SUMMARY REPORT

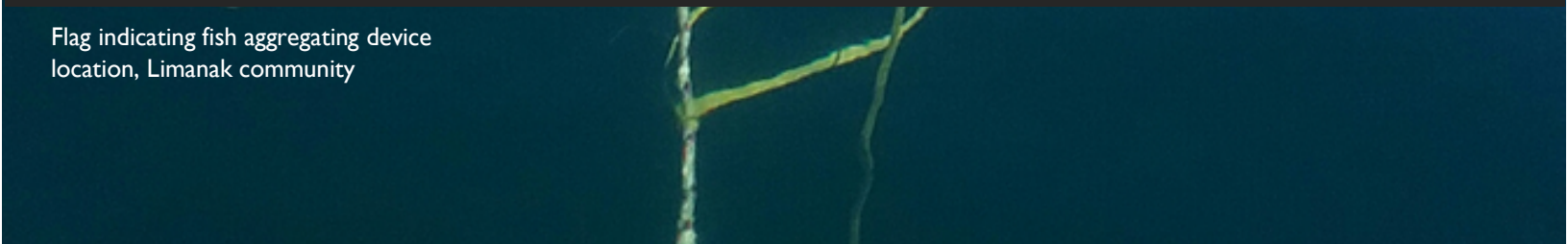
Fishers' focus group surveys: Have fish aggregating devices benefited local community fishers?

Department of Foreign Affairs and Trade

Wildlife Conservation Society

DFAT

WCS



Flag indicating fish aggregating device location, Limanak community

Building rural communities' resilience to climate change in the Bismarck Sea and Forest, Papua New Guinea
Funded by the Australian Department of Foreign Affairs and Trade

FISHERS' FOCUS GROUP SURVEY OUTCOMES: Understanding community perceptions on the impacts of fish aggregating devices on local catch and effort trends

BACKGROUND

In 2018, subsurface nearshore fish aggregating devices (FADs) were deployed within the customary waters (<200 m deep) of 11 locally managed marine areas (LMMAs) in Kavieng District, New Ireland Province, Papua New Guinea (PNG). The main objectives of FAD deployment were to help provide fishing alternatives to 13 coastal communities accessing sensitive habitats within the LMMAs and relieve fishing pressure on vulnerable populations of reef fish. A FAD consists of a series of ropes and floats that are anchored to the seafloor. The upper-most floats lie on or close to the sea surface; attached to the surface ropes are a series of streamers that are bathed in daily sunlight. Algae grow on the streamers, which in turn attracts other marine life, including baitfish (Figure 1). Pelagic fish species, such as tuna, are attracted to the smaller baitfish. The concentration of tuna around the FAD can provide fishers with a relatively reliable source of small pelagic fish (Figure 2). FADs are often viewed as a sustainable fisheries option for small-scale fisheries in tropical coastal regions because they can help transfer fishing effort from vulnerable coral reef fisheries to more resilient open water fish species.

Figure 1: The ropes and floats of a subsurface fish aggregating device (FAD) when they have been removed from the sea for maintenance. Algal growth – including clumps of the green algae *Halimeda opuntia* – have encrusted the ropes and floats. Baitfish feed on the algae, which attract larger pelagic fish for subsistence fishers to harvest. The ropes and floats need maintenance to ensure the FAD functions correctly. The FAD in the photograph was removed from Bangatan community, New Ireland Province, in July 2019, a year after initial FAD deployment. (Photograph credit: Junior Anson)

To gauge whether the FADs have benefited community members in each of the 13 communities that have LMMAs, the Wildlife Conservation Society (WCS), with support of the Australian Department of Foreign Affairs and Trade (DFAT), conducted fishers' focus group interviews in each community to understand how the community residents use their FAD, and whether the FADs have had a positive impact on community fishing trends. This report outlines the main outcomes from all of the focus groups that took place in the communities, and provides some recommendations to help communities gain further benefits from the use of the FADs in their customary waters.

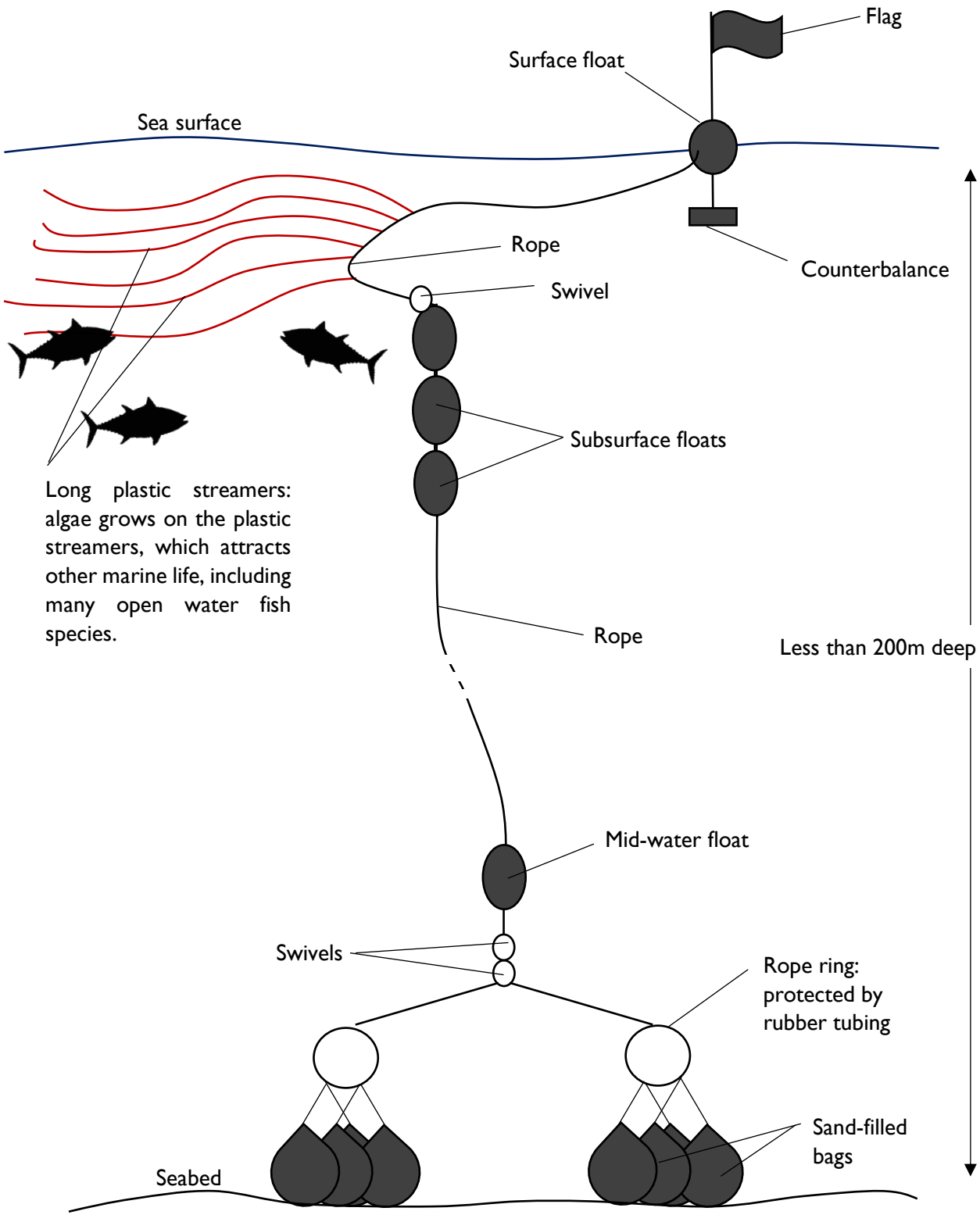


Figure 2: The basic structure of a subsurface fish aggregating device (FAD). Typically, a FAD is deployed in waters that are at least 100 m deep. Subsurface FADs were deployed in 11 locally managed marine areas in Kavieng District, New Ireland Province, Papua New Guinea, in 2018.

METHODS AND RESULTS

From the 26th May to the 29th July, 2020, the WCS team visited all 13 communities that have LMMAs in their customary waters, in order to conduct fisher focus groups surveys (Figure 3 and Figure 4). There were two-subgroups in each focus group: one subgroup for male fishers and one subgroup for female fishers (only community fishers took part in the survey). A total of ten questionnaire-based survey forms were distributed to each focus group, with approximately half to the male subgroup and half to the female subgroup. Participants had ten minutes to discuss the questions before completing the forms in their subgroups. There could be as many as 20 participants in each subgroup, in which case the participants completed the survey forms in pairs. The survey forms were presented to the communities in Tok Pisin; an example of the survey form – written in English – accompanies this report. The purpose of the survey forms and all technical terms were explained to the communities prior to the completion of the survey forms. No former study took place in each community; thus, all outcomes are based on participant perceptions.

Figure 3: Community facilitators, who form part of the WCS team, explaining to the male focus subgroup in Tsoilik community how to complete the fishers' focus group questionnaire form. A copy of the survey form accompanies this report. (Photograph credit: Alpha Leach)

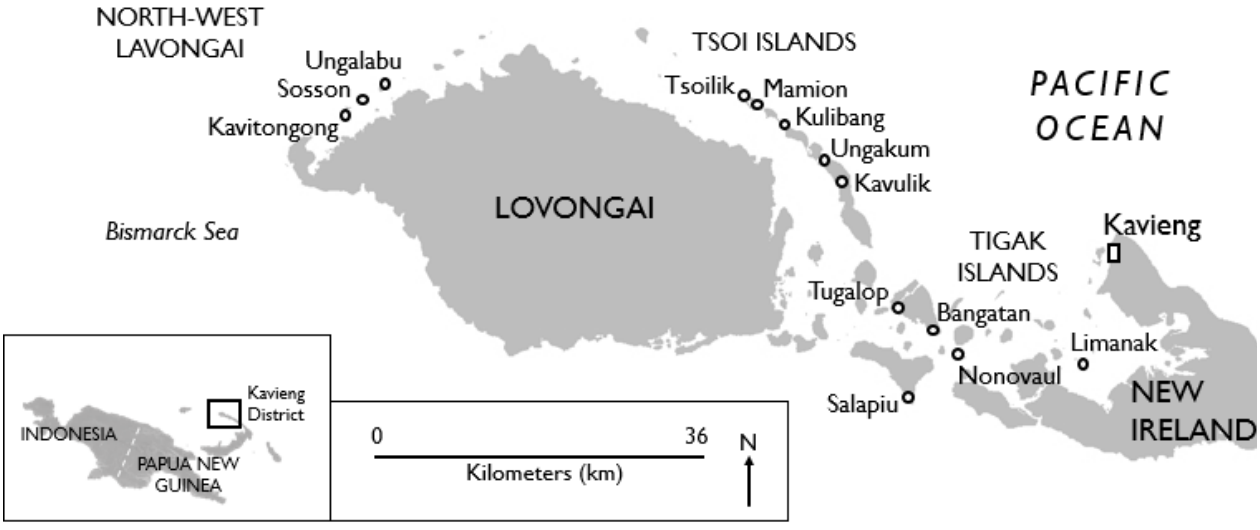


Figure 4: The focus group participants came from 13 communities, which represent 11 locally managed marine areas (LMMAs) in Kavieng District, New Ireland Porcine, Papua New Guinea. In 2018, fish aggregating devices (FADs) were deployed in each of the 11 LMMAs. The communities of Ungalabu, Sosson and Kavitongong, located to the north-west of Lovongai Island, collectively encompass one LMMA.

Across all sites, a total of 117 residents took part in the focus groups, comprising 43 female and 74 male participants. Of the 117 residents, 60 (51%) were aged 19 to 35 years old, 42 (36%) were 36 to 50 years old, and 15 (13%) were aged 50 or older (residents aged 18 or less did not take part in the study). The participants indicated how often they go fishing. The majority of fishers went fishing once a day (23%), more than once a week (25%), or more than once a month (25%). All fishers stated that they went fishing at least once a month (Figure 5A). In general, fishers relied on canoes (54%) or a range of different transport modes (42%), which may include canoes, motor boats and walking, to go fishing (Figure 5B).

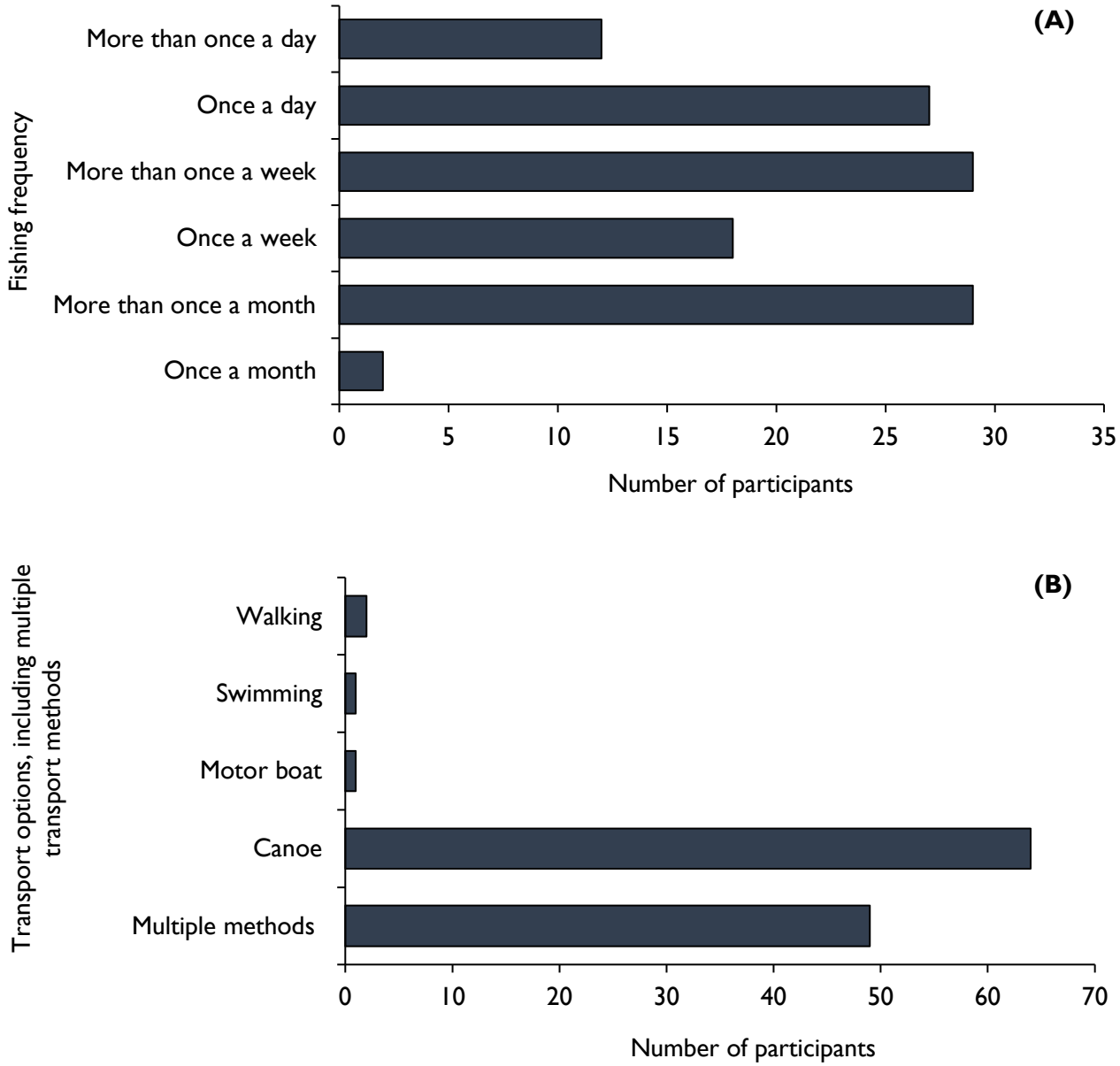


Figure 5: (A) The frequency of fishing activity according to outcomes provided by the focus group participants from all 13 communities in Kavieng District, New Ireland Province. All the participants went fishing at least once a month. (B) The usual transport mode or modes used by the focus group participants from all sites in order to go fishing. Multiple methods denotes fishers that used more than one transport method to go fishing, such as using canoes, motor boats and walking to access fishing preferred sites.

Table 1: Major fish categories identified by focus group participants from all 13 communities, which were perceived as forming key constitutes of typical fish catch compositions before and after fish aggregating devices were deployed in each community's customary waters. The nearshore fish category includes fish families and groups typically found in shallow coastal waters and which are unlikely to be caught around the fish aggregating devices. The open water fish category includes fish families that live in pelagic systems and which may be caught at the FAD. The other fish category includes fish families or groups that contain species that may live in coastal or open water marine systems, as well as fish groups that include migratory species and vague descriptions of fish that cannot be accurately classified. The problems category includes participant outcomes in which there was uncertainty as to which fish types a fisher typically catches, as well as fishers that are unsuccessful in catching fish.

Nearshore fish category	Open water fish category	Other fish category	Problems category
Emperors	Tunas	Sharks	Unsure
Snappers	Trevallies	Mullets	Struggles to catch fish
Groupers	Barracudas	Big fish ‡	Fails to catch fish
Sweetlips	Mackerels	Silver fish ‡	Not using the FAD
Rabbitfishes	Rainbow runners	Blue fish ‡	-
Surgeonfishes	Pelagic fish †	-	-
Parrotfishes	Deep water fish †	-	-
Wrasses	-	-	-
Needle fishes	-	-	-
Stingrays	-	-	-
Reef fish *	-	-	-

* *Reef fish* was sometimes listed by community participants; such outcomes were grouped in the *nearshore fish* category

† If a respondent listed *pelagic fish* or *deep water fish*, such outcomes were included in the *open water fish* category

‡ Ambiguous outcomes, such as *big fish* and *silver fish*, were classified in the *other fish* category

The participants indicated which major fish families or groups of fish were typically caught both before and after 2018, when the FADs were deployed in each community's customary waters. The fish families and major fish groups were classified into the following four categories: (i) *nearshore fish* (fish families or fish groups that typically live on or close to coral reefs, sea grass meadows, algal beds, sand flats, estuaries, or mangroves); (ii) *open water fish* (fish families or fish groups that usually inhabit pelagic environments and can be caught at FAD sites); (iii) *other fish* (including fish families or fish groups that can be found in nearshore and open water environments, such as migratory species or sharks, and vague descriptions of fish that prevent a more thorough classification, such as silver fish or big fish); and (iv) *problems* (which included respondent remarks that suggest uncertainty or an inability in catching fish during fishing trips or fishers that are unable or unwilling to use their community FADs). Table 1 provides an overview of the four fish categories, including examples of fish groups in each category.

In total, 528 fish families, species and groups, which could be categorised as nearshore fish groups or open water fish groups, were listed by the participants[*]. From the pooled data from all 13 communities, 294 fish groups were perceived as forming part of the typical catch from before FAD deployment in each community's respective customary waters, of which 176 were from nearshore environments and 118 were from open water systems. According to the respondents from all 13 communities, fewer fish groups

[*] Additional fish groups, such as *big fish* and *blue fish*, were listed by the respondents; however, due to the ambiguity of such names, these fish groups were not included in the analysis. Mullets and other migratory fish were not included in the analysis due to their migratory behaviour and life histories that can include pelagic. Nearshore and estuarine environments. Sharks were not included because they can be caught in areas of coral reef and other nearshore regions as well as at the FAD sites, depending on the species.

were caught after the FADs were deployed (234), although the number of open water fish groups had increased from 118 (before FAD deployment) to 129 (after FAD deployment); in contrast, the number of reef-associated fish had decreased from 176 (before FAD deployment) to 101 (after FAD deployment). However, while such outcomes indicate some behaviour change, it is complicated because participants reported perceived catch compositions at different taxonomic levels (for example, a fish family may live in predominantly pelagic systems, although certain species within the family may live in nearshore regions). Figure 6 presents the number of major nearshore and open water fish groups that participants from all 13 communities stated were typically caught before and after FAD deployment, as well as the number of participants that were unsure as to which fish they captured and fishers that were unable to catch fish (grouped under *problems*).

The participants from all 13 communities provided information on the preferred marine habitats they typically visit when fishing, both before and after the FADs were deployed. Before the FADs were installed, the majority of participants reported that they visited a variety of marine habitats in order to go fishing, including open ocean areas and nearshore habitats (38%), and coral reefs (26%); in contrast, 10% of the respondents claimed that they only went to areas of open water to go fishing. Following the deployment of the FADs there was little change, with 39% of respondents visiting a range of habitats, including the open ocean and nearshore marine environment, while 10% of the fishers visited only the open ocean, which would include the area where the FADs were deployed. However, the number of participants fishing on coral reefs declined to 22% (a decline of 4%) following the deployment of the FADs (Figure 7).

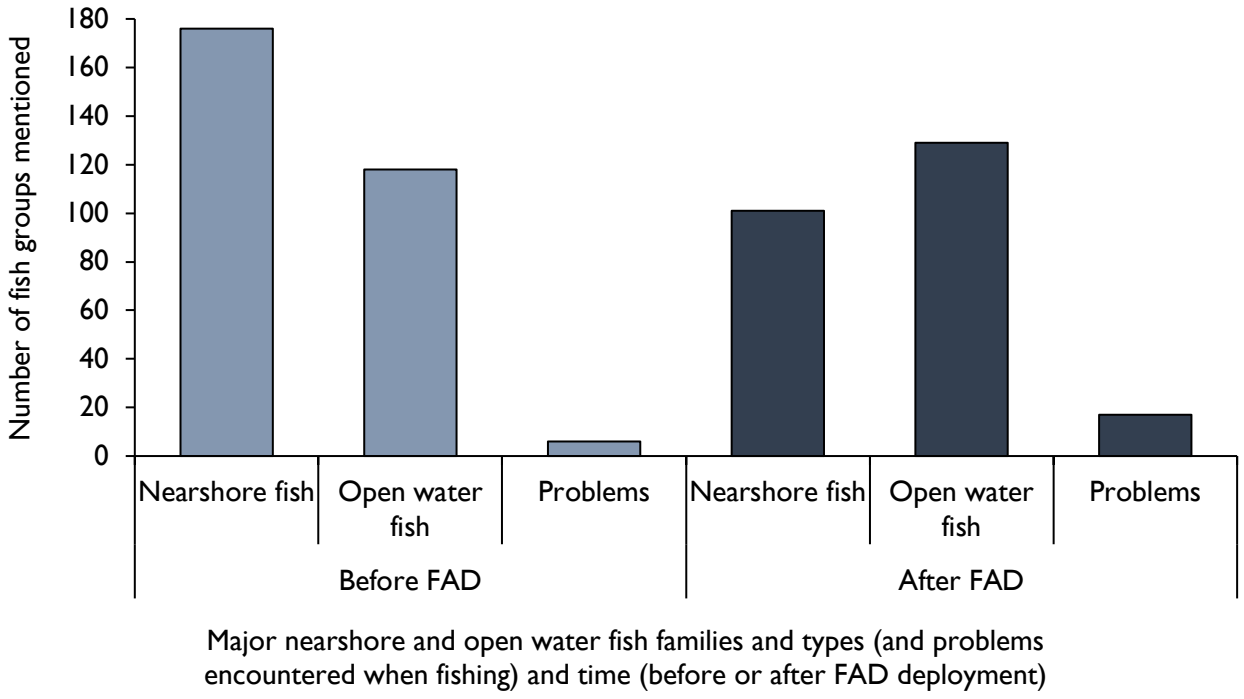


Figure 6: Respondent outcomes from all 13 communities concerning the main fish groups that fishers perceived as forming part of their typical fish catch, before and after the deployment of fish aggregating devices (FADs) within each community's customary area. The fish groups were classed as *nearshore fish* (including reef-, seagrass-, sand flat-, algal-bed- and mangrove-associated fish groups) and *open water fish* (including pelagic fish species that can be caught at the FADs). Additional details concerning the fish group categories have been listed in Table 1. The *problems* category includes responses from fishers that were unsure as to which fish they were harvesting, and also fishers that claimed that they were unable to catch fish. Light blue denotes perceived respondent outcomes from before the FAD deployment; dark blue indicates perceived outcomes from after the FAD deployment.

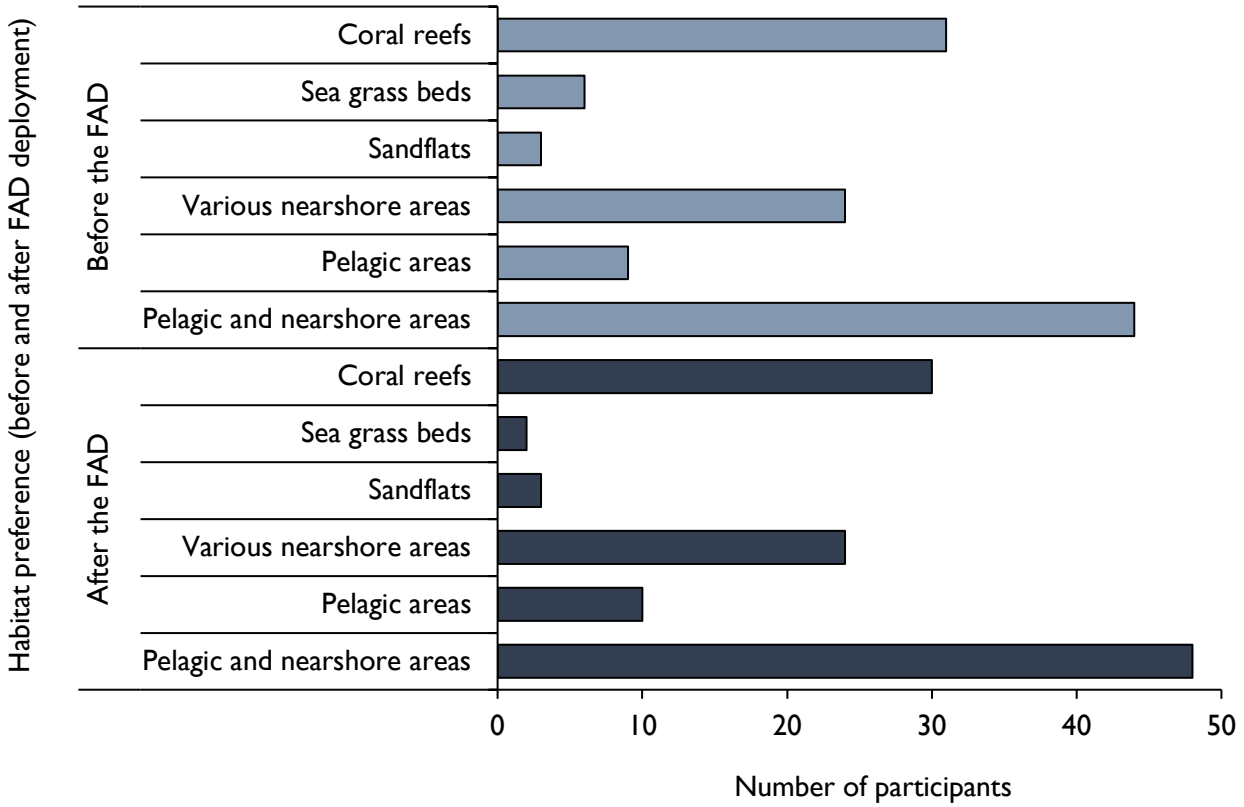


Figure 7: Perceived habitat preferences for fisher participants from all 13 communities. Habitats indicate where fishers typically visit to go fishing, both before and after FAD deployment in each community's customary waters. The *various nearshore areas* category includes two or more habitats that are associated with coastal environments, including coral reefs, sea grass beds, sand flats, mangroves and estuaries. The *pelagic and nearshore areas* category includes open water systems and one or more nearshore environment. Light blue indicates perceived respondent outcomes from before FAD deployment; dark blue denotes perceived participant outcomes after FAD deployment.

The respondents from all 13 communities provided difficulty ratings that concerned perceived fishing effort, both before and after the FADs were deployed in each community's customary waters. Before the FADs were deployed, 22% of the respondents said fishing was very easy, while 25% of the participants said fishing was quite easy. Only 4% of the respondents said fishing was very hard, and 15% of respondents were unsure. Following the deployment of the FADs in 2018, there was a small decrease in the number of respondents that said fishing was very easy (from 22% before FAD deployment, to 18% after FAD deployment). There was also a 9% increase – from 15% to 24% of respondents – that said that they were unsure of how difficult they found fishing in their customary waters (Figure 8).

The participants from all 13 communities indicated the distance they believe that they usually travel in order to go fishing, both before and after the FADs were deployed. Before the FADs, the majority of participants said they travel quite far (38%) in order to access preferred fishing grounds, while 20% of the respondents stated that they travelled a close distance to go fishing. Following the deployment of the FADs, 35% of the respondents said they travelled quite far to reach their regular fishing grounds. Both before and after FAD deployment, no residents from all 13 communities stated that their preferred fishing grounds were very close (Figure 9).

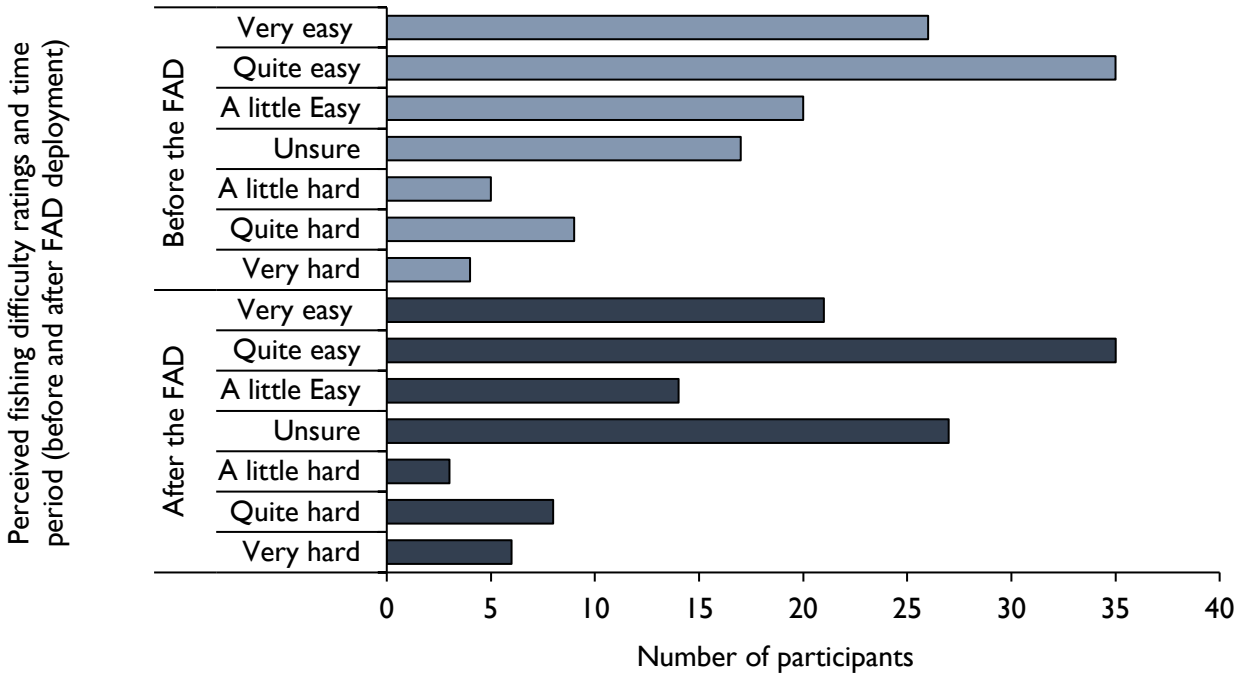


Figure 8: Fishing effort difficulty ratings, provided by the participants from all 13 communities, according to how difficult they perceived fishing to be both before and after fish aggregating devices (FADs) were deployed in their customary waters. Light blue represents community perceptions from before the FADs were deployed and dark blue denotes participant views following FAD deployment.

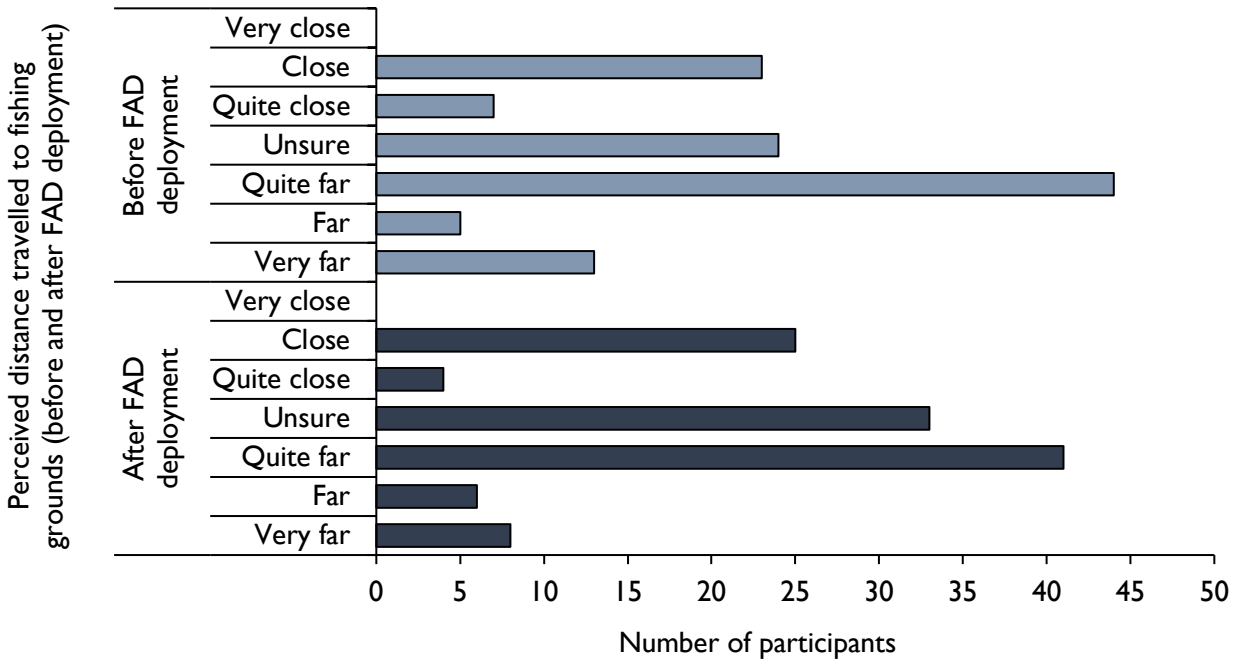


Figure 9: The perceived distance usually travelled by participants from all 13 communities to reach preferred fishing grounds, both before and after fish aggregating devices (FADs) were deployed in 2018. Light blue indicated respondent outcomes from before the deployment of the FADs and dark blue represents participant outcomes following the deployment of the FADs.

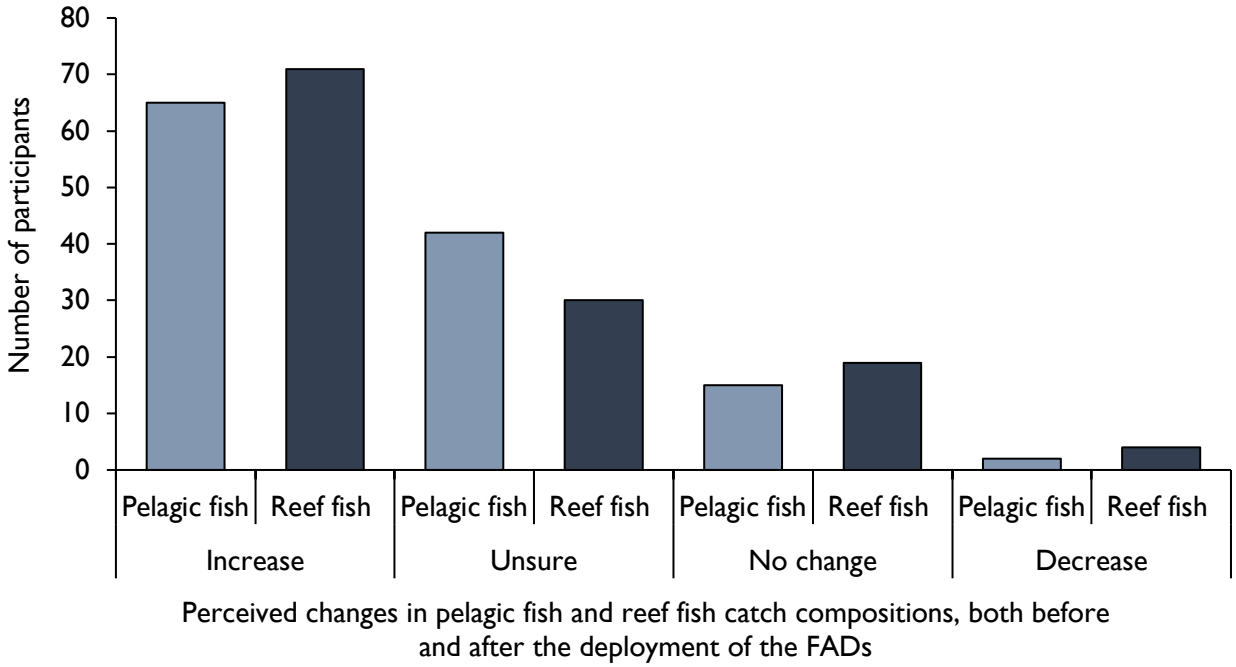


Figure 10: Outcomes from all the participants concerning the perceived changes in pelagic and reef-associated fish catch compositions before and after the introduction of the fish aggregating devices (FADs) within the customary waters in each of the 13 communities. Light blue denotes pelagic fish catches and dark blue represents reef-associated fish catch compositions.

The aim of the FAD is to transfer fishing effort away from more vulnerable reef-associated fish species to more resilient, small-bodied pelagic fish species, such as tuna. As such, the participants were asked to provide information on the whether they believed there was an increase or decrease in the number of reef-associated and pelagic fish groups in their typical fish catches, both before and after FAD deployment. From the pooled outcomes, 52% of the respondents said that there was an increase in pelagic fish species and 2% said there was a decrease. The respondents provided similar outcomes for how they perceived changes in the composition of reef-associated fish species in their typical catches: 57% of respondents said there was an increase in reef-associated species since the introduction of the FADs in their customary waters (a 5% increase than the perceived changes for pelagic fish species), while 3% stated there was a decrease in reef-associated species that were typically caught (Figure 10).

Across all 13 communities, the participants were asked whether they considered their respective FADs to be beneficial to their community. From the pooled outcomes, 56% believed their FAD was beneficial to their community, with reasons including easier access for catching fish and more fish in local waters. 14% of the outcomes from all 13 communities did not consider the FAD to be beneficial. Reasons for this included the high number of sharks that were attracted to the FAD sites, which deterred fishers, and the locations of the FADs, with some participants from Kulibang and Ungakum communities stating the FADs were deployed in the wrong locations (Figure 11(A)). The participants were also asked if they would recommend to other communities to consider deploying a FAD in their customary waters. 80% of the participants from all 13 communities said they would recommend to other communities to install FADs, while 5% said they would not. Reasons for not recommending other communities to install a FAD in their customary waters include the lack of benefits that the FAD provides to the community, and the increased number of sharks that are attracted to the FAD site (Figure 11(B)).

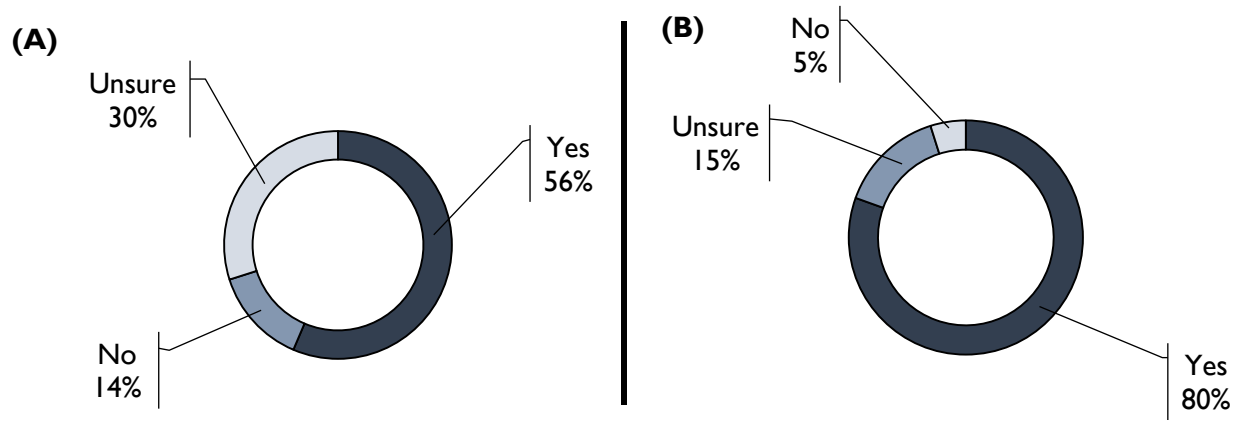


Figure 11: (A) The 117 participants from all 13 communities stated whether they thought the fish aggregating devices (FADs) in their customary waters were beneficial by helping fishers catch more pelagic fish. (B) Respondents from all 13 communities were asked whether they would recommend other communities to deploy fish aggregating devices in their customary waters.

SUMMARY

According to the outcomes from the 13 focus groups, it is apparent that there was some uncertainty among the focus group participants concerning how much effort – such as travel time to fishing grounds and level of difficulty for catching fish – that was required since FAD deployment (Figure 12). Reasons for the uncertain outcomes could include difficulties the participants had in interpreting the questionnaire forms and understanding the meaning of the questions. In addition, some residents stated that they did not use the FADs because they typically fish in nearshore habitats, or due to fears of shark attacks. Other fishers stated that the FADs did not function because they were located too far from the reef, and requested that the FADs were located on the reef flats. Such outcomes indicate that community fishers may not be aware of what the FADs are designed to do, or that the introduction of a FAD would increase the catch of all fish in both nearshore and offshore environments, demonstrated by the proportion of respondents that said there has been an increase in nearshore and pelagic fish since FAD deployment. Other misconceptions could include why catching pelagic fish at the FAD is beneficial: by taking pressure of reef fisheries so that they can rebuild. If such messages were not conveyed correctly, fishers may believe that reef-associated fish species populations have rebuilt, even though the life history traits of some reef species may take longer to recover than others. As such, there is a need for further education and awareness programmes to inform community residents about the FADs, and how they function, where they should be located, and what fishing methods should be used while at the FAD site.

Figure 12: Nesodek Lakawas, a community facilitator with WCS, introducing the focus group survey session with Mamion community. During future consultations, efforts should be made to explain the purpose of the survey and how the outcomes may benefit the community. (Photograph credit: Tracey Boslogo).

Although there was some uncertainty among the respondent outcomes, the majority of residents stated that they were pleased to

have the FADs in their customary waters, and that they would recommend other communities in New Ireland Province, or elsewhere in PNG, to deploy FADs in their local fishing areas. Indeed, most of the focus group participants stated that they would recommend other communities to install FADs in their customary waters, but with the condition that instructions on how to fish at the FADs – and maintain the FADs – were included during the initial deployment process. In view of the levels of uncertainty demonstrated by the outcomes from the focus group respondents, the following recommendations on how to conduct future survey-based fisher focus groups have been provided:

- Begin the focus group session with an education and awareness programme so that the participants are aware of what the focus group is about.
- Aim to have a mix of male, female and youth fishers in each of the focus group discussions to provide balanced perspectives.
- Conduct the focus groups – where possible – in the local vernacular, and ensure all technical terms are fully explained and understood.
- Ensure all the participants in each focus group are regular fishers within their customary waters, and not occasional fishers.
- Try to enlist focus group participants that have visited the FADs at least once since the FAD was deployed.
- Provide options or examples of key fish groups that can be found in nearshore or pelagic environments to limit the number of vague fish group responses, such as *silver fish* or *big fish*.
- Instruct the participants to give honest answers, and not responses that they believe will please the facilitators.
- Inform the participants about how the information they provided during the focus group session will be used.
- Repatriate all the information and analysis in an easy to understand manner, and provide options for informed management based on the data that were collected.

LOGBOOKS

Fisher logbooks and fish identification guides were provided to each of the 13 communities, to allow residents to collect and record basic fisheries catch and effort data (Figure 13 and Figure 14).

Figure 13: Glenda Fore, a WCS community facilitator, introducing how the log books should be used during the logbook training session in Mamion community. (Photograph credit: Tracey Boslogo).

Figure 14: A male participant from Mamion Community completing an example of the fisheries monitoring logbook on paper in front of the community as practice. (Photograph credit: Tracey Boslogo).