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Southern Indian Ocean Fisheries Agreement
Accord relatif aux Pêches dans le Sud de l'Océan Indien

Expert Review for the Development of the SIOFA Precautionary Approach and Management Projects (PAM-2024-04)

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1. Abstract

This report provides a summary of review input throughout the SIOFA Precautionary Approach and Management workshops and reviews of the draft final reports from the SIOFA Precautionary Approach and Management Projects; PAM-2024-01, PAM-2014-02 and PAM-2024-03.

The SIOFA Precautionary Approach and Management projects and associated workshops (SIOFA 2024, 2025a, 2025b, 2025c) have progressed what I consider to be a very influential approach for considering precautionary frameworks for managing fishing. The resulting reports will pave the way for a robust structure for assessing and managing the SIOFA fisheries but also will be useful guide for other jurisdictions when establishing or reviewing their fisheries management approaches and harvest strategies.

Further work will need to be undertaken to distil the thorough reports provided through the SIOFA PAM projects into clear and concise Conservation Management Measures that can be implemented in SIOFA. Consideration needs to be given to future proof the CMMs for a full range of future states of knowledge about SIOFA fisheries.

Recommendations to improve the approach are provided.

2. Introduction

The SIOFA Precautionary Approach and Management (SIOFA-PAM) projects were designed "to further enhance the scientific advice of the SIOFA Scientific Committee to the SIOFA Meeting of the parties and its member CCPs, in particular towards ensuring the sustainable management of fish stocks and the environmental impacts associated with fishing".

The SIOFA-PAM projects were focussed on the "development of a framework to ensure the sustainable management of fish stocks, and managing the environmental impacts associated with fishing activities within the SIOFA region, with the aim to guide, inform, and enhance resource protection and to improve sustainable resource management measures, especially in the context of the information-limited fisheries in the SIOFA Area".

The following SIOFA Precautionary Approach and Management (SIOFA-PAM) projects were established:

1. PAM-2024-01 (Development of a SIOFA Precautionary Approach Framework),
2. PAM-2024-02 (Determination of Biological Reference Points (BRPs) for key SIOFA fish stocks),
3. PAM-2024-03 (Development of harvest strategies for key SIOFA fish stocks), and
4. PAM-2024-04 (Expert Review Panel for the Development of the SIOFA Precautionary Approach and Management Projects).

This report presents views of the expert reviewer, Nathan Walker delivering on the objectives of the expert review project PAM-2024-04 are to:

1. Review the progress and outputs of projects PAM-2024-01 (Development of a SIOFA Precautionary Approach Framework), PAM-2024-02 (Determination of Biological Reference Points (BRPs) for key SIOFA fish stocks), and PAM-2024-03 (Development of harvest strategies for key SIOFA fish stocks).

2. Provide expert advice to the consultants of projects PAM-2024-01, PAM-2024-02 and PAM-2024-03 to assist them in developing their project outputs and expert scientific review for each of these projects.

The full terms of reference for project PAM-2024-04 are provided in Appendix I.

Broader collaboration within SIOFA was supported through three virtual workshops:

1. WS2025-PAM, 3 February 2025 which introduced the consultants, set out the terms of reference for the PAM projects, and reviewed the proposed methods (SIOFA 2025a),
2. WS2025-PAM2, 6 August 2025 which focused primarily on the draft report for project WS2025-PAM-01 (SIOFA 2025b), and
3. WS2025-PAM3, 7 October 2025 which reviewed the draft report for project WS2025-PAM-02 (SIOFA 2025c).

During WS2025-PAM (SIOFA 2025a) this reviewer noted that:

a. the work would need to ensure coordination with similar projects being progressed in other RFMOs or international fishery management organisations (i.e., CCAMLR where MSEs are being developed) and in domestic fisheries for the same or similar species. He noted that there was benefit in comparing between organisations with similar objectives, but should also take into account the different levels of information available for the fisheries in the comparisons.
b. Concerning high seas research, collection of fisheries information can be very expensive and we need to consider the cost and trade off and how that research can be arranged and managed.
c. Best practice approaches are needed to reduce non fish bycatch and impacts on ecosystems.
d. Non-target fish have even lower information than target species, so we would need to consider how to gather appropriate information or undertake risk assessments to prioritise data collection.
e. It would be useful to include climate change in the analyses. There is some work on climate change considerations in, for example, Australia and New Zealand that could help inform approaches to the management of fisheries that takes account of climate change.
f. Note that CCAMLR will be developing management strategy evaluations for both high and low information toothfish stocks.
g. Note that when considering the BRPs that with lower knowledge and greater uncertainty, more precautionary approaches could be considered. With this in mind, sensitivities could be tested that include uncertainty in the estimates of biological parameters assumed.

During WS2025-PAM2 (SIOFA 2025b), this reviewer drew the PAM-2024-01 consultants' attention to a consultation paper on applying low-medium information approaches to fisheries management to some fish stocks in New Zealand, which is available at https://www.mpi.govt.nz/dmsdocument/70080-Review-of-sustainability-measures-for-five-lowmedium-knowledge-stocks-for-2025.26.

During WS2025-PAM3 (SIOFA 2025c), this reviewer pointed out that the use of CPUE should be treated with caution as management action can also drive fisher behaviour. I also endorsed the conclusion drawn by the consultants regarding climate change that there are risks in taking a dynamic B_0 approach and emphasised the need to be certain that any apparent variation in biological parameters is real and not an artifact of data collection methods. In addition, I suggested that it may be useful to compare stocks against multiple indicators and see if the indicators support

the same conclusions or if they conflict with each other, which may suggest the need for further investigation.

3. Overarching views on the SIOFA Precautionary Approach and Management projects

The SIOFA Precautionary Approach and Management projects and associated workshops (SIOFA 2024, 2025a, 2025b, 2025c) have progressed what I consider to be a very influential approach for considering precautionary frameworks for managing fishing. The resulting reports will pave the way for a robust structure for assessing and managing the SIOFA fisheries, but also will be useful guide for other jurisdictions when establishing or reviewing their fisheries management approaches and harvest strategies.

The review contained in the document which notes numerous recommendations should be taken into account as constructive criticism tweaking the suggested approaches, along with the overarching view that this process is a highly useful valuable addition to fisheries management in SIOFA.

Further work will need to be undertaken to distil the thorough reports provided through the SIOFA PAM projects into clear and concise Conservation Management Measures that can be implemented in SIOFA. Consideration needs to be given to future proof the CMMs for a full range of future states of knowledge about SIOFA fisheries. For example, it is prudent to consider not just the increasing knowledge about a fishery, but also the possibility that the state of knowledge may decrease in quality over time requiring a change of knowledge classification.

4. PAM-2024-01 – Development of a SIOFA Precautionary Approach Framework – Conceptual framework

4.1 Overview

The conceptual framework provided in Robertson & Holmes (2025a) provides a robust approach for classifying fisheries into suitable information categories, proposes stock status zones and discusses suitable management procedures. This overall is a very good approach, although in the following sections I provide comment about specific sections and make recommendations on how to refine the conceptual framework.

The major recommendations made in reference to this conceptual framework are to include consideration that fisheries aren't only going to improve in available information relative to the accepted standards. This framework needs to be future proofed to account for both increasing and decreasing amounts of information available for fisheries and periodic reviews of the standards within the information classification system.

I also recommend that the SIOFA Scientific Committee consider developing data collection plans on a fishery-by-fishery basis to improve the state of information about each fishery. Noting that associated resources required for scientific analysis of samples and data will need to be considered.

Perhaps the strongest recommendation that I make regarding this SIOFA PAM projects is that stock assessments be presented to the SIOFA Scientific Committee along with a range of pre-agreed indicators tracking stock, environmental and fishery trends. These indicators will provide early warning of changes in the fishery, such as growth, recruitment, environmental conditions, spatial changes in effort and catch rates. Concerning trends in these indicators should be considered in break out rules for the management of the fisheries.

I recommend that careful consideration be given to how the precautionary approach and management, as proposed in these documents (Roberston & Holmes 2025a, 2025b, Hoyle & Mormede 2025, Mormede & Hoyle 2025) are communicated to the SIOFA Meeting of Parties and how they might be implemented as Conservation Management Measures (CMMs). This concern is also picked up in the recent SIOFA Workshop on the Development of Harvest Strategies; the convenors report (SIOFA 2026) notes:

> "18. The Workshop requested that the SC develop a structured approach to operationalise the PAF, including mechanisms for categorising stocks by information level and providing appropriate assessment methods for each category"

In formulating this implementation of the approach, I would urge that SC consider both progress to higher information classifications as well as degradation of the information, as well as periodic review of the information standard. This will better future proofs the approach for a broader range of future scenarios.

4.2 Specific Comments

Foundation

The application of the Precautionary Approach is a robust approach, taking account of the information available on the fish stocks while implementing the action required to manage stocks appropriately. This also references cost efficiency which is important for shared international fisheries that may not have readily accessible resources for research and management. International fisheries require coordination of, and agreement to, scientific sampling requirements, and consistent methodology between laboratories, that is a lot more challenging than in a domestic setting.

There is also a reference to established domestic frameworks, another that may be worth considering is the NSW Lobster Fishery Harvest Strategy, by the NSW Department of Primary Industries (2022). This approach references the use of Indicators that I will elaborate on below.

'Legal basis to adopt a PAF section'

I support the aims to manage the fishery resources in SIOFA to *at least* MSY. I consider that it is important that these approaches include a buffer for resilience, due to uncertainty in parameter estimations, coding errors or potential changes in environmental conditions. Some modelling approaches allow for some consideration of fluctuations in environmental conditions or stock productivity, however lower knowledge stocks should have a buffer built into the management approach to account for due to lower levels of knowledge.

Three-Zone System

The Three-Zone System for stock status evaluation needs to have clear descriptions of how a stock would shift between the Zones. This will need to be carefully considered when drafting the

Conservation Management Measure, as in CCAMLR there is currently some inconsistencies that exist now (see comments above in 3.1 and below in 3.3).

Framework Architecture:

The goal to provide a pathway for stocks to graduate to higher information categories is a good goal, however it needs to be very clear what the criteria are for transitioning between information categories and bear in mind that over time that information available on a stock may degrade or become patchy and therefore stock needs to be able to be considered dropping to lower information categories.

Status evaluation (p17)

Stock condition is to be assessed using the best available methods for the information level, should also consider a range of other indicators, as a stock assessment does not necessarily explain all of the context of a fishery. Indicators may either provide early warning of changes in the fishery (i.e. lack of recent recruitment, sex bias, growth rates changing), or provide monitoring of CPUE at a finer scale than the stock assessed, which are important considerations in managing fisheries.

Classification criteria (p23)

Under High information stocks – it is noted here that data sufficient to support forward projections fall under this category. I note that forward projections are based on a series of assumptions about the ongoing trends in environmental and fisheries conditions and these assumptions need to be fully considered by the Scientific Committee. Assumptions about recruitment levels and environmental conditions can be very influential.

Under Medium Information Stocks – Indicators that track stock trends over time, as I mentioned above, are useful for early warning of fish stock changes and these should be developed and considered by the Scientific Committee across the range of Classification Criteria.

Reference Points and Zone Boundaries (p25)

Under this proposed approach as with many other fisheries management approaches, high information fisheries have their data assessed and distilled through complex model-based approaches into a singular biomass measure of stock health. Noting that these models can be dependent on numerous modelling assumptions and errors in these processes can occur. Recommend thorough model validation is undertaken and standard diagnostics are developed. Also recommend the consideration of a range of stock status indicators that build a more in-depth understanding of the state of the fisheries.

Ecosystem-based management Principles (p29)

These principles can feed into the design of indicators monitoring the state of the fishery and environmental conditions.

Associated and Dependent Species (p29)

While not the focus of these projects, it is important to note that the cumulative impacts of fisheries on ETP species is essential to consider, and as many of the ETP species will migrate beyond SIOFA waters, being involved in risk-based approaches that take into account the impact of fisheries across a broad geographic area would be appropriate. Recommend sharing SIOFA data with broad risk assessments of fisheries impact on ETP species.

Core elements of Management Procedures (p31)

This section mentions the identification of indicators that measure performance against management objectives, these should also monitor trends within the fishery and be presented to the Scientific Committee with stock assessment results for broader context and understanding of the fishery. These indicators can track climatic changes, or trends in the fishery. These indicators could include: relevant and available environmental statistics, growth rates, recruitment metrics, and smaller spatial scale trends in CPUE within the fishery.

4.3 Recommendations

Recommend that during the drafting of the Conservation Management Measure that careful consideration is given to how the CMM classifies fisheries into the Information Classification system, ensuring that future transitions between classifications are well defined. Noting that information available on a fishery may also degrade over time, and fisheries need to be re-classified appropriately, and therefore may move into lower information categories.

Recommend that the information classification system be reviewed periodically, as the standard for fisheries information and assessment approaches will shift within SIOFA over time.

Recommend that the Scientific Committee agree on data collection plans on a fishery-by-fishery basis and consistent or comparable analysis approaches across laboratories need to be implemented and consider how to resource the science related to these fisheries across SIOFA's Members.

Recommend that the Scientific Committee thoroughly determine the appropriate assumptions for undertaking forward projections, especially with regard to recruitment and climate conditions.

Recommend thorough model validation is undertaken for stock assessments presented to the Scientific Committee and standard diagnostics are developed.

Recommend that stock assessments be presented to the SIOFA Scientific Committee with a range of pre-agreed indicators tracking stock, environmental and fishery trends. These indicators will provide early warning of changes in the fishery, such as growth, recruitment, environmental conditions, spatial changes in effort and catch rates. Concerning trends in these indicators should be considered in break out rules for the management of these fisheries.

5. PAM-2014-01 – Development of a SIOFA Precautionary Approach Framework – Technical Guidelines

5.1 Overview

The technical guidelines provided in Robertson & Holmes (2025b) provides a strong approach for operational implementation of the SIOFA Precautionary Approach.

My specific comments on the Technical Guidelines detail some points of clarification largely.

Further recommendations here include that the Reclassification Triggers be broadened to include triggers for when fisheries may be considered to drop to lower information classifications, and that feature-based CPUE is monitored for fisheries that target feature based spawning aggregations such as orange roughy.

5.2 Specific Comments

Information Content Depends on Multiple Factors (p11)

'Systematic Collection' refers to regular, systematic data collection. This process needs to also consider how samples are collected, transported to labs and analysed by the labs, across multiple fishing nations and likely multiple Members undertaking science programmes. Issues have been seen in other similar jurisdictions, for example, challenges with shipping scientific samples across borders and establishing consistent and robust methods for otolith preparations and reading.

Principles for Borderline Cases (p12)

'All Four Stock-Specific Elements Are Required' refers to fleet composition, it may be helpful to clarify if this relates just in relation to methods or nations, or is this trying to capture effort creep in fishing ability?

'Ecosystem Context Distinguishes Medium From Low' (p13)

This concept of a basic understanding of habitat requirements and ecosystem roles being expected for Medium information stocks is an important consideration as some fishery managers may overlook the ecosystem context in which the fishery exists.

Reclassification triggers (p14)

This reclassification needs to consider movements of fisheries both up and down the information classification system, as data collection efforts may fail over time, or standards for these classifications may increase over time.

Classification process

Step 1 (p21) – could include the establishment of suitable indicators for the stock and relevant environment conditions.

Step 5 (p22) – the Scientific Committee should document the stock and ecosystem indicators and include any trends in spatial CPUE.

Graduated Management Response (p28)

I welcome the graduated management response as described here, and these approaches will be tested in more detail in the PAM-2024-03 project.

'Table 6, Potential Management Objectives' (p48-49)

I believe that including indicators may also broaden the range of potential management objectives, such as 'Maintain x% of established indicators within an acceptable range', or 'Maintain finer spatial scale CPUE trends within agreed range'.

'SIOFA application of the Empirical CPUE-Based HCR' (p52)

While ORH fisheries tend to have hyperstable CPUE, it is important to monitor fisher behaviour as they may move to target ORH away from the seamounts if spawning aggregations.

5.3 Recommendations

Recommend that the Reclassification Triggers be broadened to include triggers for when fisheries may be considered to drop to lower information classifications.

Recommend that feature-based CPUE is monitored for fisheries that target feature based spawning aggregations such as ORH.

6. PAM-2024-02 - Determination of Biological Reference Points (BRPs) for key SIOFA fish stocks

6.1 Overview

The development of Biological Reference Points (BRPs) for key fish stocks in SIOFA was presented by Hoyle & Mormede (2025), this report presents a robust analysis of the options for suitable biological reference points. Relatively minor specific comments are provided below (section 5.2).

The section about Management Performance Indicators (p57) aligns well with my recommendation, first made under PAM-2024-01, that such indicators need to be considered to provide more context to the SIOFA Meeting of Parties about the state of the fishery beyond a potentially overly distilled biomass indicator. Indicators of stock, environmental and fishery trends can provide an early warning to changes that may not become evident in stock assessments immediately.

6.2 Specific Comments

Recommendation for 30% B_0 LRP for species that are less productive, particularly long lived… (p15)

While I agree with this approach it would be useful to consider what is the cut-off for determining whether a species is long-lived enough or if its productivity is low enough that it warrants a higher LRP than the default.

RFMO comparison (p21)

Noting that CCAMLR isn't officially a RFMO, perhaps rename this to RFB/RFMO. (Regional Fishery Body). It may also be good to include the probabilities for each of the reference points listed. They are included later in the document.

Common theme and best practices (p23)

I note that many national jurisdictions also are affected by data limitations to various degrees across their fisheries.

Management Performance Indicators (p57)

This concept aligns well with recommendations I made under the review of PAM-2014-01 reports. However, I consider it would be worthwhile elevating the importance of the Scientific Committee monitoring these indicators regularly, both with a new assessment and in between assessments in order to monitor for concerning trends in the data from the fishery.

Evaluation requirements (p59)

Finer scale spatial trends in CPUE should be monitored, this may indicate localised depletion, exploration of new grounds, or dispersal of spawning aggregations. These indicators may warrant a break out rule approach to fishery management approach as the stock assessment will apply to a broader area.

6.3 Recommendations

Recommend that future work explore the rationale and cutoffs for the changes in target and limit reference points suggested in the paper.

Recommend that finer scale trends in CPUE be monitored by the SIOFA Scientific Committee to detect changes in local abundance, exploration of new grounds, or dispersal of spawning aggregations.

7. PAM-2024-03 – Development of harvest strategies for key SIOFA fish stocks

7.1 Overview

The development of the harvest strategies for key SIOFA fish stocks (Mormede & Hoyle 2025) provides a robust analysis of the various harvest strategies that could be implemented for the fisheries with higher levels of information. Although I dd note that the limit reference point for orange roughy did not match the recommended value from PAM-2024-02 (Hoyle & Mormede 2025).

I found the analysis of the various harvest control rules to be robust and thorough. Intuitively I prefer the modified hockey stick approach (Rule 2) although simulations described in this paper indicated the more conservative Rule 1 was more appropriate. Rule 2 allows for some fluctuation around the target but also a higher level of exploitation below the limit reference point. Perhaps another modification to the hockey stick that allow the shoulder just below the target, but with exploitation set at zero below the limit reference point might be a logical compromise.

7.2 Specific Comments

<u>Section 4.3.1 Estimating potential value for target fishing mortality for orange roughy (p17)</u>

In line 507 and 531 it mentions that the simulation was undertaken with the LRP set at 20% which is at odds with the recommendation in PAM-2024-02 (mentioned above). It seems likely that increasing the LRP in the simulation will have a significant impact on the outcomes.

<u>Section 4.4.1 Investigating alfonsino length data (p23)</u>

The issues with data collection between fishing nations, and also the sporadic nature of data that can occur when sampling from developing or small fisheries. Spatial considerations of fishing patterns and fish distributions are also relevant. This fishery may benefit from the implementation of

a structured fishing or research approach to ensure consistent data is collected in a systematic manner across the fishing grounds to better understand the fish population.

High information stocks (p30)

While the paper describes model misspecification especially of natural mortality as a risk in considering the ORH fishery. There is also the need to monitor spatial CPUE and fishing patterns for evidence of serial depletion or change in fish aggregation behaviour as a result of disturbance of fishing on spawning aggregations. SIOFA consider effort or other limits to prevent undue disturbance on a feature basis.

7.3 Recommendations

Recommend rerunning the ORH simulations in future with 30% B_0 as the LRP.

Recommend developing a structured, or research, fishing approach in the alfonsino fishery to improve the data quality across the fishing grounds.

8. Summary of recommendations

While there is a broader list of recommendations listed in sections 3.3, 4.3, 5.3 and 6.3, the major recommendations from this review are:

R1: Recommend that during the drafting of a Conservation Management Measure on Harvest Strategies that careful consideration is given to how the CMM classifies fisheries into the Information Classification system, ensuring that future transitions between classifications are well defined. Noting that information available on a fishery may also degrade over time, and fisheries need to be re-classified appropriately, and therefore may move into lower information categories.

R2: Recommend that the information classification system be reviewed periodically, as the standard for fisheries information and assessment approaches will shift within SIOFA over time.

R3: Recommend that the Scientific Committee agree on data collection plans on a fishery-by-fishery basis and consistent or comparable analysis approaches across laboratories need to be implemented and consider how to resource the science related to these fisheries across SIOFA's Members.

R4: Recommend that the Scientific Committee thoroughly determine the appropriate assumptions for undertaking forward projections, especially with regard to recruitment and climate conditions.

R5: Recommend thorough model validation is undertaken for stock assessments presented to the Scientific Committee and standard diagnostics are developed.

R6: Recommend that stock assessments be presented to the SIOFA Scientific Committee with a range of pre-agreed indicators tracking stock, environmental and fishery trends. These indicators will provide early warning of changes in the fishery, such as growth, recruitment, environmental conditions, spatial changes in effort and catch rates. Concerning trends in these indicators should be considered in break out rules for the management of these fisheries.

R7: Recommend that future work explore the rationale and cutoffs for the changes in target and limit reference points suggested by PAM-2024-02 (Hoyle & Mormede 2025).

R8: Recommend that finer scale trends in CPUE be monitored by the SIOFA Scientific Committee to detect changes in local abundance, exploration of new grounds, or dispersal of spawning aggregations.

R9: Recommend rerunning the ORH simulations in future with 30% B_0 as the LRP.

R10: Recommend developing a structured, or research, fishing approach in the alfonsino fishery to improve the data quality across the fishing grounds.

9. References

Hoyle, S., Mormede, S. (2025) Determination of Biological Reference Points (BRPs) for key SIOFA fish stocks (PAM-2024-02) Draft SIOFA report.

Mormede, S., Hoyle, S., (2025) Development of harvest strategies for key SIOFA fish stocks (PAM-2024-03) Draft SIOFA report.

NSW Department of Primary Industries (2022) NSW Lobster Fishery Harvest Strategy. Available at NSW Lobster Fishery Harvest Strategy

Robertson, K., Holmes, G., (2025a) Development of a SIOFA Precautionary Approach Framework (PAM-2024-01) – Conceptual framework. Draft SIOFA report.

Robertson, K., Holmes, G., (2025b) Development of a SIOFA Precautionary Approach Framework (PAM-2024-01) – Technical guidelines. Draft SIOFA report.

SIOFA Secretariat (2024). SIOFA Precautionary Approach and Management (SIOFA-PAM) Grant Agreement information https://siofa.org/node/3912.

SIOFA Secretariat (2025a). Convener's Report of the Southern Indian Ocean Fisheries Agreement (SIOFA) Scientific Committee (SC) Workshop to progress the SIOFA Precautionary Approach and Management Projects (WS2025-PAM), 3 February 2025. Virtual: Southern Indian Ocean Fisheries Agreement (SIOFA).

SIOFA Secretariat (2025b). Convener's Report of the Southern Indian Ocean Fisheries Agreement (SIOFA) Workshop to progress the Precautionary Approach and Management Projects (WS2025-PAM2), 6 August 2025. Virtual: Southern Indian Ocean Fisheries Agreement (SIOFA).

SIOFA Secretariat (2025c). Convener's Report of the Third Southern Indian Ocean Fisheries Agreement (SIOFA) Scientific Committee (SC) Workshop to progress the SIOFA Precautionary Approach and Management Projects (WS2025-PAM3). Virtual: Southern Indian Ocean Fisheries Agreement (SIOFA).

SIOFA Secretariat (2026). Report of the Southern Indian Ocean Fisheries Agreement (SIOFA) Third Joint MoP-SC Workshop on the Development of Harvest Strategies (WS2025-HSS) Virtual 17 December 2025.

10. Appendix I: Project Terms of Reference

Project title: Expert Review Panel for the Development of the SIOFA Precautionary Approach and Management Projects

Project Code: PAM-2024-04

Terms of Reference

1. Introduction

The SIOFA Precautionary Approach and Management (SIOFA-PAM) programme will further enhance the scientific advice of the SIOFA Scientific Committee (SC) for the SIOFA Meeting of the Parties (MoP), in particular towards ensuring the sustainable management of fish stocks and the environmental impacts associated with fishing.

The SIOFA-PAM programme has three main projects that focus on the development of a framework to ensure the sustainable management of fish stocks and managing the environmental impacts associated with fishing activities within the SIOFA Area. These aim to guide, inform, and enhance resource protection and to improve sustainable resource management measures, especially in the context of the information-limited fisheries. A fourth project provides for expert review and advice across the three main projects.

The specific projects of SIOFA-PAM are to:

PAM-2024-01: Develop the SIOFA Precautionary Approach Framework. This project involves establishing a framework for high, medium, and lower information stocks to apply the precautionary approach within the SIOFA Area. This framework will provide guidelines and principles to help ensure that fisheries management decisions are made in a precautionary manner using the best scientific evidence available, consistent with the Objectives (Article 2) and General Principles (Article 4) of the SIOFA Agreement (SIOFA, 2006).

PAM-2024-02: Determine Biological Reference Points (BRPs) for key SIOFA fish stocks. This project focuses on developing and scientifically evaluating BRPs for the key fish stocks within the SIOFA Area, based on the best available scientific data and methods.

PAM-2024-03: Develop harvest strategies for key SIOFA fish stocks. Building upon previous workshops and ongoing efforts by the SC and MoP, this project aims to develop formal harvest strategies for key fish stocks.

PAM-2024-04: Expert Review Panel for the Development of the SIOFA Precautionary Approach and Management. Provide external expert review and advice to the project teams and SC for the work and outcomes of the three main projects.

Collectively, these projects will provide the SC with the information required for it to advise the MoP on management approaches and actions to achieve sustainable exploitation rates while considering socio-economic factors and ecosystem impacts.

This project (PAM-2024-04) is for an Expert Panel who will provide external expert review and advice on the work and outcomes of the three main projects: PAM-2024-01 (Development of the SIOFA Precautionary Approach Framework), PAM-2024-02 (Determination of Biological Reference Points for key SIOFA fish stocks), and PAM-2024-03 (Development of Harvest Strategies for key SIOFA fish stocks).

The Expert Panel will consist of up to three scientific experts, each with specialist expertise in at least two of the PAM-2024-1, PAM-2024-02, and PAM-2024-03 projects. The panel will be formed from qualified applicants to ensure adequate coverage of the scientific methods and approaches across all projects.

2. Methods

As a part of the PAM-2024-01, PAM-2024-02, and PAM-2024-03 projects, the project teams will be required to present preliminary methods, draft reports and final reports for review to the Expert Panel (this project) and the project Advisory Panels (composed by members of the SC and the Secretariat), before presenting to project workshops and the SC.

The Expert Panel will be tasked with providing an external expert review, by providing verbal and written recommendations including feedback on methods and interpretation of results to the project Advisory Groups and the SC over the life of those projects.

3. Project objectives

1. Review the progress and outputs of projects PAM-2024-01, PAM-2024-02, and PAM-2024-03.
2. Provide expert advice to the consultants of projects PAM-2024-01, PAM-2024-02 and PAM-2024-03 to assist them in developing their project outputs and expert scientific review for each of these projects.

4. Relevant SIOFA information

SIOFA data (provided by the Secretariat upon request)

Terms of Reference for the provision of scientific services to SC for projects PAM-2024-01, PAM-2024-02, and PAM-2024-03.

Preliminary and final reports and presentations for projects PAM-2024-01, PAM-2024-02, and PAM-2024-03.

SIOFA spatial data layers. Available at: https://github.com/SIOFASecretariat/SIOFA_SC_Spatial_layers

SIOFA reporting templates. Available at: https://github.com/SIOFASecretariat/SIOFA_Reporting_templates

SIOFA reports:

- SIOFA SC, SC Working Groups and workshops, and National Reports. Scientific Committee Meeting | SIOFA (https://siofa.org/)
- SIOFA MoP reports. Meeting of the Parties | SIOFA (https://siofa.org/)
- SIOFA technical and scientific reports (public reports and abstracts of restricted reports are available from https://siofa.org/, and full restricted reports will be made available by the SIOFA Secretariat to the project consultant upon request and after the approval of relevant CCPs.

5. Key project indicators

1. Follow the project timeline as detailed in this agreement, including the submission of deliverables.
2. Collect any necessary data as early as possible, e.g. by submitting a data request to the Secretariat.
3. Attend the project initialisation meeting with the project consultants of the PAM projects and their Advisory Panels (composed by members of the SC and the Secretariat) to discuss the project setup and development. Further engage, as requested, to provide advice on relevant analyses or data interpretation for the project.
4. Provide verbal and written reviews and advice of any preliminary and final presentations and reports, as well as at any interim project meetings, to the project consultants of PAM projects and the projects Advisory Panels, and review any revised any project outputs based on that review.
5. Appropriately acknowledge the project funding source (i.e. the EU), with appropriate corresponding logos in prominent positions, within any project deliverables (logos available at https://github.com/SIOFASecretariat/SIOFA_Reporting_templates/tree/main/SC%20reports/EU%20logos).
6. Take into reasonable account the outcomes of the reviews and comments made by meeting participants when providing any written or verbal comments.

6. Deliverables

1. Attend (virtually) the project Advisory Panel meetings for the PAM projects and provide expert scientific advice and commentary on work deliverables under each project.
2. Attend (virtually) the SIOFA-PAM project workshops (virtual) to be organized during the SIOFA-PAM project timeline (tentatively Jan/Feb 2025 and Nov/Dec 2025) and provide expert commentary.
3. Attend (virtually) the presentation of methods and results of PAM projects to the SC annual meetings (March 2025 and March 2026) and provide expert scientific advice and commentary to these meetings on aspects of discussion related to the outputs of PAM projects.
4. A Draft Reviewers Report that addresses the draft outcomes of PAM projects. The report should follow the guidelines and format available at https://github.com/SIOFASecretariat/SIOFA_Reporting_templates. In particular, the report should include a concise (max 300 words) summary, and should detail the review, conclusions, and concise recommendations. The Draft Reviewers Report will also be submitted to the SC.
5. A Final Reviewers Report that follows the guidelines and format available at https://github.com/SIOFASecretariat/SIOFA_Reporting_templates and includes any final review comments on the Final Report of PAM-2024 projects. The Final Reviewers Report will also be submitted to the SC.
6. Provide all the information collected to the Secretariat (including that sourced from the Secretariat) before the final payment of the contract. Such information includes electronic data files, analysis codes, biological samples, and other relevant data if applicable.

Presentations of reports to the Scientific Committee may be given virtually and travel to the meetings is not obligatory. All project meetings will take place virtually. No additional travel costs will be paid.

7. Acceptance of Draft and Final Reports

1. Draft and Final Review Reports must be submitted in English to the Project Coordinator at the SIOFA Secretariat.
2. Draft and Final Review Reports will be reviewed using the procedures outlined in paper MOP-09-12 (Annex B), see also:

https://github.com/SIOFASecretariat/SIOFA_Reporting_templates/tree/main/SC%20reports/Review%20template%20for%20consultant%20reports.

3. Payment of contracts milestones will be subject to acceptance of the submitted reports by SIOFA.

8. Intellectual Property clause and confidentiality

The Consultant shall submit all the information collected to the SIOFA Secretariat (including that sourced from the Secretariat) before the final payment of the contract is made to the consultant.

Such information includes electronic data files, analysis codes, biological samples, and other relevant data if applicable. Any arrangements for ownership, storage, or disposal of physical samples shall be agreed by SIOFA as a part of the contract. All Intellectual Property generated as a part of this contract shall become the property of SIOFA unless otherwise excluded in the proposal and agreed by SIOFA in the contract.

The Consultant shall not release confidential data provided for conducting this study to any persons nor any organizations, other than SIOFA Secretariat.

The Consultant shall delete all the confidential data upon the completion of the contract.

9. Work timeline and payment schedule

The funds for this project, budgeted under the SIOFA-PAM EU Grant (https://siofa.org/eu-grants), allow for a maximum total budget of 30,000 Euro (including all costs and any travel related expenses) for up to three expert review consultants (funds will be allocated according to the number of consultants appointed).

The consultants shall follow the timeline described in Table 1 below.

Table 1: Timeline for payments, milestones, and report submission

Milestone	Date	Activities
Initiation of contract	30 September 2024	First instalment payment (30% of the total contract sum)
Delivery of draft reviewer report	31 January 2026	Second instalment payment (30% of the total contract sum) upon satisfactorily submission of draft reviewer report, in a format suitable for submission to SC, to the Project Coordinator.
Delivery of final reviewer report	30 April 2026	Submission of final reviewer report in a format suitable for submission to SC and submission of all project information to the project coordinator. Final instalment payment (40% of the total contract sum) on acceptance of the final reviewer

Milestone	Date	Activities
		report by the advisory panel and the final submission of project information

10. Submission of applications

11. A current CV that summarises the applicant(s) relevant educational background and professional experience.
12. A brief letter (indicatively 1-2 page) outlining the consultants relevant experience and scientific background that is relevant to the three project and the qualifications for being on the expert panel.
13. Any proposed exclusions to the intellectual property clause or variations to the work timeline and payment schedule.
14. The proposed consultancy price (including all consultant expenses and project related costs), noting that the available budget for this work indicated in Section 3.
15. Identification of any project risks and associated mitigation and management required to successfully complete the project.
16. A statement that identifies any perceived, potential, or actual conflicts of interest of the applicant(s), including those described in paragraph 4 of the SIOFA recruitment procedure (see Section 12), and

Any additional relevant information the applicant(s) wish to submit.

The applicants must have appropriate experience and knowledge of similar work in their portfolio.

The consultants for the Expert Panel must be independent of the consultants and organisations undertaking the work in Projects PAM-2024-01, PAM-2024-02, and PAM-2024-03. Once the consultants for those projects have been appointed, we may contact you for additional information on potential conflicts of interest before confirming the Expert Panel.

Applications must be submitted to the SIOFA Science Officer Marco Milardi (marco.milardi@siofa.org, CC secretariat@siofa.org). Only those applications received before 12:00 PM (9:00 AM UTC) on Sunday the 8th of September 2024, Reunion Island time, will be considered.

17. Evaluation criteria for the selection of candidates

An evaluation panel, the SIOFA Secretariat, and the Chair and Vice-Chair of the SIOFA Scientific Committee will select one successful applicant for this contract. The selection criteria will include the following:

1. Adequate submission of information to allow the panel to evaluate the candidate
2. Evaluation of the proposal from the candidate, including the proposed contract price
3. Ability to undertake and complete the analyses or work required in this ToR
4. The candidate's agreement with confidentiality provisions required for the project
5. Acceptable conflict of interest statement
6. Agreement with the data submission and intellectual property terms required in this ToR, and
7. Financial and resourcing considerations.

18. Conflicts of interest. Paragraph 4 of SIOFA's Recruitment Procedure

To ensure that situations relating to potential and actual conflict of interests are avoided, persons falling into the following categories may not normally be considered for SIOFA consultancy: (i). any person designated as a designated representative or alternate representative of a CCP to the Meeting of Parties (MOP) as per Rule 3.1 of the Rules of Procedure, and to the SC and any other subsidiary bodies of the MOP, as per Rule 21.3 of the Rules of Procedure; (ii). Any person fulfilling the function of Chair or Vice-Chair of the MOP or Chair or Vice-Chair of a SIOFA subsidiary body or working group; (iii). Any person acting as a member of a delegation involved in the SIOFA decision-making process resulting in recommendations and/or approval for the SIOFA work requiring the engagement of a consultant; and (iv). Individuals who were SIOFA Secretariat staff members at the time when the recommendations and/or approval for the SIOFA works were adopted or who are members of immediate family (e.g., spouse or partner, father, mother, son, daughter, brother, or sister) of any Secretariat staff member or of the persons identified in 4 (i), (ii), and (iii).

19. Contacts

Project Coordinator – SIOFA Science Officer (Marco Milardi, marco.milardi@siofa.org)

Administration – SIOFA Executive Secretary (Thierry Clot, thierry.clot@siofa.org)

20. References

Terms of Reference for the provision of scientific services to SIOFA Scientific Committee for projects:

PAM-2024-01 Development of the SIOFA Precautionary Approach Framework (PAF) (https://siofa.org/science/sc-works/PAM-2024-01)

PAM-2024-02 Determine Biological Reference Points (BRPs) for key SIOFA fish stocks

(https://siofa.org/science/sc-works/PAM-2024-02)

PAM-2024-03 Develop harvest strategies for key SIOFA fish stocks

(https://siofa.org/science/sc-works/PAM-2024-03)