SCIENTIFIC COMMITTEE
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Electronic Reporting and Electronic Monitoring Implementation Status – July 2020

SPC, PNAO, FFA

1. Introduction

This information paper provides a summary of Electronic Reporting (ER) and Electronic Monitoring (EM) projects currently being implemented in WCPO oceanic fisheries. Patterns of e-reporting in purse seine and longline fisheries are detailed. The development and implementation of applications for the collection and transmission of port sampling data and purse seine and longline observer records is described. The number of analysed EM longline fishing sets is presented. The importance of the provision of data towards improving Artificial Intelligence (AI) and Machine Learning (ML) software and towards informing stock assessments is discussed. Finally, an outlook on advancing policy and technical matters for EM is provided.

2. Summary of regional ER and EM projects

The current status of ER and EM projects in the region is described in Table 1 by WCPFC CCM.

Table 1: Current status of EM (left) and ER (right) projects and implementation in the Western and Central Pacific Ocean.

Country	EM	Description	ER	Description
Australia	Yes	EM programme implemented on 75 vessels (three types of gear)	Yes	Two private companies offer e-log software to AFMA standards for five gear types used in fisheries managed by AFMA
New Zealand	Yes	For vessels operating in a defined fishing area on the west coast of the North Island. Roll out to other commercial vessels from 1 October 2021.	Yes	All commercial fishers must report their catch and position electronically
Papua New Guinea	No		Yes	*FIMS e-obs* for fisheries observers and *Industry FIMS e-logs* for PS and LL vessels.
New Caledonia	No		Yes	Three longline vessel using *OnBoard.* Plan to implement to rest of fleet in 2020 (20 vessels)
Solomon Islands	Yes	EM trial in 2014. EM trial in 2015-2016. Eight longline vessels equipped with EM. Another 9 LL vessels expected to be equipped in 2020	Yes	*FIMS e-obs* for fisheries observers and *Industry FIMS* e-logs for PS and LL fishers.
Vanuatu	Yes	Two longline vessels and one carrier vessel equipped with EM	Yes	Third party e-log application on trial on 66 Longline vessels
Fiji	Yes	50 longline vessels equipped with EM.	Yes	One longline vessel using *OnBoard* since June 2019.
Tonga	No		Yes	Three domestic longline vessels using OnBoard. Plan to roll out to rest of fleet domestic and foreign flag fleet.
Samoa	No		Yes	Three longline vessels using OnBoard. Plan to roll out to rest of fleet domestic fleet (9 vessels).

Country	EM	Description	ER	Description
Cook Islands	No		Yes	8 vessels using OnBoard 20 vessels using third party ER app
Tokelau	No		Yes	*FIMS e-obs* for fisheries observers and *Industry FIMS e-logs* for PS and LL fishers
Tuvalu	No		Yes	*FIMS e-obs* for fisheries observers and *Industry FIMS e-logs* for PS and LL fishers
Nauru	No		Yes	*FIMS e-obs* for fisheries observers and *Industry FIMS e-logs* for PS fishers
FSM	Yes	Five longline vessels equipped with EM	Yes	*FIMS e-obs* for fisheries observers and *Industry FIMS e-logs* for PS.
RMI	Yes	Six longline vessels equipped with EM	Yes	*FIMS e-obs* for fisheries observers and *Industry FIMS e-logs* for PS
Palau	No	EM programme is on hold ER program is operating for PS in zone	Yes	*Industry FIMS e-logs* for PS
FP	No		Yes	27 longline vessels using *OnBoard*

3. E-Reporting

The pattern of E-reporting in purse seine and longline vessels within the WCPO is described, and developments within the areas of e-reporting for port sampling and observers detailed.

At its June 2020 meeting, the Forum Fisheries Committee (FFC114) reaffirmed its commitment to progressively adopt electronic reporting for fishing vessels operating within their exclusive economic zones and the high seas with a view to achieving 100% adoption by 2022, noting the need to cater for special circumstances of small domestic vessels operating solely within EEZs.

3.1 Vessel Logsheet E-Reporting (e-logs)

3.1.1 Purse Seine vessels

The Parties to the Nauru Agreement (PNA) in collaboration with member countries and purse seine vessel owners continues to implement the integrated Fisheries Information Management System (FIMS). In addition Industry FIMS allows purse seine vessels operators to report their effort and catch data electronically on a daily basis as required by utilising an Android application eForm. This is undertaken by individual vessels having an Industry FIMS subscription which then allows data to be sent from the app and be displayed in the Industry portal. The data submitted to the Industry Portal is also securely lodged to the PNA FIMS database to meet reporting requirements and then forwarded for use by national administrations and PNAO; and SPC's TUFMAN2 database system. A

total of 226 purse seine vessels are currently operating and using the Industry FIMS E-Reporting system. The Industry FIMS to FIMS transfer is near real time and the transfer to SPC is completed within an average of two weeks' time. Since 2018, 1190 electronic logsheets from purse seine vessels have been received in TUFMAN2. Some of these purse seine vessels currently continue to also report their effort and catch data using the SPC/FFA Regional Purse Seine Logsheet paper form.

3.1.2 Longline vessels

As for purse seine vessels Industry FIMS includes an Android application *(eForms)* which allows longline vessel operators to report their effort and catch data electronically on a daily basis. 70 longline vessels are currently using the Industry FIMS E-Reporting system. As for purse seine, E-log data is lodged to the Industry portal and to FIMS database. FIMS Inc and SPC are collaborating for those e-logs to be uploaded to the TUFMAN2 database system. These vessels continue to also report their catch and effort data using the SPC/FFA Regional Longline Logsheet paper form. PNA is in the process of seeking Ministerial approval for a change in its First and Second Implementing Arrangements such that all longliners operating in PNA EEZs, i.e around 500 vessels, will be e-reporting from 2021 onwards.

The Pacific Community (SPC), at the request, and in collaboration with some member countries and longline vessel owners continues to implement the Android application *OnBoard.* This application allows longline vessel operators to report their effort and catch data at any time when internet connectivity is available (either on-board the vessel or on shore). The e-logs are securely lodged to the TUFMAN2 database system where they can be verified and validated by the respective member country's fisheries authorities. Currently six WCPFC member countries and 57 longline vessels are using *OnBoard*, and 1100 electronic logsheets from longline vessels have been received in TUFMAN2 since 2016. The logsheet can also be exported and printed into the SPC/FFA paper format. Some of these longline vessels continue to also report their effort and catch data using the SPC/FFA Regional Longline Logsheet paper form. *OnBoard* is also available for computer (PC) platforms operating Windows 10.

In 2019, the Chinese Overseas Fisheries Association (COFA) and the Overseas Fisheries Development Council (OFDC) of the Republic of China began developing e-reporting applications intended for use by Chinese and Chinese Taipei flagged longline vessels operating the WCPO. At the request and in collaboration with two member countries and two third party ER service providers, SPC has been facilitating ER trials on 80 longline vessels(operating in the southern albacore longline fisheries) to submit electronic logsheets to TUFMAN2 on a daily basis according to the agreed Standards, Specifications and Procedures for Electronic Reporting in the WCPFC. Since 2019, 111 electronic loghseets have been uploaded from these longline vessels.

3.1.3 Port sampling electronic reporting

SPC, at the request and in collaboration with some member countries, continues implementation of the Android application *OnShore.* This application allows fisheries staff to record species and size composition data of longline caught specimens landed in port. The application was specifically designed to cope with the fast pace of some longline vessels unloadings. The electronic data are securely uploaded to the TUFMAN2 database. Currently, nine member countries are using OnShore

(494 port sampling events have been submitted) and are providing regular feedback for continued development. In 2019, a biological sampling component was added which allows port samplers to record data about the biological samples collected in port.

Port Officers utilising FIMS have access to a Catch Documentation Scheme (CDS) app and module. Catch sizes, species as well as all transhipment, loading and unloading data collected as part of on shore facility or vessel inspections allows Officers to collect data on the app and then push that data to the FIMS CDS module for display, processing and reporting of data collected.

3.2 Observer E-Reporting – Purse Seine and Longline

FIMS includes an Android application **(eObs)** which allows fisheries observers to report and transmit their observations while at sea onboard purse seine vessels and upon return to port to the FIMS Observer module. The complete data set collected is lodged to FIMS at the conclusion of the trip. Whilst at sea, daily catch and GEN 3 issues can be transmitted using the Garmin Personal Communication Device allowing the Observer to forward this important data to FIMS for review by Observer Managers. The ability to pre-debrief and then debrief the complete trip using the FIMS Observer module is also available making the trip completely paperless. From January to July 2020, there were 320 electronic observer trips submitted. FIMS Inc and SPC are collaborating towards having the e-obs data uploaded to theTUFMAN2 database. Fisheries observers are still required to complete their SPC/FFA paper Regional Purse Seine Fisheries Observer Workbook.

SPC is developing an Android and PC based application for observers on longline vessels operating in the southern albacore fishery to report and transmit their recorded observations – the Offline Longline Observer (OLLO). Data will be lodged directly to the TUFMAN2 database. Field trials to ensure the application meets users' needs are being undertaken in collaboration with the Observer Programme in New Caledonia.

4. E-Monitoring

4.1 Regional update on number of vessels equipped with EMS, number of EM analysts trained and working and number of EM analysed sets

Table 2 below summarises the number of longline vessels per country equipped with an E-Monitoring System, the number of EM analysts trained and working, the number of review computers available and the number of analysed sets received in the EM database at SPC.

Table 2: Summary of EM longline operations in five Pacific Island Countries and Territories.

Country	Number of vessels equipped with EMS	Vessel gear	Number of EM analysts trained	Number of EM analysts working	Number of review stations	Number of Sets received in the EM database at SPC
FSM	7	LL	5	3	3	551
RMI	6	LL	7	7	3	1501
Fiji	50	LL	33	12	12	4920
Solomon Is.	8	LL	5	3	3	99
Vanuatu	3	2 LL + 1 carrier	10	5	1	43 (from LL)

4.3 Enhancing EM records analyses using Artificial Intelligence

EM service providers have been researching and developing software to use Artificial Intelligence (AI) solutions to aid in the analysis of EM records. Given that it is expected that more longline vessels will be equipped with EM systems, the need for efficient analysis of a growing volume of EM records means the use of AI software will be essential. However, for EM service providers to develop AI software which meet members' needs, a large volume of EM records and corresponding EM data are needed. For example, if AI is going to be used in aiding the identification of species, at least 5000 images for each species are needed (at minimum).

These EM records and EM data are currently available and belong to the respective members who have produced them. There needs to be a discussion on how, collectively, members can benefit from ensuring EM service providers gain the records and data they need to pursue AI developments (which will result in proprietary software).

The Nature Conservancy (TNC) has launched an open library of training data to accelerate the implementation of AI in fisheries. For further details please go to: https://www.fishnet.ai/home

In early 2020, one EM service provider and one member country began trials of a Machine Learning Server. Equipped with an Artificial Intelligence algorithm, the Machine Learning Server points the EM analyst towards the start and end of setting and hauling operations as well as when a catch event occurs. This removes the need for the EM analyst to review video records where no activities are taking place, in turn augmenting the analysis rate.

4.4 EM data reporting and usage

Trials of EM systems for monitoring the activities of longline fishing vessels licenced to operate in the Pacific Island Countries and Territories began in 2014. There are now 73 longline vessels equipped with EM systems. The EM records are mainly analysed by national fisheries authorities and sometimes by EM providers. Some of the resulting EM data (vessel, catch, set, haul and location

details) have been sent to SPC and are available for its member countries to query and report on using the online tool DORADO.

Currently for FIMS data is being received from a provider to the FIMS EM module. The EM data received is then displayed in FIMS and available for review. At this time the data does not relate to the video footage.

Standardised calibration and use of digital measuring tools are needed towards being able to use EM data (species and length) in stock assessments. These needs can be addressed through the establishment of an EM certification programme detailed further below.

4.5 REGIONAL LONGLINE FISHERIES ELECTRONIC MONITORING POLICY

In October 2019, a regional workshop was held at FFA to draft the Regional Longline Fisheries Electronic Monitoring Policy. The policy was drafted with inputs from members, secretariats, industry and NGOs. The draft policy was presented at the 2020 MCS WG and FFC meetings and was adopted on 19 June 2020. The purpose of this EM Policy is to describe a regional framework that, inter alia: a) supports collective action at a strategic level; b) promotes a level playing field in relation to the implementation of EM and mitigates against market distortions; and c) facilitates economies of scale for national and regional benefit.

4.6 Draft DCC Longline EM minimum data field standards

The SPC/FFA/PNAO Data Collection Committee met in February 2020 to revise the draft DCC Longline EM minimum data fields standards. These standards are proposed for member countries to use when embarking on trials or implementation of E-Monitoring (EM) for longline vessels licensed to operate in members' EEZs (and adjacent waters). These standards should be provided to the EM technical provider to ensure the minimum data fields specified within are generated from the EM system, according to the EM Protocol notes provided. These standards are in draft format and will be presented to the WCPFC Scientific Committee (SC16-ST-IP-07) and ER and EM Working Group meetings in 2020.

5. Standards for the training, assessment and certification of EM Analysts and observers using E-Reporting tools

Units of competencies for EM analysts and observers using ER tools were presented to the PIRFO Certification Management Committee in 2018 and subsequently adopted by FFC in 2018. To build on these, Members have identified that there is a need to develop curricula to guide the training, assessment and certification of EM Analysts (staff responsible for analysing EM records) and of observers using ER tools. Building from the success of the Pacific Islands Regional Fisheries Observer (PIRFO) competency development programme, SPC and FFA members support the concept that a training and development programme for EM Analysts and observers using ER tools be established within PIRFO programme.

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