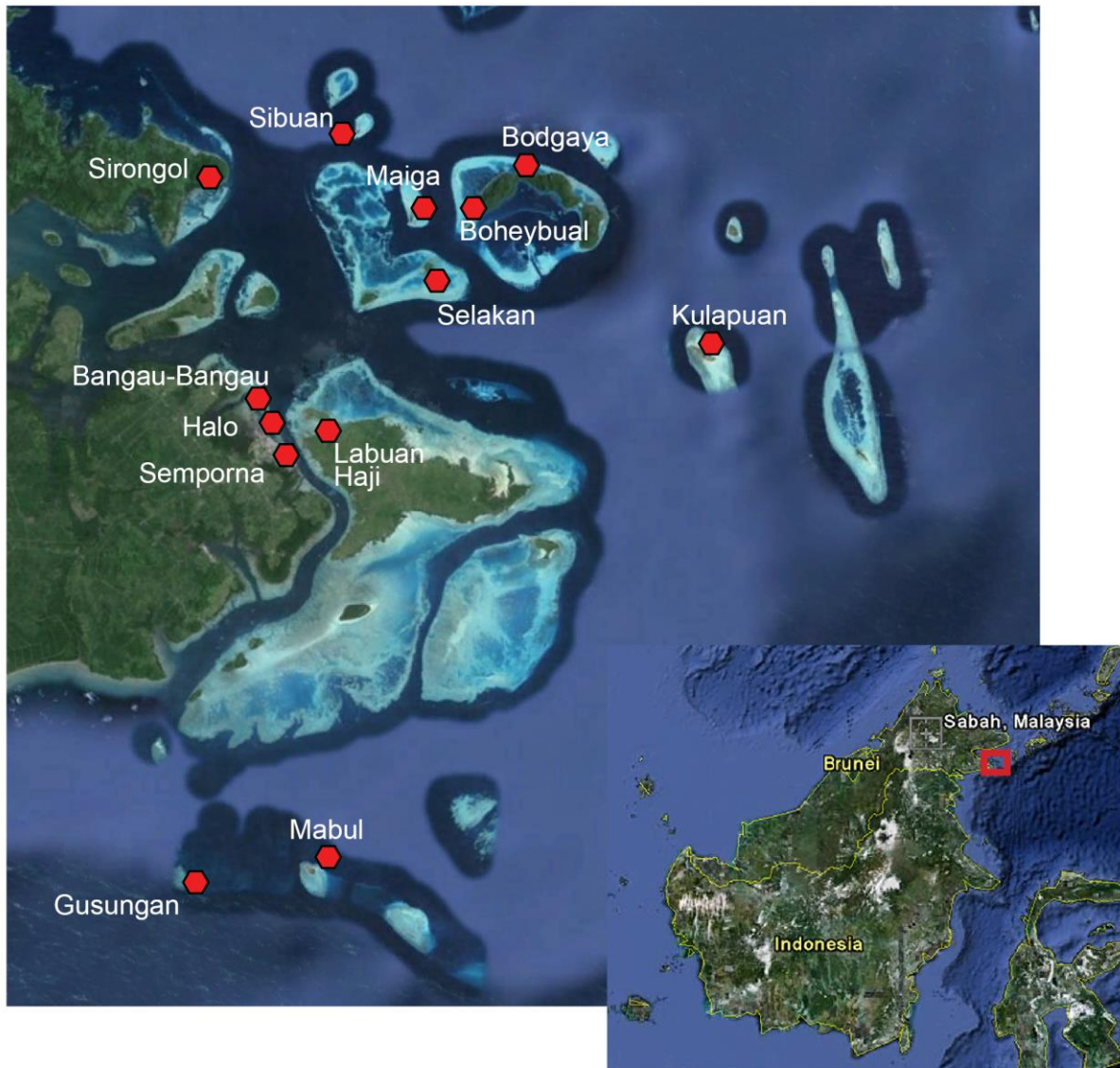


Figure 2. Map of the survey area (based on Google Earth Landsat image)

3. Results

3.1. Background information about households / respondents

3.1.1 Respondents

Name: When asked their names, 95% of respondents (n = 190) let us have them while only 10 of them hesitated to provide us with their names.

Gender: The majority of respondents were male (68%) while females made up 22% of the total and replies made jointly by husband/wife accounted for 10% of the total.

Age: Most of the Bajau Laut visited were unable to tell us their age as this is not something that they record or remember. Instead, the enumerators guessed the respondent's age by appearance. The age of 189 out of 190 respondents was estimated and majority of them were thought to be between 20-49 years old (Figure 2).

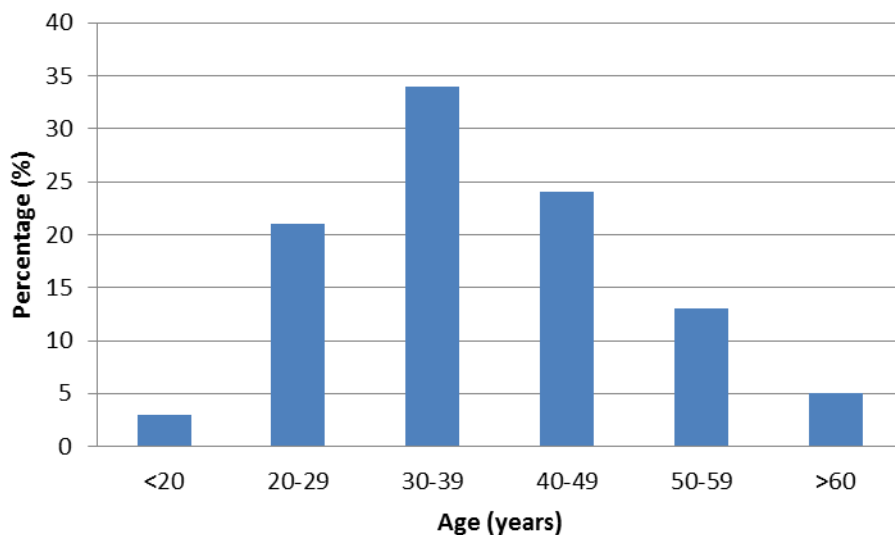


Figure 3. Age bracket of approached respondents (n = 189), based on estimates made by the interviewer (see text).

Fishing history: The majority of respondents come from fisher families and fishing practices date back to their grandparents (Figure 3).

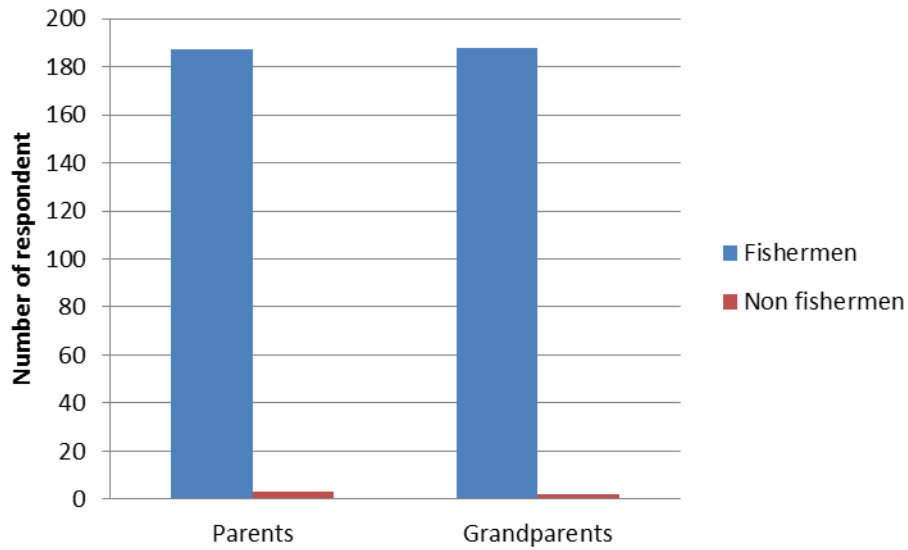


Figure 4. History of fishing in the respondent's families (n=190).

Age when started fishing/ gleaning: Fishing and gleaning mostly starts at a young age. The majority of respondents (46%) said that they estimated they were in the age bracket 5-10 years when they started fishing/ gleaning and 18% said they were in the age range 3-5 years old.

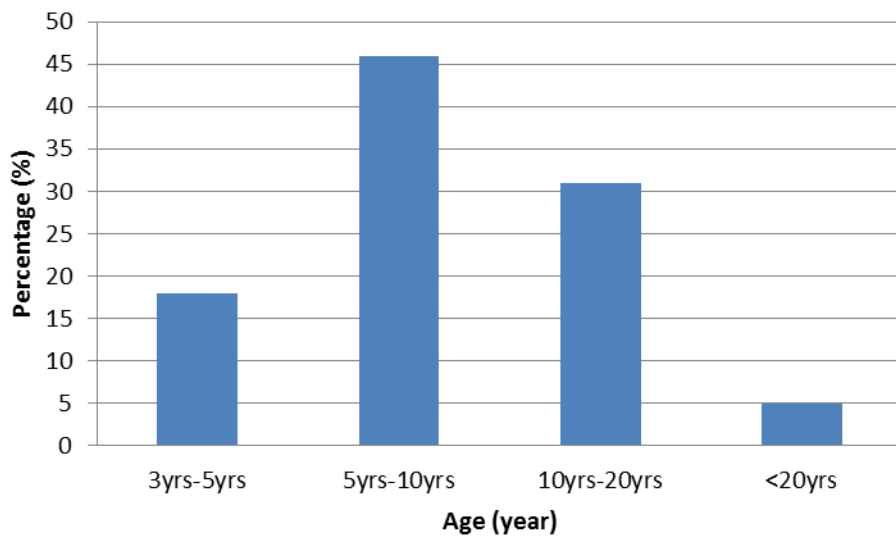


Figure 5: Age that respondents (n=190) estimated they started fishing/ gleaning.

3.1.2 Household background

Dwelling

Of the 190 Bajau Laut households interviewed, 49 lived on land above the high water mark, 41 on a boat (lepa-lepa or motor) and 100 lived in houses on the beach/ back reef.

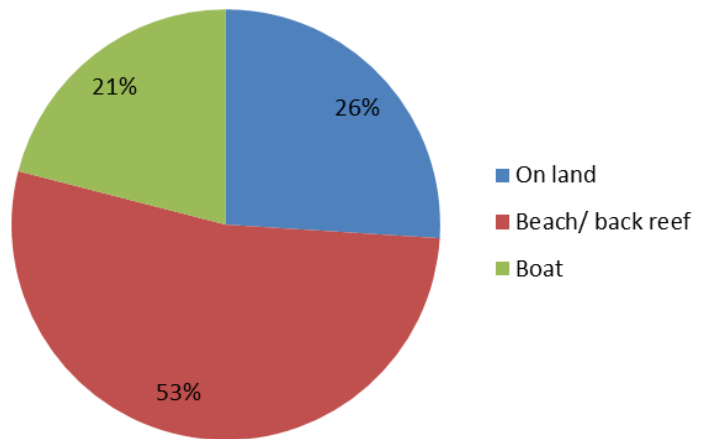


Figure 6. Type of dwelling of households participating in the survey (n=190)



Figure 7. Bajau Laut boat at Timbun Mata with houses on the beach/ back reef

Travel

The tendency to travel was linked to the type of settlement. Households that dwell on land are less likely to travel compared to those who live on the beach or back reef (half of them are still migrating) and those who lived on a boat had the greatest tendency to travel.

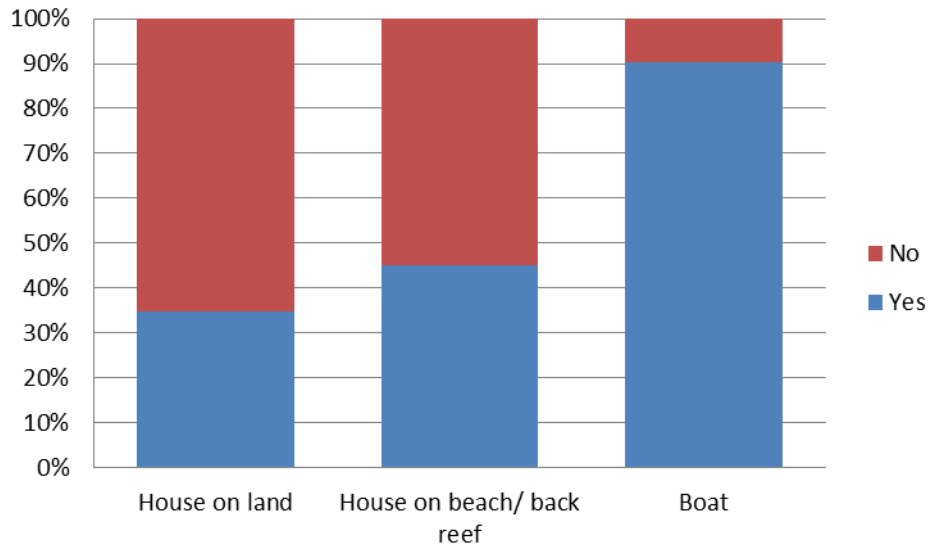


Figure 8: Relationship between the type of dwelling and the tendency to travel (n=190)



Figure 9. Bajau Laut boat moored at Timbun Mata, Semporna.

Almost all the respondents told us they used to travel in the old days or their parents were travelling but now they travel much less or not at all. More than half of the respondents who were still travelling were asked why they did so. The main reasons given were fishing for a particular species of fish/ marine resource and meeting friends/ family. Others said that travelling in the sea is more of a lifestyle choice. However, they preferred to settle in shallow waters and reef areas where fish are abundant.

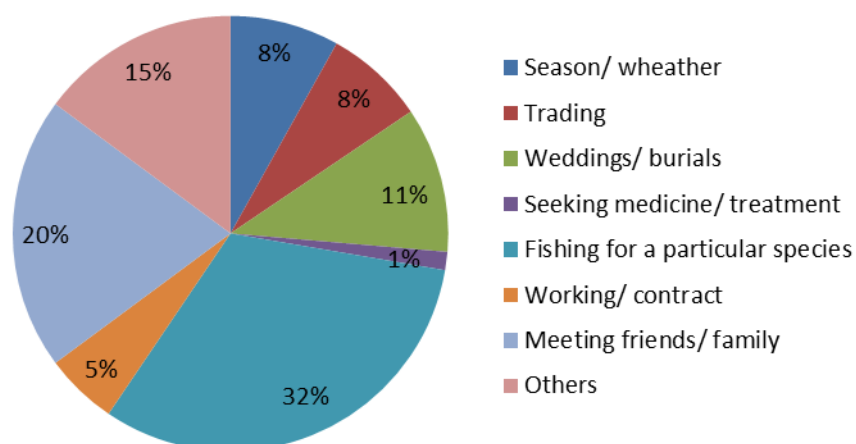


Figure 10. Fig Reasons for travelling away from the current living place to other locations.

Household and family numbers

The number of households (families) in each house or boat was recorded and also the number of people in each family (Table 1). A ‘household’ or family was defined as a group who eat together; generally they are related to each other. Most houses/ boats were comprised of a single household (family) and the maximum number in one house or boat was four (Table 1). The average family size taken overall was six.

Number of household interviewed and family member (N=189)					
Number of families	Total households	Breakdown by type of dwelling			Average number per family
		House on land	House on beach/ back reef	Boat	
1	168	42	90	36	7
2	16	5	9	2	6
3	3	1	0	2	6
4	2	1	0	1	5
Total	189	49	99	41	6

Table 1: Number of households broken down by type of dwelling.

Occupation / income

The main occupation is catching and selling fish and other marine resources (90.5%) (Table 3). None of the respondents make a living from seaweed farming alone but 6.8% combine seaweed farming with fishing. 1.6% combine small vendor and fishing. Very few rely solely on other jobs such as tuck shop and small vendor (1.1%).

Household main income (N=190)		
Occupation	Number (n)	Percentage (%)
Fishing only	172	90.5
Fishing and seaweed farming	13	6.8
Fishing and others	3	1.6
Others	2	1.1
Seaweed farming only	0	0
Total	190	100

Table 2: Occupations providing the main household income (n=190)

End use of fish and other marine resources

Those who depend on marine resources to make a living were then asked what they usually do with the collected fish, octopus, shells and other produce.

A small percentage fish just for subsistence for the family and only one household said they just fished for sale alone (Table 4). The latter were fishers who collected abalone and sea cucumber and did *payao* fishing (tuna). Those who specialised in tuna fishing (Bajau Laut in Mabul) sold their catch to their boss's 'buyer' while the abalone & sea cucumber fishers (Bajau Laut houses scattered near mainland) reported that they took their catch to 'taukay' (middleman) in Semporna.

End use of fish and other marine resources (N=190)		
	Number (n)	Percentage (%)
Family subsistence	8	4.2
Family subsistence and sale	181	95.3
Sale only	1	0.5
Total	190	100

Table 3: End use of fish and other marine resources (n = 190)



Figure 11. Clockwise from top left: sea cucumbers and grouper being dried, freshly-caught rabbitfish, fish being salted for sale and/ or family consumption, meal of seafood being prepared; sack of shells (*Strombus* sp) for sale.

3.2. Perceptions

3.2.1. Importance of selected marine resources

Respondents were asked about the importance of selected marine resources and answers marked by rank from '1=very important', '2=fairly important', '3=not very important' to '4=not at all important'

Reef fishes are evidently the main target, with 65% of respondents recording them as 'very important'. In contrast, mangrove crabs were of least importance.

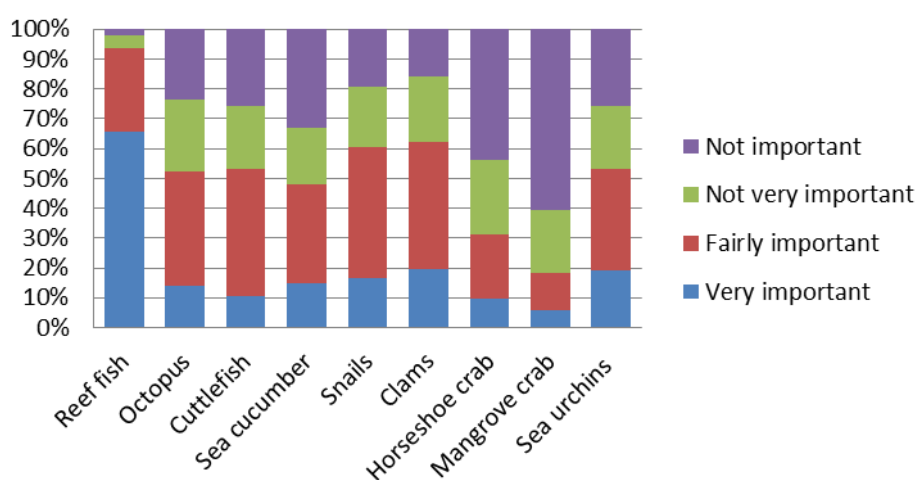


Figure 12: Importance of selected marine resources to the Bajau Laut community. (n=190)

3.2.2. Changes in availability of resources

Respondents were asked whether, according to their personal observation/experience it is more difficult or easier now (regardless of seasonal changes) to find selected resources compared when they first started fishing/ gleaning. The scores were as follows: '1=more difficult', '2=a bit more difficult', '3=about the same', '4=easier' and '5=not sure'.

Overall, the majority of the answers were ranked '1' and '2' for all marine resources. More than 70% of respondents said that it was either a bit more difficult or much more difficult to find reef fishes than in earlier days. '5=not sure' for certain resources was also given by those who did not target them, which explains the high percentage of 'not sure' for mangrove crabs.

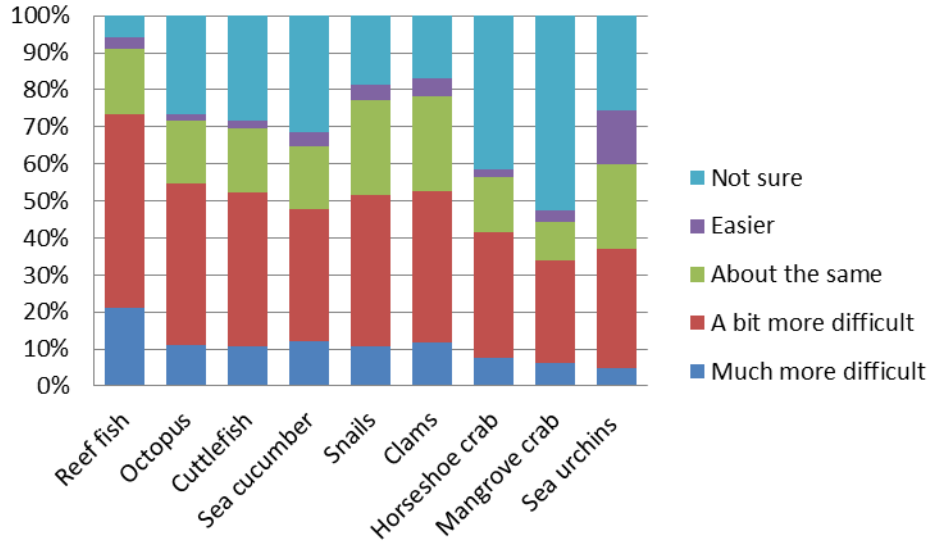


Figure 13: Availability of selected marine resources compared to earlier days. (n=190)

3.2.3. Perceived changes in size of fish caught

Focusing on reef fish alone, respondents were asked about changes in the size of individual fish caught on a fishing trip. They were also asked to comment on trends (if any) that they had noticed. This question was intended to help assess changes in fish stocks.

Regarding general changes in the size of reef fish caught, the answer for ‘no changes’ and ‘smaller’ were fairly equal (no change = 46%; smaller = 42%) while 8% said the fish caught were bigger (Table 4).

Size	Number	Percentage
Bigger	15	8.1
No changes	86	46.2
Smaller	80	43.0
Don't know	5	2.7
Total	186	100

Table 4. Perceived changes in size of reef fish caught (N=186)

Reasons given for why the fish were larger:

- Because fish are always breeding just like humans and fish are well protected by the government (Sibuan respondent).

Reasons for no changes in size

- Depending on the fishing method, using a net usually gets bigger fish. As long as you put in the effort, you can still get big fish.

Reasons given for smaller fish:

- All big fish had been caught. Bigger fish disappear because of destructive fishing method by poison and bomb, use of compressor and fishing net with fine mesh size which means even juvenile fish cannot escape.
- We are not allowed by Sabah Parks to enter areas with big fish anymore, (Sibuan respondent).
- It is God's will that there are no more big fish in the sea'.
- Due to being cursed; when younger child married first before older brother/sister. The fish being caught since then are only small ones'.

3.2.4. Changes in distance travelled to fish/glean

This question was asked to try and assess changes in fishing effort.

The majority of respondents (52%) said that there were no changes in general in the distance they go while 44% said they went further away than the earlier days.

Distance	Number	Percentage
Further away	83	44.4
No changes	98	52.4
Don't know	6	3.2
Total	187	100

Table 5. General changes in the distance to travel to fishing/ gleaning area (N=18)

Reasons given for no changes in distance

- Mainly because they are wandering around the sea and they never feel the difference in the distance they go. Wherever they went, it feels like home, thus they cannot see any trend (boat dweller).
- Sometimes they get plenty of fish or other marine resources, sometimes not. If the resources in an area decrease they will move and will come back again after some time, thus generally no changes observed.
- They are afraid of thieves wandering around the sea, so they only go to the same places they used to go.
- Uncertainty about the weather and frequent bad weather prevents them going further.
- Poor condition of their boat may prevent them going further. Also, some have to rely on paddling as they have no engine or cannot afford to pay for fuel.

Reasons why some people go further away are because:

- They said the fish and marine resources nearby are depleting and it is too hard to find them nearby.
- They are not allowed to fish in nearby areas (inside TSMP).
- The resources become too scarce in the place with residents.

3.2.5. Changes in numbers of people fishing/gleaning

The question was asked whether the number of people fishing/ gleaning in their village or island is increasing. In response, 39% said the number had increased and 41% said no changes while the rest did not know the trend.

Answer to question 'has there been an increase?	Number of respondents	Percentage of respondents
Yes	73	39
No	78	41
Don't know	38	20
Total	189	100

Table 6: Changes in number of fishermen based on all villages (n=189)

There was a noticeable difference in the responses to this question depending on the location. In comparison with locations outside TSMP (except for Kulapuan), a slightly higher percentage of people from within TSMP (Maiga, Selakan, Boheybual, Sibuan) said there had not been an increase. These respondents said that there were fewer fishermen in their area because of park rules that restricted fishing activities. Thus fishermen were migrating to other places and not staying inside because of the hardship.

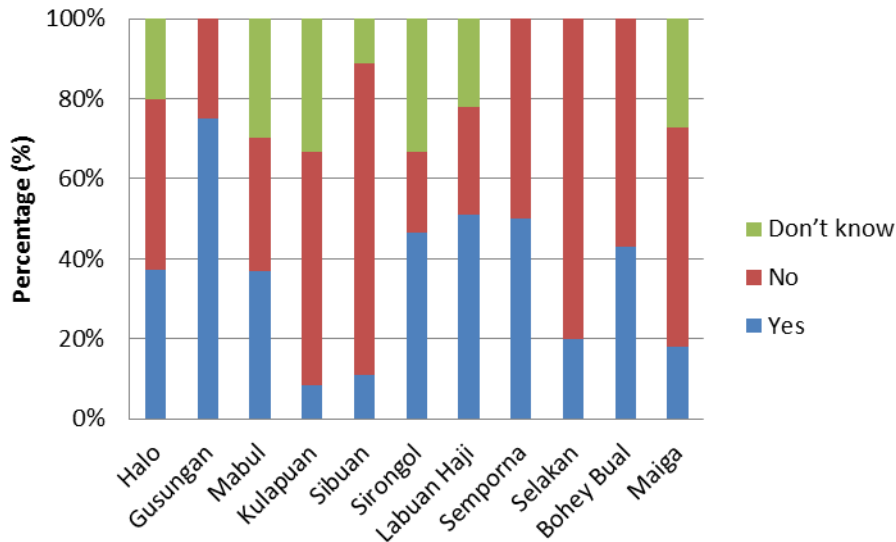


Figure 14. Perceived changes in numbers of fishermen at different locations (n=189)

3.2.6. Status of resources in places where there is more fishing/gleaning

Respondents were asked their views on the status of fish and other marine resources when there were a lot of people fishing and gleaning and were requested to rank their answer as follows: '1=a lot less', '2=less', '3=the same', '4=more' and '5=don't know'.

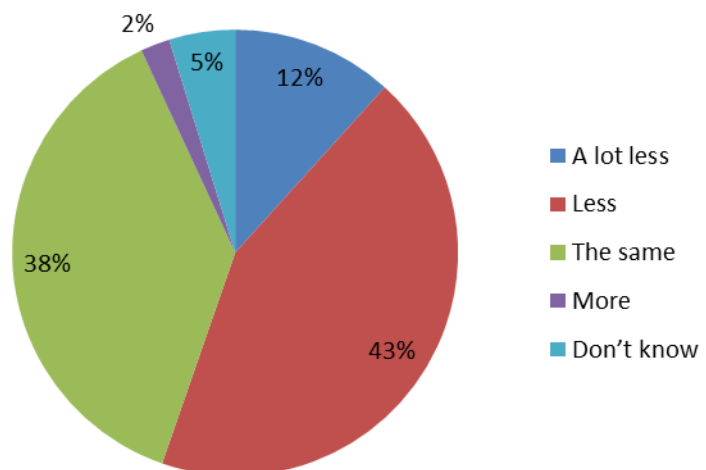
The majority (55%) gave the answer '1' and '2'. Some of the respondents commented that many people built houses in the sea and that this made the situation worse. They mentioned that having too many people fishing caused stress to the marine resources and nowadays even juvenile fish also got caught, so not allowing time for the stock to recover. For abalone collecting for example, they are very competitive and once the coral reefs in the area have been turned upside down (to look for abalone), it will be hard to find them again. Sometimes in one trip they can only find 5 individual abalones.

Just over one third (38%) said the resources remained the same regardless of increased numbers of fishermen. They believe fish will still be plentiful, depending on luck and effort. If you go to Denawan (an island close to Si Amil) the fish there have never decreased.

Only 2% said resources would increase with more fishermen, but they did not know the reason.

5% said they did not know what effect more fishermen have on the status of resources. They commented that the threats did not come from more fishermen, but from destructive fishing such as bombing and poisoning. As long as they use hook and line only, the resources would not be depleted.

Figure 15.
Perceived level of
catch where a lot
of people are
fishing/ gleaning
(n=188).

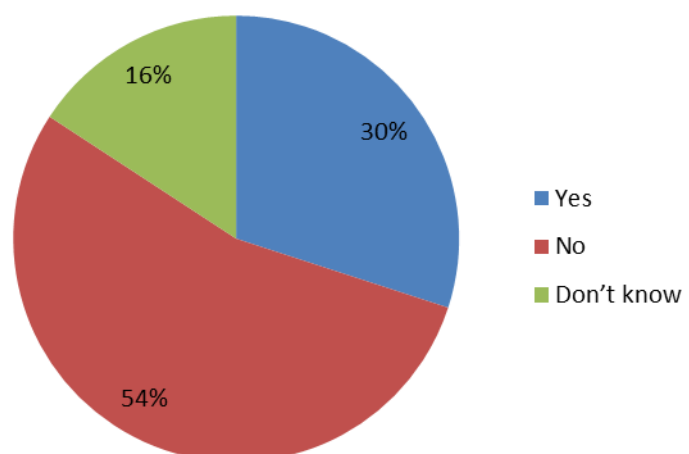


3.2.7. With more fishing will there still be enough fish for food and to sell?

When asked “what do you think when more and more people fishing, will there still be plenty of fish to feed your family and to sell?” the majority (54%) said that if the number of fishermen continues to increase, marine resources will not be enough and there will be no time to recover from the high levels of fishing (vigorous intake).

30% of the respondents said there will be still plenty of fish in the sea, regardless of the increasing number of fishermen. They believe it is all fated by God. However, it is pertinent to note that, even nowadays, many have been pushed into poverty and can hardly afford more than one meal a day.

Figure 16:
Response to the
question ‘when
more and more
people are fishing,
will there still be
plenty of fish to
feed your family
and to sell’?



3.3 Beliefs

3.3.1. Importance of prayer

Despite differences in who they pray to, most of the respondents (87%) agreed that prayer is indeed important in life to them personally. Some of them pray to Allah, some pray to late ancestors (*mbo*) and some pray to sea spirits (*Alam deo*).

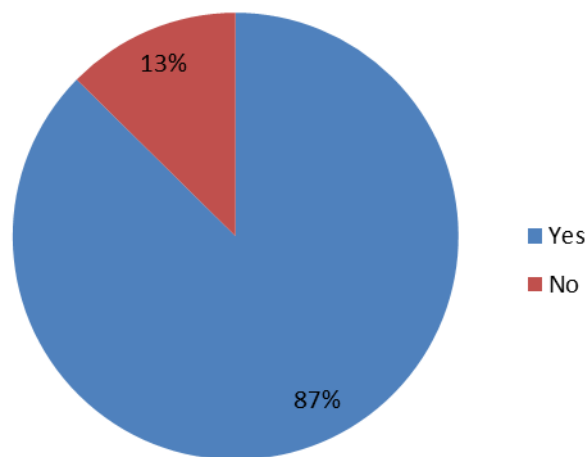


Figure 17: Response to the question 'is prayer important to you personally' (n=190)?

3.3.2.. Are prayers said for good fishing?

Out of that 87% who said that prayers were important, 66% said that they did pray before fishing. Prayers were made at the sea, just before the net was laid or fishing started. A prayer was asked to the sea spirit *alam deo*' to give its blessing. A prayer done as a courtesy to ask permission to the 'sea guardian' means the spirit will protect them during the fishing trip and give them plenty of fish.

The remainder (34%) did not think prayers about good fishing were important in influencing their catch. Those 34% do not believe prayer is a solution that can bring them a good catch, it all depends on one's effort.

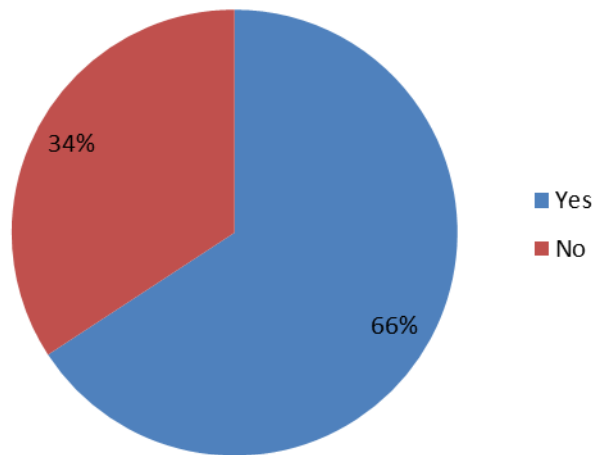


Figure 18: Response to the question 'do you pray for good fishing' (n=190)?

3.3.3. Do good or bad spirits play a role in your fishing activities?

Spirit belief was quite strong, with just over half the respondents believing good spirits played a part while just under 50% thought bad spirits played a part.

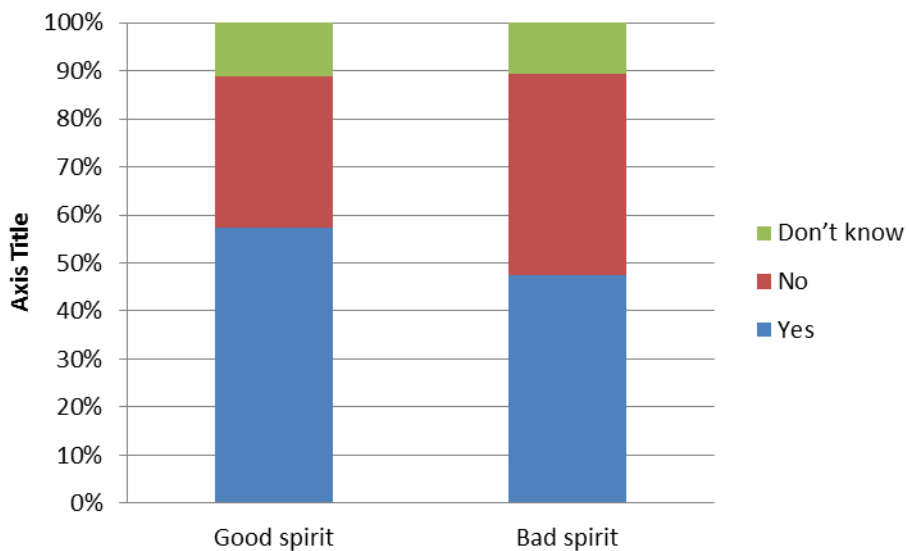


Figure 19: Influence of spirits in fishing activities.

Comments about good spirit:

1. Departed ancestors spirit (*Mbo'*)

The spirit of departed ancestors watches over them and brings good fortune in life, can heal illness, and save their soul anywhere in the sea. The spirit also helps those with good attitude to have good fishing in the sea. They said they should pay respect to the ancestors. If they get a good catch, or when they feel disturbance from *mbo'* spirit, they will give a feast for the departed spirit. The feast will be held in house/boat. They will prepare incense, turmeric rice, flags (yellow and green). The guard spirits are located in Ligitan, Mabul, Gusungan, Tubing, Sahasaan or anywhere in the graveyard where they been buried.

2. Prophet spirit (*nabi*)

The prophet spirit gives them a good catch if they pray to the prophet and 'tuhan' god. This comes from Muslim belief and they named the prophet as Nabi Muhammad, Nabi Sulaiman.

3. Sea spirit (*alam deo'/saitan deo'*)

The spirit resides in the sea and blesses people with a good catch but it can turn bad depending on people's behaviour towards the sea. Bombing and dumping trash into the sea is some of the reason (see *Marine Issues* Section 3.5). The sea spirit will curse those who destroy the sea, which may include bombing and littering. If the sea spirit is angry, they will be cursed; fall sick or even die (same as *mbo' laot*)

Comments about bad spirit:

1. Bad devil (*landung saitan/saitan*)

Many of the respondents believe that bad spirits reside everywhere in the sea in almost any hill or shallow water (*tabbah*). They are also located in places settled by humans like Gusungan, Mabul, Bohey Dulang.

One has to ask 'permission' to enter the spirit's territory to avoid any harmful events during the trip. The existence of a bad spirit in an area manifests itself when they get back home and feel sick, then they know they have been cursed by the spirit. It can cause them fever and headache or even death if the *saitan* spirit is ignored. Strong storms and big waves in the sea also come from the *saitan* spirit. If anything like that happened, they have to ask for forgiveness by serving the spirit with tumeric yellow rice and yellow and green flag/ cloth so it will not disturb them.

2. Spirit of big trees
If cursed by the 'spirit possessed big tree', this can be fatal or cause sickness. To stop the curses, they worship the spirit with white bowls, turmeric rice, incense and white cloth. For instance, if they take a log from an area, they will replace it with cigarettes/ rice/ flag or the spirit will haunt them.
3. Manta/ devil rays (*kalitan*)
Large devil rays that are black in colour are possessed by an evil spirit and they believe they eat humans. They could be in anywhere in the sea.
4. Satan down below (*saitan deo'*)
This spirit curses them with harmful events and sickness if not respected. It is located in the seafloor and not on the land. They know the location of the bad spirit because they cannot get anything (fish and other sea resources) from there.
5. Bad ancestors' spirit (*Mbo' laot*)
Besides the good ancestors, there are bad ones who always cause them trouble.

3.3.4. Does fish bombing go against your personal view of acceptable fishing practice?

As soon as they heard the words 'fish bombing', most of the respondent looked startled and denied using bombs (even though they were not asked whether they use them or not). It was difficult to get clear answers to this question, possibly due to anxiety about saying the wrong thing.

Some respondents said that it was against his/ her personal view and some said that it was not. However, for the reasons described above, the answers were not quantified as it was felt that they might not be reflecting the true thoughts of the respondents.

3.4 Marine Protected Areas

This section was designed to investigate the perspectives and views of the Bajau Laut towards the idea of Marine Protected Areas as well as to check their knowledge of the established Tun Sakaran Marine Park.

3.4.1. Local rules and customs

When asked whether they have traditional rules that govern fishing activities such as not fishing in some areas or not fishing during the fish breeding season, only 21% said there are rules while the majority said there were no such rules and they go fishing every day regardless of times or occasion.

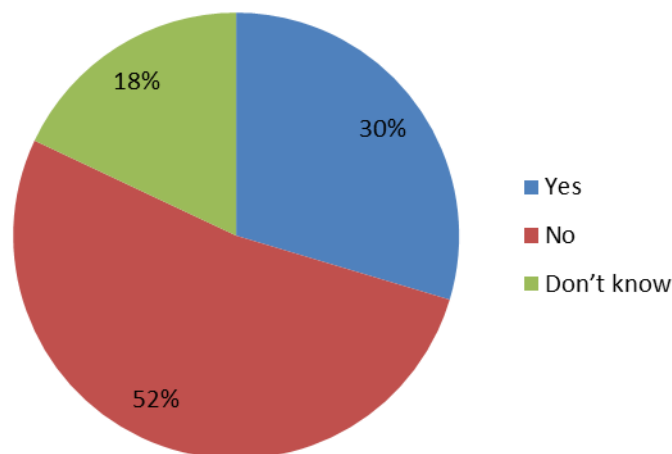


Figure 20. Response to the question 'Are there any community rules/customs towards fishing activities' (n=189)?

Of the 21% who had some traditions, some claimed they usually do not go fishing on Friday because they believe it is bad luck to do this. Besides that, some of them also said they did not fishing on Hari Raya and Maulud Nabi (the birth day of the Prophet Muhammad).

They said they do not know when is the time for fish breeding/ laying eggs. However, in slight contradiction, they said if they know the time or season when fish contain eggs, they vigorously catch them because of the high price/ market demand.

3.4.2. Are there places where you used to fish but not allowed to now?

The majority of households (77%) said that there were places where they used to fish that they are not allowed to now (Figure 16). Table 8 shows the closed areas that were mentioned by the different communities, all of which include Bohey Dulang.

18% said they had never been prevented from entering, gleaning or catching fish in any area around Semporna. 5% did not know or were unable to answer this question.

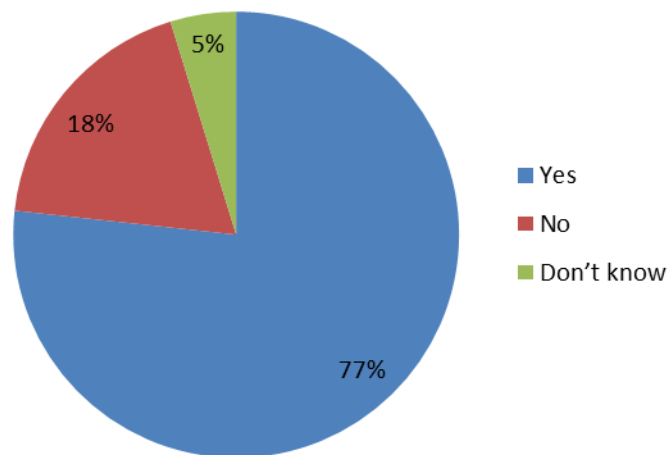


Figure 21. Responses to the question 'Are there any places where you used to fish but people tell you that are not allowed to now?'

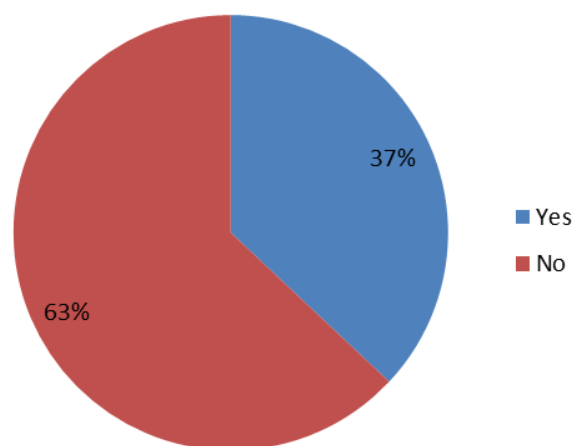
Respondent's Kampong/ island	Where are the areas where fishing is not allowed now?
Halo	Pulugaya, Bohey Dulang, Selakan, Sibuan, Siramba, Sipungkau, Sipadan, Maiga, Kulapuan, Mabul, Kapalai, Mataking, Omodal
Gusungan	Bohey Dulang
Mabul	Pulugaya, Bodgaya, Bohey Dulang, Sipadan, Mataking, Palihi, Pom-Pom, Siamil, Kapalai, Mabul
Kulapuan	Bohey Dulang, Bodgaya, Mataking, Pom-Pom
Sibuan	Sibuan, Bohey Dulang
Sirongol	Sibuan, Lok Jipun (Bohey Dulang), Mantabuan, Bodgaya, Maiga, Sipungkau, Tabbah Kumai, Tabawan (Kunak), Magapit
Labuan Haji	Bohey Dulang, Kapalai, Mabul, Pulugaya, Bud (Bodgaya-Bohey Dulang), Mataking, Pom-Pom, Pandanan, Selakan, Maiga, Mantabuan
Semporna	Bohey Dulang, Bodgaya, Sibuan
Selakan	Bohey Dulang
Boheybual	Sibuan, Tabbah Siramba, Bohey Dulang, Silangau, Bodgaya, Sipungkau, Maiga, Boheybual
Maiga	Sibuan, Pulugaya, Bohey Dulang, Maiga, Bodgaya, Bangau-Bangau, Sipungkau, Tabbah Kumai, Tabbah Siramba

Table 6. Compilation of the locations where respondents reported they were no longer allowed to fish.

3.4.3. Do you know the reason why you are not meant to fish in certain areas?

The majority of respondents (63%) said that they did not know the reason why they were not all allowed to fish in certain areas.

Figure 22.
Response to the question 'Do you know the reason why you are not meant to fish in certain areas (n=189)?



For those that did know, the reasons given for the closures to fishing were fairly equally divided. Some said that it was based on what their peers told them, some experienced being chased away and being informed of the reasons directly by officers/ tour operators; others were based only on personal judgement.

It was noted that the reasons given varied according to the locality. For the areas inside Tun Sakaran Marine Park (Bodgaya, Tetagan, Bohey Dulang, Sibuan, Mantabuan, Maiga, Selakan and Sebangkat), the reasons are:

1. The sea resources are protected by Sabah Parks/ government to allow fish stocks to recover.
2. Residents in Pondoohan (Selakan-Sebangkat reef) are afraid they (the Bajau Laut) will use poison for fishing and that it will ruin seaweed cultivation. The people there purposely do not allow them to pass inside the seaweed areas.
3. The Japanese in Bohey Dulang prohibited them to go into the lagoon.
(Note: the Japanese had a lease on the lagoon for the cultivation of pearl oysters and guarded the area with guns. They left in 1993 but clearly the closure of the lagoon has been remembered).

Whereas reasons given for not being allowed to fish in the areas outside of TSMP are:

1. Seaweed farm areas (Bum-Bum)
2. Tourism/ diving sites such as resorts and all (Mabul, Kapalai etc)
3. Community/ personal properties (Bangau-Bangau, Bum-Bum)

3.4.4. Opinions about anticipated benefits to fish stocks / fishers of no-fishing areas

For this question, it was first explained that the aim of setting up no-fishing zones was so that fish can grow and breed and help build up stocks, so making fishing better for everyone. The respondents were then asked what they personally thought about this idea.

Just over one third thought the concept was a 'very good idea' while slightly under a third that it was 'not such a good idea'. One fifth (20%) thought it was a bad idea and 15% did not have an opinion (Figure 23).

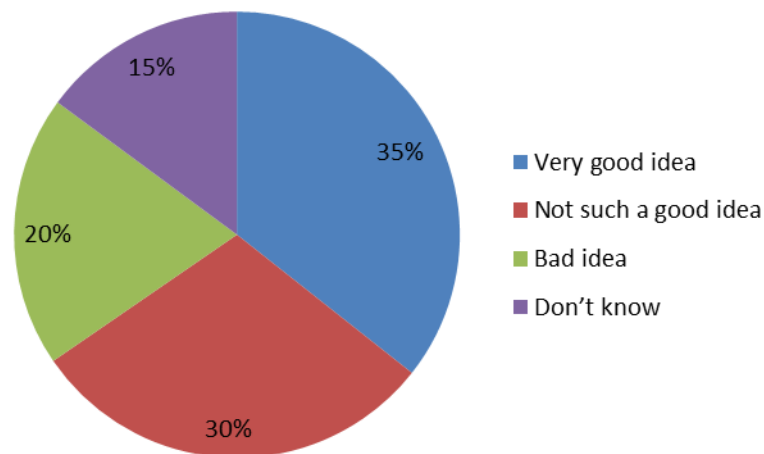


Figure 23. Opinion about the anticipated benefits of no-fishing areas (n=188)

3.4.5. Correlation between knowledge of the reason(s) why fishing is not allowed in some areas and the respondent’s opinion about no-fishing areas after the anticipated benefits had been explained.

As shown in Figure 24, there appears to be a correlation between what people already knew about not being allowed to fish in certain areas and their opinion about no-fishing areas once the anticipated benefits had been explained. Of those who thought that the idea of setting up no-fishing areas was ‘very good’, 30% were already aware of the reason why they couldn’t fish in certain areas. In contrast, of those who thought the idea was ‘bad’ only about 5% were aware. This suggests that where there is a better understanding of the reasons for establishing no-fishing areas, the idea of setting them up becomes more acceptable.

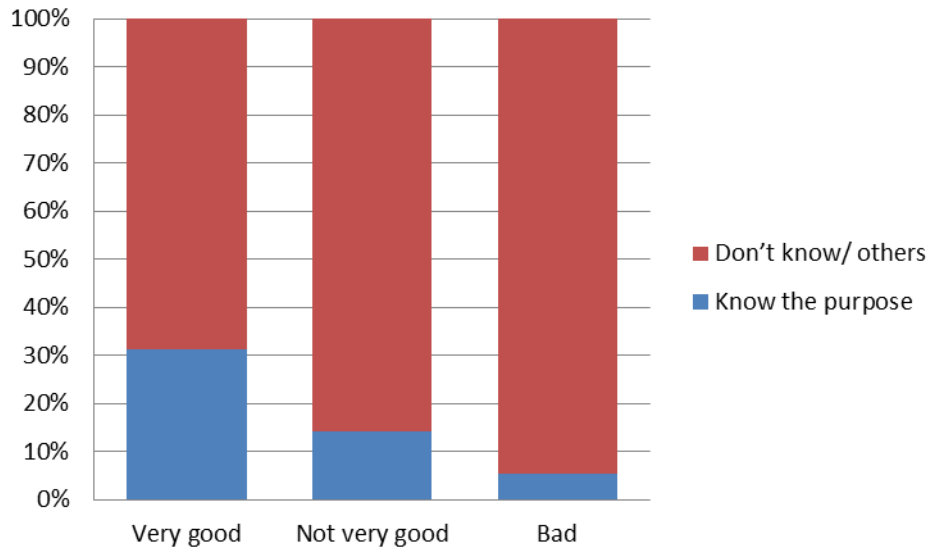


Figure 24. Opinion about the idea of establishing no-fishing zones correlated with prior knowledge about the purpose of these zones. (n=190)

3.4.6. Fishing in no-take areas

In answer to the question ‘Do you ever go fishing/ gleaning in these areas anyway?’ the majority (57%) said that they didn’t but just over one third (35%) said that they did (Figure 25).

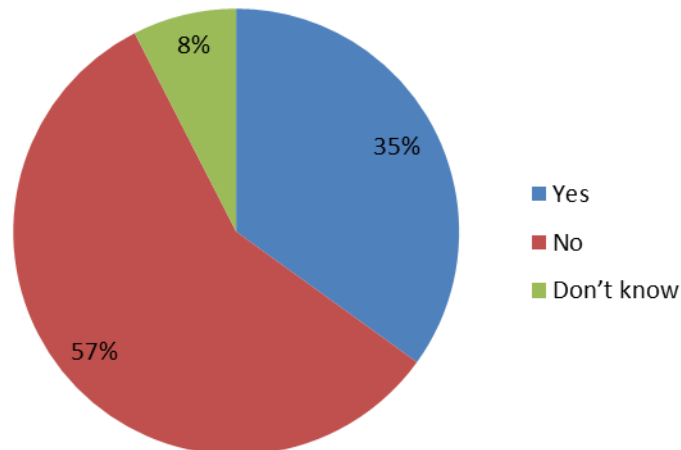


Figure 25. Response to the question ‘Do you ever go fishing/ gleaning in closed areas’ (n=186)

3.4.7. Knowledge about the existence of Marine Parks around Semporna

The majority of respondents (61%) replied 'yes' to the question 'Do you know if there are any Marine Parks around Semporna?' (Figure 26). However, 39% replied 'no', despite the fact that the Tun Sakaran Marine Park has been in existence since 2004.

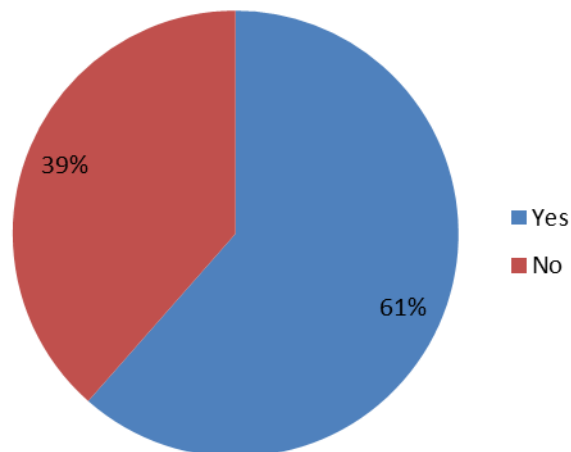


Figure 26. Response to the question 'Do you know if there are any Marine Parks around Semporna?' (n=187)

There were noticeable differences in knowledge about the existence of Marine Parks according to the location of the respondents (Figure 27).

Respondents from Sibuan, Maiga, Boheybual and Selakan recorded a very good knowledge of the existence of marine parks in Semporna which is not surprising since all of these locations are within the Tun Sakaran Marine Park.

More than half of the Bajau Laut residing outside TSMP at Halo, Gusungan, Sirongol (Timbun Mata), Labuan Haji and Semporna were aware of a Marine Park in the vicinity. Knowledge was lower at Kulapuan, where only around one third replied yes to this question.

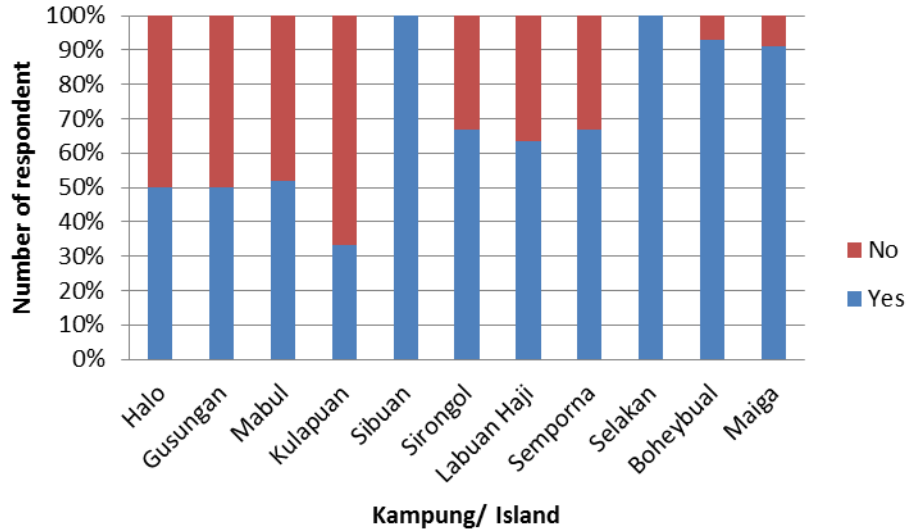


Figure 27. Response to the question ‘Do you know if there are any Marine Parks around Semporna?’ broken down by location of respondent. (n=190)

3.5. Marine issues and your role

The aim of this section was to gain an understanding of marine issues from the Bajau Laut point of view and to see whether they think they are a problem. Furthermore, they were asked about their role in helping to keep the reefs healthy and make a better living out of them.

3.5.1. Views about marine issues; are there problems?

The respondents were asked about six (6) local issues and asked if they thought these might be a problem or could affect their livelihood. They were asked to rank the level of concern as follows: ‘1=not heard about this’, ‘2=not much of a problem’, ‘3=quite a problem’, ‘4=definitely a problem’ and ‘5=unsure whether it is a problem or not’.

In general, for all of the six listed issues, around 60-80% of the respondents said they had ‘never heard’ about the issues or they were ‘not much of a problem’ (Figure 28).

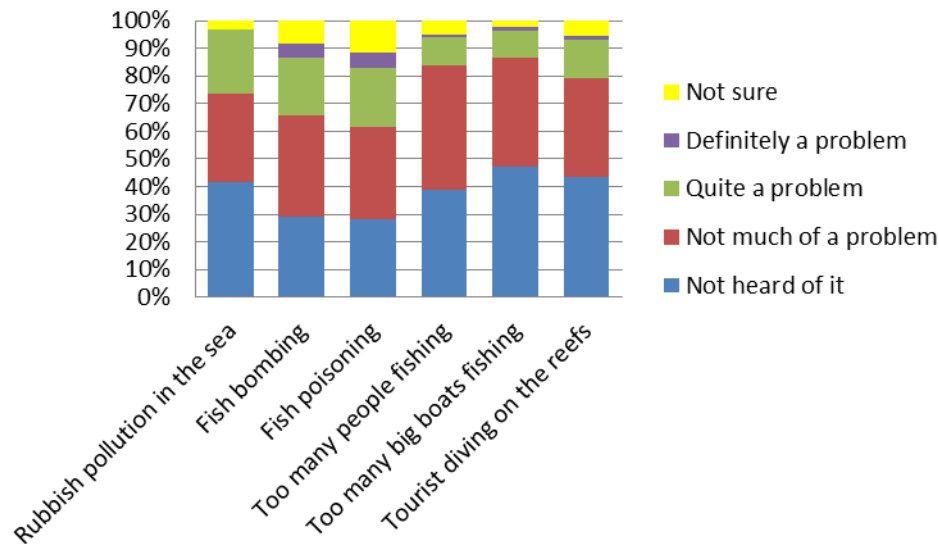


Figure 28. Responses to the question: Do you know about any of these issues and do you think they are or could be a problem for you and could affect your livelihood? (n=190).

Listed comments that influence the ranking were as follows:

1. **Rubbish pollution in the sea:** More than 70% of respondents said they had either not heard of this issue or that throwing plastic or other rubbish will never bring any impact to the sea. They mentioned that throwing rubbish in the sea is a simple and easy way to keep their house/ boat clean. The sea current will just wash it away.
2. **Fish bombing:** Around one third of respondents said fish bombing was not much of a problem and another third said they had not heard about it being an issue. Only about a quarter of respondents thought that it was a problem. What concerned them the most about bombing was the accidental explosion that may lead to injury. Other than that, they said that bombing is risky yet beneficial as one can get plenty of fish in just one explosion.
3. **Fish poisoning:** Around 60% either had not heard about it or were not concerned about fish poisoning (sujum). They claimed it did not break up the coral or cause damage but simply acted as a sedative for fish. A few said it can kill planted seaweed, thus farmers do not allow those suspected of using poison to come near their farm area. Only around 25% said that it was a problem.
4. **Too many people fishing:** About 45% said that this was not much of an issue and around one third said they had not heard of it being a problem. They believed one's catch never influenced other people's catch. It is all fated by God and catch size depends on one's effort. They did not feel fishing is a competitive job. Only just over

10% said that too many people fishing is bringing problems as resources are depleted quickly.

5. **Too many big boats fishing:** Big boats in Semporna are mainly for pelagic fishing known as 'kulibu' and 'posainol' (purse seine). Just as when asked if too many people fishing bring problems, the presence of big boats was generally not a concern for the Bajau Laut. On the contrary, big vessels with a big load of catch sometimes give them fish for free if they (Bajau Laut) ask. Just a very few respondents said that the net used in the big vessels are worrisome as they can catch almost anything, including 'ubbung' (dolphin) and turtles. Even juvenile fish cannot escape because of the fine size mesh.
6. **Tourists diving on the reefs:** Nearly 80% of respondents said they had not heard of it being an issue or that there was not much of a problem having tourists around and diving on the reefs. However, some respondents said that tourists were a problem because they used to be chased away by 'foreigners'; not allowing them to fish too close to resort areas. Some also blamed tourists as the ones who created no fishing areas in Semporna and tourists do not want fish to be taken but only to photograph them.
7. **Others:** Nine individuals said that problems were created by people lifting up coral blocks when searching for bottom dwelling organisms like sea cucumbers and abalone and other animals that bore or live in coral crevices. Stepping on the reef and gleaning also can cause problems. Seven individuals felt these were 'definitely a problem' while 2 said they were 'quite a problem'.

In general there were no particular issues that they felt affected their livelihoods, even though they make their living and depend very much on marine resources for survival.

3.5.2. Views about the importance of keeping coral reefs healthy

The respondents were asked the question: 'You need the coral reefs around here to find fish, octopus, shells, sea-cucumbers and other important resources. Do you think it is important to try and make sure the reefs stay healthy and keep providing these things?'

Most of the households visited are dependent on coral reefs for their living (see section 3.1.2) and 44% said it was important to keep the reefs in a healthy condition. However, 40% gave their answer as 'not important' and 16% of them said they did not know.

Reasons given why it is important to try and keep the reef healthy:

1. Healthiness of the reef is important mainly for fish hiding places, for fish breeding and, laying eggs. Juveniles can start growing in this healthy area.

2. If the corals die, fish will disappear because fish eat coral's mucus. If they are not protected, too many people will come destroying them.
3. Reserved area important for fish to recover their stock.
4. Healthy reef provides good fishing and food security for the next generations to come.
5. The sea looks beautiful with the presence of reefs.

Reasons given why it is not important:

1. What is important is the fish, not the reefs (i.e. the fishermen were thinking about what they can catch/earn and the reef itself was of no concern). Protecting coral reefs means they are not allowed to fish there any more (opinion based on the reason told by those who chase them away from fishing area), and this is quite hard for their living. Thus for some it was not important or a good idea due to the impact of closure on their livelihoods.
2. Some did not agree with the statement that survival of key resources such as octopus, fish etc depend on the health of the surrounding reefs.
3. The health of the reef is fated by god. It is Allah and prophet Muhammad who protect coral reefs. God has all the power to set it all in a stable condition. People come and go, so it is not their duty to protect it even if corals are destroyed, there are still too many corals in the vast sea.
4. No one thinks about protecting the reef, they know only how to 'harvest' the resources.
5. Fishing does not destroy the reef, simply leaving the area after fishing should be fine.

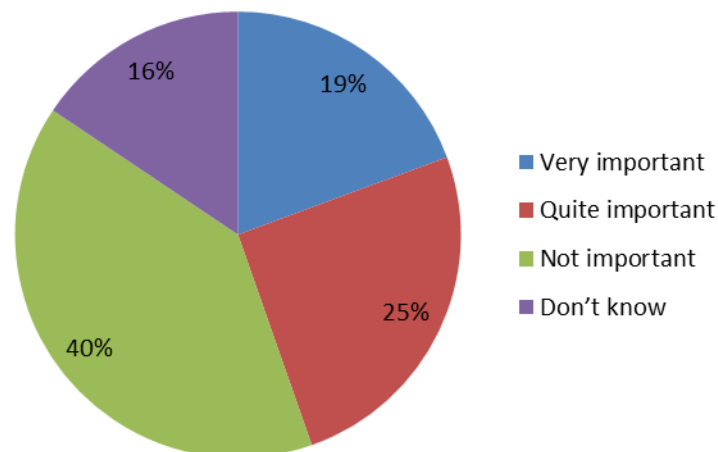


Figure 29. Opinions about the importance of keeping the reefs healthy. (n=186)

3.5.3. Opinions about anything that can or should be done by you or someone else to make the reefs healthy?

The discussion extended to whether the respondents had their own suggestions about what could or should be done in order to make reefs stay healthy. 31% (58 out of 190 respondents) gave suggestions. The main points are summarised below:

1. Frequent patrolling by Sabah Parks and Fisheries Department.
2. Use reef friendly method to catch fish and never use destructive practices such as bomb, poison, fine mesh size and lifting up corals (abalone and sea cucumber). Better way, stick to traditional fishing practices like hook and line.
3. Corals that have been turned upside-down, should be replaced in their original position, that way they will still live.
4. Catching fish further away from reef areas.
5. Investigate those who often come close to reef area; see if they use bomb or poison. If they do, they should be chased away and be warned.
6. Government should introduce more tourist/ diving sites.
7. A respected community leader with strong voice must be appointed in each island/ village and he is responsible to control his people and his area. This will be extended to community reef watch to guard their own area.
8. If no more fish in an area, it should be left; no more fishing. Fishing activity should be alternately in days (eg today fishing, tomorrow no fishing) shifting the fishing ground so that the resource will have time to recover.
9. They want to be recognised and given IC as Malaysian so that they can look for a job instead of just hoping for subsistence from the sea and just giving the marine resources stress.

Those who were against any action gave these reasons:

1. No way we can watch and protect the reef in a vast sea.
2. No one should take care of coral reefs, wasting time, better think of something that can earn money.
3. Even if one might protect it another will just destroy it.
4. Reefs support their livelihood, and sometimes they can't help damaging it, for example, one has to break up coral in searching for abalone.

4. Discussion

This survey looked specifically at the relationship that the Bajau Laut have with the marine environment and its resources. Whilst the survey was relatively small (190 households/respondents), it has helped us to better understand Bajau Laut perceptions, belief systems and their sensitivity/ knowledge of local marine issues.

The study confirmed many previous reports about the dependency of the Bajau Laut on marine resources both for family consumption and sale (Akimichi & Supriadi. 1996; Sather, 1997; Wood *et al.*, 2006). Fishing and gleaning is a way of life for this community and defines their socio-economic and cultural well-being. It begins at a young age and follows in the traditions of parents and grandparents. The skills of the Bajau Laut are widely recognised and, at least within the Tun Sakaran Marine Park, it is this community who do much of the fishing, often acting for middlemen who sell in Semporna, Tawau and further afield.

Human populations have increased dramatically in the Semporna area (and elsewhere in Sabah) which means that pressure on marine resources continues to grow. Studies from around the world have shown that unmanaged use of resources in these situations can very easily lead to over-exploitation and subsequent hardship for fishers as well as ecosystem impacts including loss of biodiversity.

There is irrefutable evidence from marine surveys that over-fishing and destructive fishing have occurred in the Semporna area and that marine resources have been depleted and coral reef ecosystems degraded (Wood *et al.*, 2004; Kassem *et al.*, 2012). In terms of the impact on local fishing communities, 70% of respondents in the survey felt that it was either a bit or much more difficult to find reef fishes than in earlier days. In addition, just over half (54%) said that if the number of fishermen continues to increase, marine resources will not be enough. This suggests that a link has been made in at least some of the fisher's minds between the amount of fishing that is carried out and the availability of resources.

However, 30% of respondents said there will be still plenty of fish in the sea, regardless of the increasing number of fishermen. The consultation showed that the Bajau Laut believe strongly that availability of resources and success in fishing is willed by God and that the level of catch depends on effort. This presents a challenge for people or organisations trying to explain that there are biological limits to the amount of fish and other resources that can be taken from the sea beyond which productivity will decline and stocks will not recover. Fishers who believe that availability of resources is willed by God may not accept this premise or see the need for conservation action.

Some fishing communities around the world have well established customary practices for managing use of natural resources and promoting long-term sustainability and food security. Local community-based initiatives aimed at conserving and managing marine resources have also evolved in recent years in many countries, often encouraged by non-governmental organisations.

This study indicates that the main method the Bajau Laut use in order to bring in a sufficient supply of marine resources is to move to new fishing grounds if and when local supplies dwindle. 'Rotational' fishing can be an effective way of conserving stocks because the fishing grounds are 'rested' and exploited populations can grow and breed. However, this approach is only likely to work effectively in terms of resource conservation if there is a high level of withdrawal from fishing in a particular area for a reasonable length of time. The Semporna reefs are seldom seen without fishermen on them and it appears that even if a few families decide to move away for a while, others will remain or take their place. Thus fishing pressure remains high and resources continue to dwindle. The Bajau Laut do not have any customary practices specifically aimed at conserving stocks and in fact reported that they target spawning fish because of high prices for fish with eggs.

Fishery reserves (no-take zones) are a recognised way of promoting the re-building of stocks, but at least in the short term, closures affect fishers who have previously used these areas. 77% of respondents experienced not being allowed to fish in areas where they used to catch fish/ glean before. The sites they mentioned included those within the Tun Sakaran Marine Park but also a number that are tourist resorts (e.g. Pom Pom, Kapalai, Matakong) or community personal properties (Bangau-Bangau, Bum-Bum). Clearly, the closure of areas to fishing means that fishers will have to seek out other areas, although one third of respondents said that they continued to fish in closed areas.

Taken overall, the majority of respondents (63%) said that they did not know the reason why they were not allowed to fish in certain areas. This suggests that the reasons were either badly explained or not explained at all. Another possibility is that because of their location and/or roving lifestyle the Bajau Laut who took part in this survey missed roadshows and other events where the reasons were explained. Whatever the explanation for the low level of awareness, it is clear that efforts need to be re-doubled to a) reach all communities and b) ensure that the purpose and benefits of no-take zones are explained clearly and simply.

The most effective way of demonstrating how no-take areas work is for people to witness them for themselves. Possibly responsible 'champions' could be selected from the Bajau Laut community and taken on a visit to Sipadan, where there has been no or minimal fishing for well over 25 years. They would be able to see quite clearly how the fish stocks have responded and how healthy populations of sharks, groupers, barracuda and large fish such as humphead wrasse have built up.

Whilst the benefits for productivity, biodiversity, ecosystem health and dive tourism are clear, actual or potential benefits of no-take zones to fishers such as the Bajau Laut are less immediately obvious and quite naturally this can be a barrier to acceptance of this strategy.

The theory is that the reserves allow fish to grow and breed, producing 'spill-over' of adult fish to neighbouring fished reefs and quantities of larvae that float out to colonise the surrounding area. When these potential benefits were explained to the respondents in the survey, just over one third thought the concept of no-take areas was a 'very good idea'.

However, slightly under a third said that it was 'not such a good idea' so there is obviously much work to be done to demonstrate how a restrictive policy can actually bring benefits in the long term.

Case studies from around the world can be shared with the Bajau Laut in order to illustrate how 'spillover' of fish and other marine life from no-take areas has benefitted local fishers. It should be stressed that although the Semporna reefs have been badly over-fished and degraded by fish bombing, stocks could recover if no-take areas are successfully established in potentially productive areas.

Some of the acknowledged 'big marine environmental issues' in the Semporna area are not of great concern to the Bajau Laut. When asked their opinion about pollution, fish bombing, fish poisoning, too many people and/or big boats fishing and tourists diving on the reefs, between 60-80% of the respondents said they had 'never heard' about the issues or they were 'not much of a problem'. In other words, the perspective of the Bajau Laut on these issues differs from that of people and organisations working on the marine environment in the area. There is a need to explore this disconnect in more detail and also to better explain the potential long-term consequences of environmental impacts on their lives and livelihoods.

On the question of healthy reefs 16% of the Bajau Laut respondents said they did not know whether it was important and the rest were split fairly evenly between those who thought it was important to keep them healthy and those who thought it was not. Reasons for the answer 'not important' included the view that it is the resources that are important, not the reef itself, that the 'survival' of the resources is not connected with the health of the reef and that the health of the reef is fated by god. However, when asked about what could be done to help make the reefs stay healthy nearly one third of respondents made suggestions and their replies indicated a good grasp of key issues.

In general, however, many of the Bajau Laut do not appear to make a strong connection between human activities and the availability of marine resources. If there was a greater understanding of conservation issues and basic fishery principles there might be more support for conservation action and fishery management. This need not conflict with or negate their belief in god or spirits.

5. Conclusions and next steps

The findings from this survey suggest that the following actions would help to promote conservation and the sustainable use of reef resources:

1) Appoint/elect Bajau Laut 'reef champions'/community leaders

This suggestion came from within the Bajau Laut community and if it could be taken forward would be a major achievement. The Bajau Laut are represented in the 'Boheydulang Development and Community Affairs' group which was set up in 2013 and which aims to engage with key local issues. However, currently, the Bajau Laut are ignored or side-lined in discussions about management of the Tun Sakaran Marine Park (TSMP) and are not given enough opportunities to engage in conservation activities. This is regrettable because, as has been previously emphasised by SIP in relation to TSMP, the Bajau Laut are part of the Park community and should be treated as such. If community groups spearheaded by Bajau Laut were established and encouraged this could greatly help to promote a sense of stewardship and ultimately provide benefits to those who commit to help look after 'their area'.

2) Maintain and expand outreach work

Although TSMP was established in 2004 there is still a relatively high proportion of Bajau Laut who are unaware of the existence of the Park or the aim and benefits of the no-take zones. This is particularly the case with communities living outside the Park and public awareness campaigns need to continue and expand to provide a better level of awareness. Many of the Bajau Laut also said they were not too concerned about issues such as marine pollution, fish bombing, fish poisoning and too much fishing – a perspective that differs from that of people and organisations working on the marine environment in the area. There is a need to explore this disconnect in more detail and also to better explain the potential long-term consequences of environmental impacts on people's lives and livelihoods.

3) Awareness programme covering basic fishery principles

Outreach work should also include a programme covering basic fishery principles. This need not negate or contradict Bajau Laut beliefs about the availability of resources being in God's hands but would seek to provide simple explanations and examples of how fish stocks respond to fishing and what can be done by fishers to promote long-term productivity and food security. This could include a visit to a functioning fishery reserve such as Sipadan.

4) Joint monitoring programmes

The Bajau Laut are highly skilled fishers and also very knowledgeable about the resources on which they depend; for example they probably know a great deal about reproductive patterns and migrations in fish and about seasonal change. All of our interactions with the Bajau Laut also suggest that they are willing and interested to

share information. A joint monitoring programme, perhaps with NGOs, the private tourism sector or Sabah Parks, could help to provide useful information as well as stimulating more interest in / understanding of the reef ecosystem.

5) Improved livelihood opportunities

It is also clear that more needs to be done to ensure that the Bajau Laut community benefit from the existence of the TSMP, not just through measures to promote sustainable fishing, but also through improved livelihood opportunities. Renewed efforts need to be made to investigate alternative and supplementary livelihoods including in the rapidly-developing tourism sector.

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APPENDIX 1

BAJAU LAUT/ SAMA DILAUT QUESTIONNAIRE SURVEY FORM

Interviewer: Note taker:	Date:
Kampung/ Pulau:	ID Sheet.:

Dwelling of respondent

1. Permanent house on land (above high water)
2. Temporary house on land (above high water)
3. House on beach/back reef (below high water)
4. Boat

Hello, my name is _____ and this is ----- (the interviews will be done by 2 people – one chatting, one recording) and we work for a non-governmental organisation that is looking at how life is for fishing communities around here.

Please may we ask you a few informal questions? The answers you give will be completely anonymous and not connected to you or your family. Its fine if you don't want to participate, you are not obliged to but we would very much value your views

We would like to know your name in case we need to contact you again, but you don't have to tell us if you would rather not.

Background

1. Name of respondent _____
2. Age <20 20-29 30-39 40-49 50-59 60+
3. Gender M F
4. How many people live in this house or boat?

	Father	Mother	Children	Other relatives
Number in <u>your</u> family (i.e. that eat together regularly)				
Other family 2				
Other family 3				
Other family 4				

5. Can you tell us how long you have been living here at this place?
 < 1 1-2 3-5 5-10 10-20 20+

6. Can you tell us whether you travel much and stay in other places? Travel:
Yes No Occasionally
Destinations _____

7. Can you tell us the main reason why you travel?

Season/weather	<input type="checkbox"/>	fishing for a particular species	<input type="checkbox"/>
Trading	<input type="checkbox"/>	Working/contract	<input type="checkbox"/>
Weddings/burials/ medicine/treatment	<input type="checkbox"/>	meeting friends/family	<input type="checkbox"/>
		other(specify)_____	<input type="checkbox"/>
			seeking <input type="checkbox"/>

8. Do you remember how many years ago you started fishing?
 < 1 1-2 3-5 5-10 10-20 20+

And / or how old were you?

< 1 1-2 3-5 5-10 10-20 20+

9. Are your parents also fishers? Yes No

10. Grandparents fishers? Yes No

11. What is the main source of income / making a livelihood for your family?

Catching and selling fish and other marine resources

Seaweed farming

Other (specify)_____

12. Can you tell us about what you usually do with the fish, octopus, shells and other marine resource you collect? Do you:

Use them all or nearly all for subsistence for your family?

Use them about equally for subsistence & sale?

Use them only or mainly for sale?

Perceptions

We know from talking to other fishers and from carrying out surveys on the reef (e.g. counting fish underwater) that sometimes it is not so easy to find fish, clams, sea-cumbers and other resources and sometimes there are plenty. Your community has the most skilled fishers in the area and you know more about the marine resources than anyone else. We would really value your opinions and hope that you will share them with us please.

In your observation, since you started fishing/gleaning, what is the general situation regarding how good the fishing is? We would like you to try and ignore changes from one time of year to another and just think about whether things have changed since you first started fishing?

13. How important are the following to you? And in the view of you and your family, is it easier or more difficult to find them than it was when you first started fishing / gleaning?

Score				
		Importance of this resource to your family:	Easier or more difficult to find now?	
Reef fish		1 = very important 2 = fairly important 3 = not very important 4 = not at all important		1 = Much more difficult 2= A bit more difficult 3= About the same 4 = Easier 5 = not sure
Octopus				
Cuttlefish				
Sea-cucumber				
Snails				
Bivalves				
Horseshoe crab				
Mangrove crabs				
Sea urchins				

14. Do you think there have been any general changes in the size of reef fish that you catch:

Bigger No changes Smaller Dont know

Reasons for change? _____

15. Have there been changes in the distance that you have to travel to the fishing/gleaning area:

Further away No changes Dont know

Reasons for change? _____

16. Do you think there are more people fishing/ gleaning around here than there used to be?

Yes No Dont know

Comments _____

17. In places where there are a lot of people fishing and gleaning do you find you can catch less or more fish and other resources?

A lot less Less The same More Don't know

Comments _____

18. What do you think will happen if more and more people are fishing - will there still be plenty of fish to feed your family and for you to sell?

Yes No Dont know

Comments _____

Beliefs

Prayers, spiritual beliefs and help from ancestors (Mbo') are very important for many communities around the world. We would like to ask you about how important they are to you, especially when you are fishing.

19. Are prayers important to you personally?

Prayers: Yes No

Comments: _____

20. If you DO use prayer are any of the prayers about having enough fish to catch?

Prayers about good fishing: Yes No

Comments: _____

21. Do **good spirits** play any role in your fishing activities?

Good Spirits: Yes No

If yes, what are the spirits and what sort of role do they play and where do they reside?

22. Do **evil/ bad spirits** play any role in your fishing activities?

Bad Spirits: Yes No

If yes, what are the spirits and what sort of role do they play and where do they reside?

23. Are there any special Customs, legends, rituals, stories that influence your daily life and your fishing practices?

Comments: _____

24. Does fish bombing go against your personal views of what are acceptable fishing practices?

Yes No

Comments: _____

Marine Protected Areas

Fishers sometimes have their own rules (adat) or customs about not fishing or gleaning in some areas or not catching fish or other marine animals that are breeding.

25. Can you tell us if you or your community have any rules or customs like this?

Yes No Don't know

If yes, please give full details

26. Are there any places where you used to fish but people tell you that are not allowed to now?

Yes No

If yes, where are these places (refer to map and note local names or names of Marine Park or tourist resort etc).

27. Do you know the reason why it is that you not meant to fish here?

Yes No

If yes, what is the reason?

28. Do you ever go fishing/ gleaning in these areas anyway?

Yes No

Why?

29. When there is no fishing in a particular place the fish there should be able to grow big and produce lots of young fish that can spread out to other areas. In the end this could make fishing better for everyone. What do you personally think about this idea?

Very good idea not such a good idea Bad idea Don't know

Comments:

30. Do you know if there are any Marine Parks around Semporna?

Yes No Dont know

If answer is yes, do you know where?

Marine Issues and what to do

There are some things happening around the Semporna area that may be making the sea and the reefs less healthy and reducing the amount of fish and other marine resources.

31. We wonder if you know about any of these things and if you think they are or could be a problem for you and could affect your livelihood?

Heard or know about this and think it is		
Rubbish pollution in the sea		1 = Not heard about this 2 = Not much of a problem 3 = Quite a problem 4 = Definitely a problem 5 = Unsure whether it is a problem or not
Fish bombing		
Use of sujum		
Too many people fishing		
Too many big boats fishing		
Tourists diving on the reefs		
Other - details		

32. You need the coral reefs around here to find fish, octopus, shells, sea-cucumbers and other important resources. Do you think it is important to try and make sure the reefs stay healthy and keep providing these things?

Yes very important Quite important Not important Don't know

Why? _____

33. In your opinion, is there anything that can or should be done by you or someone else to make the reefs healthy?

Suggestions of what could be done

By whom? _____

34. Is there anything that you want to ask us or any other comments that you would like to make?

Interviewer confidential comments

1. Do you think respondent looks honest answering the questions?

Honest Somewhat honest Not honest

2. Do you think respondent look interested and give attention to the interview?

Interested Moderate Not interested

3. Do you think respondent sounds confident and comfortable answering the questions?

Comfortable Reasonable No

4. Why do you think so? _____

5. Please state why there is blank answer (not answered questions, if any):
