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A PILOT PROJECT FOR THE IOTC REGIONAL OBSERVER SCHEME

PREPARED BY: IOTC SECRETARIAT ON BEHALF OF THE SCIENTIFIC COMMITTEE, 10 MAY 2017

Executive Summary

Since its origination in 2009, national implementation of the Regional Observer Scheme remains very low among IOTC CPCs. Artisanal fisheries are hugely important in the Indian Ocean and yet the implementation of observers in these fisheries remains particularly low. Where observer programmes have been established, these are wide ranging and highly variable in the type and quality of information collected and the reporting of data to IOTC standards remains poor and so the data that are submitted and stored regionally are currently of little value.

In recognition of these issues and in a positive step towards addressing the problems and seeking solutions, the IOTC adopted Resolution 16/04 *On the implementation of a pilot project in view of promoting the Regional Observer Scheme of IOTC* earlier this year. This paper therefore outlines a comprehensive plan for the ROS Pilot Project as part of a long-term, holistic strategy for supporting the implementation of the Regional Observer Scheme in the IOTC area of competence.

This project proposal aims to tackle each of the key issues that currently prevent the collection and analysis of high quality data to contribute to stock assessment and management advice through the development of new technologies, tools, standards and processes. A critical component in all of the workstreams proposed is the piloting phase and Resolution 16/04 provides a framework for trialling these innovations by drawing together the outputs from the various work streams and operationalising them in selected voluntary CPCs. The overall strategic framework is centred around five key components:

1. Observer training programme and minimum standards
2. Electronic reporting
3. Observer database development and historic data collation
4. Electronic monitoring system
5. Observation in-port

1. Observer training programme and minimum standards

The first component addresses the problem of establishing new observer programmes where there are few resources, expertise and experiences to draw on through the development of a full observer training programme package. This is intended to produce a set of working protocols, tools and materials for observer managers to assist them in setting up new observer programmes and providing a training package to be used for the training of observers. Alongside this the development of a set of standards for observer programmes and observers are required in order to assist the harmonisation of schemes that are currently in place and under development to ensure that data have been collected in a standardised way and are of sufficiently good quality to be used for analysis. This will include a sub-component that involves the development of a 'regional pool' of trained scientific observers that are recognised regionally, and may be employed by a flag state for use on any of its vessels, particularly where vessels may be entering multiple coastal EEZs.

2. Electronic reporting

The second project component aims to tackle the issues with poor data reporting such as the data that are currently being submitted in hard copy, hand-written format, in flowing prose in non-IOTC languages or other non-standard methods meaning that the extraction of pertinent data may be complex, time-consuming and costly. This is to be addressed through the development of an electronic reporting tool which will facilitate the submission of data at both the national and at the regional level, improving the quality of data through error-checking procedures and creating time-saving efficiencies for CPCs and the IOTC Secretariat.

3. Observer database development and historic data collation

A closely linked third project component is the development of a regional database to host observer data and the population of this database with historic data that has been submitted in non-standard formats or has not yet been submitted at all due to various reasons.

4. Electronic monitoring system

The fourth project component is the development of Electronic Monitoring Systems (EMS) for small-scale fisheries, specifically gillnet fleets, in the Indian Ocean. Developing coastal states with large fleets of small vessels have identified a number of difficulties they face with implementing an onboard observer scheme. These include concerns about adequate safety-at-sea, inadequate working and living conditions onboard the small vessels, lack of human and financial resources required for sufficiently monitoring the large number of vessels and coordination of an observer scheme. Given the successes of EMS that have been evidenced in other oceans and fisheries, it is important that this is trialled for gillnet fleets in the Indian Ocean, particularly where no observer coverage has yet been implemented.

5. Observation in-port

In conjunction with this, the fifth project component will involve the development of data collection protocols for field samplers[1] to collect data at port, complementary to information provided by EMS and onboard observers.

The development of these tools and technologies is already underway in some areas (e-reporting and database development), however, a number of them will require a piloting phase which will take place under the framework set out in Resolution 16/04. This will involve the implementation of the training programme (component 1 of the strategic plan) in three voluntary CPCs, including training in the e-reporting tool for data collection (component 2 of the strategic plan). In addition to the implementation of this programme in individual priority CPCs, these tools will also be used to train a set of 'regional observers', thereby creating a pool from which flag states may employ individuals that are regionally recognised as competent to provide the scientific observer coverage required for flagged vessels under Resolution 11/04. Component 3, the regional database, is already under development so does not form part of the pilot project, however, information from the pilot project will be used to populate this further. Components 4 (EMS) and 5 (observation in port) will also be developed as part of the pilot project. The first three components of the strategic plan address paragraphs 2a, b, c, and e of Resolution 16/04, while the fourth and fifth components tackle paragraphs 6 and 7.

Once tested and verified, long-term resourcing strategies will be developed for the continuation of activities and expansion to other CPCs, where applicable. A Project Steering Committee will be established to provide direction and oversight over the course of the project lifetime and a mid-term and final review will be conducted by the IOTC Scientific Committee and Commission. Further details, including detailed project activities, timelines and budgets are including in this proposal.

Background

Fisheries observer data is vitally important for fisheries management, providing an independent source of detailed, high quality information on fishing activities and catches at a sufficient level of resolution to be used for analyses such as the standardisation of catch rates and analysis of bycatch mitigation measures. A large number of observer programmes have now been established for industrial fleets across the Indian Ocean and these are used to collect scientific fisheries data by onboard observers, according to specific research requirements specified by each of the coordinating organisations. Data are collected and reported at the regional level to the IOTC Secretariat as summarised in paper IOTC-2016-SC19-07.

[1] Field sampler: a person who collects information on land during the unloading of fishing vessels. Field sampling programmes can be used for quantifying catch, retained bycatch, collecting tag returns, etc. (definition provided in IOTC Resolution 11/04)

Implementation of the observer scheme

Since the establishment of the IOTC Regional Observer Scheme, a number of key issues have been identified which are hindering progress in reaching the ultimate objectives of providing good quality, comprehensive, independent data to be used to inform management advice. The main issues are:

- *Low level of implementation*

Although 7 years have now passed since the Resolution first came into force (in its first iteration, 09/04), the level of implementation of national observer schemes is still very low (IOTC-2016-SC19-07). Developing coastal states with large fleets of small vessels have identified a number of difficulties they face with implementing an onboard observer scheme. These include concerns about adequate safety-at-sea, inadequate working and living conditions onboard the small vessels, lack of human and financial resources required for sufficiently monitoring the large number of vessels and coordination of an observer scheme. There are also complex socio-cultural issues involved with deploying scientific observers on vessels who are of different nationalities and socioeconomic backgrounds to the crew members with the associated various language and cultural barriers. Implementation is hindered by the lack of a set of agreed regional minimum standards for scientific observer programmes, competency standards for observers and lack of a comprehensive training programme including tools and materials.

- *Low level of reporting to IOTC*

The information received by the IOTC on the implementation of observer schemes is also very low. In some cases this is due to a lack of implementation, while in others it is simply lack of reporting from the established schemes. This low level of data reporting might be due to limited resources or time for data processing, lack of technical expertise, or lack of knowledge of the reporting requirements and timescales for data reporting. Improvements in data reporting methods will result in improved efficiency for both CPCs and IOTC Secretariat receiving the information.

- *Confusion between the Regional Observer Scheme and national compliance (MCS) programmes*

There is a vast array of different observer initiatives that have been developed across the Indian Ocean, by a range of organisations. This includes:

i. Observer capacity building, deployment coordination and data standardisation initiatives conducted by organisations such as the IOC (PRSP, SmartFish, SWIOFish1), the SWIOFC (SWIOFP).
ii. Observer capacity building actions implemented under the AU (African Union), the FAO Somalia and WWF.
iii. Private observer activities sponsored by Tuna purse-seine vessel owners associations such as Orthongel (OCUP) Anabac/Opagac (MoU with SFA for 100% coverage of their fleet), etc..
iv. National Observer Programmes implemented by CPCs fisheries management authorities, such as France OT (TAAF), Seychelles (SFA), Madagascar (CSP), EU (Spain – AZTI/IEO; France – IRD).

The goal of some of these initiatives is to place observers on board foreign-flagged vessels to verify compliance with the terms of the licensing arrangements of the coastal State while others have scientific objectives. It is important to note that the Regional Observer Scheme also has a strictly scientific objective, and is the responsibility of the flag State. This has created confusion among some Members who, erroneously, interpret that these compliance-based programmes are part of the Regional Observer Scheme. The issues associated with this variety of standards and programmes and lack of coordination have already been identified in some areas such as the southwest Indian Ocean region.

While the IOTC has developed and published broad guidelines and some standards for national observer schemes under the ROS, the range of observer programmes in place has led to a corresponding lack of standardised procedures for national observer schemes. Different training curricula have been developed, using different resources and data collection methods and procedures based on different national data reporting requirements and systems and adhering to different standards.

- *Lack of data reporting to IOTC standards*

Revised observer reporting templates were adopted by the SC17 in 2014 and the manual and data collection forms are available on the IOTC website[2]. While a number of CPCs are now reporting according to the new requirements, many are still reporting a range of data in a variety of other formats (e.g. hard copy, hand-written, descriptive narratives, non-IOTC languages or using other non-standard methods) meaning that the extraction of observer data may be complex, time-consuming and costly, preventing the data from being readily collated and analysed.

A strategic plan for the ROS

These issues described above have been identified and discussed by the IOTC Scientific Committee who have agreed that, while challenging, exploring possible methods of overcoming these problems is critical to the success of the Scheme. The Commission has also agreed that there is a need for a holistic strategy to address these issues and to develop solutions at the regional level. Paper IOTC-2016-SC19-14 provides details of a plan to develop a long-term, comprehensive strategic framework for supporting the implementation of the Regional Observer Scheme in the IOTC area of competence. This document describes a number of initiatives that have been planned including the development of new technologies, tools, standards and processes to support implementation of the ROS. These have been developed as part of a holistic strategy to tackle all of the issues identified and provide a comprehensive framework for developing the ROS. This framework is centred around five key project components which contribute to the higher level goals in a complementary way:

1. Observer training programme and minimum standards
2. Electronic reporting
3. Observer database development and historic data collation
4. Electronic Monitoring Systems
5. Observation in-port

The overall workflow, inter-relationships and linkages among these component projects are shown in Figure 1.

Observer training programme and minimum standards

The first component addresses the problem of initiating observer programmes where there are few resources, expertise and experiences to draw on through the development of a full observer training programme package. This is intended to produce a set of working protocols, tools and materials for observer managers to assist them in setting up new observer programmes and providing a training package to be used for the training of observers. Alongside this the development of a set of standards for observer programmes and observers are required in order to assist the harmonisation of schemes that are currently in place and under development to ensure that data have been collected in a standardised way, are of sufficiently good quality to be used for analysis and to allow for observer exchange among CPCs where vessels may be entering multiple coastal EEZs. A sub-component of this project will be creation of a pool of 'regional observers' who will be comprehensively trained based on the new programme and standards. These observers will come from voluntary CPCs and will be available for use by any fleet wishing to hire them to contribute towards the observer coverage of the flag state of the vessel. These observers will collect scientific data wherever the vessels is fishing, whether this is on the high seas or in coastal waters of another flag state and will be funded by the flag state of the vessel. The time plan for these activities are provided in Appendix 1.

Electronic reporting

The second project component aims to tackle the issues with poor data reporting. This is to be addressed through the development of an electronic reporting tool which will facilitate the submission of data at both the national and at the regional level, improving the quality of data through error-checking procedures and creating time-saving efficiencies for CPCs and the IOTC Secretariat. This will be complemented by the development of a national database that can be populated by the outputs of the e-reporting tool to be used by countries to manage the national observer datasets.

Observer database development and historic data collation

[2] www.iotc.org/science/regional-observer-scheme-science

A closely linked third project component is the development of a regional database to host observer data and the population of this database with historic data that has been submitted in non-standard formats or has not yet been submitted at all due to various reasons. These components are already underway and the development phase has now been completed.

Electronic Monitoring System

The fourth project component is the development of Electronic Monitoring Systems (EMS) for small-scale fisheries, specifically gillnet fleets, in the Indian Ocean. Electronic Monitoring Systems (EMS) offer a practical solution to the logistical issues of placing human observers onboard vessels, particularly small vessels (<24m) that are operating on the high seas where there are issues regarding safety-at-sea and inadequate working and living space. The term refers to a wide range of technologies, including: Vessel Monitoring Systems (VMS), electronic logbooks, video (including cameras, digital recording systems and monitors), images, and the integration of video with other data sources such as radio frequency identification (RFID) tag readers, net pinger hydrophones, winch sensors, and hydraulic pressure monitors (Figure 2).

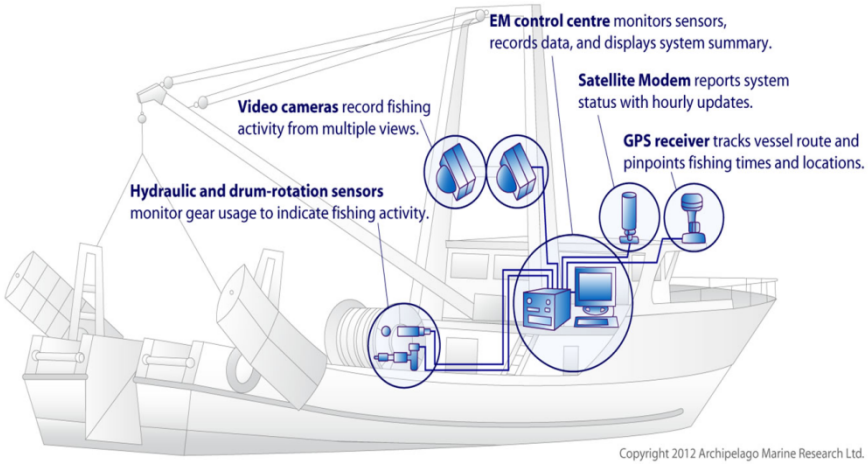


Figure 2. Schematic of a standard electronic monitoring system.
(source: AFMA, http://www.afma.gov.au/monitoring-enforcement/electronic-monitoring-program/).

EMS also offers the potential to improve the accuracy of observer data collection and coverage compared with human onboard observers. For example:

i. Electronic monitoring provides an independent and verifiable record of fishing activity.
ii. Placement of cameras in different areas of the vessel allows for the complete and simultaneous monitoring of all steps in the fishing operation – including gear setting, hauling, sorting of target species and bycatch, discards, and storage of catch, as well as direct monitoring of the environment around the vessels.
iii. The potential for continuous video monitoring using EMS enables sampling of much larger numbers of fish than compared to human observers, which in turn can potentially improve the accuracy of species composition estimates through verification of video footage, and high resolution image capture to verify species – particularly in the case of purse seine catches where large volumes of fish are processed quickly and sent to wells.
iv. Functionality for automated species identification and data capture of basic biological data, such as length measurements, are developing rapidly with EMS. In many cases levels of accuracy are generally considered to be on par, or higher, than compared to onboard observers or port samplers.
v. In some cases, EMS may be more cost effective than onboard observers and can be used to increase observer coverage in situations where deployment of scientific observers is impractical.

Given the successes with EMS that have been evidenced in other oceans and fisheries, it is important that this is trialled for gillnet fleets in the Indian Ocean. This project component will involve the development and piloting of EMS suitable for the collection of information on catch, bycatch, and related scientific data in support of the Regional Observer Scheme reporting requirements, particularly from semi-industrial or small-scale artisanal fisheries (e.g., offshore gillnetters, or gillnet-longline combination vessels) where IOTC observer coverage is either lacking or non-existent.

Observation in-port

The fifth project component will address the artisanal fleet component (<24m fishing within the coastal EEZ of the flag state). The ROS manual[3] covers the industrial (i.e., at-sea) component of the observer scheme, however, Resolution 11/04 *On a Regional Observer Scheme* also sets out requirements for the collection of data by field samplers at the landing place from artisanal fisheries (vessels <24m that operate exclusively within the coastal EEZ of the flag state). Artisanal fisheries are extremely important in the IOTC area of competence, accounting for well over 60% of the total catches of IOTC species. Hence the development of data collection protocols for artisanal fisheries is an activity that has been identified as a high priority in the IOTC Working Party on Data Collection and Statistics programme of work (IOTC-2016-WPDCS-R; PoW, item 1.1), specifically to "*develop or amend fisheries specific data collection protocols, by country, where necessary" and "assist implementation of pilot sampling activities in countries/fisheries not/insufficiently sampled in the past; with priority to be given to the following coastal fisheries: Indonesia, India, Pakistan, Sri Lanka, Yemen, Madagascar, and Comoros".* This will involve a series of country-specific reviews of the current data collection systems in place and a set of recommendations on how these can be improved through amending or developing the data collection protocols.

[3] http://www.iotc.org/science/regional-observer-scheme-science

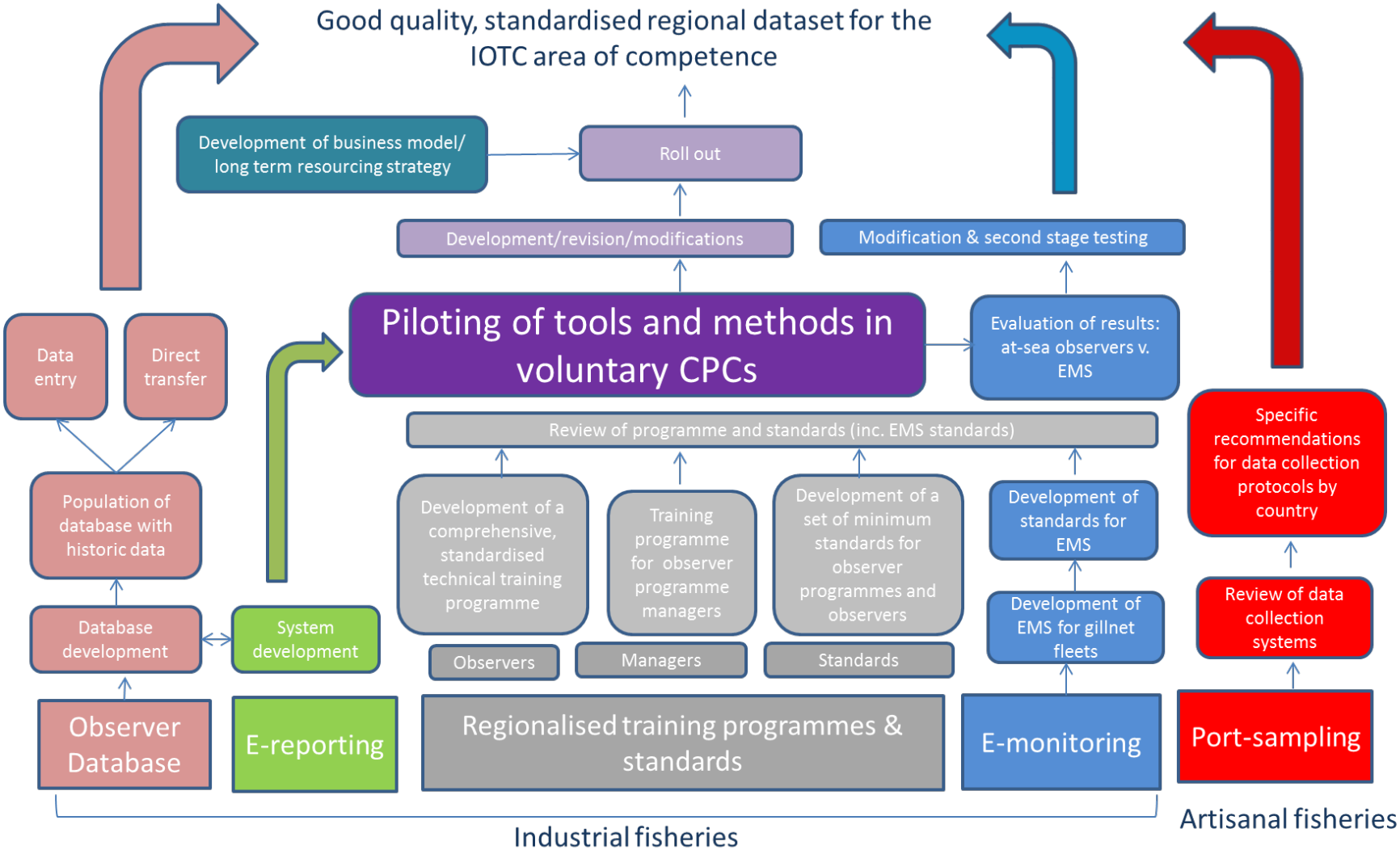


Figure 1. Proposed workflow of project components to support implementation of the IOTC Regional Observer Scheme

Current status of progress of the strategic plan

Table 1 presents a summary of the current state of progress in implementing the overall strategic plan for the ROS as background for the pilot project activities, highlighting where pilot project activities will be taking place.

Table 1. Current status of activities to support the ROS

	Workstream	Status
1	Observer training programme and minimum standards	Under development. Piloting of materials to take place once development is complete. These will be implemented in 3 individual CPCs and for the development of a 'regional pool' of observers
2	Electronic reporting tool	Initial development complete, to be piloted (as part of the observer training programme package)
3	Observer database development and historic data collation	Database developed and to be updated with information from the pilot project (but not part of pilot project)
4	Electronic monitoring system project	Under development.
5	Observation in-port	To be developed.

Resolution 16/04: Proposal for a Pilot Project

The Commission has agreed that there is a need for action at the regional level to ensure the effectiveness of the IOTC objectives through the promotion of the implementation of Resolution 11/04. As such, Resolution 16/*04 On the implementation of a pilot project in view of promoting the Regional Observer Scheme of IOTC* was established. This Resolution makes provisions for the trial of initiatives developed to support implementation of the ROS and to improve compliance with Resolutions 11/04, 15/01 and 15/02 through pilot projects. A critical component in all of the workstreams described above is the piloting phase and Resolution 16/04 provides a framework for trialling these innovations by drawing together the activities and operationalising them in selected CPCs. Once tested and verified, long-term resourcing strategies will be developed for the continuation of activities and expansion to other CPCs, where applicable. Table 2 provides an overview of the timeline for the various project components and Table 3 provides the indicative budget, acknowledging where funding sources have already been identified.

Pilot project activities

Observer training programme, including e-reporting

Observer coordinator training and planning

A small team of consultants (2) will undertake a mission to each selected voluntary CPC to work with the country focal point to implement the observer coordinator training and undertake the groundwork for establishing an observer scheme. The consultants will work directly with the observer scheme coordinators to select observers for training,

identify vessels for monitoring, source all appropriate technical and safety equipment and make the necessary arrangements for the training courses. During this time, a comprehensive set of working procedures will be established for the coordinator. In addition to the training material developed under Project component 1, the coordinators will be introduced to the electronic reporting systems and national databases designed under Project component 2 during a week-long workshop with the IT specialist to establish a data management and reporting system. Following the successful completion of these capacity building activities, national focal points from selected countries are expected to be able to implement the envisaged ROS data management workflow consisting of:

- Collection of mandatory data (as per ROS specifications) through the e-reporting tool;
- Storage and management of the collected information within the National Databases (including facilities for the assessments of collected data for statistical purposes);
- Regular dissemination of the required reporting information to the Regional Database.

Observer training

This will be followed by the implementation of observer training (5-week period):

- Survival-at-Sea training compliant with STCW 2010, including fire-fighting (1 week)
- Technical training (3 weeks)
- Training on the e-reporting system (1 week)

During this period, the training materials will be fully reviewed by trainers and participants. Short tests will be conducted prior to and on completion of the training to evaluate progress as well as final performance level. Participants will also be provided with evaluation forms to provide specific feedback on all components of the training programme.

Observer deployment at-sea

The newly trained observers will undergo a series of deployments on vessels and will collect and report data to the controlling organisations which will subsequently be reported to the IOTC Secretariat.

Evaluation of tools and training success

A second country mission will be undertaken by the consultants to review progress and provide further support as needed. A follow-up workshop will be held with the observer coordinators and observers to review the success of the training programme and tools. Participants will be asked to discuss the main training areas that were missing or inadequate from the initial training provided. The information collected by observers will be reviewed and problem areas identified and addressed through discussion of the underlying causes of misunderstanding and will subsequently be followed by appropriate revision of the programme. Based on the outcomes of the workshop, the training programme will be revised to include any gaps identified and to improve on any sections deemed to be require more attention. Follow-up training will be implemented as required during this second trip.

The outcomes of the trials, with the final programme and set of materials will be summarised and presented to the Scientific Committee in 2017 for review and will be made publically available. This will enable the Scientific Committee to evaluate the successes and failures of each project component as they progress, providing the opportunity for review and revision of activities to improve the efficiency and effectiveness of support provided for national observer schemes.

A pool of 'regional observers'

Following the piloting of the materials and tools, a set of voluntary observers from a number of CPCs that are interested in participating in the scheme will be trained, based on the final training curriculum and standards developed. Once the training has been completed and the observers are certified as competent to the established standards, these observers will be placed on a regional registry to be made available to fleets requiring onboard observer coverage for their vessels, thereby contributing to the coverage of the flag state required by IOTC Resolution 11/04. This registry

and the ongoing recruitment, training and deployment of regional observers will be coordinated by an organization or individual working directly under the auspices of the IOTC Secretariat.

Electronic Monitoring Systems

Implementation of EMS

The main project activities will comprise:

i. Development and implementation of an Electronic Monitoring System (EMS) integrating, e.g., cameras (video or stills), haul detection sensors and positional information (e.g., VMS/AIS) suitable for small-scale vessels with/without an onboard observer.
ii. Training in EMS equipment and maintenance for crew and onboard observers, as well as training in data extraction and processing of EMS data for land-based observers.
iii. Analysis and presentation of the results of EMS.

Independent appraisal of data

There will be an independent appraisal of the quality and reliability of EMS data capture and processing by land-based observers based on a comparison and cross-validation of data collected by at-sea observers, EMS, port sampling and logbooks (if available).

Land based observers will be trained to monitor video footage in addition to conducting port sampling activities. While EMS may be used to obtain positional data, information on fishing effort and methods and discards, port sampling also might be used to collect additional, complementary, information from the same vessels on return to port. The combination of EMS and port-sampling can be used to cross-verify the total retained catch quantities and species, obtain length frequency information and take biological samples where necessary, as well as record gear specifications such as mesh sizes used, length and material of nets etc.

Evaluation

There will be a final evaluation of the EMS pilot study, including:

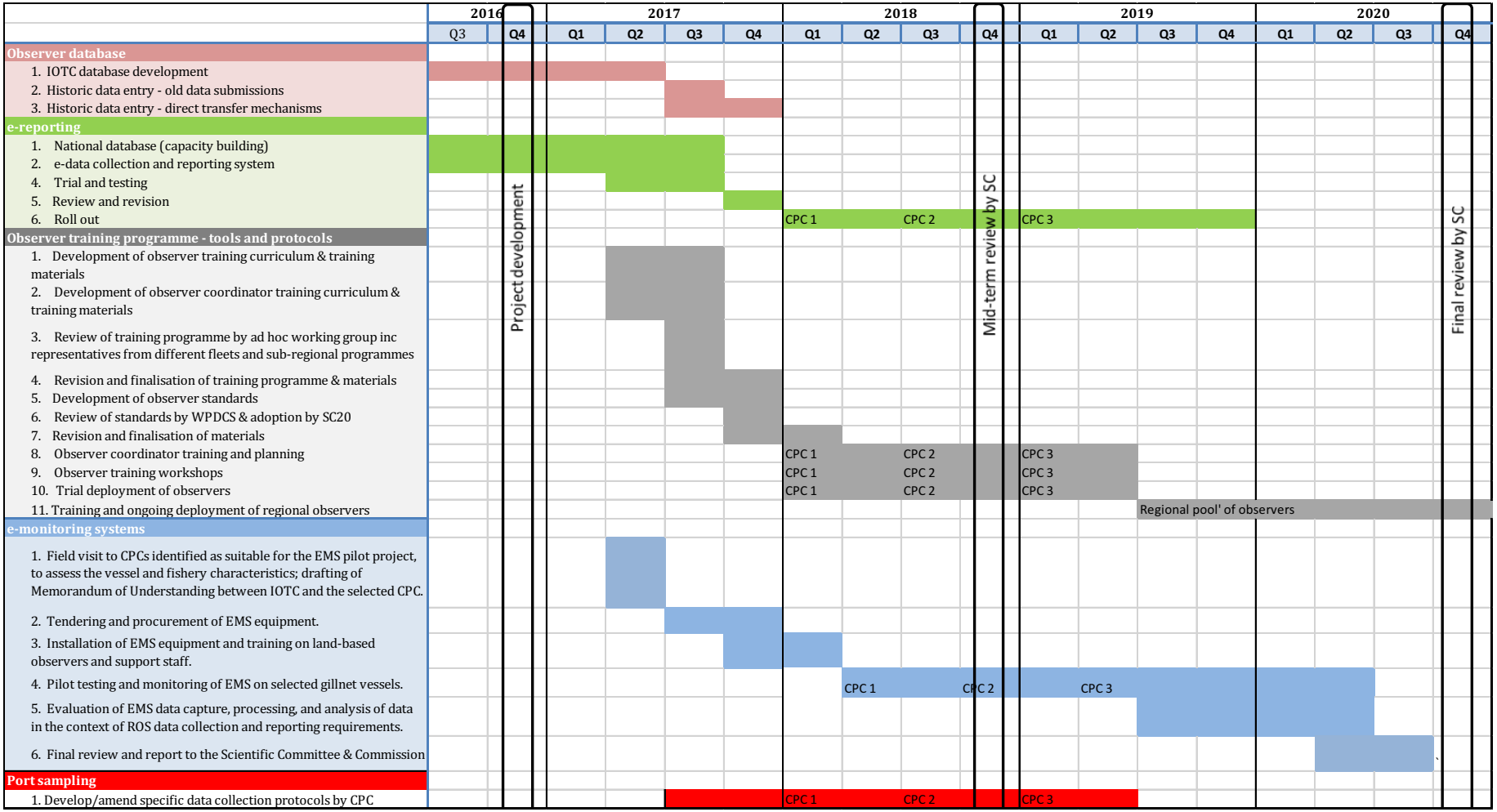
- Practicalities of implementing EMS on smaller-scale vessels, and factors for consideration (e.g., gear type, availability of onboard and continuous electricity supply, storage space for EMS equipment, monitoring and reporting requirements, and cost effectiveness).
- Accuracy of data capture (e.g., species identification of IOTC and bycatch species) and estimation of weight and size of catches by land-based observers.
- Appraisal of the viability and integration of EMS related data as part of CPCs standard ROS data submissions to the IOTC Secretariat.
- Assessment of the level of resources (e.g., I.T. equipment and personnel) required to process and extract EMS data suitable for reporting data to the IOTC.
- Implications for data sharing policies related to the capture of EMS video and still images, and IOTC data confidentiality agreements [IOTC Resolution 12/02].

Observation in port

This project component will comprise individual country missions to review and assess the status of port sampling systems in priority CPCs (Table 4). Recommendations will be developed on a case-by-case basis to improve the current data collection systems in place to achieve a minim of 5% coverage by field samplers for these coastal fleets. An international fisheries expert will be hired as a consultant to visit the selected CPCs and conduct a comprehensive

assessment of the status of the fisheries statistical systems for coastal fisheries in context of the data collection and reporting requirements of the ROS, namely catch by species and size frequency information. The estimated costs will cover the consultancy fees, travel and DSA required to visit the selected CPCs including plus reporting.

Table 2. Gantt chart of all project related activities



Funding timeline	2016 Q3	2016 Q4	2017 Q1	2017 Q2	2017 Q3	2017 Q4	2018 Q1	2018 Q2	2018 Q3	2018 Q4	2019 Q1	2019 Q2	2019 Q3	2019 Q4	2020 Q1	2020 Q2	2020 Q3	2020 Q4	Budget total
Observer database																			
e-reporting							3,500		3,500		3,500								
Observer training programme - tools and protocols							151,000		151,500		151,500		346,000						
e-monitoring systems								270,000		270,000		270,000							
Port sampling							30,000		30,000		30,000								
Total			Development activities - already funded				$184,500	$270,000	$185,000	$270,000	$185,000	$270,000	$ 346,000						$1,710,500

Table 3. Budget for pilot project activities

Standards and training programme	**unit cost**	**units**	**Total (US$)**	**Notes**	**Funding secured**
Preparation days (consultant)	300	15	4500		
Consultant flights	1500	4	6000	2 consultants make 2 trips	
Consultant DSA - trip 1	200	120	24000	2 consultants make a trip of 2 months duration	
Consultant days - trip 1	300	90	27000		
Consultant DSA - trip 2	200	60	12000	2 consultants make a trip of 1 month duration	
Consultant days - trip 2	300	40	12000		
Basic Sea Survival Course (STCW 2010)	1000	20	20000	20 observers	
Stipend for observers (1 month)	60	600	36000	20 observers 1 month trip US$60/day	
Materials & equipment			10000		
	Subtotal (per CPC):		**151,500**	Potential DG-MARE(EU) funding for 2 x CPCs	**300,000**

Regional observers – training & deployment	**unit cost**	**units**	**Total (US$)**	**Notes**	**Funding secured**
Coordinator position	300	260	78000	Consultancy position - one year	
Consultant flights	1500	2	3000	2 consultants make 1 trip	
Consultant DSA - trip 1	200	70	14000	2 consultants make a trip of 5 weeks duration	
Consultant days - trip 1	300	50	15000		
Observer flights	1500	20	30000	20 observers	
Observer DSA	200	700	140000	20 observers, 5 weeks training	
Basic Sea Survival Course (STCW 2010)	1000	20	20000	20 observers	
Stipend for observers (1 month)	60	600	36000	20 observers 1 month trip US$60/day	
Materials & equipment			10000		
	Subtotal (per CPC):		**346,000**	To be sourced	**0**

E-reporting & national database set-up	**unit cost**	**units**	**Total (US$)**	**Notes**
IT consultant flights	1500	1	1500	
IT consultant DSA - trip 1 (CPC1)	200	5	1000	
IT consultant days	200	5	1000	
	Subtotal (per CPC):		**3,500**	DG-MARE funding for 3 x CPCs	**10,500**

E-monitoring	**unit cost**	**units**	**Total (US$)**	**Notes**
Equipment			125,000	(onboard & offshore)

Training of land based observers	45,000	(to be complemented by observer training activities above)	
Maintenance and support	30,000		
Project supervisor	45,000		
Evaluation of EMS data collected by land-based observers	25,000		
Subtotal (per CPC):	**270,000**	Potential DG-MARE(EU) funding for 1 x CPC	**270,000**

Port sampling	**unit cost**	**units**	**Total (US$)**	**Notes**	
Consultant flights	1500	1	1500		
Consultant DSA	200	60	12000	(trip of 2 months duration)	
Consultant days	300	55	16500	45 working days durin trip + 10 days reporting	
Subtotal (per CPC):			**30,000**	DG-MARE(EU) funding for 3 x CPCs	**100,000**
Total per CPC:			**455,000**		
Total for 3 X CPCs:			**1,365,000**	**Total funding secured:**	**680,500**

Selection of fleets for project activities

The number of vessels listed as active on the IOTC registry in 2016 is provided in Table 4 by gear type, with an indication of whether or not observer information has been provided for the fleet segment. This gives an overview of the current status of implementation of the observer scheme and highlights the fleet segments that require further support and are therefore priority fleet for the pilot project. This table identifies the fleets requiring support for the establishment of an observer scheme as: India (LL), I.R.Iran (PS, GN), Malaysia (LL), Maldives (LL and BB), Oman (LL), Pakistan (GN), Thailand (LL), Seychelles (LL), Sri Lanka (GN) and Indonesia (PS, GN). A number of other fleets have initiated observer programmes or pilots, and may also require additional support. These include Madagascar (LL), Mauritius (PS), Mozambique (LL), Sri Lanka (LL) and Indonesia (LL).

This list includes large vessels as well as smaller vessels, for which there are numerous difficulties in implementing onboard observer coverage as described above, particularly the gillnet vessels. Figure 2 presents the size distribution of vessels sizes by flag, based on the active vessel registry list for 2015. This highlights where active fleets contain some particularly small vessels, including vessels <20m, such as EU,France, India, Indonesia, I.R.Iran, Madagascar, Maldives and Sri Lanka (where almost the entire fleet is <20m). As requested in Resolution 16/04, the pilot project will aim to explore the possibilities offered by electronic observation for these fleets.

Table 5 describes the elements of observer coverage applicable to each fleet component and links this to the most appropriate project component with a list of potential fleets for which the project component is relevant. For the pilot project, three CPCs have been selected to volunteer: I.R.Iran, Sri Lanka and Tanzania. This is based on requests for support that have been made to the IOTC Secretariat by I.R.Iran and Sri Lanka, and based on the large size of their fleets which are predominantly gillnet vessels for which very little information has been collected historically and have been identified as priority fleet components by the IOTC Scientific Committee. Fleets for the e-monitoring component will be selected based on fishery characteristics including vessel size, gear configuration, including procedures for setting and hauling, and suitability for installation of on-board equipment (e.g., availability of storage space, dry compartments, continuous electricity on-board, etc.).

Tanzania has also been selected as it is in the early stages of establishing an observer scheme and is part of the SWIOFC. Given the network of observer programmes within the southwest Indian Ocean, it would be beneficial to include a representative CPC to maintain coordination with the activities and harmonisation efforts taking place at the sub-regional level. The gillnet, purse seine and longline fisheries are all represented within these three selected fleets and so they provide an opportunity to trial the tools developed for each of the main IOTC fisheries.

For the establishment of the ‘regional pool’ of observers, applications will be made by interested individuals so that a selection can be made based on the established set of the necessary pre-requisites. Flag States can sponsor candidate observers from CPC's of their choice. In terms of vessels to participate in the project, all fleets that are interested in recruiting observers from the pool will be able to participate.

Table 4. Status of implementation of the ROS in IOTC CPCs, including the number of vessels of each gear type recorded as active in 2016 (≥24m or high seas).

	Vessels on active list (2016)				Observer data reported to IOTC				
CPC	**LL**	**PS**	**GN**	**BB**	**LL**	**PS**	**GN**	**BB**	**Format of data reporting**
Australia	2	6		1	Y	N		N	Data 2010-2014 word doc (IOTC template); 2014 - some submitted in excel; 2015 - E-Monitoring data submitted in excel file
Bangladesh									
China	67				Y				Data submitted as word doc (IOTC template) with size data in excel
Comoros									
Djibouti									
Eritrea									
EU,France	17	12			Y	Y			LL data submitted as pdf report, non IOTC format; PS data pdf doc, old IOTC format
EU,Italy		1				N			
EU,Portugal	7				Y				pdf doc in old IOTC format
EU,Spain	19	18			N	Y			Word docs in Spanish (2013-2014); 2015 - ST09 ICCAT aggregated format
EU,UK					N[4]				
France (OT)									
Guinea									
India					N[5]				
Indonesia	246	11	13		Y	N	N		Excel file (IOTC reporting template)
Iran, Isl. Rep. of	5	8	1192		N	N	N		

[4] 1 longline vessel active until 2015
[5] Not yet submitted active vessel list for 2016

Japan	43	2			Y	N			Excel file (non-IOTC format)
Kenya	1				N				
Korea, Rep. of	13	6			Y	Y			Word docs (old IOTC format)
Liberia									
Madagascar	7[6]				Y				Letter to the Executive Secretary summarising total catch of 7 trips, handwritten SWIOFP forms
Malaysia	10				N				
Maldives	47			325	N			N	
Mauritius	5	2			N	Y			Word docs (old IOTC format) + excel file for catches
Mozambique	11				Y				pdf (old IOTC format), 2015 - excel file, non-IOTC format
Oman	1				N				
Pakistan			10[7]				N		A crew, self-sampling observer scheme has already been initiated by WWF-Pakistan, however no data has yet been submitted to the IOTC Secretariat.
Philippines									
Senegal									
Seychelles[8]					N	Y			pdf (old IOTC format)
Sierra Leone									
Somalia									

[6] Vessels all <24m and fish within EEZ so while the boats are listed in the active vessel registry, there is no requirement for them to have onboard observer coverage
[7] 10 vessels listed on the record of authorised vessels to be confirmed if they are also active
[8] Active vessel list for purse seine and longline vessels yet to be submitted for 2016

South Africa	13				Y				Word docs (old IOTC format)
Sri Lanka			1455		Y[9]		N		IOTC forms (data from pilot trips - too poor quality to use)
Sudan									
– Taiwan,China	233				Y				pdf (old IOTC format)
Tanzania, United Rep.of	3				Y				Training took place in January 2017 by CapMarine and one trip report has been submitted in the old IOTC format
Thailand[10]		1			N	N			
United Kingdom (OT)									
Yemen									

[9] Longline vessel registered as active in 2015
[10] No LL active in 2016 due to suspension which will soon be lifted

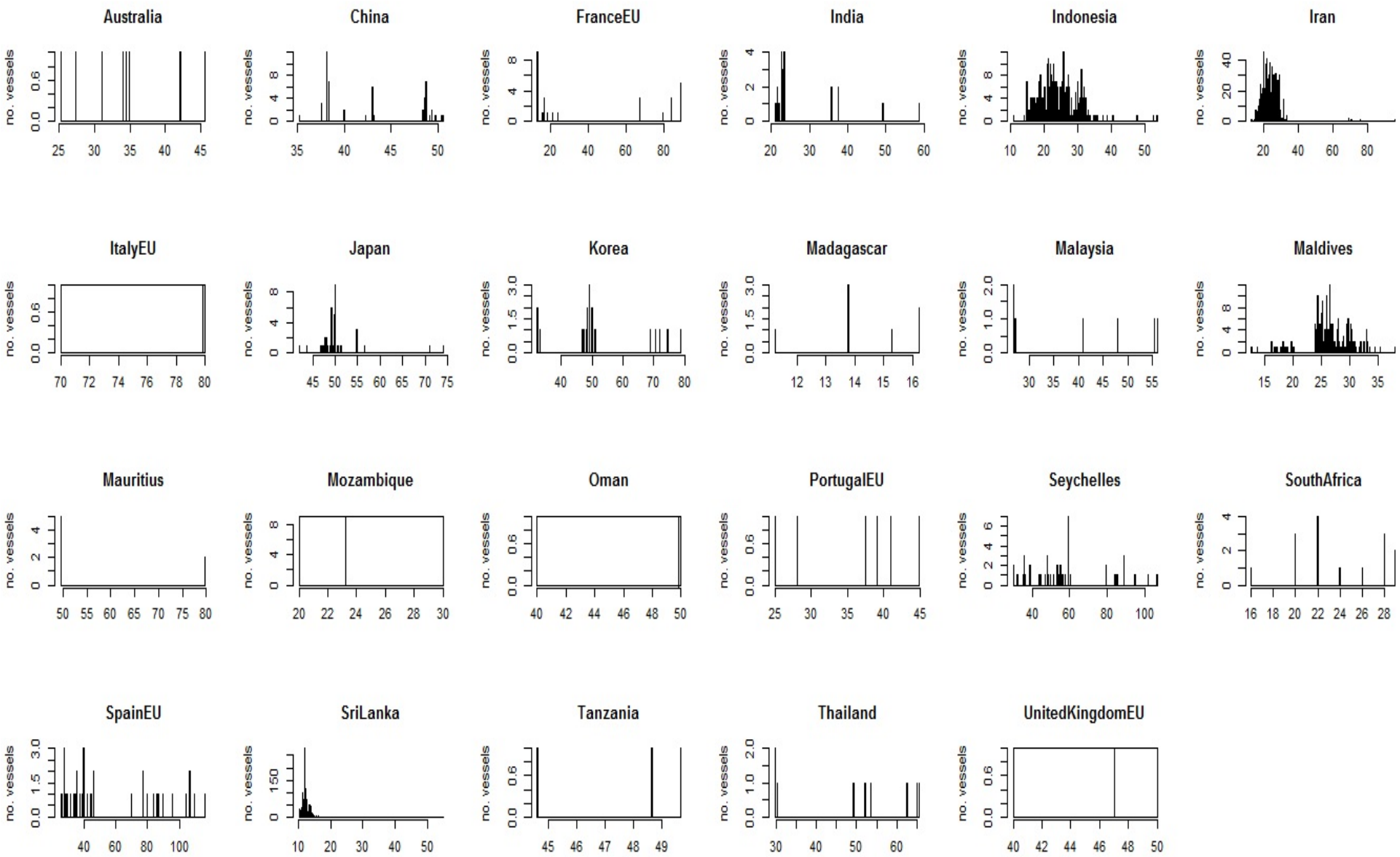


Figure 3. Distribution of vessels sizes by flag (active vessel registry, 2015).

Table 5. Fleet segments and related project components

Target fleet	Requirement under Resolution 11/04	Project components applicable	Development progress	Pilot countries (Resolution 16/04)	Potential countries for expansion
≥24m	Onboard coverage	• Regional training programme and standards • Electronic reporting • National database	• Consultancy advertised and development initiated • Preliminary version of e-reporting tool and database development complete	• I.R. Iran • Sri Lanka • Tanzania • Seychelles	• India • Malaysia • Maldives • Oman • Pakistan • Thailand • Madagascar • Mauritius • Mozambique • Seychelles • Indonesia • Kenya
<24m high seas	Onboard coverage	• Electronic monitoring • Electronic reporting • National database	• Review of other e-monitoring schemes currently taking place	• I.R.Iran • Sri Lanka • Pakistan?	• India • Indonesia • Madagascar • Maldives
<24 m coastal	Port sampling	• Country specific data protocol reviews and amendments	• Consultancy under development	• Sri Lanka • Tanzania • Madagascar (as per WPDCS PoW)	• Indonesia • Pakistan • Sri Lanka • Yemen • Madagascar • Comoros • Tanzania • Thailand • Malaysia • (as per WPDCS PoW)

Project management

Steering Committee

A Project Steering Committee will be established to provide oversight and direction as well as to monitor progress, including a mid-term review and a final term review. The Scientific Committee decided that the Steering Committee should be small, functional and contain sufficient technical expertise. Therefore the proposed members are of the Steering Committee are:

- Chairperson of the Scientific Committee
- Chairperson of WPDCS
- IOTC Secretariat Science Manager
- E-monitoring specialist
- Experienced observer programme coordinator
- Gillnet fishery expert
- Purse seine/longline/pole and line fleet expert
- EU DG-MARE representative

Following the establishment of the Project Steering Committee, they will provide comments on the project proposal and convene for a virtual meeting to discuss any issues arising before the project commences. The aim will be to discuss the main issues to overcome with implementing an observer scheme in each county and establish an agreed way forward. This will cover any particular institutional, legislative, resourcing, technical and logistical issues that may be faced and will agree on the priority areas for tailoring of the training programme as needed for in advance of the country missions. The proposed stages of project review are provided in Table 6.

Cooperation coordination mechanism between participating CPCs

An MoU will be drawn up between the selected CPCs participating in the pilot project to ensure coordination of activities and recognition of observer programmes and observers by each CPC[11]. This will nevertheless be centred on establishing recognition for the regional observers trained under this pilot project and mechanisms for coordination of these observers across cooperating fleets.

Stages of review

The Project Steering Committee will meet biannually (physically where possible in conjunction with other meetings, or virtually through tele-conferencing) to review the project progress and provide direction for the upcoming activities (Table 4).

Mid-term review

The mid-term review will provide an opportunity for all areas of work to be evaluated and for progress to be reviewed by the SC. This will be followed by a second stage where appropriate modifications, revisions and amendments are made where necessary and where areas for further development are identified. These will be further tested through the pilot project through a second stage trial.

Final review phase – assessing sustainability

Both technical and financial support are required in many instances for implementation of national observer programmes, whether they establish and manage the scheme directly or under contract through observer management organisations, however, resourcing is a key constraint in the implementation of observer schemes at the national level. This has been identified as a crucial limitation in the recruitment, training and deployment of observers. Key areas for improved resourcing include:

- Observer programme management – at the very minimum a logistical coordinator and data manager are required for the implementation of a national programme
- Observer remuneration and insurance – this should be at a rate that is competitive enough to attract new recruits and to retain well-trained, highly competent observers
- Training – the provision of funds for well-qualified instructors to provide training in key technical areas such as species identification, data collection methodologies and safety-at-sea.

[11] Resolution 16/04 para. 2 (e) "cooperation coordination mechanism between CPCs participating in the project"

- Technical equipment – the provision of equipment sufficient to enable an observer to complete the scientific tasks requested. This includes callipers, deck tapes, digital cameras, hand-held GPS systems, scales, binoculars, compass, knives, tablets/laptops
- Safety equipment – the provision of equipment needed to ensure the observer is able to utilise the sea survival skills learned during training where these are not present such as life rafts, life vests, first aid kits and communications equipment.

A final review will be conducted to evaluate progress at the culmination of the Pilot Project. This will include recommendations on how to expand the experiences and results of the pilot project to the entire IOTC area of competence (Resolution 16/04, para.4). Establishing continued resourcing for those workstreams that prove successful during the pilot stage of the project will be critical to the success of the scheme. Therefore, an investigation into potential ongoing financing for the activities will be drawn into the final project phase as indicated in Figure 1. Ongoing resourcing is required and may be sought through a range of potential channels. Examples include:

- Industry funding through mechanisms such as fishing licences
- Government funding of management teams based within the Fisheries Ministry
- National or regional fisheries development projects
- Increased funding due to market incentives brought about through MSC certification or FIPs
- Private sector funding from companies with Corporate Social Responsibility strategies with environmental or livelihoods improvement objectives, allowing them to make payments for environmental services.

Table 6. Pilot Project timeline – development and review

	2016	2017	2018	2019	2020
Review and oversight	Presentation of project proposal and further development by the Scientific Committee	Distribution of revised draft proposal by the Chair of Scientific Committee Comments from Contracting Parties to be provided one month following circulation of the proposal Revised draft proposal (including budget) to be submitted to the Compliance Committee and Standing Committee on Administration and Finance for review. Review and approval of project by Commission Kick-off review by Project Steering Committee	2 x reviews by review by Project Steering Committee Mid-term review by Scientific Committee	2 x reviews by review by Project Steering Committee	2 x reviews by review by Project Steering Committee Final term review by Scientific Committee Recommendations on how to extend the project to the entire IOTC area of competence

Appendix 1

Table 7. Timeline for the development of observer training programme and competency standards

	2017	Second quarter 2017	Third quarter 2017	Fourth quarter 2017	2018	2019
Observer programme coordinator	Course curriculum	Development of observer training curriculum	Review by ad hoc observer working group Revision based on recommendations by the working group	Final version reviewed by WPDCS and approved by SC20	Extended uptake of tools and rollout of observer programme by CPCs	Use of standards and training programme to establish a 'regional pool' of observers
	Coordinator working protocols	Development of observer programme coordinator working protocols				
	Tools and reference materials	Development of tools and materials				
Observer programme standards	Minimum standards for national observer programmes to adhere to	Development of standards for observer programmes				
	Minimum standard data fields	Review of minimum data fields and proposals for improvement, where necessary				
Observer training programme	Course curriculum	Development of observer training curriculum				
	Observer working protocols	Development of observer working protocols				
	Tools and reference materials	Development of tools and materials				

Observer standards	Observer standards	• Medical • Safety-at-sea • Technical competency Minimum technical competency standards for scientific observers to be developed			Only observers meeting these agreed competency standards will be submitted to the IOTC Secretariat for regional recognition.	