

The e-evolution of fisheries monitoring: The implementation of e-reporting and e-monitoring tools in longline and purse seine fisheries

Necessity is the mother of invention: We need new tools, let's build them!

Many Pacific Islands countries and territories (PICTs) rely on the harvest of seafood resources for both subsistence and economic growth. Oceanic fisheries monitoring programmes have been successfully implemented over the last five decades in the region. The information resulting from this monitoring has allowed countries to understand the dynamics of their marine resources and to make informed management decisions to ensure its sustainable harvest. The majority of fisheries monitoring data are reported on paper forms and are then manually entered into databases by technicians. The time span between data collection in the field and its availability in a database is variable but generally long (weeks to months).

Recognising the delicate nature of marine renewable resources, especially in the face of climate change and increases in fishing efforts, it is evident that fisheries monitoring programmes need to evolve. Scientists now need rapid and reliable data to ensure management decisions can be taken in as near to real time as possible. Fisheries monitoring tools using electronic technologies are needed to meet this goal. For the past five years, the Pacific Community (SPC) has been collaborating with its member countries, regional fisheries management agencies, the fishing industry, technology providers and non-governmental organisations to design, build and test new electronic fisheries reporting and monitoring tools. This article aims to provide an overview of this electronic evolution.

Electronic logsheets: From trials to implementation

Fishing vessels operating in member countries' exclusive economic zones (EEZs) are required to provide their effort and catch data. This standardised information is conventionally referred to as the logsheet and is essential to fisheries managers. The two main types of fisheries occurring in the region are purse seine and longline fisheries.

In 2013, the computer-based electronic reporting tool eTUNALOG was developed by SPC and initially tested in the Solomon Islands' purse seine fishery. Successful results led to other regional purse seine fisheries using this tool. Concurrently, in Papua New Guinea's purse seine fishery,

the tablet-based electronic reporting tool iFIMS was developed with successful trials leading to other associated countries also testing this tool. Today the iFIMS tool is in routine use on most purse seine vessels that are licenced to fish in PICTs' EEZs.

Later on, the eTUNALOG application was also developed to allow longline vessels to electronically report their logsheets. Continued innovation led SPC to develop a new tablet-based application in 2016, OnBoard, which is now being implemented across longline fisheries that target southern albacore tuna.

The implementation of these e-Log tools offers considerable advantages, including in-built data validation processes that ensure high quality data. The data itself is either transmitted to database systems directly from the vessels at sea when they are equipped with satellite connectivity equipment, or when the vessels come back to port and can connect to mobile or Wi-Fi networks. This results in fisheries authorities having quality data submitted in near real time.

Empowering fisheries observers: Connected eyes and ears at sea

Across the region, in the purse seine fishery, it is a legal requirement for each vessel to embark a fisheries observer who is assigned to independently report on effort and catch activities. Such information is also essential to fisheries managers as it is compared with logsheet data for validation. Fisheries observers are the backbone of fisheries monitoring programmes and they deserve to be empowered using modern tools.

Electronic reporting (ER) tools have been developed to allow observers to report their data in near real time by transmitting their data using satellite connectivity systems. These tools not only ensure higher quality data as a result of data validation processes but they also provide safer working conditions as observers are able to communicate with shore parties independently of the vessels' communication systems.

There are 18 PICTs currently implementing electronic reporting tools for fishers or observers. The degree of implementation varies from some countries having started their initial trials and others having committed to full implementation by early 2018.

Video electronic monitoring: A useful complement to existing observer programmes

In 2014, Solomon Islands was the first to experiment on the use of a video electronic monitoring (EM) system installed on-board two longline vessels in collaboration with SPC and the Pacific Islands Fisheries Forum Agency (FFA). Electronic monitoring systems consist of multiple high definition cameras and sensors mounted on the vessel to record effort and catch activities. The records are stored on storage devices, which are removed when the vessels return to port. The records are analysed by experienced observers in order to produce electronic monitoring data. Initial results indicated that video electronic monitoring is a viable tool for producing standardised observer data. While electronic monitoring cannot be used to collect all the data that on-board observers usually collect, when combined with port monitoring programmes it has the potential to increase a country's observer coverage of longline vessels. Electronic monitoring is also being tested on two purse seine vessels this year. While there is 100 per cent observer coverage on purse seine vessels, electronic monitoring has the potential to alleviate observers' tasks so they can focus on collecting more biological data, for example. In 2017, there are 37 longline vessels equipped with electronic monitoring systems across five countries. SPC has been collaborating closely with these countries and the technology provider to ensure national EM data is curated and available for reporting through an online database query system. Electronic monitoring may also offer employment opportunities for female observers who may be uncomfortable embarking on fishing vessels with all-male crews.

ER and EM coordinators: Dedicated to the e-volution

Countries that have committed to implementing either electronic reporting or electronic monitoring, and often both together, have established new positions held by staff members who are dedicated to coordinating these new projects. Seven countries have established such positions. Two staff members at SPC are also dedicated to providing regional coordination.



New Caledonia Fisheries Officer Thomas Auger (at right) presents the SPC-developed OnBoard electronic logsheet mobile application to longline vessel captain Pierre Heutro (image: M. Hosken).

As ER and EM projects continue to expand, so will the amount of data generated. In-country and regional technicians currently tasked with manually entering data into databases will see their roles evolve and their skill sets improve, and they will be able to focus on providing accurate and timely data. There are no jobs at risk of becoming redundant – quite the opposite; new jobs will need to be created to cope with an increasing data load.

Process standards: How do we do it?

In 2014, when recognising the need for countries to implement these new tools as well as the need to establish documented policies and standards for these technologies, the Western and Central Pacific Fisheries Commission (WCPFC) established the ER and EM Working Group.



From left to right: Malo Hosken, from SPC, and French Polynesia captains Moana and Freddy Lucas who are now using the OnBoard e-log application (image: M. Hosken).

This specialised working group has since met once in 2015 and again in 2016. As a result, during the thirteenth regular meeting of the Commission in 2016, the standards, specifications and procedures for electronic reporting in the region were unanimously adopted. Also in 2016, an international workshop held at SPC provided the draft process standards for electronic monitoring for longline vessels. In November this year, a similar workshop will be held at SPC to enhance the longline electronic monitoring standards as well as to draft new standards for purse seine electronic monitoring. These standards aim to guide countries and technology providers in the implementation of these new tools.

Regional implementation: Made possible from support funding

While the core of the development work has been conducted by either SPC or independent technology vendors in collaboration with the countries, major funding has been supported by environmental non-governmental organisations such as the International Seafood Sustainability Foundation, the World Wide Fund for Nature, the Environmental Defence Fund, the PEW Foundation and The Nature Conservancy. Their support has allowed SPC and member countries to establish new positions dedicated to the research and development of new tools and associated database systems, the procurement of hardware (tablets and satellite transmission devices) and the facilitation of regional trainings and workshops.

A brave new world: Towards an efficient transition

The differences between countries that are fully committed to this transition and others that are stepping into it can be attributed to the availability of human and financial resources that are needed to confidently implement these new tools, as well as to the relationships between the fisheries regulators and their fishing industries. The transition from paper-based collection systems to electronic ones also needs to be efficiently managed, including maintaining data collection standards that will ensure data continuity. The implementation of electronic reporting and monitoring tools across the region is a great challenge. This technological e-evolution is, never the less, being met by people. They are empowered with imagination, dedication and a will to ensure oceanic resources remain bountiful for our future generations.

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