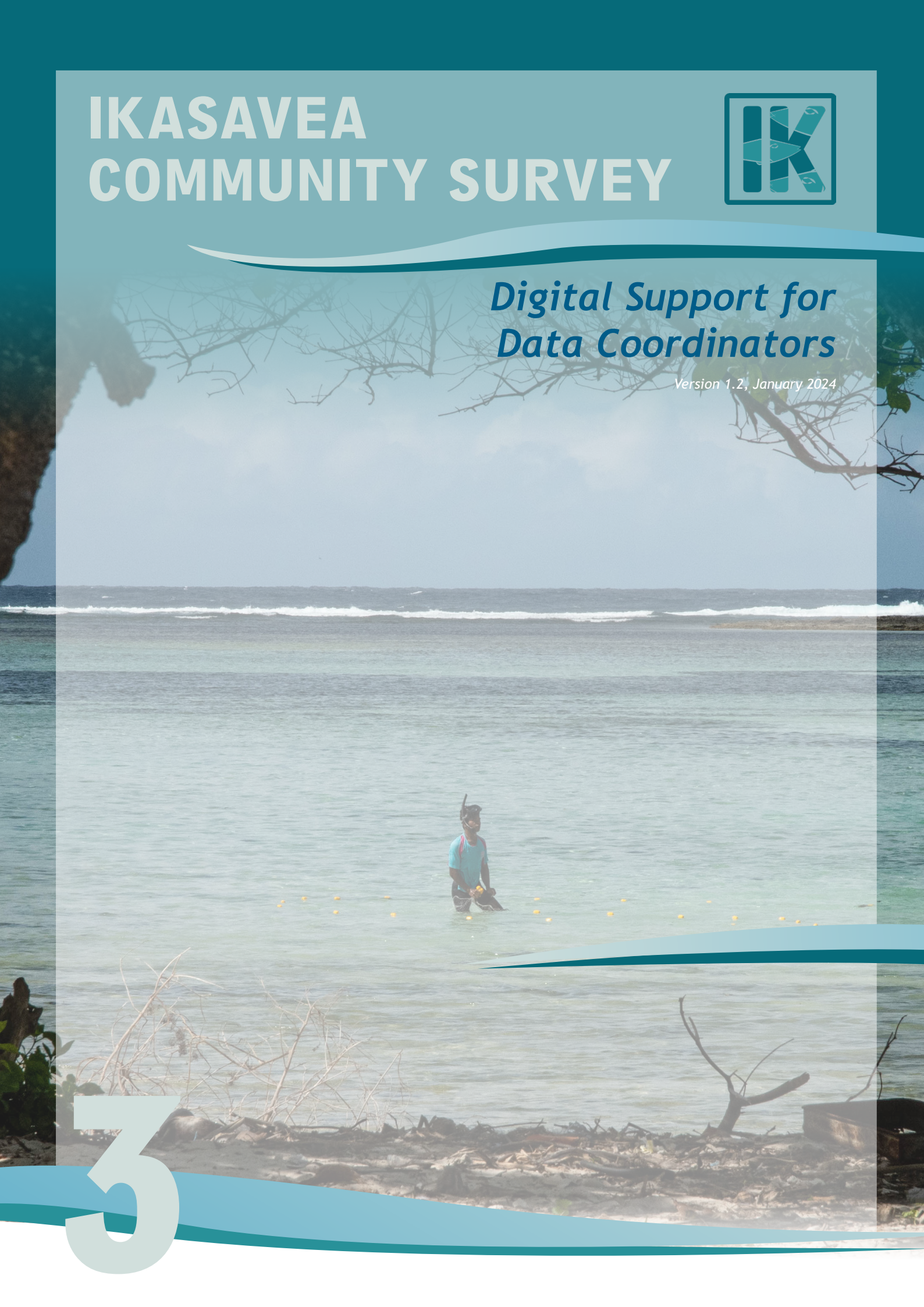
IKASAVEA COMMUNITY SURVEY

Digital Support for Data Coordinators

Version 1.2, January 2024



3

CONTENTS

p.

Acknowledgements 3

Introduction to the manual..... 5

BEFORE data collection in communities 6

Linking email accounts to devices
Adding or subtracting fishing methods
Adding commodities often photographed in 'bundles'
Replicating existing surveys
Setting up the survey: Regions and surveyors
Systems check

DURING data collection in communities 13

AFTER data collection in communities 14

Cleaning
Generating reports
Data constraints and analyses

Appendices: Presentations 21

A: SPC Powerpoint presentation: CBFM database

B: SPC Powerpoint presentation: Automated processing of landing images

Manual citation: ***UOW (2023). Catch Monitoring Manual for CBFM in the Pacific Region. Manual 3: Data Management for Data Coordinators, Version 1.2, October 2023. Australian National Centre for Ocean Resources and Security, University of Wollongong, Australia***

OTHER CREDITS
Cover image: Discussing CBFM with community members in east Malekula, Vanuatu. Eleanor McNeill, 2022.
Fish illustrations: Boris Colas, Pacific Community (SPC).
Invertebrate illustrations: Food and Agriculture Organization of the United Nations, Original Scientific Illustrations Archive. Reproduced with permission.
Report design and remaining graphics: Eleanor McNeill.

ACKNOWLEDGEMENTS

ANCORS

The Pathways team is grateful to Bradley Moore for advice in developing the sampling protocols, and Andrew Halford and colleagues at SPC-FAME for discussion about sampling, design and implementation challenges in monitoring community fisheries in the Pacific Region.

The survey protocols and manuals were developed by the following project staff members:

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Vanuatu: Abel Sami, Pita Neihapi, Lucy Joy, Douglas Koran, Ada Sokach, Vasemaca Malverus, Regina Ephraim.

ANCORS: Brooke Campbell, Owen Li, Neil Andrew, Aurelie Delisle, Hampus Eriksson and Dirk Steenbergen.

SPC-FAME

The Pathways team is grateful to Franck Magron and Bernard Viga at SPC for developing and modifying the Ikasavea app and the SPC Coastal Fisheries Applications website, and offering their on-going support. The transition of CBFM optimised catch monitoring to digital means was made possible by Franck Magron and Bernard Viga. Their role has been central in co-developing and modifying the Ikasavea app and the SPC Coastal Fisheries Applications website, and offering their on-going support.

KIRIBATI

The Pathways team is grateful to the communities of Nabeia and Buariki village in North Tarawa, Bubutei village in Maiana, Nuotaea islet in Abaiang, Tekuanga village in Marakei, Bikati islet in Butaritari, Tebwanga maiaki in Abemama and Kabuna in North Tabiteuea for their time in supporting the co-design, piloting, refining the monitoring tools as well as their assistance during monitoring activities in Kiribati. We thank the Director of Coastal Fisheries and staff of Coastal Fisheries Division at MFMRD for providing feedback on the development of the monitoring tool and supporting its implementation. We would like to especially thank the Fisheries Assistant trainees at Coastal Fisheries Division for their active involvement in data collection and their discussion on improvements in the delivery of the tool.

VANUATU

The Pathways team is grateful to the communities of Kwamera, Loh, Malo, Naone, Peskarus, Port Orly and Takara for their participation in co-designing, piloting, and refining the monitoring tools. We thank the Director and staff of VFD for supporting the development of the monitoring tool. Specifically, the contribution of the fisheries observation division at VFD was crucial in providing enumerators to the CBFM monitoring program, not only for data collection but also for their technical inputs and feedback that helped develop the tools and program.

FUNDING

The Pathways 2 project was supported by the Australian Government through the Australian Centre for International Agricultural Research (ACIAR) project FIS/2020/172.

CBFM optimised fishery monitoring program

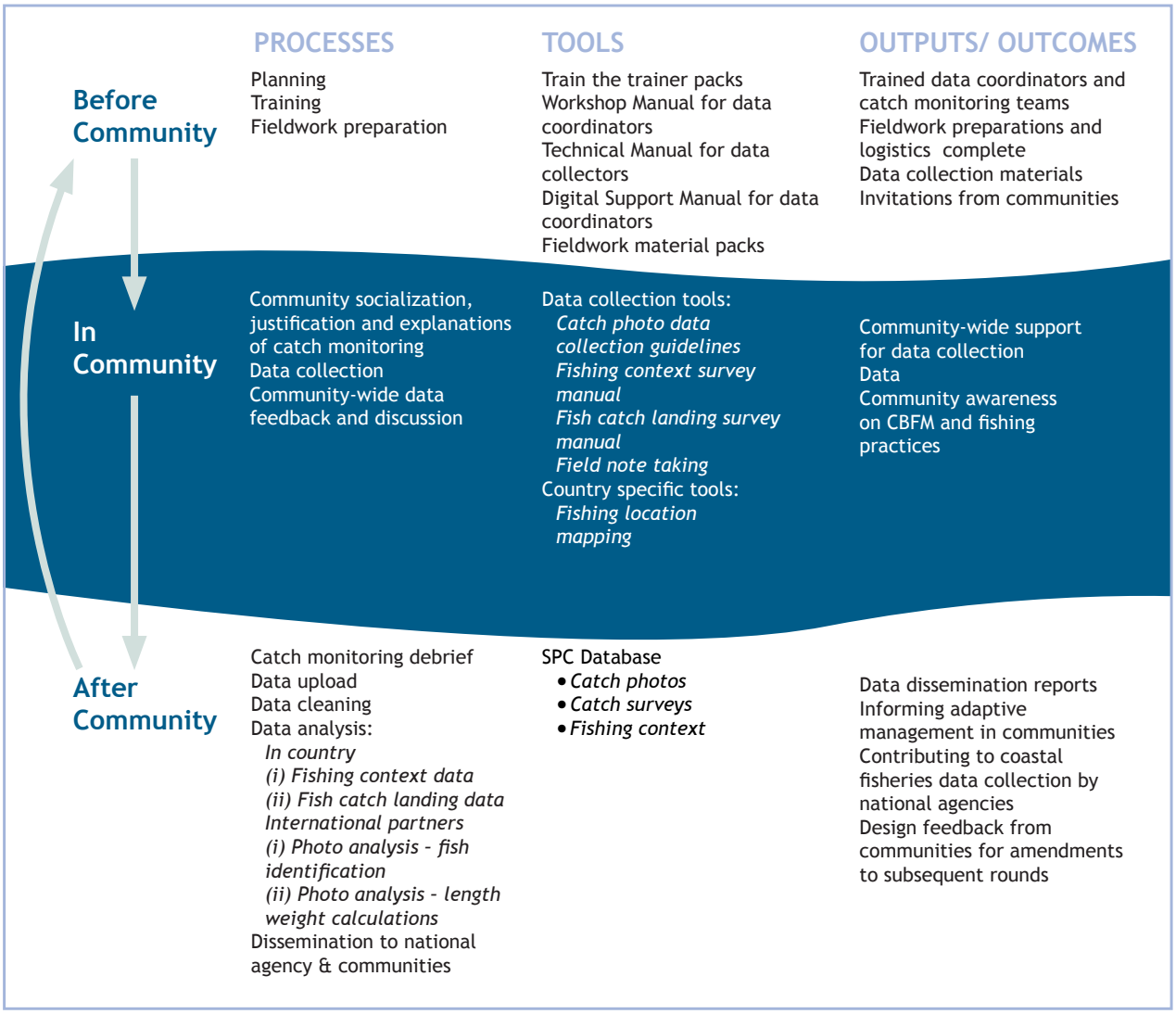


Figure 1. CBFM optimised catch monitoring programme

INTRODUCTION TO THE MANUAL

Digital Support for Data Coordinators

This manual is one of three designed to support the use of the Ikasavea Community Survey:

1. *Technical Manual for Data Collectors*
2. *Workshop Manual for Data Coordinators*
3. **Data Management Manual for Data Coordinators**

This manual is designed to assist data coordinators, or whomever oversees management and curation of data in the use of the Ikasavea app, and the SPC web interface for the Ikasavea Community Survey.

The information provided is instruction on what needs to happen before, during and after each field trip to ensure the data collected is as clean, complete and useful as possible.

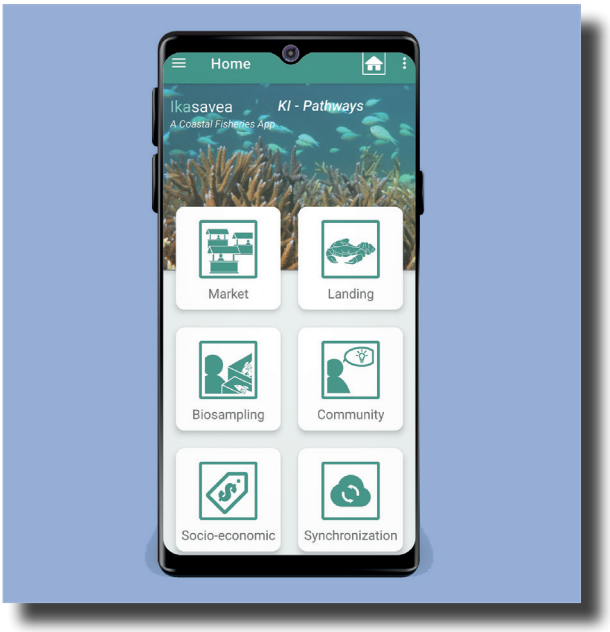
It is vital that the data collected in the communities is not only collected correctly, but also cleaned, transferred and secured appropriately. Errors and inconsistencies can compromise our ability to extract meaning from the data, and therefore, compromises our ability to advise communities about the fisheries they trust us to gather data about.

The steps laid out in this manual will help data collectors manage their surveys and data collectors, ensure data is backed up and uploaded completely, and generate reports from the data using the SPC web interface.

The prescribed steps in this manual are largely based upon a Powerpoint presentation created by SPC-FAME (Appendix A).

Not all of these steps need to be carried out in the precise order that they occur in this manual. However, the steps/procedures have been arranged according to the stages of the catch monitoring program that they should be carried out during (i.e. Before, During and After each field trip).This manual supports a catch monitoring approach based upon a pilot catch monitoring program undertaken in various communities in Vanuatu and Kiribati as part of the Australian government-funded Pathways project.

This manual, and its supporting materials will help you in your tasks as coordinator of this catch monitoring program supported by the Ikasavea Community Survey developed in collaboration with the SPC.



Ikasavea app launch screen.

BEFORE DATA COLLECTION IN COMMUNITIES

1 Linking email accounts to devices

To begin, please go to https://spc/int/coastalfisheries and log in using your details provided by SPC-FAME. If you have not yet been issued these details, please send an email request to: ikasavea_support@spc.int.

Each device that will be used to conduct an Ikasavea Community Survey needs to be linked to an email (Google or any valid email account) and given appropriate permissions by our correspondents at the SPC.

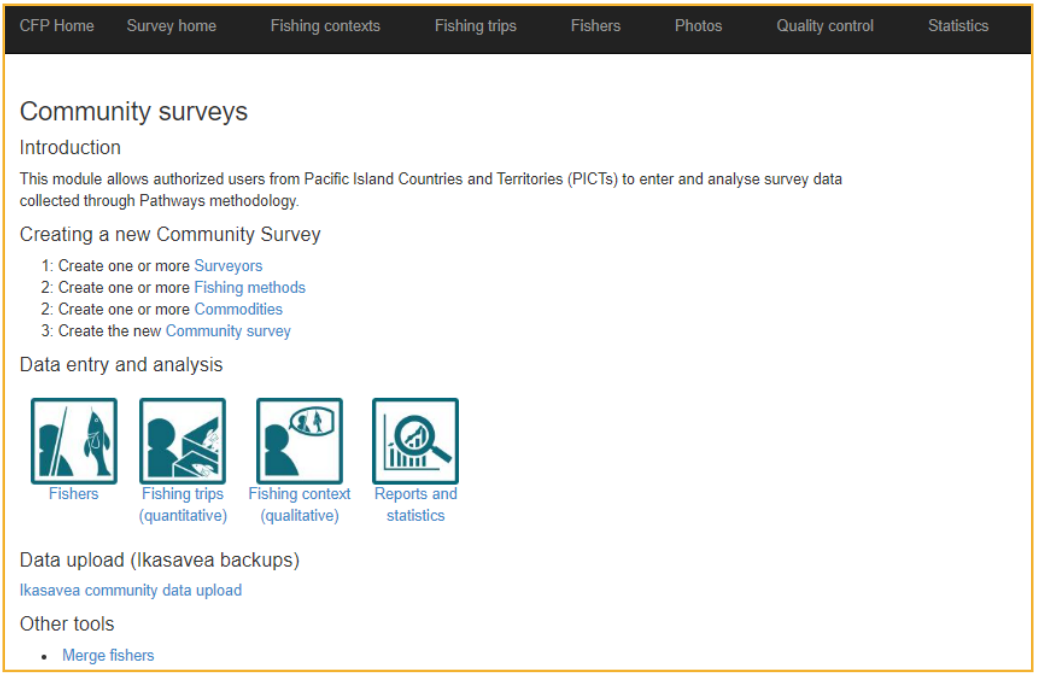
We suggest that these accounts either be designated to individuals going out into the field, or the study sites.

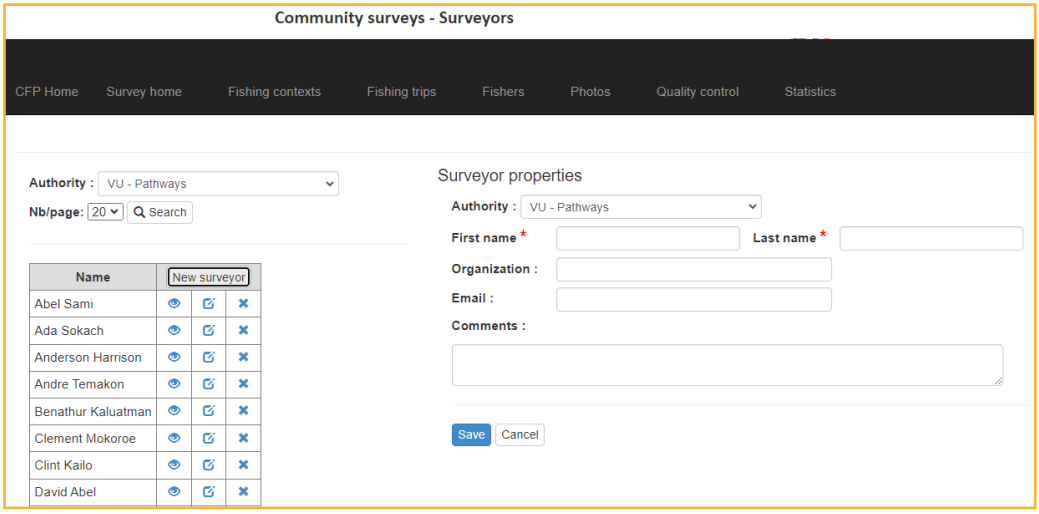
Whichever choice is made, the first step will be to notify SPC-FAME (ikasavea_support@spc.int), who will issue permission to those accounts to download/update the relevant surveys, and operate the devices.

To add a data collector/surveyor:

- Type in their names
- Type in their organisation (optional)
- Type in their email
- Push “Save”

The linked accounts can then be seen on the SPC web interface, where you can add surveyors, or allocate them to particular surveys/communities. If necessary, this list can be adjusted for each survey, and surveyors can be attached to different surveys at a later point.





2 Adding or subtracting fishing methods

The web interface allows you to manage the list of fishing methods that will show up as options for each specific survey. This function allows you to add local fishing methods that have no easy English translation. and to take away those that are irrelevant, minimising the risk of your data collectors missing the correct fishing method.

To add a new fishing method:

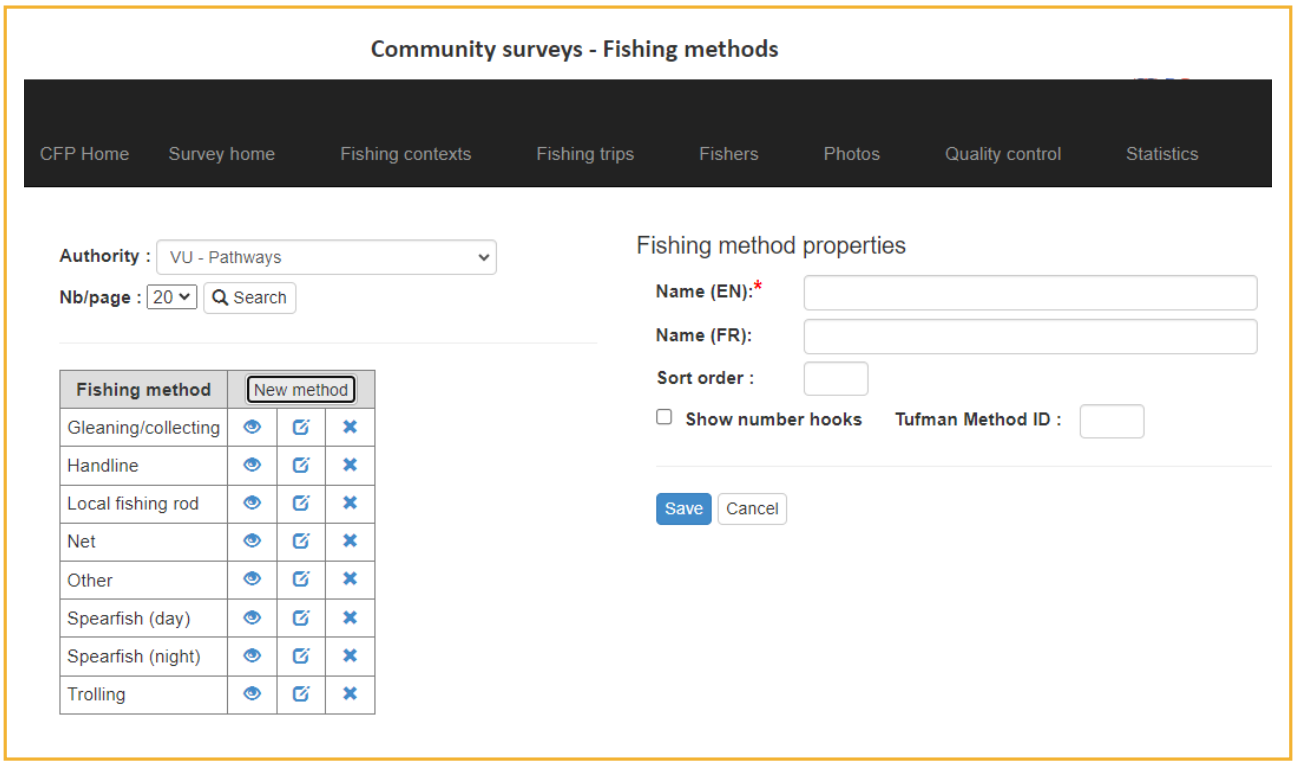
- Type in the fishing method name (you are welcome to use your own language if there is no easy English translation, and you are sure your data collectors will interpret the chosen wording consistently)
- Push “Save”

To remove a fishing method:

- Click on the “x” next to the method in the table.

If a fishing method is not listed, it can be typed into the notes by the data collector, and you, as the data coordinator can add the new method to the list for next time.

Note: “Show number of hooks” and “Tufman method id” are not relevant for community surveys. Leave them as default.

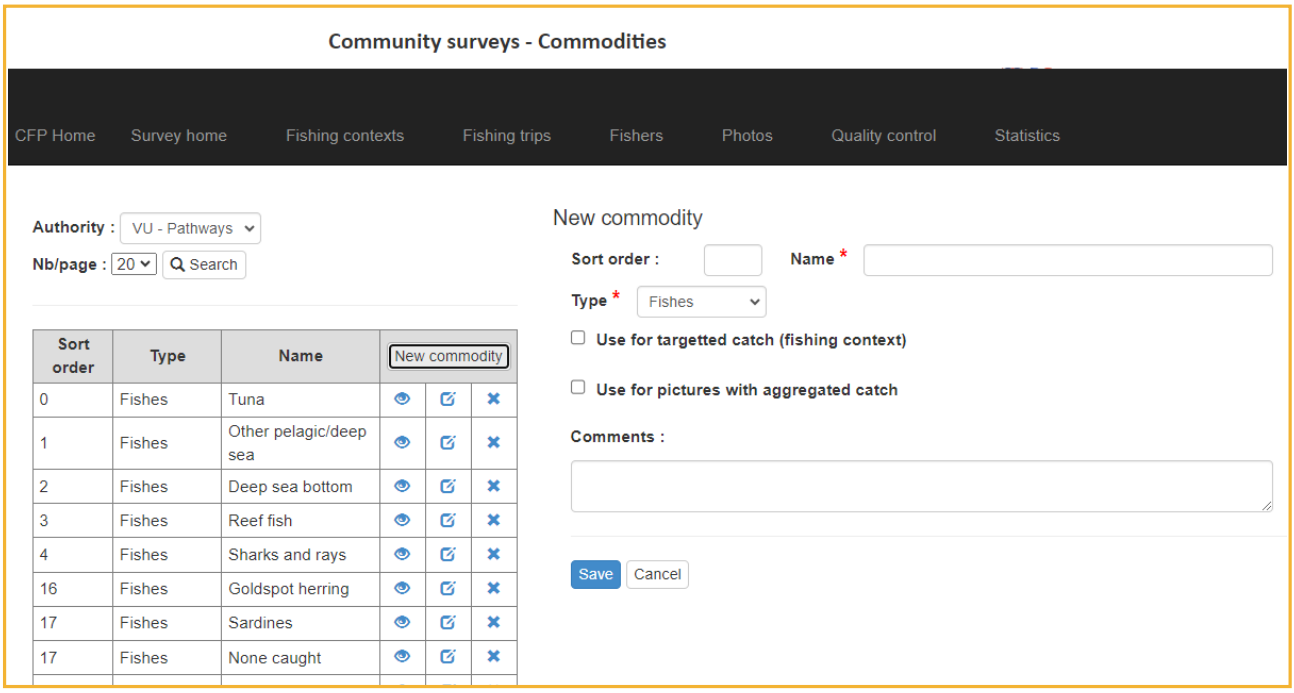


3 Adding commodities often photographed in 'bundles'

Depending on which community is being visited, some animals will be routinely presented in 'aggregated units' such as strings, bags, tubs, or baskets. For these animals, data collectors will need to select the "Add bundle" option in the Community Survey. When "add bundle" is selected, a list of commodities* will be made available, and data collectors can select an option from that list. This list can be adjusted to be more (or less) specific in the same manner as the fishing methods can.

It is important to remember that the units you choose should be **consistent, even if they are aggregated** (i.e. a string of clams should always consist of the same number of clams). If that is not possible within reason, we strongly suggest reminding your data collectors to add relevant details in the comments section (e.g. the herring were in a bowl 30cm across).

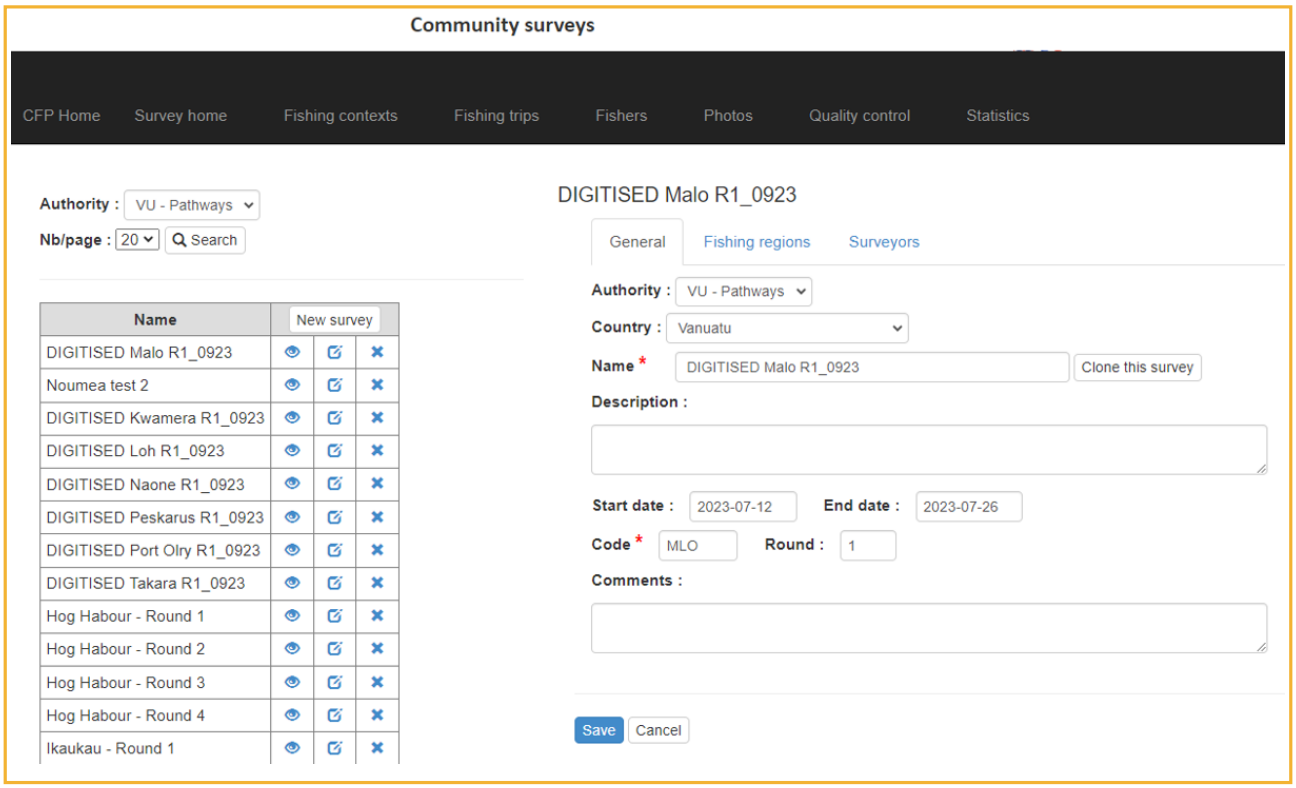
- Select whether the commodity correspond to fishes or invertebrates.
- Enter the name of the commodity.
- Tick "Use for targeted catch" if you want the commodity to appear in the fishing context form
- Tick "Use for pictures with aggregated catch" if you want the commodity to be used for pictures, for example bags of cockles or buckets of sardines.
- Click 'Save' to add the commodity.



*Commodities are the broad categories of fishes & invertebrates that are reported as targeted by fishers when interviewed (fishing context) and photographed in bulk quantities while reporting catch.

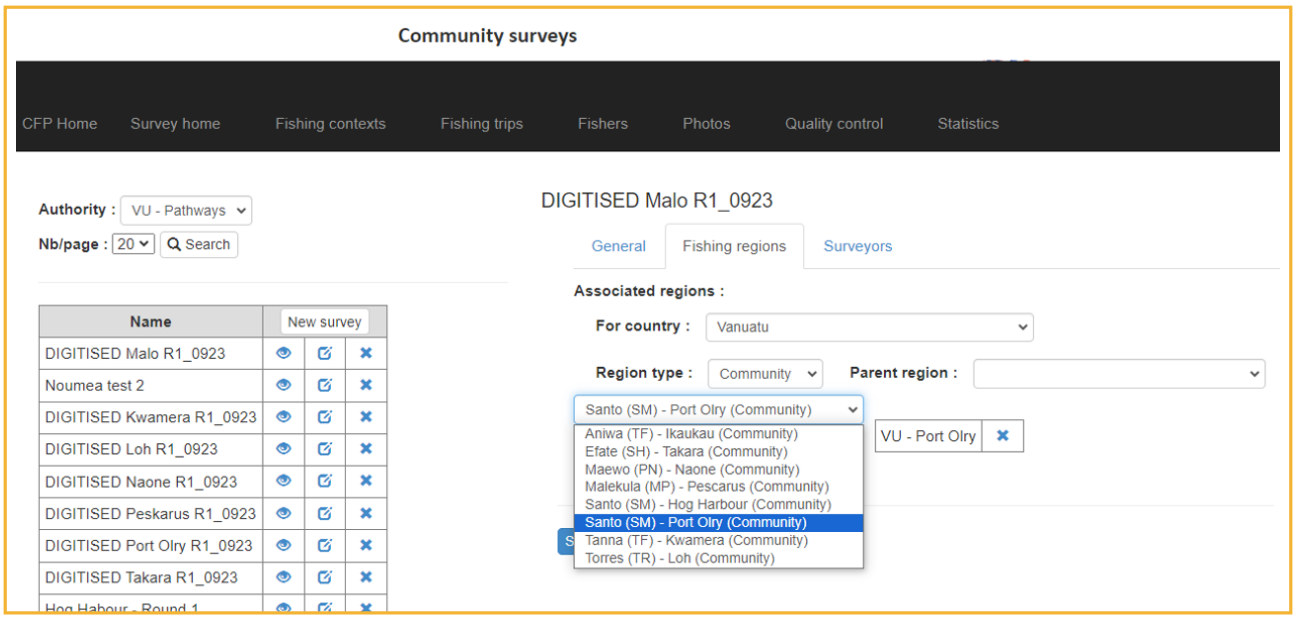
4 Replicating existing surveys

If your surveys are consistent, you can clone one for a new community, or new round. Once you clone a survey, please remember to give it a new name in place of the automatic text i.e. “Based on ....”



5 Setting up the survey: Regions and surveyors

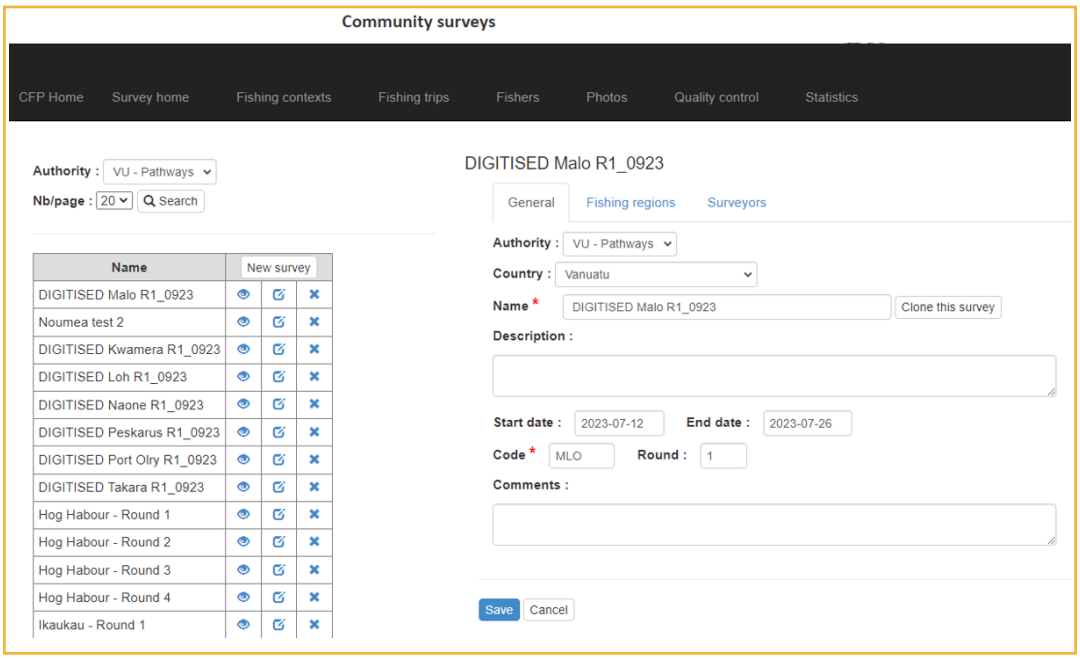
To ensure each survey is linked to the appropriate fishing regions, and maximise the ability to correlate our catch data with previously collected data, a community will need to be selected for each survey.



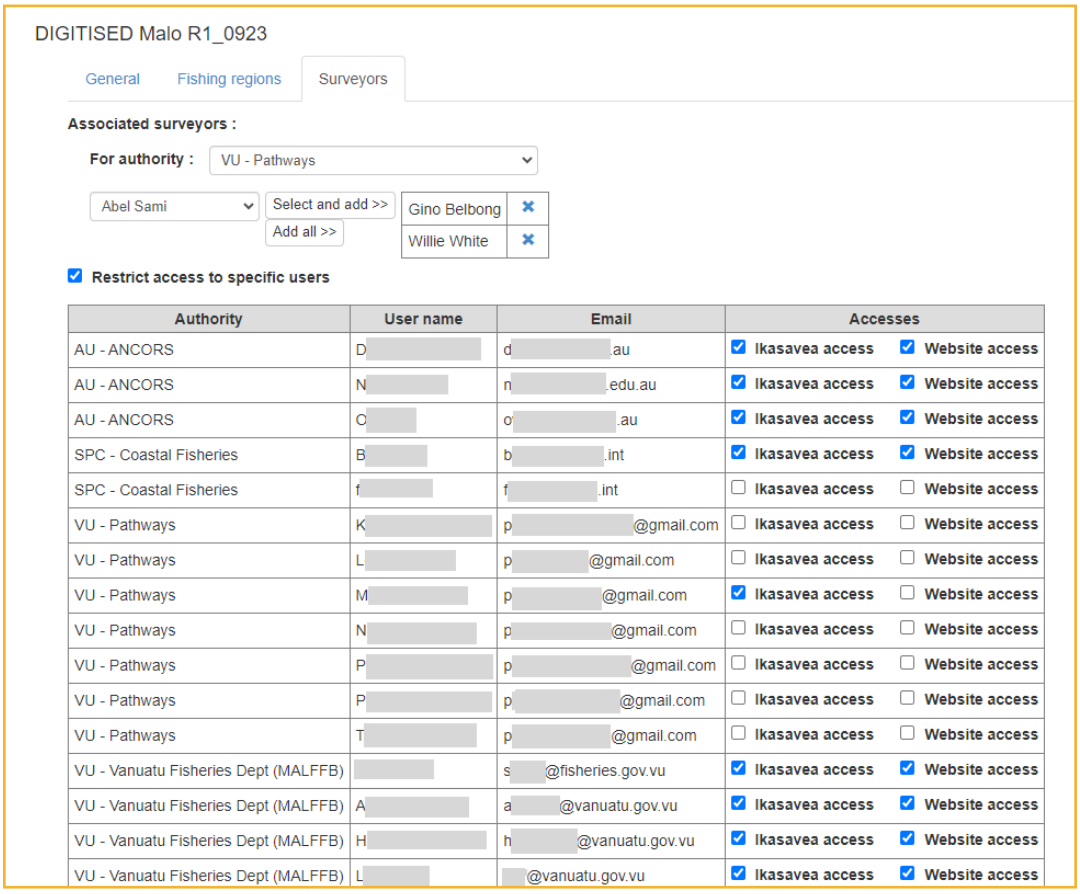
Once you have selected your region, you will need to name this specific survey. Make sure this name is unique.

Also remember to:

- Enter a start and end date
- Add any details that will help you keep track of your data (e.g. any extra questions or specifications added to that specific survey)



Data collectors will also need to be assigned to each survey – please note, if you have chosen to assign individual data collectors accounts, and they are NOT selected for that survey, they will NOT be able to download that specific survey onto their tablet and carry it out.



7 Systems check

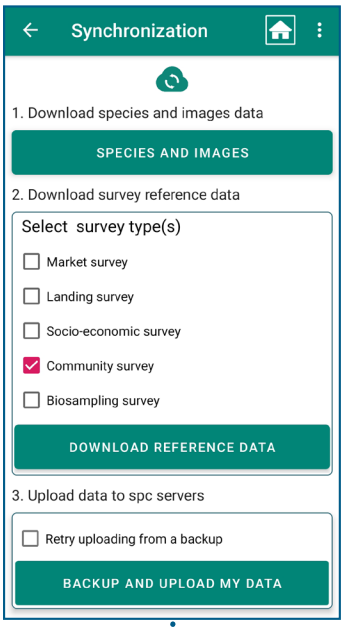
Please ensure that each device is running the Ikasavea community survey smoothly before taking/sending them out into the field:

a. Make sure that each tablet's software is updated.

b. Make sure each tablet has the most recent version of the Ikasavea app (Use Android Play Store).

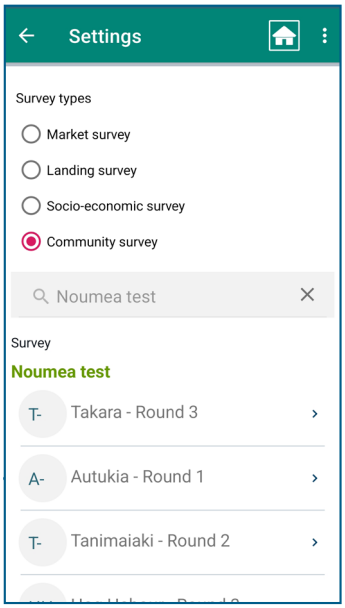
c. Set up a "test survey" via the web interface (the same survey can be used for testing every time). To avoid confusion, please use a name that is clearly different than the communities you are visiting (e.g. Test Surveys MFMRD).

d. Make sure that every device has been synchronised and set to the correct survey and surveyors for that trip – if either are not completed, a survey cannot be completed.



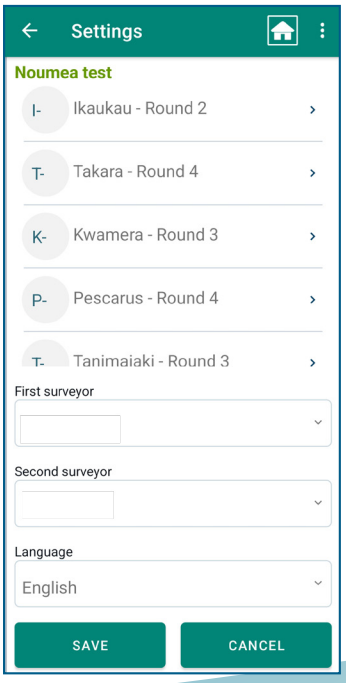
i. Synchronise:

- ☐ Home > Synchronise
- ☐ Download "species and images" data
- ☐ Select and download reference data for Community survey



ii. Settings:

- ☐ Select Community survey
- ☐ Select the name of the survey that will be conducted using the device in hand from the "Survey" list.
- ☐ Select Surveyor 1 for the tablet
- ☐ Select Surveyor 2 for the tablet
- ☐ Leave current language set to English



e. Run through both the catch and fishing context surveys using the "test survey" to ensure they operate smoothly:

- ☐ Make sure that photos can be checked
- ☐ Make sure that survey answers are saved and can be both reviewed and adjusted
- ☐ Make sure that data can be recorded in all relevant fields
- ☐ Use web interface to make sure the data can be synchronised to the SPC-FAME servers effectively, and that the quality of the photos are suitable

It is strongly recommended to run through the test surveys while the tablet is connected to the internet. This way the staff at SPC-FAME are notified immediately when an error occurs.

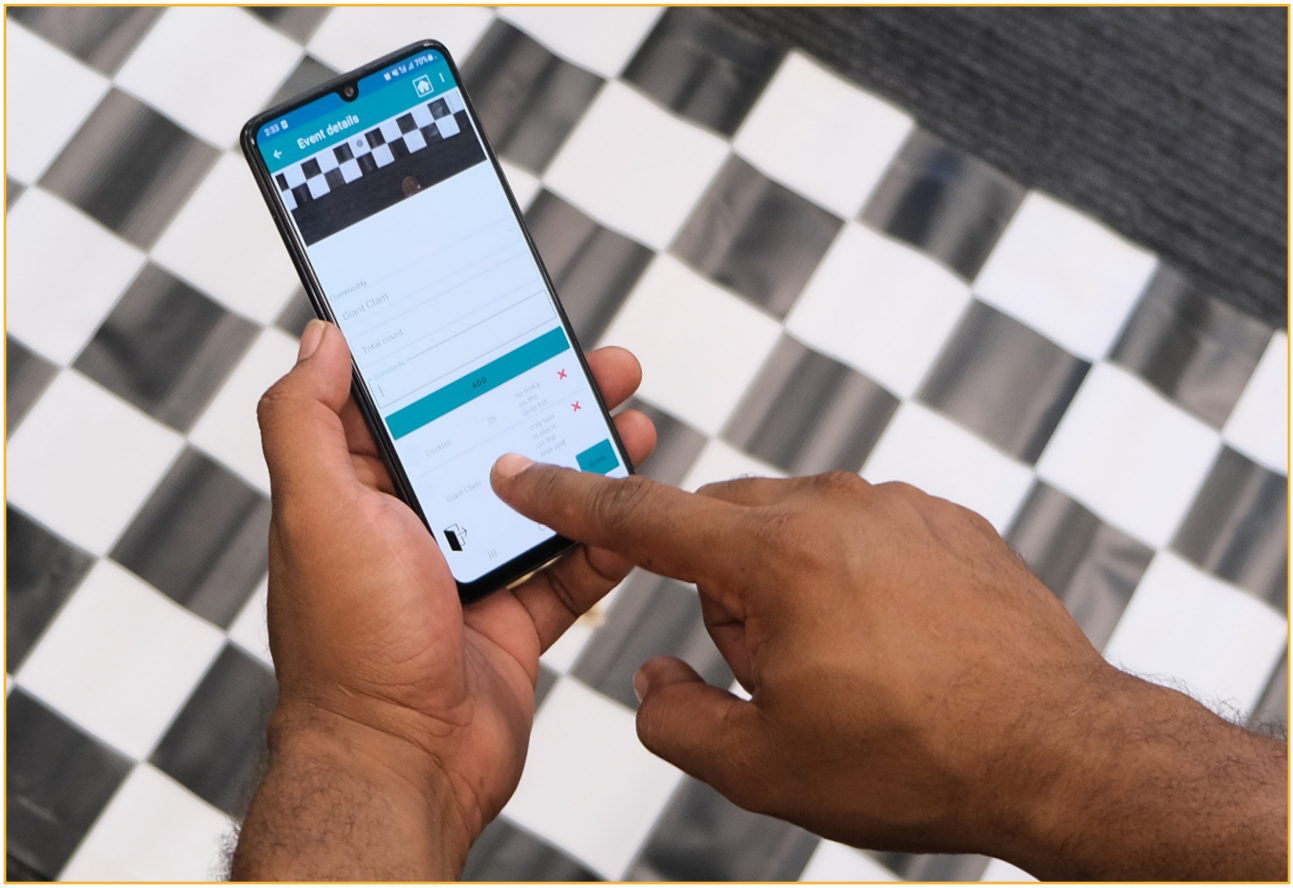
IN CASE OF ERRORS

If you encounter errors and issues, please do the following:

- ☐ Check to see that Ikasavea has been updated to the most recent version
- ☐ Try updating and restarting the device
- ☐ Try re-installing Ikasavea (i.e. uninstall it, and then re-install it)
- ☐ Make sure Ikasavea was given the appropriate permissions upon installation:
  - Access to location
  - Access to camera and pictures/storage

If issues persist, we suggest you reach out to SPC-FAME for assistance: ikasavea_support@spc.int

It will be most helpful if you can provide the particularities of your device (i.e. brand, model number etc.), the name of the survey created and synchronised to the tablet(s) with the issue, and the authority that created the survey.



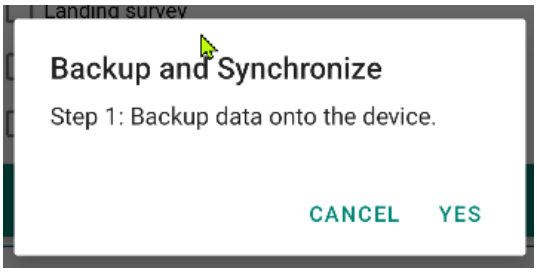
DURING DATA COLLECTION IN COMMUNITIES

Depending on whether you are in the field with your team, you may want to back up the data from each device each day.

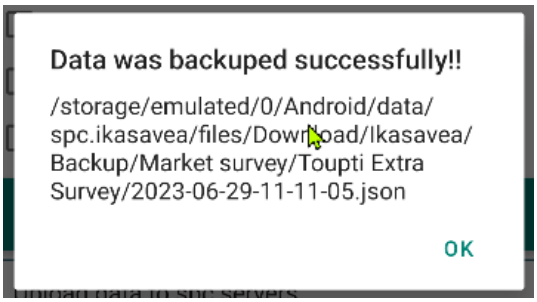
This needs to be done by plugging the chosen device into a secured laptop.

Then, on the Synchronisation page of the Ikasavea app, select “Backup and upload my data”

The following window will open:

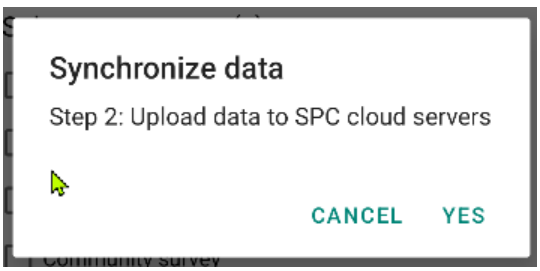


Once you click yes, the following window should confirm that the backup has been completed:



BEFORE clicking “OK”, please make sure that you can locate the backup files, and that they are intact. Note: the file will be generated and saved on the tablet in the file location indicated in the popup screen shown below. You must then locate this file and copy and transfer it onto the laptop.

Once you click “OK”, the following screen will appear:



IMPORTANT - SYNCING IN THE FIELD

If your team is in the field, please click CANCEL.

Synchronising the data to SPC servers will automatically erase all data on the tablets themselves once it has been uploaded.

Keeping the data on each of the tablets in the field, will make it easier for you to keep track of errors.

At times, your data collectors might be forced to complete surveys later on in the field trip owing to time constraints (e.g. there are too many fishers/invertebrate harvesters for everyone to complete a whole survey before someone leaves).

If the data is synchronised/uploaded to the SPC servers, those incomplete surveys will be uploaded and removed from the device, making it impossible for your data collectors to complete those surveys when the fishers/ gleaners have more time available.

AFTER DATA COLLECTION IN COMMUNITIES

1 Cleaning

There are two opportunities to begin cleaning the data. Data can be checked on each tablet before backing up and synchronising, or afterwards once things are synchronised to the SPC-FAME servers.

One advantage to checking data before synchronisation would be the ability to check that the correct photographs were uploaded from a device's gallery (in instances where photos needed to be taken before catch surveys were carried out). This way, the device in question is already in hand, and the correct picture can be uploaded to the catch survey very quickly.

However, data coordinators from Kiribati and Vanuatu have preferred to clean using the web interface once the data has been synchronised. They found data cleaning, correction and management much easier once it was all in one place, and presented more cleanly. Moreover, the data needs to be synchronised to the SPC-FAME servers anyway, and photos can still be uploaded easily onto the web interface if necessary.

The choice is ultimately your own. However, below, you will find instructions for how to conduct fundamental cleaning exercises using the web interface.

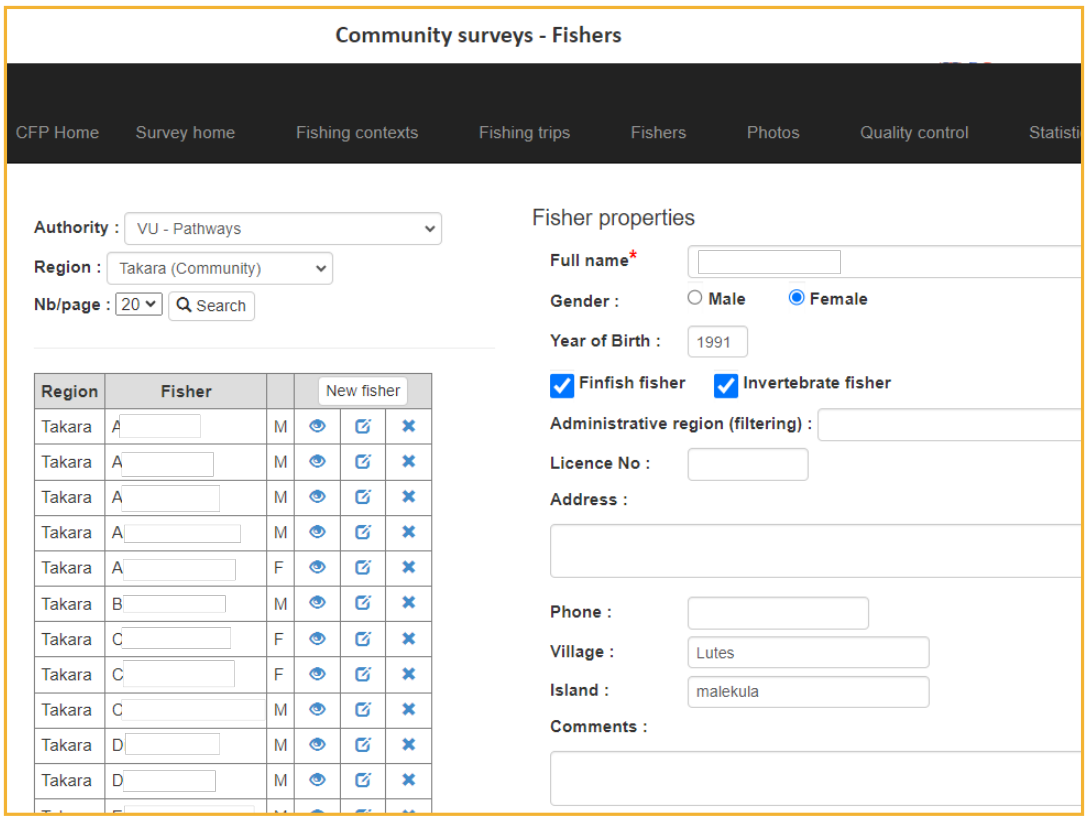
To access the fishing context surveys, follow this pathway:

Survey home > Fishing context (qualitative:)

To access the catch surveys, use this pathway:

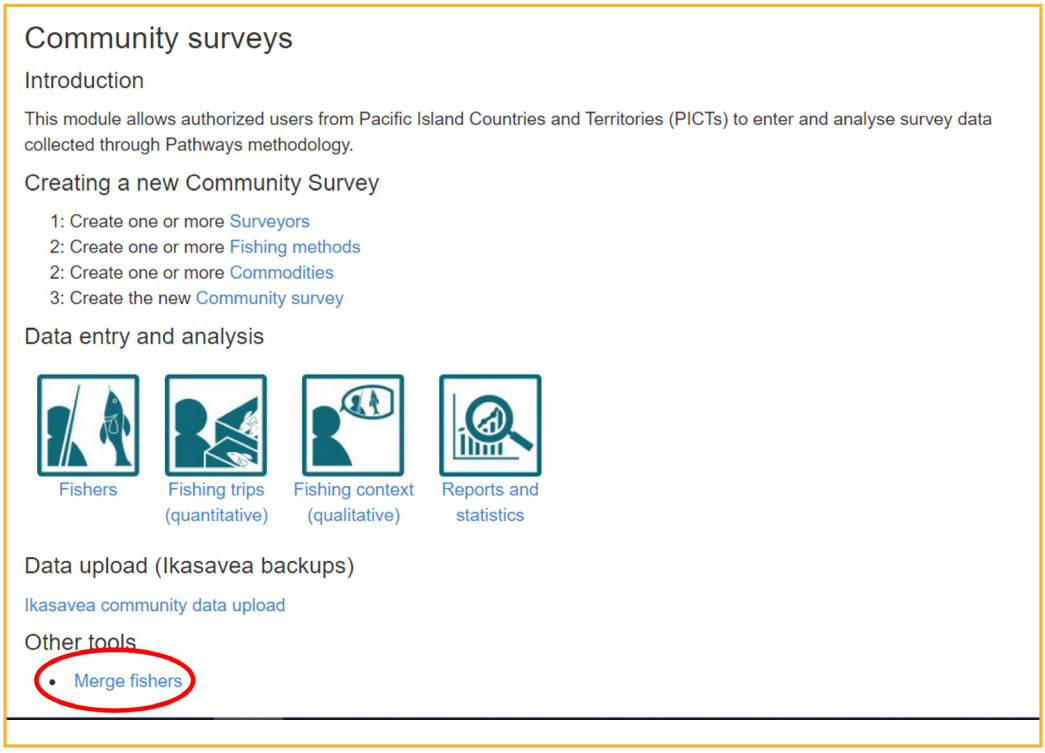
Survey home > Fishing trips (quantitative) "
Once you are comfortable that the data from each tablet can be uploaded to the SPC, you can synchronise that data to the SPC cloud servers. At that point, your access to the data will be through the SPC web portal.

1a. Double counting: To check whether any fishers have been double-counted, you can sort the data by fishers' names.

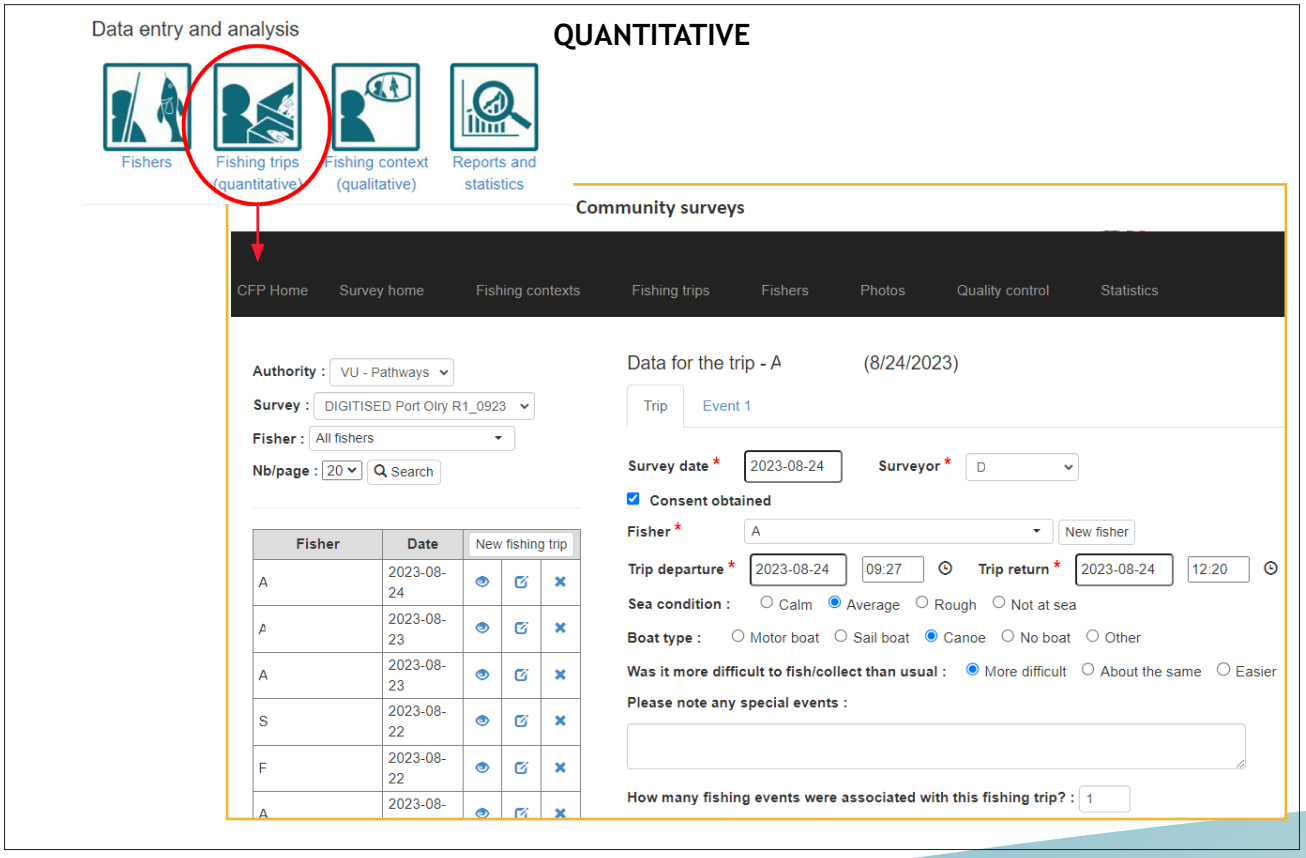


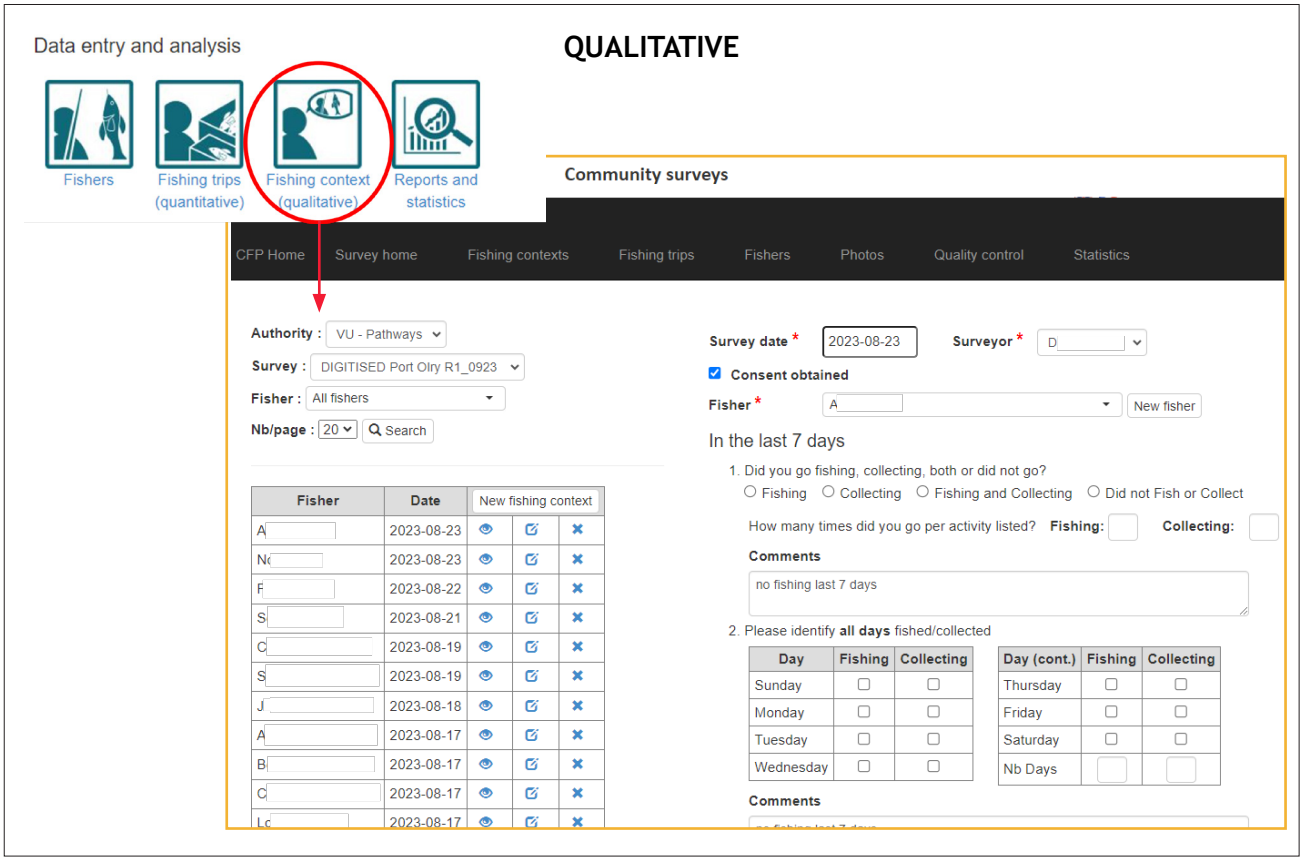
1b. Merging entries: You can merge surveys from entries if you have confirmed that they are different spellings of the same name etc.

You can also check all the data entered for each completed survey, allowing you to check for inconsistencies, and add information based on data collectors' field notes.

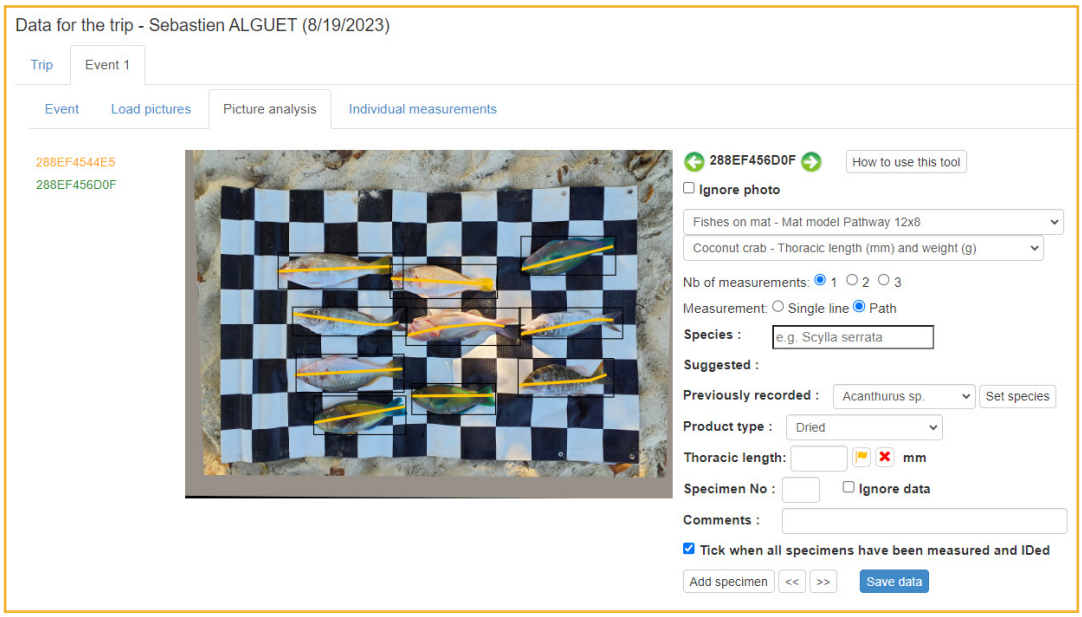


You can also check all the data entered for each completed survey, allowing you to check for inconsistencies, and add information based on data collectors' field notes.



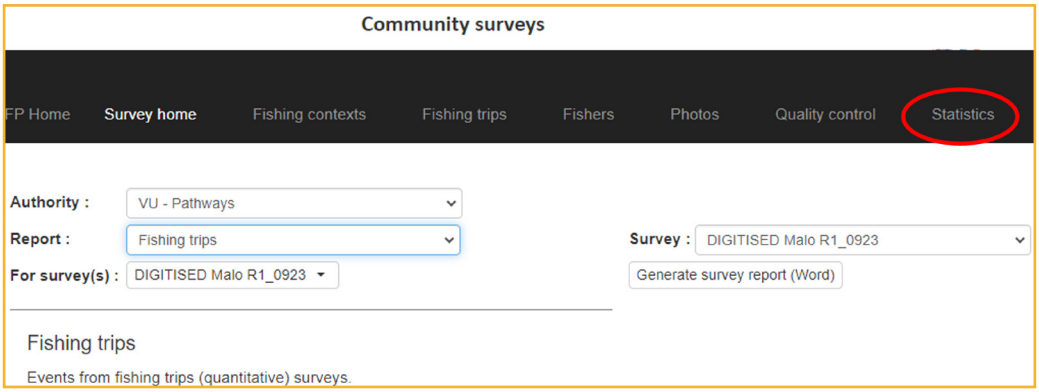


1c. Checking photos: It is also possible to check the photos attached to each catch survey:



2 Generating reports

The SPC web portal gives you the ability to quickly generate summary reports based on the collected data.



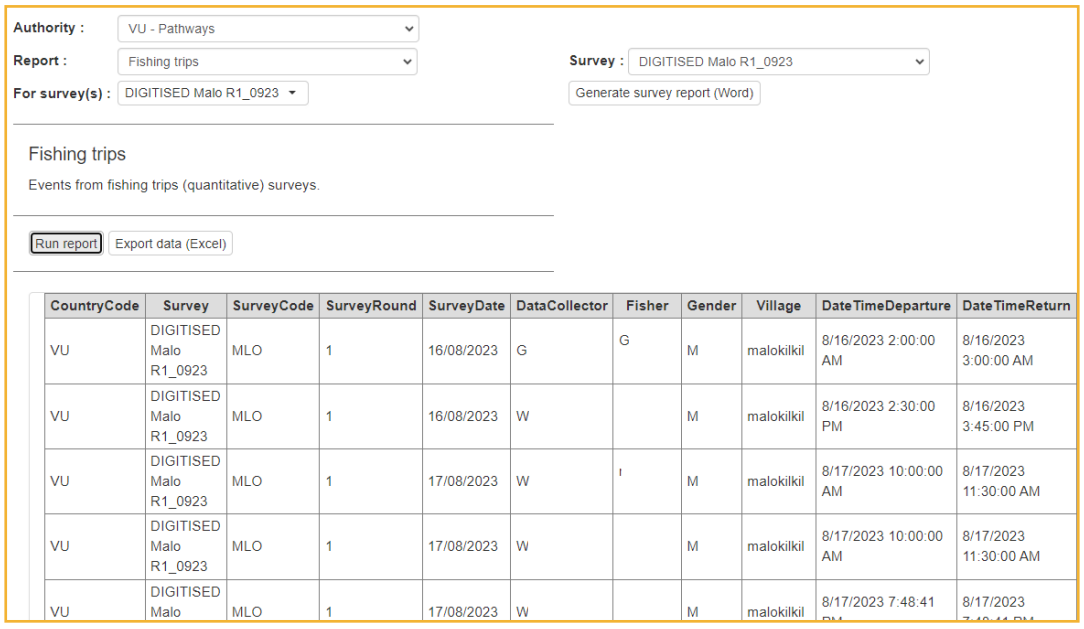
You have two choices. Exporting the data via Excel, or running a report, which will generate a Word Document. The contents of the report can be negotiated with our counterparts at SPC.

Please bear in mind that the size of the fish, and their identification NEED TO BE VALIDATED^. If you generate a report before the validation has been completed, the contents of that report can be INACCURATE. The weight generated in these reports is calculated by inserting the length of each fish into a formula with a ratio that is species/genus specific:

$$\text{Weight} = a * \text{Length}^b$$

Where:

- Weight is reported in grams.
- Length is entered in centimetres.
- Coefficients a and b are species/genus specific.



CountryCode	Survey	SurveyCode	SurveyRound	SurveyDate	DataCollector	Fisher	Gender	Village	DateTimeDeparture	DateTimeReturn
VU	DIGITISED Malo R1_0923	MLO	1	16/08/2023	G	G	M	malokilkil	8/16/2023 2:00:00 AM	8/16/2023 3:00:00 AM
VU	DIGITISED Malo R1_0923	MLO	1	16/08/2023	W		M	malokilkil	8/16/2023 2:30:00 PM	8/16/2023 3:45:00 PM
VU	DIGITISED Malo R1_0923	MLO	1	17/08/2023	W	I	M	malokilkil	8/17/2023 10:00:00 AM	8/17/2023 11:30:00 AM
VU	DIGITISED Malo R1_0923	MLO	1	17/08/2023	W		M	malokilkil	8/17/2023 10:00:00 AM	8/17/2023 11:30:00 AM
VU	DIGITISED Malo	MLO	1	17/08/2023	W		M	malokilkil	8/17/2023 7:48:41	8/17/2023

^All catch photos submitted to the SPC still require validation by an expert via the SPC web interface. Validation involves: Identifying the fish/invertebrates to a genus/species level; and ensuring the AI is measuring the animal correctly. With time, as the AI becomes more proficient at identifying different species of fish, less validation will be necessary. However, depending on how many photographs are uploaded of each species of fish, it is still advisable to retain the services of someone familiar with the fish species from the region, who is capable of identifying those fish to a genus or species level.

3 Data constraints and analyses

Please bear in mind that no data set is perfect, and there are always constraints and assumptions associated with any data. In the instance of the community survey data, you might want to work through the provided checklist.

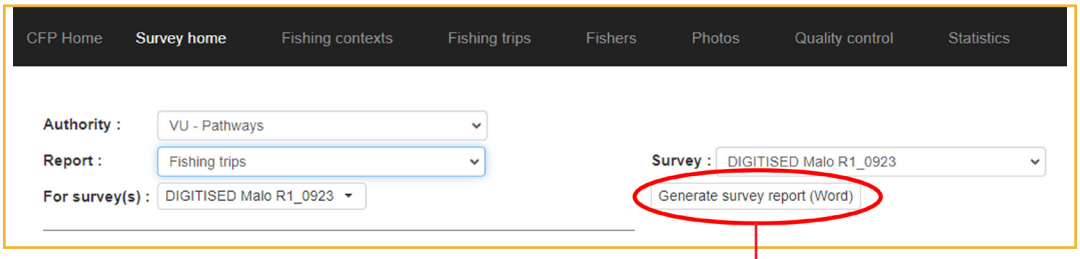
The data will show a more accurate picture as time goes on, and multiple, consistent surveys have been conducted. It is risky to have too much confidence in data/reports based on surveys that have only been conducted a few times.

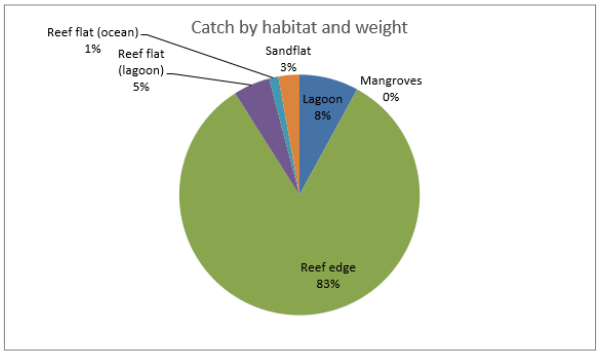
As you see in the figure below, the SPC web interface allows you to access data in two ways – via a survey report in the form of a Word document, or an Excel workbook.

The reporting function on the web interface is open to most kinds of analyses, but your organisation will need to send a list of requests to the SPC. Once those functions/analyses are built in, they will repeat for any dataset you wish to generate a report from.

DATA SET CHECKLIST

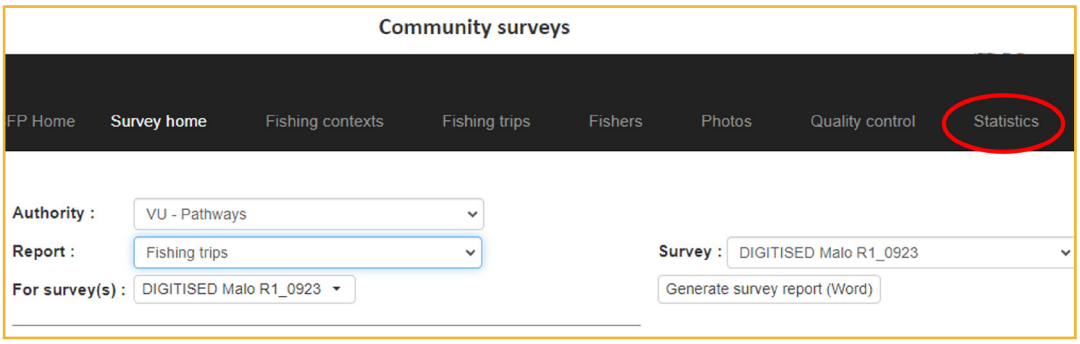
- ☐ **Possibility of incomplete coverage:** your sample of fishers/gleaners might not be representative of the entire community
- ☐ **Temporal variation:** the period of time that the survey was performed might not be representative of the rest of the year
- ☐ **Accuracy of the surveys:** whether your data collectors/surveyors have asked all of the requisite questions properly, and input the answers as accurately as possible has a significant bearing on how useful the data will be afterwards. There are only very rare instances where data can be responsibly corrected after the fact
- ☐ **Cleanliness of the data:** data always needs to be cleaned. Do the best you can to ensure all questions were answered and reported correctly, the appropriate photos are attached to the each survey, and that individual fishers are not counted multiple times (e.g. where one fisher is treated as multiple, separate fishers because the fishers' name was spelled differently by several data collectors/surveyors)





III- Fish catch top species

Species	Common name	Total count
Mulloidichthys flavolineatus	Yellowstripe goatfish	46
Caesio caerulaurea	Blue and gold fusilier	41
Siganus argenteus	Streamlined spinefoot	38
Gnathodentex aureolineatus	Striped large-eye bream	37
Lutjanus gibbus	Humpback red snapper	22
	Other species	299



REPORTING

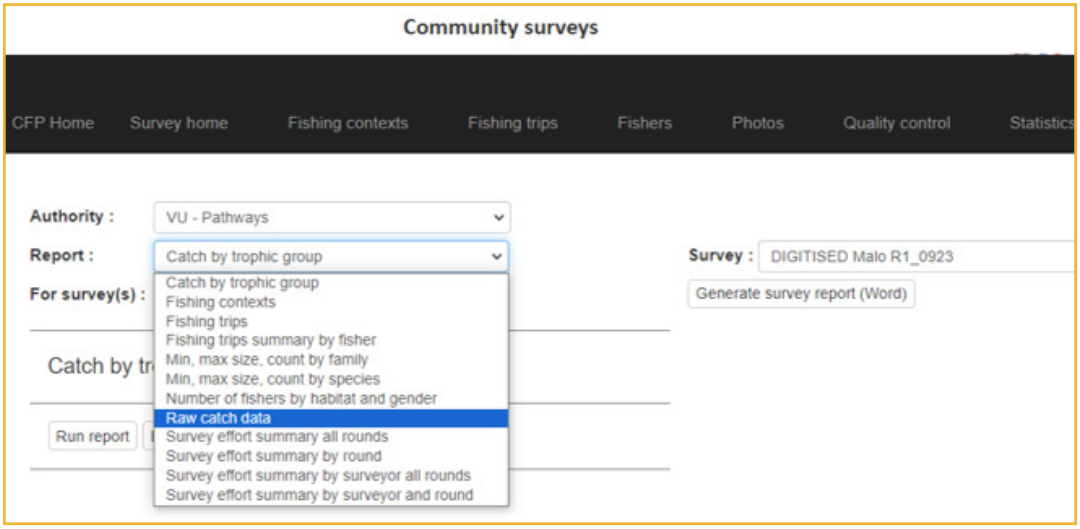
The most basic report (as of publication) presents the following:

1. Total no. fish species: Counted and identified by the AI, but only trustworthy after expert validation
2. Total no. fish caught: Counted by the AI
3. Total weight of fish caught: Calculated using the measured length of the fish and the L/W formula listed on page N.
4. Total no. fish families: A function of the AI count and species identification, but only trustworthy after expert validation
5. Catch by habitat (no. of fish and total weight of fish): A function of the AI count, species identification, and application of L/W coefficients, but only trustworthy after expert validation
6. Most commonly caught fish species: A function of the AI count and species identification, but only trustworthy after expert validation*
7. Fish species that made up the most weight (kg): A function of the AI count, species identification, and application of L/W coefficients, but only trustworthy after expert validation.
8. Weight (kg) contributed by each family of fishes: A function of the AI count, species identification, and application of L/W coefficients, but only trustworthy after expert validation
9. No. of times a fishing gear was reported being used (by males and by females): Count of responses to the relevant question in the survey – the list of fishing gear/methods can be changed by the data coordinator as specified on page 7.
10. No.s of males and females aware of CBFM regulations: Count of responses to the relevant question in the survey
11. Perceived compliance levels as reported by males and females: Count of responses to the relevant question in the survey*

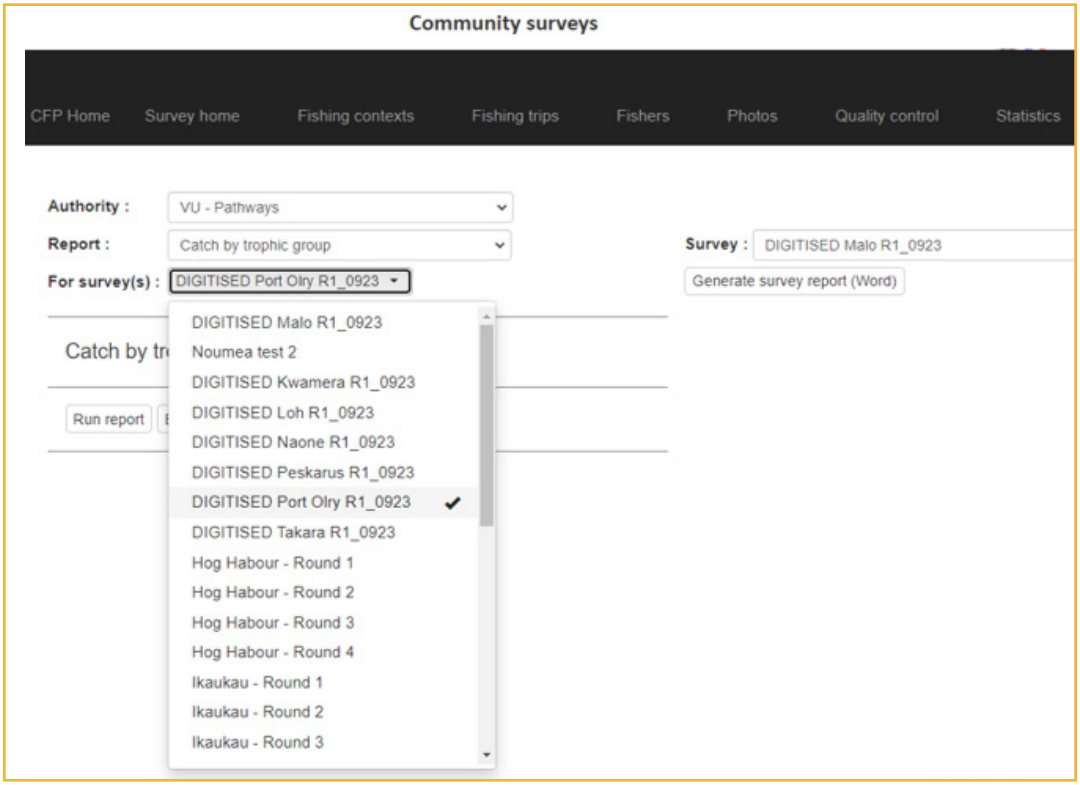
*Note that 6 of the 11 points above are only trustworthy after the AI driven species IDs have been validated by an expert. Please do not rush and generate reports before you are certain that those species IDs have been validated. The time taken to validate the species IDs will vary depending upon the number of fish photos, the diversity of the recorded catch, and the abilities and time available to your experts.

Once your dataset is complete, you might wish to conduct your own, more complex data analyses using the data.

Select the data that you are interested in using the “Report” dropdown menu.



Next, ensure you choose the dataset of interest



Once sure, you can then click the “Export data (Excel)” button. An Excel workbook will then be downloaded to your device, which you can then use like any other Excel workbook.

CBFM database

Web/tablet app for data entry & querying

Flow chart

Before the survey

1. Get accounts created for data collectors by SPC
2. Set up the survey(s) from web interface
3. Install Ikasavea on tablet and synchronize surveys

- Add surveyors
- Add fishing methods
- Add commodities
- Set up survey

During the survey

4. Collect data & synchronize regularly with server

After the survey

5. Verify data uploaded and validate species
6. Extract results for analysis and reporting

Get accounts created for data collectors by SPC

- Mail to: franckm@spc.int, Cc: bernardv@spc.int
- Accounts are required for the users to access the web interface and synchronize tablet data
- Provide first name, last name, email address (and role: data entry only or full access to set up surveys). All or specific surveys.
- A google account (gmail) address can be used for user authentication instead of user and password: provide the email address associated with the tablet

Set up the survey(s) from web interface

https://www.spc.int/CoastalFisheries/

Community surveys
Pathways

Creating a new Community Survey

1: Create one or more Surveyors
2: Create one or more Fishing methods
2: Create one or more Commodities
3: Create the new Community survey

Data entry and analysis

Fishers | Fishing trips (quantitative) | Fishing context (qualitative) | Reports and statistics

Other tools

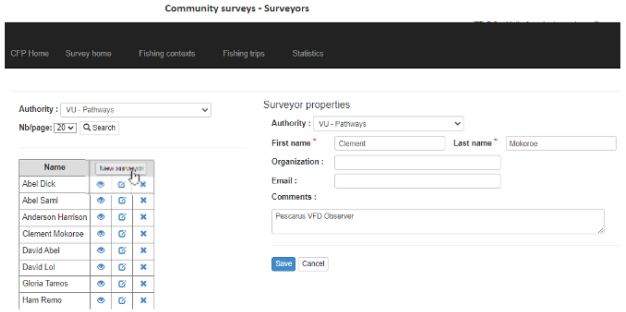
- Merge fishers

Add surveyors (if necessary)

Creating a new Community Survey

1. Create one or more Surveyors
2. Create one or more Fishing methods

Add missing surveyors
You'll associate them to surveys later



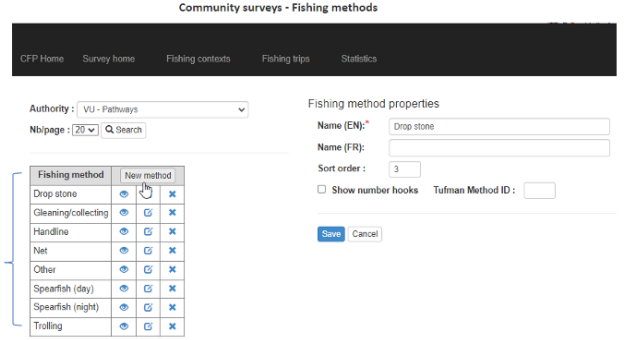
Add fishing methods (if necessary)

Creating a new Community Survey

1. Create one or more Surveyors
2. Create one or more Fishing methods
3. Create one or more Communities
4. Create the new Community survey

Add only fishing methods of importance to your country and not present in the default list

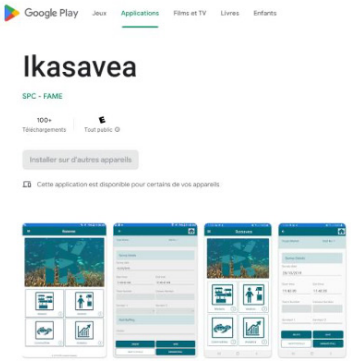
Default list



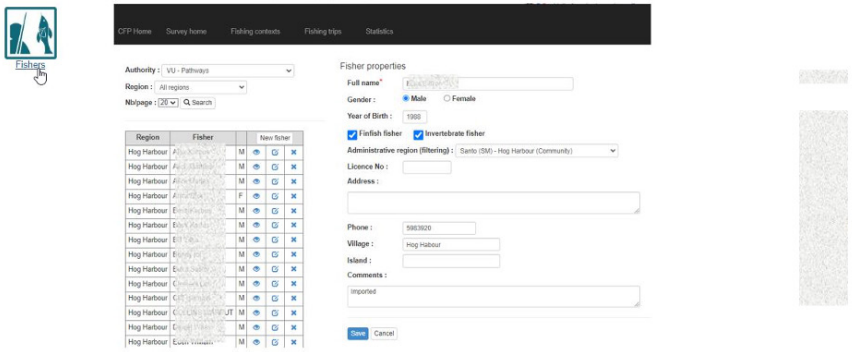
Installing Ikasavea on your tablet

From google play

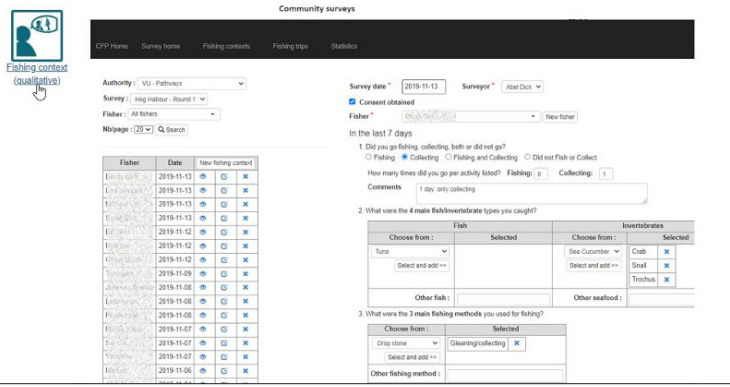
Google Play



Fishers



Fishing context (qualitative)



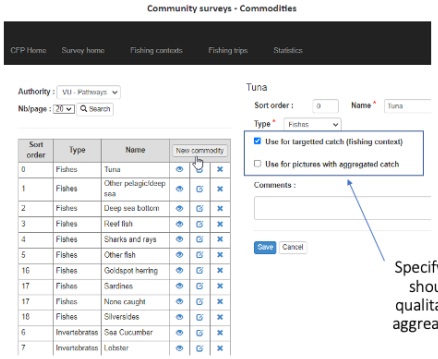
Add commodities (if necessary)

Creating a new Community Survey

1: Create one or more Surveyors
2: Create one or more Fishing methods
2: Create one or more Commodities
3: Create the new Community Survey

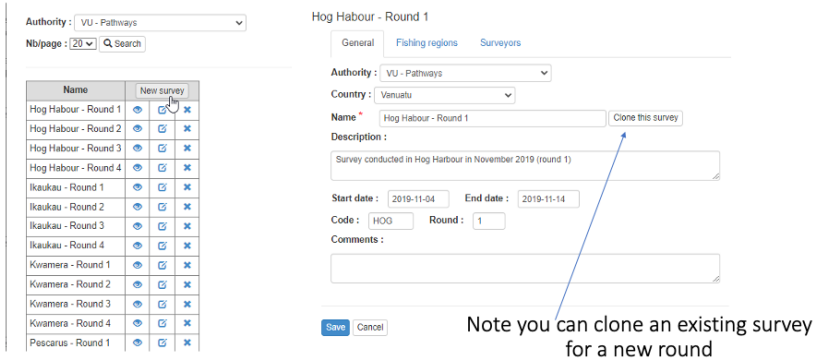
Commodities are used for qualitative surveys (fishing context) and for aggregated catch

Add only commodities of importance to your country and not present in the default list



Specify if the commodity should appear in the qualitative surveys or for aggreated catch (or both)

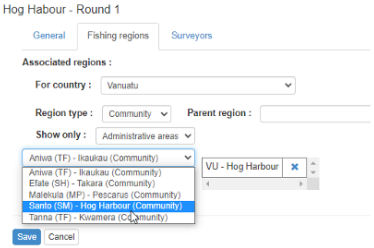
Set up survey: general properties



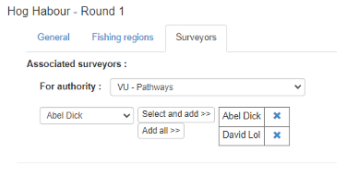
Note you can clone an existing survey for a new round

Set up survey: regions and surveyors

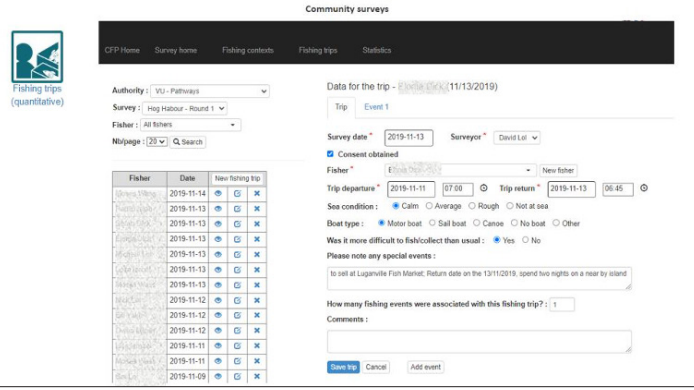
Associated communities



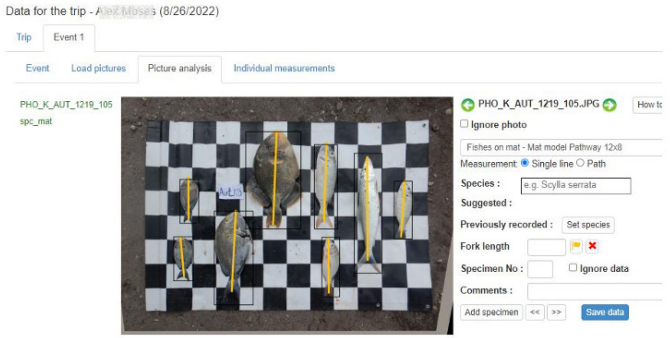
Associated data collectors



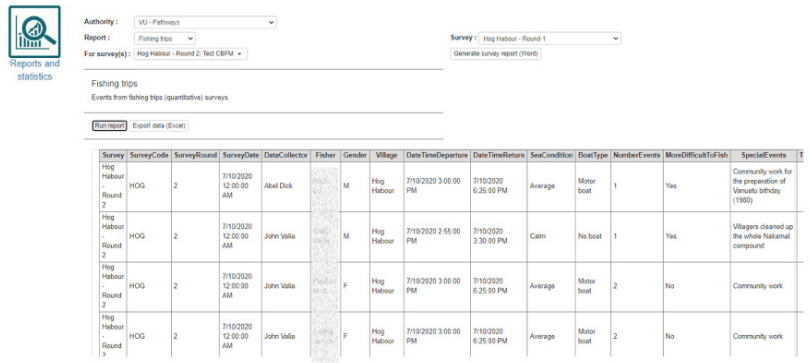
Catch survey (quantitative): trips



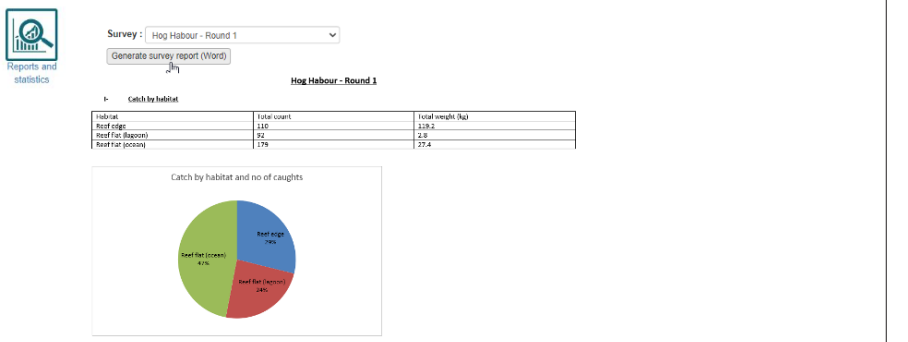
Catch survey (quantitative): catch



Reporting



Report generation



Automated processing of landing images

Measuring boards and calibrated mats

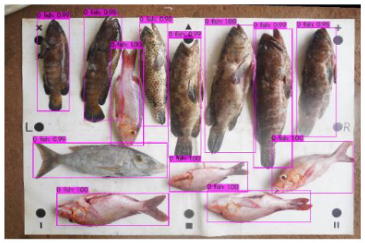
Failed checkerboard mat calibration

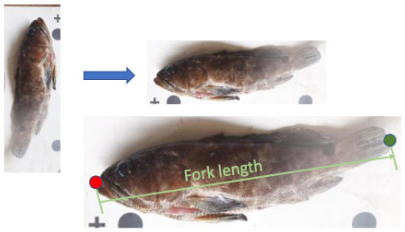
Another mat interferes with calibration

Mat blending with background

Calibration of these images would have to be done manually by selecting 5 know key points on the image

Fish detection and measurement

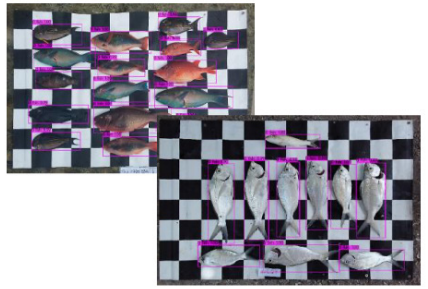




● Detected snout ● Detected fork

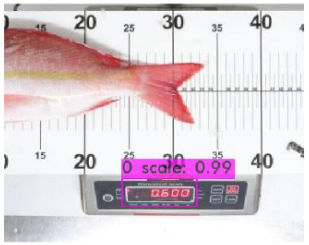
Fishes are detected from the calibrated mat, then rotated and/or flipped to standardize the picture
Snout and fork are detected for fish measurement

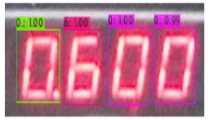
Fish detection on a checkerboard



The checkerboard background adds an extra difficulty for automatic detection but it works generally well

Scale detection and reading digits

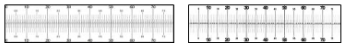




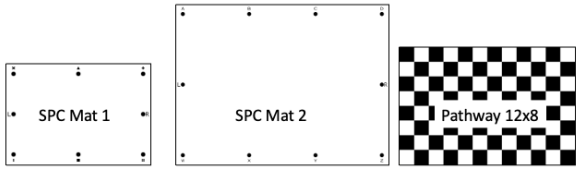
Reading digits 0. 6 0 0

For measuring board photos, scale is detected and digits read from detected scale picture. Resulting number is further processed to choose a weight unit (kg or g).

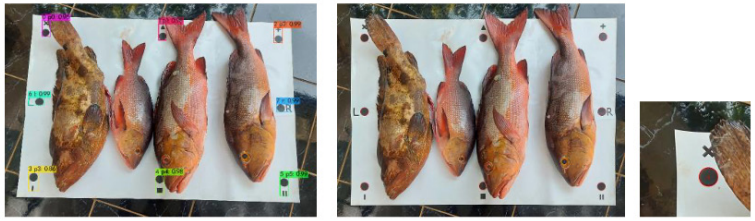
Standard mats & boards for calibration



SPC Boards



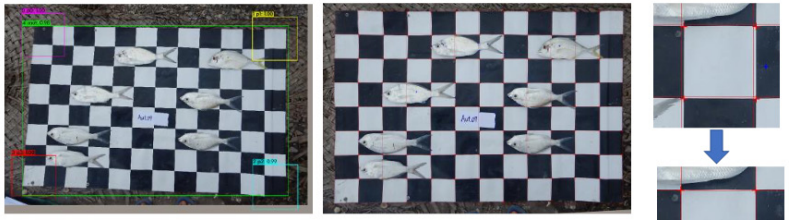
Standard mats & boards for calibration



For SPC mats, markers are detected with AI for initial reprojection
Black circles are also used to refine the calibrated image

You need at least 4 non-aligned and fully visible markers to calibrate an image. More is better.

Standard mats & boards for calibration



For checkerboard mats, corners are detected with AI for initial reprojection
Key points of the checkerboard are used to refine the calibrated image.

Calibration can be impaired if corner blocks are not visible or free

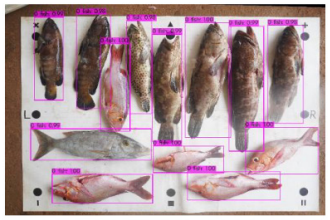
Failed checkerboard mat calibration

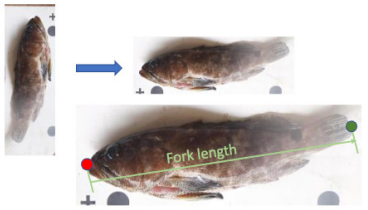
Another mat interferes with calibration

Mat blending with background

Calibration of these images would have to be done manually by selecting 5 know key points on the image

Fish detection and measurement





Detected snout Detected fork

Fishes are detected from the calibrated mat, then rotated and/or flipped to standardize the picture
Snout and fork are detected for fish measurement

Fish detection on a checkerboard

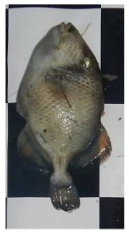
The checkerboard background adds an extra difficulty for automatic detection but it works generally well

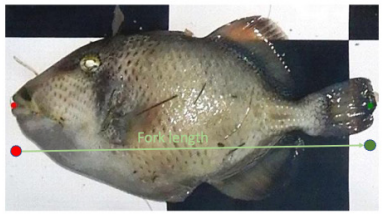
Failed checkerboard mat detection

Missing corners of the mat

Missing one column of the mat

Fish measurement (checkerboard)

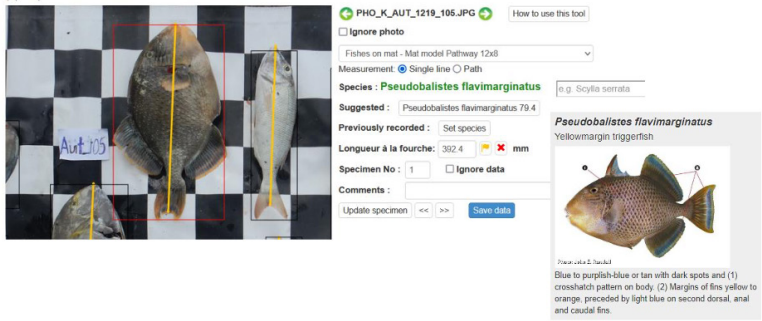




Detected snout Detected fork

Detected fishes the calibrated checkerboard are rotated and/or flipped to standardize the picture
Snout and fork are detected for fish measurement. For the above example detected length is 19.751 cm and the manually measured length with ImageJ is 19.831 cm

Automated species identification



Prepared by ACIAR/DFAT Pathways Project
ACIAR project FIS/2020/172