Seychelles Fishing Authority

Research Plan 2021 – 2025

September 2020

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1) Introduction

This Research Plan provides a clear direction for the development and implementation of fisheries related research programmes by the Seychelles Fishing Authority (SFA) for the next five years. It provides guidance on priority areas of research, which will guide decision-making within SFA and enable the Organisation to prioritise allocation of resources where it is needed. The SFA Research Plan is principally guided by the SFA Strategic Plan 2018-2020, the Seychelles Fisheries Sector Policy and Strategy 2019 and the Fisheries Comprehensive Plan (FCP) of the Ministry of Fisheries and Agriculture (MFAg). It is also aligned with various international instruments relating to fisheries such as the United Nations Sustainable Development Goal 14 and the FAO Code of Conduct of Responsible Fisheries.

The Research Plan will be implemented through an Annual Operational Plan, which will provide clear work plans to achieve the goals and objectives of the Research Plan. Both the Research Plan and the Annual Operational Plan are intended to be living documents, capable of responding to the emerging needs of Fisheries Management and the stakeholders involved in fisheries activities.

2) The Seychelles Fishing Authority Fisheries Research Section

Fisheries Research is a Section within the Fisheries Research and Development Division, which forms one of the six main branches of SFA. The SFA Board of Directors approved the structure of the Fisheries Research Section in 2020. The Section will comprise of three Scientific Units and the Research Vessel Unit (see attached Annex 1 for the detailed Structure).

Since the establishment of the SFA, the Research Section has implemented an extensive list of research projects and work programmes to support the development of fisheries in Seychelles (see attached Annex 2 for a non-exhaustive list of projects). The SFA has a good record of collaborative research with national and international partners in support of fisheries research and development of capacities for its staff.

2.1 The roles of the Fisheries Research Section

The roles of the Fisheries Research Section are as follows:

- Develop and carry out applied research to improve our understanding of fisheries, population biology and dynamics, effects of climate change and the relationships between the ecosystems and the fisheries they support
- Collect and manage data pertaining to the assessment of fisheries resources
- Assess the status of fisheries resources to provide robust advice to resource managers, fisheries stakeholders, partners and the general public on the management and development of Seychelles fisheries

2.2 Challenges of the Fisheries Research Section

The challenges faced by the Section are as follows:

- Lack of a Research Strategy to guide the development of fisheries research activities. This leads to a lack of clear direction and work prioritization. The development of this Research Plan will address this issue.

- Lack of communication between top management and the Research Section.

- Lack of communication and cohesion between different Sections of the SFA to facilitate the alignment of work priorities.

- Lack of interaction and input from fisheries stakeholders regarding their issues and needs.

- Lack of short-term and long-term plans for the renovation or replacement of key Research infrastructure (Research Lab and R/V L'Amitié research vessels). With the expansion of research activities over the years, the Research Lab is getting too small to accommodate all the necessary lab equipment and there is a lack of storage space. The research vessel, R/V L'Amitié is over 25 years old and the maintenance costs keeps increasing. In addition, the vessel is not well equipped to cater for new emerging research needs.

- Lack of allocation of a transport to the Section to support the implementation of its work.

- The Section has a relatively young and inexperienced group of scientific staff. It is imperative that resources are allocated to cater for the training needs of staff in order to improve their knowledge and assist in building their capacity.

- Budget constraints (EU sectoral support) during periods of reallocation of funds affects the implementation of research activities and projects.

3) Development of the Research Plan

The Research Plan has been prepared to take into consideration the following:

- The needs of Fisheries Management to support the implementation and development of management plans for various fisheries
- To support the implementation of the FCP
- To meet SFAs international obligations to various regional fisheries bodies
- To support the implementations of National Plans of Actions

3.1 Alignment to instruments and policies

The Research Plan of SFA is aligned to various national and international instruments and policies concerning fisheries. These instruments are:

(1) SFA Strategic Plan 2018-2020

Strategy 3.3 'Improve understanding of fisheries, fisheries resources and the ecosystems that supports fisheries through targeted research and surveys' directly relates to research.

(2) Seychelles Fisheries Sector Policy and Strategy 2019

Policy 9 'Research and innovation in the fisheries sector and aquaculture' states that "The Government will respond to the needs of the fisheries sector by promoting tactical research driven by the needs of fisheries management and aquaculture development. It will also seek to encourage innovative longer-term research aimed at an understanding of possible climate change impacts on the fisheries sector and of the adaptation that may be required of the sector"

(3) Fisheries Comprehensive Plan

The FCP provides guidance for future actions to spearhead the development for the fisheries sector for the next three years (2019 – 2022). It provides clear goals and objectives for all fisheries related activities. It also identifies areas where there is a need to commission scientific studies to provide key information for Fisheries Management.

(4) United Nations Sustainable Development Goal 14

SDG 14 aims to "Conserve and sustainable use the oceans, seas and marine resources for sustainable development"

(5) FAO Code of Conduct of Responsible Fisheries

The FAO Code of Conduct for Responsible Fisheries sets out the principles and international standards of behavior for responsible practices to ensure the effective conservation, management and development of living aquatic resources. Article 12 of the Code provides the guiding principles for Fisheries Research.

3.2 Guiding principles

In implementing this Research Plan, the SFA shall be guided by the following principles:

- Ensure the use of best scientific practices
- Ensure that fisheries research is well coordinated and cost-effective
- Ensure that research results are of relevance to Fisheries Management
- The Research Section shall work in close collaboration with relevant Sections within SFA to implement the Plan
- Engage in collaborative partnerships with national and international partners (NGOs, Universities, Institutions) to promote collaborative research and capacity building
- Engage with stakeholders and fishing communities to implement research activities
- Strive to publish research work in technical reports and peer reviewed journals

- Communicate research findings in a timely manner through appropriate mediums to the broader scientific community, stakeholders and general public

4) Research priorities

The research priorities can be grouped into four major areas:

- Research to support the implementation and development of Fisheries Management and National Plans
- Research to support sustainability of fisheries resources
- Research to better understand the links between the environment and fisheries resources
- Research to promote diversification in fishing activities

For each of the main priority areas, priority actions has been identified with specific objectives and potential outcomes.

4.1 Research to support the implementation and development of Fisheries Management and National Plans

1. Research to support the implementation and development of Fisheries Management and National Plans			
Priority areas	**Objectives**	**Outcome**	**Priority**
1.01 Investigate the size at maturity (Lm50) of key demersal species: List of species (in order of priority): 1) *Lutjanus sebae* 2) *Aprion virescens* 3) *Lutjanus sanguineus* 4) *Epinephelus multinotatus* 5) *Lutjanus bohar* 6) *Epinephelus chlorostigma*	To improve our understanding of the reproductive biology of key species and establish minimum size limits based on Lm50	Improved understanding of the reproductive biology of key species and minimum size limits established based on Lm50 and incorporated in Management Plans	High
1.02 Investigate the post-release survival of key demersal species (same list as above)	To determine the survival rates of key species following catch and release	Improved understanding of the survival of species following catch and release to inform whether minimum size limits are viable management measures	High
1.03 Implement fishery and biological data collection programmes for the lobster fishery	To ensure that key information (catch and effort) on the fishery and biological information are collected and available for analysis	Fishery and biological data are available for further analysis (fishing summaries, fishery assessments)	High
1.04 Undertake fishery-dependent analysis and assessment of the lobster fishery	To provide timely information (catch, effort, CPUE, size structure etc..) on the fishery	Key information on the fishery is available to all stakeholders	High

1.05 Implement fishery and biological data collection programmes for the sea cucumber fishery (including electronic monitoring)	To ensure that key information (catch and effort) on the fishery and size structure are collected and available for analysis	Fishery data are available for further analysis (fishing summaries, fishery assessments)	High
1.06 Undertake fishery-dependent analysis and stock assessment of the sea cucumber fishery	To provide timely information (catch, effort, CPUE, size structure etc..) on the fishery and the status of the stock	Key information on the fishery and stock status is available to all stakeholders Management advise derived from assessment	High
1.07 Undertake fishery-independent assessments of the sea cucumber fishery	To improve our understanding of the biology and status of sea cucumber stocks and to ensure that the fishery is managed based on information derived from scientific studies	Improved understanding on the biology, biomass, abundance and stock status of sea cucumbers Management advise (e.g. TACs) derived from scientific research	High
1.08 Undertake fishery-independent assessments of the lobster resources at different life stages.	To improve our understanding of the biology and status of lobster stocks and to ensure that the fishery is managed based on information derived from scientific studies	Improved understanding on the biology, and recovery of the lobster stocks. Management advice derived from research	Medium
1.09 Undertake a study on the Octopus fishery	To improve our understanding of the octopus fishery (number of fishers, catch, effort, species caught, biology)	Improved understanding of the octopus fishery. Information available to Fisheries Managers for development of Management Plans	Medium
1.10 Investigate the habitat use and movement of species most vulnerable to fishing pressure	To improve our knowledge on the habitat use and movement of these species to potentially inform on appropriate management options for conservation of the resource	Improved knowledge on vulnerable species Management decisions/option informed through scientific research	Medium
1.11 Implement monitoring programmes to monitor the catch of other priority fisheries and vulnerable species (sharks, parrotfish, endangered species)	To collect information on catch, species composition	Fishery data are available for further analysis (fishing summaries, fishery assessments) Information available to Fisheries Managers for development of Management Plans	Medium
1.12 Implement fishery and biological data collection programmes for the Spanner Crab fishery	To improve the understanding of the fishery (number of vessels operating, gear configuration, catch, effort, size structure, biology)	Fishery and biological data are available for further analysis (fishing summaries, fishery assessments)	Low

Information available to Fisheries Managers for development of Management Plans	

4.2 Research to support sustainability of fisheries resources

2. Research to support sustainability of fisheries resources			
Priority areas	**Objectives**	**Outcome**	**Priority**
2.1 Undertake biological data collection programmes for key species targeted by the artisanal fishery Current list of species: - *Lutjnaus sebae, Aprion virescens, Epinephelus chlorostigma*	To ensure that important biological data that are essential for stock assessment purposes are collected	Biological data are available for further analysis and incorporated into stock assessments	High
2.2 Undertake biological data collection programmes for key species targeted by the semi-industrial fishery Current list of species: - *Thunnus albacares, Thunnus obesus, Xiphias gladius*	To ensure that important biological data that are essential for stock assessment purposes are collected To ensure that SFA meets its obligations under the IOTC requirements for data collection	Biological data are available for further analysis and incorporated into stock assessments SFA meets its obligations for data collection	High
2.3 Undertake stock assessments of key species for the artisanal fishery	To determine the stock status of key species/demersal fisheries and inform managers on the status of the stocks	Stock status of key species/demersal fisheries are known Fisheries managers are aware of the stock status for management actions	High
2.4 Undertake studies on the population structure of key demersal fisheries resources in Seychelles	To determine the connectivity and identify stock units	Stock units are identified Stock assessments are undertaken at the level of the unit stock	High

2.5 Undertake biological data collection programmes for species targeted by the sports fishery Current list of species: - *Lutjnaus sebae, Aprion virescens, Epinephelus chlorostigma, Thunnus albacares, Thunnus obesus, Katsuwonus pelamis, Thunnus alalunga, Makaira indica, Makaira nigricans, Tetrapturus audax, Istiophorus platypterus*	To ensure that important biological data that are essential for stock assessment purposes are collected To ensure that SFA meets its obligations under the IOTC requirements for data collection	Biological data are available for further analysis and incorporated into stock assessments SFA meets its obligations for data collection	Medium
2.6 Undertake biological sampling programmes for species targeted by the Industrial fishery	To ensure that important biological data that are essential for stock assessment purposes are collected To ensure that SFA meets its obligations for data collection for the French purse seine fleets operation in the IO	Biological data are available for further analysis and incorporated into stock assessments SFA meets its obligations for data collection	Medium
2.7 Undertake fishery-independent surveys of key dermsal resources using appropriate methods (BRUVS, Dive transects, fishing surveys etc..)	To determine the biomass, diversity, relative abundance and distribution of commercially targeted species	Improved understanding of the abundance of commercially targeted species to inform the stock status of the fishery	Medium
2.8 Introduce harvest strategies for vulnerable commercially targeted species	To ensure that fisheries resources are managed based on pre agreed set of objectives (data collection, assessments, management actions)	Harvest strategies are implemented in the management of fisheries resources	Low

4.3 Research to better understand the links between the environment and fisheries resources

3. Research to better understand the links between the environment and fisheries resources			
Priority areas	**Objectives**	**Outcome**	**Priority**
3.1 Investigate the impacts of fishing gear/fishing aids on the coastal/benthic habitats	To improve our understanding and assess the adverse impacts of fishing gears/fishing aids on coastal/benthic habitats	Improved understanding of the impacts of fishing gears on the habitats Management decisions on the restriction of harmful gears based on scientific research	Medium

3.2 Investigate the impact of natural and anthropogenic factors on fisheries resources (pollution, contaminants)	To improve our understanding on the impacts of anthropogenic factors on fisheries resources and the resulting risk associated with the consumption of fish	Improved understanding of impacts and associated consumption risks are known	Medium
3.3 Investigate the impacts of climate change on fisheries	To improve our understanding of the impacts of a changing environment (SST, ocean acidification, primary productivity etc..) on the abundance and composition of fishery species	Improved knowledge on the effects of climate change on fisheries resources	Low
3.4 Incorporate the use of in situ environmental data and remote sensing data in the interpretation of fisheries data	To elucidate any underlying environmental factors that may influence the abundance/composition of fisheries resources	Improved understanding of the environmental factors influencing fisheries resources	Low
3.5 Undertake research to investigate the nutrient composition of fisheries resources	To improve our understanding of the nutritional benefits of the consumption of fish	Improved knowledge and increased awareness on the nutritional benefits of fish consumption	Low

4.4 Research to promote diversification of fishing activities

3. Research to promote diversification in fishing activities			
Priority areas	**Objectives**	**Outcome**	**Priority**
4.1 Undertake baseline studies and assessments of underutilized fisheries resources (e.g. deep slope species, distant fishing banks, spanner crabs etc.)	To improve knowledge on the biomass and abundance of these resources To determine the potential to expand fisheries to target these resources	Improved knowledge on the resource to guide Fisheries Managers on the development/expansion of fisheries targeting underexploited resources	Medium
4.2 Undertake research on new fishing technologies and fishing gears	To evaluate the selectivity, efficiency and impacts of new fishing gears on the fisheries resources and habitats	Improved understanding of the impacts of fishing gears	Medium
4.3 Undertake studies to investigate the use of alternative materials for the construction of FADs and traditional (biodegradable)	To evaluate the feasibility of biodegradable materials in the construction of fishing gears/fishing aids.	Development of biodegradable fishing gears to reduce long term impacts on the environment and reduce ghost fishing	Low

5. Working with others

The Fisheries Research Section implements a large number of work programmes and projects. In order to effectively deliver all these projects, the SFA has established various collaborations with national and international partners. Examples of such partners include the Seychelles Island Foundation (SIF), the Island Conservation Society (ICS), the Marine Conservation Society Seychelles (MCSS), the Commonwealth Scientific and Industrial Research Organization (CSIRO) and the *James Michel* Blue Economy Research Institute (BERI) to assist in capacity building and promote partnership for joint research and development of projects.

The Research Plan provides a guide for priority areas where SFA can engage with partners to build partnership on. The Fisheries Research Section will proactively pursue additional collaborations to assist in the implementation of the Research Plan.

6. Implementation and review process

The Research Plan will be implemented through an Annual Operational Plan (AOP) developed by the Research Section. The Annual Operational Plan shall provide detailed actions/activities with specific timelines for specific priority research areas in order to achieve the specific set objectives. Both the Research Plan and Annual Operational Plan are intended to be living documents, capable of responding to the emerging needs of Fisheries Management and stakeholder. This Research Plan shall be reviewed every two years to cater for emerging research areas and to assess the achievement of the objectives. The Annual Operational Plan shall be assessed on a quarterly basis to assess the progress of the planned activities.