



# Proceedings of the meeting on a digital fisheries information system and vessel tracking device installation in Malawi



AFRICAN DEVELOPMENT BANK GROUP



# Proceedings of the meeting on a digital fisheries information system and vessel tracking device installation in Malawi

---

## Authors

Peerzadi Rumana Hossain, Alexander Tilley, Basiita Rose Komugisha and Alinafe Maluwa.

## Citation

This publication should be cited as: Hossain PR, Tilley A, Komugisha BR and Maluwa A. 2024. Proceedings of the meeting on a digital fisheries information system and vessel tracking device installation in Malawi. Penang, Malaysia: WorldFish. Proceeding: 2024-15.

## Acknowledgments

This proceeding is an output as part of the Program for Improving Fisheries Governance and Blue Economy Trade Corridors (PROFISHBLUE) funded by African Development Bank, implemented by Southern African Development Community (SADC).

WorldFish has organized the meeting within the scope of the component “Digital fisheries information systems (FIS) and knowledge sharing platform for managers and value chain actors” under the assignment “Genetic improvement, support to aquaculture value chains and promotion of fish in foods systems in SADC.”

We also acknowledge all the participants from the Department of Fisheries in Malawi for joining this meeting and their engaging discussion along with valuable inputs. WorldFish Malawi jointly works with the Department of Fisheries to implement the activities of Digital FIS component, whom we sincerely thank.

## Contact

WorldFish Communications and Marketing Department, Jalan Batu Maung, Batu Maung, 11960 Bayan Lepas, Penang, Malaysia. Email: [worldfishcenter@cgiar.org](mailto:worldfishcenter@cgiar.org)

## Creative Commons License



Content in this publication is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License (CC BY-NC 4.0), which permits non-commercial use, including reproduction, adaptation and distribution of the publication provided the original work is properly cited.

© 2024 WorldFish.

## Photo credits

Front cover, pages, 6, 7, 8, 9, 12 Alinafe Maluwa/WorldFish.; page, 11 Peerzadi Rumana Hossain/WorldFish.

# Table of contents

---

Agenda	4
Attendees	5
Welcome	6
Previous meetings	7
Remarks from Director, Department of Fisheries, Malawi	8
Presentation: Opportunities for a digital fisheries information system in Malawi	9
Interactive discussion session and key points	10
Training on the installation of the vessel tracking devices	12
Appendix 1. Snapshots of Dr. Tilley's presentation	13

# Agenda

Time	Activity	Speaker
12:00–12:30	Arrive at the venue	
12:30–13:00	Meet and greet	
13:00–14:00	Lunch	
14:00–14:05	Welcome and introduction	Davie Khumbanyiwa, Department of Fisheries
14:05–14:15	Update on outcomes of previous meetings	Dr. Peerzadi Rumana Hossain, scientist (PROFISHBLUE-FIS component lead), WorldFish
14:15–14:30	Remarks	Dr. Hastings Zidana, director, Department of Fisheries, (focal point for PROFISHBLUE in Malawi)
14:30–15:00	Overview of the Pelagic Data System (PDS), vessel trackers, PDS network and the Peskas platform in relation to fisheries information systems	Dr. Alex Tilley, senior scientist (PROFISHBLUE-FIS-Activity lead), WorldFish
15:30– 16:00	Needs assessment of the current fisheries data collection system in Malawi (who is collecting what and where, where there are gaps, who owns the data, etc.)  Type of fisheries information needed to make decisions in the context of Malawi  Identification of the waterbody and fishers, how to receive catch data, etc.	Interactive discussion
16:00– 16:30	Way forward	Dr. Rose Komugisha Basita, senior scientist (PROFISHBLUE project lead), WorldFish
16:30–17:00	Training for installing vessel tracking devices	Dr. Tilley, senior scientist (PROFISHBLUE-FIS-Activity lead), WorldFish
17:00–17:30	Group photo and closing with tea and coffee	

# Attendees

Name	Position	Organization
Dr. Rose Komugisha Basita	Senior scientist and project lead for PROFISHBLUE	WorldFish
Dr. Peerzadi Rumana Hossain	Scientist and FIS component lead	WorldFish
Dr. Alex Tilley	Senior scientist and FIS-Activity lead	WorldFish
Alinafe Maluwa	Research assistant	WorldFish
Trevor Maele	Account manager	WorldFish
Olivia Kanyilika	Office assistant	WorldFish
Dr. Hastings Zidana	Director of fisheries and focal point for PROFISHBLUE in Malawi	Department of Fisheries
Dr. Maxon Ngochera	Senior deputy director	Department of Fisheries
Dr. Letson Yoyola Phiri	Senior deputy director	Department of Fisheries
Jacqueline Kazembe	Senior deputy director	Department of Fisheries
Reird Kandapo	Deputy director	Department of Fisheries
Mofart Manase	Deputy director	Department of Fisheries
Davie Khumbanyiwa		Department of Fisheries
Dr. Harod Sungani	Officer in charge	Monkey Bay Fisheries Research
Heals Kabowa	VMS desk officer	Monkey Bay Fisheries Research
Salimu M'balaka	Principal fisheries research officer	Monkey Bay Fisheries Research
Mr. Thomson Tchale	Assistant fisheries officer	Namiyasi Fisheries Enforcement Unit-Mangochi

# Welcome

---

Mr. Davie Khumbanyiwa from Malawi's Department of Fisheries (DOF) welcomed everyone to the meeting and asked the participants to introduce themselves. After the introductions, Mr. Khumbanyiwa asked Dr. Hossain to provide an overall update of vessel tracking activity under the digital fisheries information systems' component of PROFISHBLUE.



Mr. Khumbanyiwa welcoming everyone to the meeting.

## Previous meetings

---

Dr. Peerzadi Rumana Hossain, Scientist (PROFISHBLUE-FIS-Component Lead), WorldFish

Dr. Hossain briefly highlighted the discussion points raised in previous meetings and the decisions that were made.

WorldFish has significant technical expertise on digital fisheries monitoring across various projects in different countries, including Timor-Leste, Kenya, Tanzania and Mozambique. Given this, WorldFish asked the secretariat of the Southern African Development Community (SADC) for a variation in the budget to allow it to purchase vessel tracking equipment. The SDAC approved the purchase, and the secretariat advised WorldFish to synchronize its work with the World Wildlife Fund (WWF), as the WWF would be doing similar and comparable activities. After receiving approval, WorldFish organized a virtual meeting for December 19, 2023. In attendance, was the director of the DOF and SADC's focal point in Malawi, WWF officials Mr. Vicente Cossa and Mr. Eduardo Videira, Ms. Katrina Hilundwa from the SADC, and Dr. Basita, Dr. Tilley and Dr. Hossain from WorldFish.

The team discussed different perspectives regarding the use, maintenance, price and longevity of the device. They agreed that 10 would be installed on small-scale fishing fleets, as 80 percent of the fishers in Malawi are small scale. The team also agreed to share information among WorldFish, the WWF and DOF and work together.

The next meeting was arranged for January 15, 2024. At the meeting, Dr. Tilley [provided an overview](#) of his work on digital information systems in fisheries over the past 7 years. He then discussed how, under PROFISHBLUE, we can leverage the existing code and scaling of the larger project to trial a fisheries information system approach for Malawi.

As per the outlined steps for implementation in Malawi during the Jan 15, 2024 meeting, the team opined to have a physical meeting with the DOF to discuss the details of the plan.

At the meeting in Lilongwe. Dr. Tilley guided the attendees on the activity and taught them to train people on how to install the gadgets on fishers' boats.

Before this, however, Dr. Hossain asked Dr. Zidana for his remarks to start the discussion.



Dr. Hossain outlines the outcomes of the previous meeting.

# Remarks from Director, Department of Fisheries, Malawi

Dr. Hastings Zidana, Director, Department of Fisheries, Malawi and Focal point from SADC for PROFISHBLUE in Malawi.

Dr. Zidana first thanked the WorldFish team for making sure these efforts are empowering Malawi's fisheries sector. He suggested that if there are 10 gadgets, we can install five in Mangochi and five in Salima. However, he left it open for those present with technical expertise to decide which areas would be best. He mentioned that Mr. Heals Kabowa, from Monkey Bay Fisheries, is the VMS desk officer for the DOF and would be able to provide some baseline information, as the DOF is already doing something similar. Dr. Zidana then officially opened the meeting.



Dr. Zidana delivers his remarks.



# Presentation: Opportunities for a digital fisheries information system in Malawi

Dr. Alex Tilley, senior scientist (PROFISHBLUE-FIS-Activity lead), WorldFish

Dr. Tilley delivered a presentation on the opportunities for a digital fisheries information system in Malawi (Appendix 1), in relation to the developed information system PESKAS, which is an open-source web portal that provides data and insights on fisheries for data-driven decision-making. When PESKAS was first implemented in Timor-Leste, in 2016, it did so with no fisheries data. Since then, it has successfully progressed from pilot to national adoption. The PESKAS system integrates catch data from enumerators based at key landing sites with vessel movement tracks using solar-powered vessel monitoring systems from a U.S. company called Pelagic Data Systems that record data on location every 6 seconds. These solar-powered trackers have no on/off switch and have sufficient battery life to record for up to 1 month, without being recharged. Installation is simple, with eight screws needed to attach the device to the top or side of the vessel facing the sun (and out of the way of hauling gear), after which it requires no further maintenance. Malawi already has a data collection system, which uses a KoboToolbox form, and PESKAS could help integrate this pre-existing system with vessel monitoring for more accurate effort information as well as spatial distribution of fishing.



Dr. Tilley delivers his presentation.

## Interactive discussion session and key points

---

Mr. M'balaka asked how long the battery of the gadgets can last after charging. The response from Dr. Tilley was that the device continues to record as normal for approximately 1 month, if fully charged.

Mr. Moffat Manase enquired as to whether the technology could be extended to other value chain actors in the fisheries sector. Dr. Tilley responded that it can be installed on vehicles to track how long it takes to transport fish to markets. He added that trials to combine this with temperature sensors are underway in Timor-Leste to explore food safety and the adequacy of the cold chain.

Dr. Zidana requested training on data management using R for his team. He also asked for a virtual training session to learn how to integrate KoboToolbox and PESKAS. Dr. Tilley agreed; however, he mentioned that he would need to talk with the data scientist to determine the content, date and time and of the training and to finalize it.

Dr. Ngochera mentioned that the DOF has already done the sensitization of fishers on the vessel tracking monitors in Salima of Lake Malawi. Considering this, the team agreed that the 10 gadgets would be installed on fishing boats in Salima District's landing site.

A query was made into whether the devices would be used for small-scale or large-scale fishers. Considering 80 percent of fishers in Malawi are small scale, the team decided that they would be the target.

The team realized that installation would need to take place within 3 weeks after the meeting, as fishers were already anticipating the activity through other engagement from the DOF. On a query regarding the length of the data, Dr. Hossain said that if we can start by March, we could have data for at least 1 year, from March 2024 to February 2025, to analyze, taking into account that the project is set to end in June 2025.

Regarding the current collection procedure, DOF officials mentioned that they use KoboToolbox to collect data, and that sampling is usually 4 days per landing site, usually the first 16 days. They have a current regimen and sampling form they use to collect data and agreed to share them with WorldFish. WorldFish can employ one casual staff member as an enumerator to support the existing data collection procedure at the beach landing site in Salima, where the gadgets will be installed. The DOF can select the enumerator from the local inhabitants or from the beach village community.

The team also realized the need to form a WhatsApp group of WorldFish staff and DOF officials for quick and easy communication in line with the activity.

The following measures were tabled as a way forward:

- Create a WhatsApp group for PROFISHBLUE FIS team of WorldFish based on a list of individuals with technical expertise from the DoF, Malawi.
- The tracker installation be done on vessels of small-scale fishers as the target group on Lake Malawi.
- The DOF will provide Dr. Tilley with the current KoboToolbox form used to collect catch data as well as some sample data.
- Ensure the vessel tracking devices are placed under sunlight to recharge and kept safe while waiting for installation.
- Maluwa will be the key contact person for WorldFish on the ground; however, Dr. Tilley, Dr. Hossain and Dr. Basita need to be kept in the loop on each communication.
- Dr. Tilley would let the team know about the training plan after having a discussion with his data scientist.



Photo credit: Papatadi, Panama, Panama, Worldfish

Dr. Tilley provides training on how to install the vessel tracking device.

# Training on the installation of the vessel tracking devices

At the end of the meeting, five DOF officers and one research staff from WorldFish were trained on how to install the vessel tracking devices: Dr. Ngochera, Mr. Khumbanyiwa, Mr. Kabowa, Mr. M'balaka and Mr. Tchale from the DOF, as well as Maluwa Alinafe from WorldFish.



Photo credit: Alinafe Maluwa/WorldFish

PROFISHBLUE FIS team.

# Appendix 1. Snapshots of Dr. Tilley's presentation

## Opportunities for digital fisheries information systems in Malawi

Alex Tilley  
a.tilley@cgiar.org  
PROFISHBLUE Project





## Principles for Sustainable Fisheries monitoring

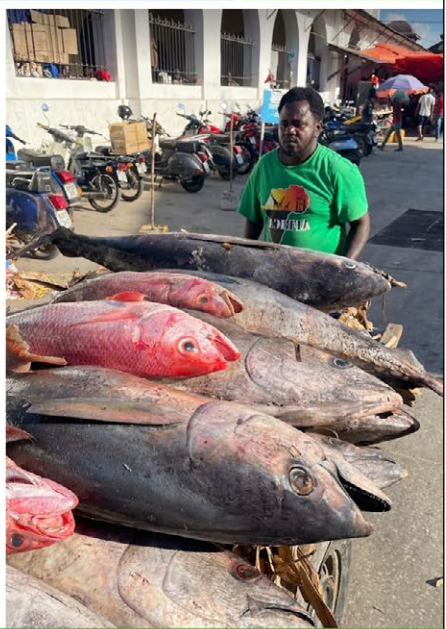
- **Convene** stakeholders and government to identify data sources and promote ownership.
- **Co-design** systems to suit aspirations and capacity.
- **Enhance** existing data, systems and capacities
- **Integrate** new methods and models
- **Adapt and scale** technologies and approaches

*Peskas™*

Catch monitoring	Data validation	Vessel tracking
Dashboard & visualization	Data analytics	Fishing pressure Effort

Existing catch system

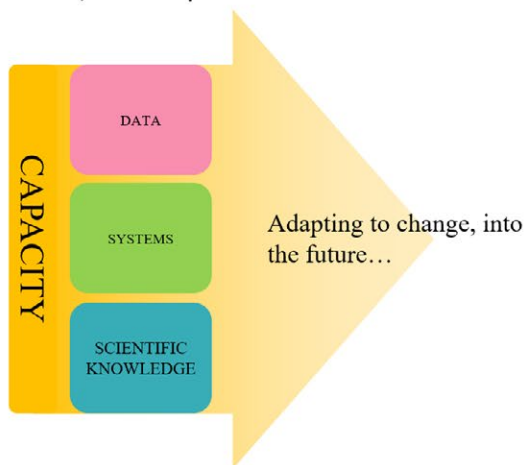
Existing catch system	Data validation	No budget for vessel tracking
Dashboard & visualization	Data analytics	Fishing pressure Effort



# Vision and Objectives

## Vision

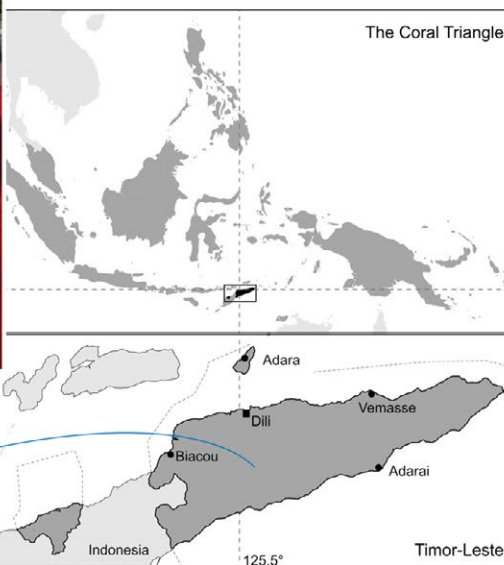
All fisheries stakeholders have access to and the capacity to use data to make smart, nature-positive decisions into the future.



# Catch data collection



Started with 5 enumerators



Catch data can be collected by government enumerators under existing processes. Investment into tablets or phones along with a small amount of monthly pulsa to submit data.

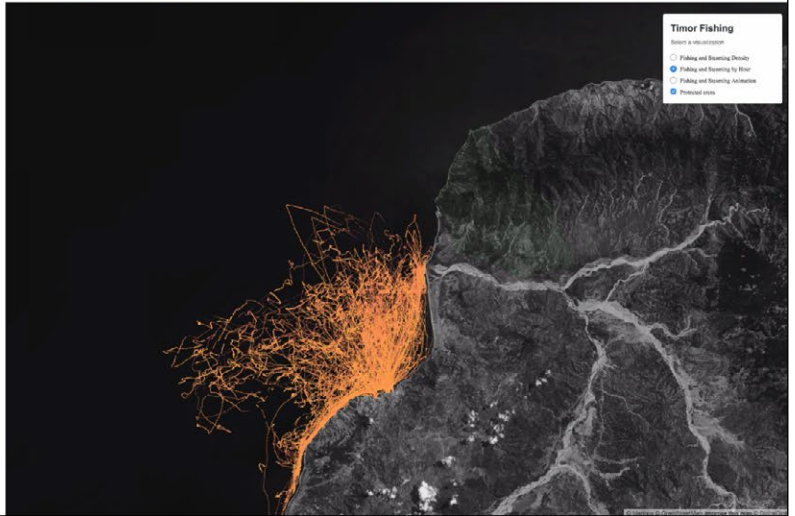
Data can also be collected and submitted by fisher cooperatives/organisations, allowing them to 'own' and store their data.

Incentivizing individual fishers to submit data over the long term is extremely difficult and relies on illustrating the value of data to them.



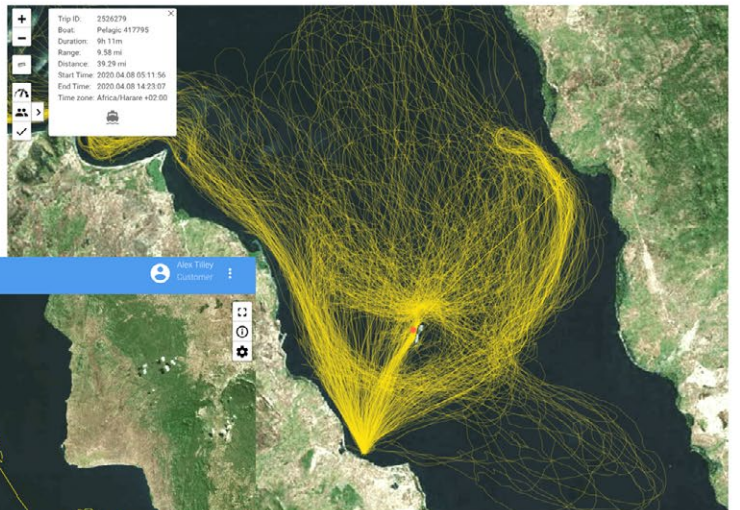
# Vessel tracking since 2018

400+ boats  
~100,000 trips to date



# Malawi vessel tracks

1 boat - Makawa  
258 trips  
Nov 2019 – May 2021



Multiple Trips

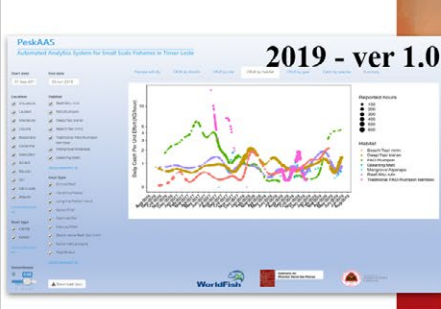
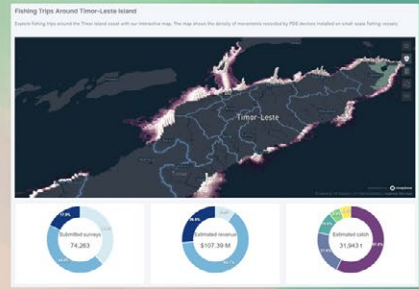
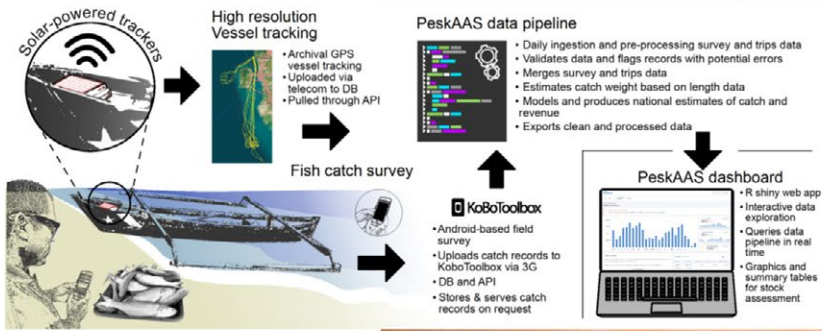
Customer: WorldFish - Malawi, WorldFish - Zambia

258 Selected

Boat	Start	Duration	Distance (mi)	Range (mi)	Trip
Pelagic 417795	2019.11.22 05:41:11	9h 5m	31.15	8.6	252
Pelagic 417795	2019.11.21 05:49:41	10h 23m	96.36	8.3	252
Pelagic 417795	2019.11.20 05:56:08	12h 36m	36.39	11.3	252
Pelagic 417795	2019.11.19 05:05:04	12h 19m	40.2	10.52	252
Pelagic 417795	2019.11.18 04:38:30	12h 48m	43.14	14.59	252
Pelagic 417795	2019.11.17 04:52:05	13h 16m	44.76	17.97	252
Pelagic 417795	2019.11.15 04:26:16	11h 18m	49.35	20.38	252
Pelagic 417795	2019.11.14 04:24:59	8h 43m	36.96	13.91	252
Pelagic 417795	2019.11.13 05:45:23	12h 7m	50.92	21	252
Pelagic 417795	2019.11.12 04:52:31	12h 4m	49.61	20.61	252
Pelagic 417795	2019.11.11 00:10:12	16h 48m	61.29	21.38	252
Pelagic 417795	2019.11.09 20:26:25	21h 39m	67.99	34.12	252

# Scaling an approach

timor.peskas.org

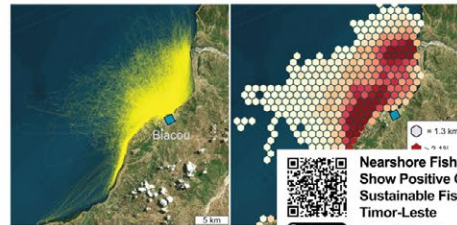


## Data driving research insights

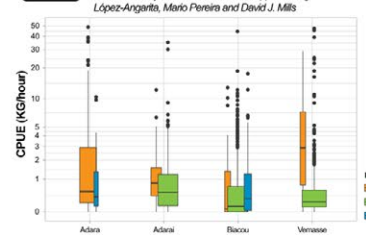
- Data give the opportunity to test new approaches



**Evaluating the Fit of Co-management for Small-Scale Fisheries Governance in Timor-Leste**  
 Alexander Tilley\*, Kimbraley J. Harram, David J. Mills, Dirk J. Steenbergen, Hugh Gouvea, Enrique Alonso-Pulido, Matthew Roscher, Maria Pereira, Pedro Rodriguez, Teresa Amador, Agustinha Duarte, Mario Gomes and Philipp J. Cohen

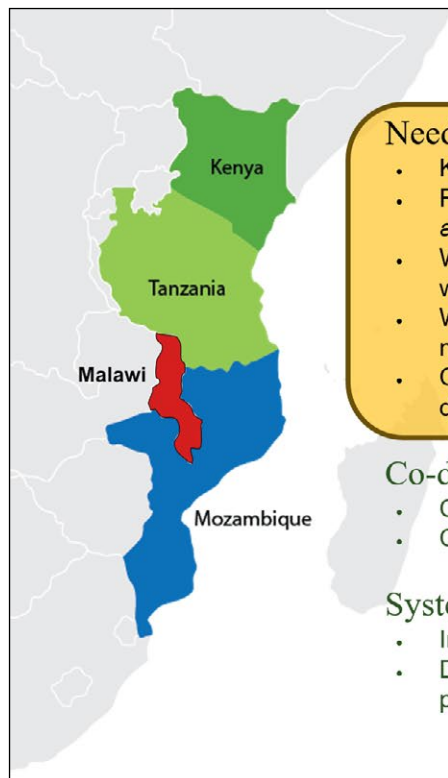


**Nearshore Fish Aggregating Devices Show Positive Outcomes for Sustainable Fisheries Development in Timor-Leste**  
 Alexander Tilley\*, Shaun P. Wilkinson, Jeppe Kokking, Juliana Lopez-Angarita, Mario Pereira and David J. Mills





## Example implementation process



### Needs assessment & data mapping (*Can be done today*)

- Key local partner mapping and understanding gov needs/strategy
- Fisheries data collection system mapping: *Who is collecting what and where, and where are there gaps?*
- What data exists, who holds it, who owns it? What systems exist already that we can build on?
- What information is needed to make decisions? By whom? What data are missing? User stories...
- Collect subsets of existing data to pilot an example analysis pipeline & dashboard.

### Co-design, iterative development and capacity building

- Co-design of new data collection tools and digital training and capacity building
- Contextualise data systems for local scenarios and needs

### System augmentation (*examples*)

- Integrate larger scale climate/weather models, ML, cybernetics
- Develop targeted stock assessment for key species or balanced harvest profiles for key fisheries.



# Thank You





## **About WorldFish**

WorldFish is a leading international research organization working to transform aquatic food systems to reduce hunger, malnutrition, and poverty. It collaborates with international, regional, and national partners to co-develop and deliver scientific innovations, evidence for policy, and knowledge to enable equitable and inclusive impact for millions who depend on fish for their livelihoods. As a member of CGIAR, WorldFish contributes to building a food- and nutrition-secure future and restoring natural resources. Headquartered in Penang, Malaysia, with country offices across Africa, Asia, and the Pacific, WorldFish strives to create resilient and inclusive food systems for shared prosperity.

For more information, please visit [www.worldfishcenter.org](http://www.worldfishcenter.org)