CATCH MONITORING MANUAL FOR CBFM IN THE PACIFIC COMMUNITY

MODULE B
Pathways Project
Training Workshop Manual

Version 1.0, September 2021
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The manuals can be downloaded from SPC Coastal and Oceanic Fisheries Programmes Digital Library:

fame1.spc.int/en/fame-digital-library
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INTRODUCTION TO THE MANUAL

This training manual is a training and learning tool for catch monitoring coordinators or other supervising staff.

It provides suggested guidance on how to run a catch monitoring data collection training workshop for catch monitors.

It may also be used as an additional training reference document for catch monitors.

Manual B: Training Manual

This manual was designed for those of you in charge of catch monitoring programmes designed to support CBFM using the tools developed by the Pathways project:

- Catch monitoring data collection manuals (above)
- Catch survey forms (right)
- Fishing context survey forms (right)

Specifically, this manual outlines a three day workshop covering the use of the correct interview technique, how to use the Pathways Catch Survey and Fishing Context Survey instruments, and the taking of clear catch photos.

It is vital that the catch data we gather from the communities we visit is accurate and precise. Without accurate data, communities will not be able to have confidence that their management plans are functioning well, or be made aware if adjustments need to be made.

This manual, and its supporting materials will help you train catch monitors so that they can use the tools developed by Pathways to gather accurate and precise catch data that will serve the communities and their management plans.

CATCH SURVEYS (after each fishing trip)

The catch surveys are vital for collecting data about each fishing method that was used, the areas and habitats that were fished, the number of people fishing, and the number of hours community members need to spend to catch their fish or gather their invertebrates.

FISHING CONTEXT SURVEYS (ONCE PER FISHER PER SURVEY TRIP)

The fishing context surveys give us a longer range view, giving us an understanding of how the catches we have data on compare to catches in the past. There are also questions designed to capture information about seasonality and whether fishers have changed their fishing methods and locations, and whether certain habitats have changed or been damaged, and require more attention.
Pathways Catch Monitoring Programme

**Figure 1. Pathways catch monitoring programme**
**Capturing Diversity**

The catch monitoring programme this manual supports has shown it is able to capture the incredible diversity of the fisheries depended upon by the women, children, youth and men of coastal communities in the Pacific.

**Eagle Ray alongside shark and wahoo:**

Sometimes, large Elasmobranchs are also recorded. Seen here are a Spotted Eagle Ray (*Aetobatus narinari*) and Grey Reef Shark (*Carcharhinus amblyrhynchos*).

**Tremendous diversity:**

This one catch photo of 42 fish has individuals from 17 species representing 7 families (*Acanthuridae, Holocentridae, Labridae, Lethrinidae, Mullidae, Scaridae* and *Serranidae*).

**Bare mat:**

The fishers are also supportive of allowing that a photo of a bare mat will be recorded from time to time. Zero catch is important if we are to help communities gauge the relative success of their fishing efforts and track that over time.
Small wrasse alongside large deepwater haul:
The fisheries used by fishers in the communities we visit are incredibly diverse. From inshore fisheries for small Purple Surge Wrasse (*Thalassoma purpureum*) and Stocky Hawkfish (*Cirrhitus pinnulatus*) not exceeding 20cm, to offshore fisheries for deepwater snapper species (*Etelis sp.*) upwards of 90cm in length.

Diversity of invertebrate harvesting strategies:
Invertebrates of many species are targeted or harvested opportunistically along with finfish. When invertebrates are targeted, the catch is typically much larger, with hundreds of individuals being harvested at a time. When invertebrates are targeted opportunistically, we typically see fewer than ten being harvested at any one time.
# Day 1 - Introduction to catch monitoring

## WHY CATCH MONITORING?

**Topics:**
- Why catch monitoring?

**Materials:**
- Notepads; slides

**Learning Outcomes (Learn to...):**
- Understand:
  - What catch monitoring is, and why it is important
  - An understanding of what kinds of information the Pathways survey forms are designed to collect

## INTERVIEW TECHNIQUES

**Topics:**
- Interview techniques

**Materials:**
- Catch survey and fishing context survey forms; note pads; slides

**Learning Outcomes (Learn to...):**
- Use the:
  - Catch monitoring survey form accurately and appropriately
  - Fishing context survey form accurately and appropriately

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# Day 2 - Field Skills

## TAKING GOOD CATCH PHOTOS

**Topics:**
- Taking good catch photos

**Materials:**
- Cameras/tablets; fish/invertebrate cut-outs; notepads; slides

**Learning Outcomes (Learn to...):**
- Take useable photos of catch:
  - Using the catch mats.
  - In challenging conditions (i.e. too many fish, bad light, varied light etc.)
  - Understand protocols for how to react when a fisher/gleaner presents their catch in a non-standard way.
  - Identify instances where catches might be presented in consistent non-standard units (e.g. there are always 10 shucked clams on each string)
  - Approach fishers/gleaners with different catches/circumstances and gather the most accurate data
  - Maximise the chances of gathering accurate data from fishers/gleaners who are hard to approach

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# Day 3 - Debrief and shared learnings

## IMPORTANCE OF DEBRIEFING

**Topics:**
- Importance of debriefing

**Materials:**
- Notepads; catch monitoring data collection manuals

**Learning Outcomes (Learn to...):**
- Understand:
  - What is involved in debriefing
  - The team’s protocol for gathering and organising the data collected each day
  - Approach the task of gathering catch data in your communities
  - Identify places where the prescribed approach might need to be adjusted to work in your communities
DAY 1 - INTRODUCTION TO CATCH MONITORING

Please use the presentation attached in Appendix A. The below text will complement the text and materials on the slides provided.

Why catch monitoring?

Catch monitoring will give us a better understanding of the fishing and gleaning patterns and trends in communities with management plans. Not only does this information help during the design of the management plans, but also gives feedback to the communities regarding:

- Whether their sacrifices have resulted in good fisheries outcomes
- Whether some adjustments need to be made to the management plans

Without accurate catch data, we cannot help the communities answer either of these questions with confidence.

Interview techniques

Please take the time to ensure your catch monitors can follow the following instructions:

- Enumerators/catch monitors coordinate with each other (if travelling as a group) as to who will go where and when so that a good sample of different fishing/collecting practices by men and women, and different ages can be captured
- Enumerators/catch monitors will need to coordinate to make sure no surveys or catch photos share the same ID number(s)
- When a fisher/collector is first approached, before any data collection takes place, enumerators/catch monitors must first explain to the fisher and collector why the data collection is taking place and why their voluntary participation is an important part of the long term success of the community fisheries management plan, as well as of the project’s understanding of fishing activities in the community
- Enumerators/catch monitors must be ready to answer any questions the fishers/collectors might have before the survey begins. If the enumerator/data collector does not know the answer, they must know who to ask, and ensure the fisher/collector receives a satisfactory answer
- Ensure each fisher or collector has given their consent to participate

- Make sure that catch photo ID labels are properly filled out and readable on each catch photo taken
- Ensure any fisher/collector who has their catch photographed and surveyed is also asked to answer the fishing context survey
- Survey even those fishers/collectors with zero catch - either for a particular method or for the whole. It is still really important to catch survey them (assuming they are willing)
  Catch monitors/enumerators should write ‘no catch’ or similar in the photo number spot on the catch survey (don’t leave it blank)
- After completing the surveys, check, and double-check to make sure all sections of the survey forms are filled out, in particular the consent, fisher’s full name and gender
- Not sure about a question or a response? Extra information given? Notice something unusual? Put it all in the comments! There is no such thing as too much information
- Most importantly, make sure all survey forms filled for one specific fisher/collector are kept together and that all survey forms filled are stored in a safe, clean, and dry location
Taking catch photos - the basics

Following these steps will help your catch monitors take good catch photos:

1. Lay the gridded measuring mat down on a flat and even surface.
   
   For example, make sure the mat is not bunched up, or in a hole, or does not have a big rock underneath

2. For each unique ‘fishing method’ (see definitions below):
   - Place all fish, shells, etc. caught on the mat
   - Make sure that they are all as flat as possible, side-by-side with no overlaps,
   - Make sure least one square on the mat has its edges visible

Making sure that each of the blank cells are filled in, and ensuring the labels are captured in each catch photo will mean each photo will have a unique identifier. This unique identifier will ensure that each photo, and therefore each individual fish within it, will be trackable as the database grows - vital if we want to make sure the data collected is as accurate as possible.

3. Fill out the photo catch ID label (figure 1) with a different photo number each time you place catch associated with a different method on the mat.

   These photo numbers should also be matched to the relevant catch survey.
   The photo number should also be written in the space provided on that catch survey.
   There may be multiple photo numbers for a single catch survey.

4. Take one catch photo for each fishing method used in a fishing trip - there may be more than one catch photo for a single fishing trip.

   Rarely, (if the catch is really big or the fish is really big) you may need to take 2 photos for a single method.

When taking photos, try to be quick, careful, and efficient - these fish are someone’s livelihood!

<table>
<thead>
<tr>
<th>COMMUNITY</th>
<th>MMYY</th>
<th>CATCH SURVEY #</th>
<th>PHOTO #</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kuma</td>
<td>0719</td>
<td>2</td>
<td>1</td>
</tr>
</tbody>
</table>

Figure 1. An example of a catch ID label.
How to take good catch photos

IN THE BEST LIGHTING POSSIBLE:

☐ Take a photo of the catch from straight above the mat (not on an angle)
☐ Avoid shadows crossing over mat that will make it difficult to see/identify species
☐ Make sure all caught species are laid out as described in the mat section above
☐ Make sure the catch label is visible and legible

A photo taken in this way will make the identification of the different fish species as easy as possible, while also making sure that each fish can be measured as accurately as possible.

TOO MANY FISH:

It is understandable that you may wish to try and get the entire catch on the mats provided. However, if the only way to photograph the entire catch is to take a photo from an angle, or crowd the fish on the mat (see images), it is better to take several photos from straight above and code them accordingly.

This photo has been taken at an angle, causing the fish to be foreshortened. This makes measuring the fish accurately difficult/impossible, and in extreme cases, can also make it impossible to identify the species of the fish.

Ideally, catch photos should be taken from directly above the catch mats - the easiest way to tell is if the opposing edges of the catch mat are different lengths (e.g. the closest edge appears longer than the furthest edge).

Here there are instances where fish have been placed upon one another, obscuring heads and tails (marked with red circles). When the head, or the fork of the tail are obscured, fish become hard/impossible to measure accurately, but in some instances, not being able to see even small parts of their heads or tails can make accurate identification impossible too.
CHALLENGING LIGHT CONDITIONS:

It is likely your catch monitors will encounter situations where light levels can make taking good photos difficult.

If it is dusk or dark, the following tips might help your catch monitors take useable pictures:

- Putting the camera in night mode
- Holding a flashlight (the one from your phone will be fine) as high as possible over the catch, making sure not to over-expose some animals while leaving others in darkness, or make shadows that cross over the mat. Where possible, using more than one light source is better.
- Holding the camera as still as possible while the photo is to minimise blurriness. Camera light sensors need more time to take clear pictures when there is only a little light. If the pictures are too blurry, the species will be hard to identify.

Likewise, if there is too little light, digital cameras struggle to take clear photos.

This photo was taken in an area partly shaded from bright sunlight. In these instances, the camera’s light sensor struggled to adjust for both light levels, and the fish in the shadow can be obscured significantly. When fish are obscured this way, species identification and measurement can be difficult or impossible.

As a general rule, digital cameras take the most useable photos when there is a uniform source of light.

So, it is best to avoid taking photographs where the camera must adjust to bright and dark areas at the same time (e.g. partly shaded areas).

It is completely understandable that your catch monitors will encounter fishers/gleaners who only return to the landing site/village as night falls or even later.

In these instances, it is still possible to take useable photos.

Here is a catch photo taken during the night in the best possible way. An additional light source was used, and held high above the mat.

This photo was taken with too little light. From time to time, the fishers we need to collect data from will be landing their catches in the night, and far from buildings with good sources of light. The photo does not necessarily need to be well lit, but ID and measurement become difficult or impossible when it is only possible to see the silhouette of the animal(s).
Non-standard units

Before you move on, please discuss what to do when animals are presented in a non-standard unit (i.e. not an individual).

Usually, it is invertebrates that are presented in various vessels (e.g. buckets, bags etc.), or strung on a cord. Animals presented this way are difficult to count and ID. However, it might not be possible or appropriate to place the individual animals on mats to photograph them. As an example, the animals might be:

- Too numerous
- Alive and likely to escape
- Removed from their shells (in which case ID and measurement might be possible anyway)

We only suggest that protocols be put in place where catch monitors know who to contact in the instances where animals are presented in non-standard units, and what to do in the instance that their supervising team member is unavailable or not possible to reach.

We strongly suggest that in those instances, your catch monitors take clear photos of the animals in non-standard units, and take detailed notes that might provide helpful insight into whether this non-standard unit might be consistent (e.g. a string of shucked clams is always 10 individuals).

There is no clear-cut solution here. However, we suggest that you as a department/team come to a collective decision regarding how to deal with these non-standard units.

CRABS

Crabs are often still alive when they are presented to you, which can make photographing them on a mat difficult. We suggest taking a spare bag or bucket with you so that you can count the crabs out safely, and then photographing some of the more sluggish ones on the mat (if possible).

INVERTEBRATES

Sometimes invertebrates are either too soft-bodied to measure meaningfully, or they are shucked before being landed, making measurement impossible. In these instances, we suggest photographing the animals as best you can so they can be identified, and counting them (if possible), noting the number down in the catch survey. If you can establish whether clams and worms etc. are usually threaded together in consistent numbers, this will make things even easier.

Images: Checked mat and bucket photos from Pathways project team.
LARGE CATCHES OF SMALL FISH

Sometimes, when there is a large catch of small baitfish, they are presented in buckets or bowls. We suggest taking a sample of 10 or so and laying those out on the mats for ID and measurement, counting them (if possible), and noting down the number on the catch form. You will need to decide how many fish are too many to count as a team. We suggest doing that prior to beginning your catch surveys.

MOLLUSCS

Molluscs of many varieties are often presented to you in bags, sacks or bowls. If there are too many to sensibly lay out on the mats and photograph, then we suggest placing a few on the mats so an approximate average size can be calculated, and then counting the others out, noting the number on the catch survey. As with the baitfish, you will need to decide how many molluscs are too many to lay out on the mats as a team.
**Scenario training**

This role-playing exercise was designed to help new catch monitors familiarise themselves with the Pathways data gathering tools (i.e. surveys, catch mats etc.), and also to put them in situations that they are likely to face in the field. These different situations will require the enumerators to adjust their approach in slightly different ways so that accurate data can still be gathered, and the results will reflect each community’s catches and fisheries as closely as possible.

**SCENARIO TRAINING CHECK LIST**

For the scenario training activities, you will need the following for each trainee:

- Field manuals (can be shared between two)
- Fishing context survey form
- Catch survey form
- Pencil/pen
- Fish and invertebrate cut-outs for each scenario
- Catch mat
- Digital camera

We suggest placing the pairs in circumstances where they might need to make adjustments to ensure a good catch photo can be taken. Some examples for you to consider:

- Partial/harsh shade
- Areas of almost complete darkness
- Catch hidden in buckets/bags
- A catch that is too large to present on one mat

**RUNNING THE SCENARIO EXERCISES**

1. Split people into 3 or 4 groups of 2 people
2. Randomly allocate one of the scenarios below to each pair of people: One scenario per data collector + fisher/collector
3. Run-through: Full data collection exercise - approaching fisher/collector, mat label, both surveys, photos
4. 2 rounds (~20 min each), switch fisher/collector and data collector
5. Group debrief
   - How did each enumerator/trainee need to adjust their approach to make sure they captured a complete picture of what the fisher did during their trip?
   - What were the cultural and social aspects that needed to be treated with sensitivity during the exercise?
   - Which scenarios required the enumerator/trainee to pay close attention to what had not been said, or was being actively hidden?
   - Were there any instances where enumerators needed to deal with catches presented in non-standard units, and how did they cope with the situation?
## Scenarios

The following scenarios were created to get you started, and represent some of the more common situations your enumerators are likely to encounter. If you feel your enumerators/trainees are likely to encounter a scenario that is not in the table, please feel free to create the situation yourself.

<table>
<thead>
<tr>
<th>SCENARIO</th>
<th>FISHER BEHAVIOUR</th>
<th>ISSUES</th>
<th>CUT OUTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>IDEAL</td>
<td>Completely compliant</td>
<td>None</td>
<td>All caught using one fishing method</td>
</tr>
<tr>
<td>IDEAL - varied (location and method)</td>
<td>Completely compliant, BUT does not realise the fish need to be sorted according to fishing methods</td>
<td>Catch from multiple methods, BUT the fisher does not realise this is important. Clue will be that the fisher has several types of equipment (a net, hand-line).</td>
<td>Fish usually caught inshore (i.e. mullets, goatfish); reef fish (i.e. emperor, snapper, grouper); and pelagic fish (i.e. tuna)</td>
</tr>
<tr>
<td>VARIED - METHODS</td>
<td>Completely compliant</td>
<td>The fisher fished in one location but with numerous gears. Clue will be that the fishery has several types of equipment even though they only mention one fishing location.</td>
<td>Fish speared from a nearby reef (i.e. surgeonfish, parrotfish). Also Tridacna clams</td>
</tr>
<tr>
<td>SECRET BAIT</td>
<td>Completely compliant</td>
<td>Fisher does not consider fishing for bait to be an ‘method’. This fisher stopped to catch bait before heading offshore and fishing deeper water. Clue will be that the fisher has bait gathering gear (i.e. a net or handline for trolling) on-board as well as deep water fishing gear.</td>
<td>Small mullet or small tuna</td>
</tr>
<tr>
<td>DODGY</td>
<td>A sceptic, mistrustful of government, a little bit evasive</td>
<td>Needs to be convinced to participate. Has possibly been poaching the local protected area.</td>
<td>Fish speared from a nearby reef (i.e. surgeonfish, parrotfish). Also Tridacna clams</td>
</tr>
<tr>
<td>GLEANER/COLLECTOR</td>
<td>A lady, has a basket full of collected shellfish, BUT will not approach, because she is “not a fisherman”. Compliant and engaged when approached.</td>
<td>Will need to be sought out and approached deliberately.</td>
<td>Molluscs for gleaners - reef, Molluscs for gleaners - lagoon</td>
</tr>
<tr>
<td>ZERO CATCH</td>
<td>Does not understand why he/she should participate if he caught nothing</td>
<td>Went fishing, caught nothing (using 2 methods).</td>
<td>NIL</td>
</tr>
</tbody>
</table>
DAY 3 - DEBRIEF AND SHARED LEARNINGS

Debriefing

At the end of each day in the field, it is important for the team to get together and debrief. Debriefing involves letting each other know how the day went, and sharing learnings that might help the team collect better data into the future. As an example, catch monitors might take the time to talk about difficulties they experienced, and how those difficulties could be resolved.

The team should also take this time to gather up the day’s forms, and ensure there is no overlap between survey numbers, and that each catch survey has a corresponding fishing context survey etc.

Debriefing checklist

Upon completion of the data collection trip, a debrief with catch monitors should be organised with the data coordinator. The debrief should cover any issues and/or concerns that may have arisen during the trip.

Catch monitors should also debrief on specific issues that arose during data collection and make records of decisions and modifications which were made to allow for consistency or revision during the next round. The debrief should also make mention of feedback or concerns from community members and/or CBFM committees.

The data coordinator could encourage the catch monitors to use their field notebooks to assist with the debrief. The data coordinator should also get all the forms from the catch monitors, check for repeat numbers, missing labels and missing information and ask catch monitors for input. Gears can be returned at that time and photos can be downloaded.

The debrief is also a good time for the team to add the name(s) of fishers/collectors of fishers who have not yet filled in a fishing context survey to the list of people who need to be visited and surveyed before the team’s departure.

The debrief is also a good time for everyone to get organised for the next day, ensuring that each catch monitor has an adequate number of forms, and if you as a team decide to allocate catch survey numbers, then ensuring that there is no overlap.

DEBRIEFING CHECKLIST

- Discuss issues/concerns that catch monitors have become aware of during the day
- Discuss solutions or ways to mitigate the issues that have arisen
- Discuss feedback or concerns relayed from community members over the course of the day
- Collect all catch surveys and fishing context surveys
- Ensure each catch survey has an accompanying fishing context survey
  
  *Note those community members who might need to be re-visited if they have filled in a catch survey, but not a fishing context survey*

- Download catch photos
- Ensure each catch photo taken has an accompanying photo label, and that the photo ID number matches the one recorded in the corresponding catch survey form
- Plan the next day’s activities
Appendix A (i): How to use Pathways Catch Survey Forms

You are vital!!

Without good data, all our analyses will be flawed.
Inaccurate data is very hard/impossible to fix.

Good data serves the communities, bad data will hurt them.

Data collection in communities

- Interview as many fishers, collectors as possible.
- Catch survey.
- When a person comes back from fishing/collecting.
- Include zero catch.
- You can survey the same person several times during the 2-week survey period.
- Take pictures of the catch per fishing method on the mat.
- Don’t forget to take the survey form and the photos.

Overview of catch monitoring work

- 5 communities.
- 4 trips max per community (2 min), 2 per year.
- 2 weeks in each community.
- 1 fishing context survey.
- 2 survey forms:
  - 1 fishing context survey to provide information about general fishing in the community (outside the 2 weeks we are in the village).
  - Photos of catch on gridded mat.

Why monitoring?

We want to:
- Better understand fishing/collection patterns and trends in communities with fisheries management plans.
- Provide feedback to these communities about how their fisheries are doing.
- Communities have more information to help them make better decisions about their management plans now and into the future.

So that:
- “adaptive management.”
## SECTION TITLE: FISHING CONTEXT SURVEY

### Important notes – fishing context survey

- Please use the fishing context survey to interview as many fishers/gleaners as you can. The information is valuable, even if that person was not fishing/gleaning that day.

- The fishing context survey form only needs to be filled in once per fisherman per 2-week period. Fill it out again during the next trip (important to capture possible changes in fishing behaviour)

- Some people who fish might not go fishing during our 2-week data collection = we are missing some general information about fishing in the community.

- The fishing context survey helps us understand what happens outside the 2-week period = more data to assist communities with the CBFM decision-making

### Fishing context survey

- Trends beyond our visit
- Targeted fish/invertebrates
- Usual fishing methods
- Usual fishing frequency
- Catch over a longer period of time
- Effort increases or decreases over a year
- Perceptions of CBFM and its impact
- Relates to SPC socio-economic survey

### Fishing over the past 7 days

- Explanation on the last 7 days:
  - Do not include the day of the interview
  - If you interview a fisherman on Monday, then ask them if they have gone fishing/collecting from last Monday to the day before (Sunday)
  - Make sure that the answer on number of days gone fishing/collecting in question 1b is the same as the number of days you tick in question 6

### Important notes – fishing context survey

- Question 13a about local restrictions is inclusive of CBFM rules (obviously some people may not know there are some).

- Take as many notes as possible about fishing/collecting in the community or details fishers tell you about.

- Information from the above will help the CBFM team know if there is a need for further info-awareness at the community level.
**SECTION TITLE: CATCH SURVEY**

Catch survey

- What community members have caught
- Length/weight
- Numbers of fish/invertebrates harvested
- Techniques community members are using to catch certain fish
- Habitats that community members are fishing/gleaning in
- Time spent during most recent fishing/gleaning trip

Catch survey: Trip versus Method

- **FISHING TRIP**: A journey to catch fish/collect invertebrates over a defined time period, i.e. date/time of departure/return
- May have more than one associated ‘method’
- May have zero, one, multiple, associated catch photos

Survey form section: Fishing trip info

**FISHING TRIP DETAILS:**
Date of departure:
Time of departure: ____________________________ Time of return: ________________________________
Sea condition: Calm Average Rough Not at sea
Boat type (circle one): No boat Motor Paddle Sail
How many different fishing methods were associated with this fishing trip?:

Was it more difficult to fish/collect today than usual:  Yes  No
Please note any special events:

*Please fill in this information even when there is zero catch. The information is about effort taken by fishers/collectors in the community to collect marine resources.*

Catch Survey: Trip versus Method

- **FISHING METHOD**: a discrete fishing episode in which a specific fishing method was used during a fishing trip
- There may be multiple methods per single trip
- Separate ‘fishing methods’ should be recorded:
  - Where there was a change in fishing method used during a fishing trip, even if targeting the same species
  - Where there was a change in habitat fished, implying a significant change in location
SECTION TITLE: CATCH SURVEY (CONTINUED)

Catch Survey: Trip versus Method

- Trolling then drop-stone lining for yellowfin tuna would be two distinct ‘fishing methods’
- Cast netting for bait and then trolling for fish would be two distinct ‘fishing methods’
- Hand collecting using different hand tools for different invertebrate species in the same habitat would be one ‘fishing method’
- Hand collecting using different hand tools for different invertebrate species in 2 different habitats would be two distinct ‘fishing methods’

Catch Survey: Trip versus Method

- Please fill in the section on fishing method details even when there is zero catch for a method. It is again about effort of fishers/collectors in the community.
- Fill in the method #, the method used, time spent fishing, number of fishers, habitat fished
- Answer “no” for was there catch for this method?
- Leave photo number(s) blank
- Add any general comments (if any)

Survey form section : FISHING METHOD DETAILS:

Fishing method #:
Fishing method used (circle one):  Casting nets  Gillnetting
Beach seine netting  Scoop netting  Drop-stone fishing
Handlining  Rod and reel  Trolling  Spear (night)  Hand collecting  Other____

Approx. time spent actively fishing (hrs):  Number of fishers:
Was there catch from this method (circle)?  Yes  No
Approx. weight (kg):
Habitat fished (for this method):
Lagoon  Reef flat (Lagoon)  Reef edge  Mangroves
Ocean - no FAD  Ocean - FAD  Reef flat (Ocean)
Other____

Photo number(s):

General Comments:
SECTION TITLE: BOTH FORMS AND CONCLUSION

Important notes – both forms

- Don’t forget to circle yes on the consent question: it just mean that you did not force the person to answer your questions 😊

- Make sure that you fill in all the questions; write N/A if not applicable.

- Tip: look at the survey forms (catch and fishing context) each day with your data enumerator partner to check that there is no missing info. Easier to remember on the day than later.

Important notes – both forms

- You could do a catch survey first and then a fishing context survey

- You can also do a fishing context survey first and then a catch survey; staple them together (keep a list of who has been surveyed in the community)

- Either way, all fishers interviewed with the catch survey need to have a fishing context survey form

- You can have a fishing context survey without a catch survey (i.e. instances where a person who usually fishers/gleans did not do so over the 2 week sampling period)

A few lessons learned

- Make sure that all forms are labelled, and staple catch survey forms and fishing context survey form for one fisher together.

- To avoid duplication (i.e. making sure no two surveys are labelled “25”) you could try the following:

<table>
<thead>
<tr>
<th>Catch monitors</th>
<th>Survey Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1-99</td>
</tr>
<tr>
<td>2</td>
<td>100-199</td>
</tr>
<tr>
<td>3</td>
<td>200-299</td>
</tr>
</tbody>
</table>

Thank you!
### A (ii): Catch Survey Example

**CATCH SURVEY DETAILS**

<table>
<thead>
<tr>
<th>Data collector name:</th>
<th>Survey code:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>PES-042</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Survey date (DDMMYY):</th>
<th>Island:</th>
</tr>
</thead>
<tbody>
<tr>
<td>14/07/2020</td>
<td>Malekula, Maskelyne</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Fisher/Collctor name:</th>
<th>Community/Village:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pescarus</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Fisher/Collctor gender:</th>
<th>Fisher/Collctor contact details</th>
</tr>
</thead>
<tbody>
<tr>
<td>male</td>
<td>[Redacted] (daughter)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Fisher/Collctor age:</th>
<th>Consent Obtained (circle):</th>
</tr>
</thead>
<tbody>
<tr>
<td>45</td>
<td>YES</td>
</tr>
</tbody>
</table>

**FISHING TRIP DETAILS**

<table>
<thead>
<tr>
<th>Date of departure:</th>
<th>Time of departure:</th>
</tr>
</thead>
<tbody>
<tr>
<td>14/07/2020</td>
<td>8 am</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Time of return:</th>
<th>Sea condition:</th>
</tr>
</thead>
<tbody>
<tr>
<td>3:30pm</td>
<td>Calm</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Boat type (circle one):</th>
<th>How many different fishing methods were associated with this fishing trip?:</th>
</tr>
</thead>
<tbody>
<tr>
<td>No boat</td>
<td>2</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Was it more difficult to fish/collect today than usual:</th>
<th>Please note any special events:</th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
<td>for Sale of Ula</td>
</tr>
</tbody>
</table>

**FISHING METHOD DETAILS**

<table>
<thead>
<tr>
<th>Fishing method #:</th>
<th>Fishing method used (circle one):</th>
</tr>
</thead>
<tbody>
<tr>
<td>i</td>
<td>Casting nets, Gillnetting, Beach seine netting, Rod and reel, Hand collecting</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Approx. time spent actively fishing (hrs):</th>
<th>Number of fishers:</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 hours</td>
<td>4</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Was there catch from this method (circle)?</th>
<th>Approx. weight (kg):</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Habitat fished (for this method):</th>
<th>Other:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lagoon</td>
<td></td>
</tr>
<tr>
<td>Reef flat (Lagoon)</td>
<td></td>
</tr>
<tr>
<td>Mangroves</td>
<td></td>
</tr>
<tr>
<td>Ocean - no FAD</td>
<td></td>
</tr>
<tr>
<td>Reef edge</td>
<td></td>
</tr>
<tr>
<td>Ocean - FAD</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Photo number(s):</th>
<th>General Comments:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Good weather.</td>
</tr>
</tbody>
</table>
### FISHING METHOD DETAILS

<table>
<thead>
<tr>
<th>Fishing method #:</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fishing method used (circle one):</td>
<td>Casting nets</td>
</tr>
<tr>
<td></td>
<td>Drop-stone fishing</td>
</tr>
<tr>
<td></td>
<td>Spear (day)</td>
</tr>
<tr>
<td></td>
<td>Scoop netting</td>
</tr>
<tr>
<td>Other:</td>
<td></td>
</tr>
<tr>
<td>Approx. time spent actively fishing (hrs):</td>
<td>4 hrs</td>
</tr>
<tr>
<td>Number of fishers:</td>
<td>4</td>
</tr>
<tr>
<td>Was there catch from this method (circle)?</td>
<td>Yes</td>
</tr>
<tr>
<td>No</td>
<td>Approx. weight (kg):</td>
</tr>
<tr>
<td>Habitat fished (for this method):</td>
<td>Lagoon</td>
</tr>
<tr>
<td></td>
<td>Mangroves</td>
</tr>
<tr>
<td></td>
<td>Reef flat (Ocean)</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Other:</td>
<td></td>
</tr>
<tr>
<td>Photo number(s):</td>
<td>2a, 2b, 2c</td>
</tr>
<tr>
<td>General Comments:</td>
<td>Good weather</td>
</tr>
</tbody>
</table>

### FISHING METHOD DETAILS

<table>
<thead>
<tr>
<th>Fishing method #:</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fishing method used (circle one):</td>
<td>Casting nets</td>
</tr>
<tr>
<td></td>
<td>Drop-stone fishing</td>
</tr>
<tr>
<td></td>
<td>Spear (day)</td>
</tr>
<tr>
<td></td>
<td>Scoop netting</td>
</tr>
<tr>
<td>Other:</td>
<td></td>
</tr>
<tr>
<td>Approx. time spent actively fishing (hrs):</td>
<td>30 min</td>
</tr>
<tr>
<td>Number of fishers:</td>
<td>4</td>
</tr>
<tr>
<td>Was there catch from this method (circle)?</td>
<td>Yes</td>
</tr>
<tr>
<td>No</td>
<td>Approx. weight (kg):</td>
</tr>
<tr>
<td>Habitat fished (for this method):</td>
<td>Lagoon</td>
</tr>
<tr>
<td></td>
<td>Mangroves</td>
</tr>
<tr>
<td></td>
<td>Reef flat (Ocean)</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Other:</td>
<td></td>
</tr>
<tr>
<td>Photo number(s):</td>
<td>3</td>
</tr>
<tr>
<td>General Comments:</td>
<td>Good weather</td>
</tr>
</tbody>
</table>
**A (iii): Fishing Context Survey Example**

<table>
<thead>
<tr>
<th>Q#</th>
<th>Question – ASK FIRST TIME ONLY</th>
<th>Response</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>i</td>
<td>What 3 mangears do you normally catch or collect with?</td>
<td>1. Baiting 2. Spear (night) 3. -</td>
<td></td>
</tr>
<tr>
<td>ii</td>
<td>What 3 main species do you normally catch or collect?</td>
<td>1. Reef fish 2. - 3. -</td>
<td></td>
</tr>
<tr>
<td>iii</td>
<td>How long have you been fishing and/or gleaning/collecting for?</td>
<td>Years: 39 Months: -</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Q#</th>
<th>Question – ASK EVERY TIME</th>
<th>Response</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1a</td>
<td>In the last 7 days, did you go fishing, collecting, both, did not go?</td>
<td>Fishing, Collecting, Fishing and Collecting, Did not Fish or Collect</td>
<td></td>
</tr>
<tr>
<td>1b</td>
<td>In the last 7 days, how many times did you go per activity listed (#)?</td>
<td>Fishing, Collecting</td>
<td>Always fishing or collecting</td>
</tr>
<tr>
<td>2</td>
<td>In the last 7 days, what were the 4 main fish/invertebrate types you caught?</td>
<td>FISH: Tuna, Other pelagic/deep sea, Deep sea bottom, Reef fish, Sharks and rays, Other fish (specify); INVERTEBRATES: Sea cucumber, Lobster, Crab, Clam, Trochus, Cockles, Octopus, Urchin, Snail, Other seafood (specify)</td>
<td></td>
</tr>
</tbody>
</table>

| 3  | In the last 7 days, what were the 3 main fishing methods you used for fishing? | Net, Handline, Drop stone, Trolling | None caught, Spearfish (night), Spearfish (day), Gleaning/collecting, Other (specify) |
| 4  | In the last 7 days, how much catch (in kg) did you catch in total? | 20 kg |         |

| 5  | In the last 7 days, has a local closed area (e.g. tabu) been opened for fishing? | Yes, No | I don't know, There are no local areas closed to fishing |

<table>
<thead>
<tr>
<th>6</th>
<th>In the last 7 days, please identify all days fished/collected. If you did not fish or glean/collect, leave the day and activity blank.</th>
<th></th>
<th>Starting gillnet all this time.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Day</td>
<td>Fishing</td>
<td>Collecting</td>
<td>Comments:</td>
</tr>
<tr>
<td>Sunday</td>
<td>✔</td>
<td>-</td>
<td>Using gillnet all this time.</td>
</tr>
<tr>
<td>Monday</td>
<td>✔</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Tuesday</td>
<td>✔</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Wednesday</td>
<td>✔</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Thursday</td>
<td>✔</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Friday</td>
<td>✔</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Saturday</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td></td>
<td>How long does it take you to travel to your main fishing/collecting ground?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Hours</td>
<td>Minutes</td>
</tr>
<tr>
<td>8a</td>
<td>Since the last Pathways survey (in the last 12 months if first village survey), have you changed your main fishing/collecting location?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8b</td>
<td>If yes, is the new location closer, farther, about the same distance from your village than your previous location(s)?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8c</td>
<td>If yes, explain why you have changed locations in the comments.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Since the last Pathways survey (in the last 12 months if first village survey), does it take you more, less, about the same time to catch/collect the same number of fish and/or invertebrates?</td>
<td>FISH</td>
<td>INVERTEBRATES</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Since the last Pathways survey (in the last 12 months if first village survey), are you catching/collecting more, less, about the same total number of fish and/or invertebrates?</td>
<td>FISH</td>
<td>INVERTEBRATES</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Since the last Pathways survey (in the last 12 months if first village survey), are you catching/collecting larger, smaller, about the same size of fish and/or invertebrates?</td>
<td>FISH</td>
<td>INVERTEBRATES</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Since community-based fisheries management was implemented in your village/community, has fishing/collecting improved, gotten worse, about the same?</td>
<td>FISHING</td>
<td>COLLECTING</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13a</td>
<td>In your village, are there local restrictions on how to fish? (Species, areas, methods, gear etc.)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>13b</td>
<td>If yes, are people following these fishing restrictions? (circle one of number 1-5, where 1 = None followed and 5 = All followed)</td>
<td>1 2 3 4 5</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Write any comments.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>Do you have any concerns about your local fisheries resources?</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>If yes, describe concerns in comments.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>Do you have any more comments?</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>If yes, describe in comments section.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Taking photos to support the Pathways catch monitoring approach

Calculating weight

\[ \text{Weight (g)} = \text{Coefficient A} \times \text{Length (cm)}^{\text{Coefficient B}} \]

Good photos are crucial

Accurate species identification, and measures of length can help answer the following questions:

- Which species of fish/invertebrates are the community members catching?
- What amount/weight of certain species of fish/invertebrates are the community members catching?
- Which species of fish/invertebrate might need protection?

Length x weight ratios

<table>
<thead>
<tr>
<th>Family Name</th>
<th>Genus</th>
<th>Species</th>
<th>Coeff_A</th>
<th>Coeff_B</th>
<th>Issue</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prognathidae</td>
<td>Prognathus</td>
<td>tayenus</td>
<td>0.02820342</td>
<td>2.82791</td>
<td>Length - Weight</td>
</tr>
<tr>
<td>Acanthistidae</td>
<td>Acanthus</td>
<td>sp.</td>
<td>0.03805692</td>
<td>2.860568</td>
<td>Length - Weight</td>
</tr>
<tr>
<td>Gobiidae</td>
<td>Callionymus</td>
<td>plumatus</td>
<td>0.03697032</td>
<td>2.622856</td>
<td>Length - Weight</td>
</tr>
<tr>
<td>Serenidae</td>
<td>Hyperbrotus</td>
<td>hirundinis</td>
<td>0.01122047</td>
<td>1.855471</td>
<td>Length - Weight</td>
</tr>
<tr>
<td>Hemiramphidae</td>
<td>Hemiramphus</td>
<td>leucurus</td>
<td>0.06989738</td>
<td>3.468647</td>
<td>Length - Weight</td>
</tr>
<tr>
<td>Setipinnidae</td>
<td>Setipinnus</td>
<td>leschenborii</td>
<td>0.03409615</td>
<td>3.000007</td>
<td>Length - Weight</td>
</tr>
<tr>
<td>Thysanorhynchidae</td>
<td>Thysanorhynchus</td>
<td>sp.</td>
<td>0.02906748</td>
<td>2.992093</td>
<td>Length - Weight</td>
</tr>
<tr>
<td>Pomacentridae</td>
<td>Oryxina</td>
<td>gallo</td>
<td>0.039240068</td>
<td>3.180691</td>
<td>Length - Weight</td>
</tr>
<tr>
<td>Serenidae</td>
<td>Pomacentrus</td>
<td>gregoryi</td>
<td>0.01145232</td>
<td>3.631976</td>
<td>Length - Weight</td>
</tr>
<tr>
<td>Acanthistidae</td>
<td>Zebrafishes</td>
<td>flavicanthus</td>
<td>0.03783697</td>
<td>2.843767</td>
<td>Length - Weight</td>
</tr>
<tr>
<td>Serenidae</td>
<td>Chromis</td>
<td>hoactli</td>
<td>0.01823402</td>
<td>2.753369</td>
<td>Length - Weight</td>
</tr>
<tr>
<td>Serenidae</td>
<td>Serenos</td>
<td>von der Decken</td>
<td>0.01345232</td>
<td>3.390514</td>
<td>Length - Weight</td>
</tr>
<tr>
<td>Serenidae</td>
<td>Serranidae</td>
<td>leucurus</td>
<td>0.03409615</td>
<td>3.000007</td>
<td>Length - Weight</td>
</tr>
<tr>
<td>Serenidae</td>
<td>Lutjanidae</td>
<td>prasinae</td>
<td>0.03907737</td>
<td>2.992093</td>
<td>Length - Weight</td>
</tr>
</tbody>
</table>
**Photo label**

- It is **vital** to have a photo label in frame for each catch photo, and to have that label number written in the corresponding catch survey.
- Doing the above makes sure that the catch survey corresponding to each photo (and vice versa) can be tracked down quickly and easily.
- An example from Kiribati:

<table>
<thead>
<tr>
<th>Community</th>
<th>MMYY</th>
<th>Catch Survey #</th>
<th>Photo #</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kuma</td>
<td>0719</td>
<td>2</td>
<td>1</td>
</tr>
</tbody>
</table>

**What makes a good photo**

- Flat – taken from directly overhead
- Easily visible photo label
- Good, even light
- No parts of the fish obscured
- Fish on catch mat with squares of known size

**Examples of poor photos – too much angle**

- Photo taken at an angle
- Fish furthest away are difficult/impossible to ID
- Accurate measurement for any of these fish is not possible
- Label and object of known length too far away

**Examples of poor photos – crowded mat**

- Multiple instances where fish overlap
- When the whole fish cannot be seen, ID and accurate measurement become difficult/impossible
Examples of poor photos – partial shade

- Partial shade makes it difficult for the camera sensor to adjust
- Here, fish in the shade are almost impossible to see

Examples of poor photos – too little light

- This photo was taken with too little light
- The detail necessary to accurately ID these animals is not possible to see

What to do – poor light

- If there is bright light with partial shade, take the photo either completely in the shade, or completely in the light
- If the photo needs to be taken at night, consider providing a light source held as high as possible to minimise shadows and over-lighting some animals while under-lighting others
- Some cameras also have a night mode.

What to do – too many fish

- If there are too many fish/invertebrates to place on one mat, or take a photo of from directly overhead, you can take multiple photos
- But PLEASE ensure each photo has its own number, and all are written down on the corresponding catch survey form
Practical Time

- Catch monitors to practice taking photos in challenging situations
- Data coordinator to check work and offer advice

What to do - poor light

An example of an ideal photo taken at night:

Thank you!
Appendix C: Fish cut-outs

ACANTHURIDAE - SURGEONFISH
LUTJANIDAE - SNAPPER
SCARIDAE - PARROT FISH
SERRANIDAE - GROUPER
ALBULIDAE - BONEFISH
MUGILIDAE - MULLET
SCOMBRIDAE - TUNAS/ MACKERELS/ BONITOS
Giant Clams

TRIDACNA MAXIMA

TRIDACNA CROCEA
Reef-associated species

SPONDYLUS SQUAMOSUS

TURBO SETOSUS
Lagoonal species

ANADARA GRANOSA

STROMBUS LENTIGINOSUS