
SUSTAINABLE FISHERIES MANAGEMENT IN THE FACE OF CLIMATE CHANGE
Submission to the 17th round of informal consultations of States Parties to the Agreement (ICSP-17)

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Prepared by the WCPFC Secretariat

I. Background

1. This document outlines the discussion and initiatives of the Western and Central Pacific Fisheries Commission (WCPFC) concerning the topic "Sustainable Fisheries Management in the Face of Climate Change." It provides an overview of WCPFC's activities in addressing climate change, covering its historical perspective and the latest developments from WCPFC meetings. Additionally, it explores the Commission's experiences in sustainable fisheries management, highlighting key learnings, best practices, and prevailing challenges. It emphasizes the need to strengthen ways to manage fisheries sustainably, considering climate change, and with a specific focus on the obstacles encountered by developing states.

History of WCPFC activities in response to climate change

2. The need for research on the issue of climate change and its associated ecosystem indicators was raised in the early stages of the WCPFC's Scientific Committee (SC) deliberations. At SC4 in 2008 ([EB-WP-10](#)), a Spatial Ecosystem and Population Dynamics Model ([SEAPODYM](#)) was introduced and updated annually. SEAPODYM provides a unique framework for spatially and temporally resolved scientific investigation into the plausible future abundance and distribution scenarios of tuna (skipjack, bigeye, yellowfin, and albacore), and includes key population dynamics processes (i.e., spawning, movement, mortality)¹. The model was considered a useful tool for assessing short to long-term fine-scale spatial effects on tuna stocks as well as large-scale climate effects. It was also considered an important tool for future stock assessment as well as a tool to investigate the potential effects of greenhouse gas emissions (climate change) on tuna population abundance and distribution.

3. At SC10 (2014), a scientific peer review² of SEAPODYM was requested to assist with guiding the WCPFC in evaluating potential model applications and its future work program. In 2015, SC11 had an intensive discussion on the scope of work related to developing ecosystem indicators for possible incorporation into management objectives. SC requested the Commission provide guidance on whether it would like the SC to move forward with the further development of ecosystem indicators for possible incorporation in the Commission's Management Options Workshop (MOW) process, building on the work of other international

¹ [SC16-EB-IP-06 Review of SEAPODYM, including recent developments and as an ecosystem model for tropical tunas and important bycatch species in the Western Pacific Ocean](#)

² [SC10 Summary Report](#), paragraph 593

fisheries. However, no decision was taken by WCPFC12 that year on an appropriate way forward.

4. In 2016, SC12 reviewed the scientific services provider (SSP³) paper [SC12-EB-WP-02](#) (Ecosystem indicators: moving forward to design and testing) and the results of the review of SEAPODYM ([SC12-EB-IP-14](#)), and for the latter recommended WCPFC13 endorse the results of that review. WCPFC13 subsequently adopted SC12's recommendation as follows (Paragraph 659, SC12 Summary Report):

SEAPODYM has the potential to be a useful complementary model to MULTIFAN-CL for MSE work that includes spatial management. Similarly, the capacity of SEAPODYM to include alternate oceanographic states (e.g., ENSO phases and climate change projections) would allow climate proofing (reducing risks and capitalizing on opportunities presented by climate change) to be a consideration in the MSE work undertaken by WCPFC.

5. At SC15 in 2019, climate change issues were first considered in the process of developing a harvest strategy framework. When SC15 reviewed information on the outputs for the WCPO skipjack harvest strategy and the work undertaken to test candidate management procedures (MPs) based upon the latest Management Strategy Evaluation (MSE) framework ([SC15-MI-WP-05](#)), SC15 noted that work is progressing on identifying specific El Niño and La Niña distribution models so that non-stationary movement can be estimated and help account for possible climate change-related impacts.

6. At WCPFC16 in 2019, the Commission held discussions on the implications of climate change for regional tuna stocks, including long-term impacts of climate change that continue to suggest overall negative impacts on skipjack, yellowfin, and bigeye tuna in the WCPO. After extensive discussion, the Commission adopted [Resolution 2019-01 on Climate Change as it Relates to the Western and Central Pacific Fisheries Commission](#), which recognized the need for further work to understand the potential impacts of climate change and the relationship between climate change and fishing activities. Under Resolution 2019-01, the Commission resolved to:

- a. Consider the potential impacts of climate change on highly migratory fish stocks in the Convention Area and any related impacts on the economies of CCMs⁴ and food security and livelihoods of their people, in particular Small Island Developing States and Participating Territories.
- b. Support further development of science on the relationship between climate change and target stocks, non-target species, and species belonging to the same ecosystem or dependent on or associated with the target stocks, as well as interrelationships with other factors that affect these stocks and species and estimates of the associated uncertainties.
- c. Take into account in its deliberations, including in the development of conservation and management measures, scientific information available from the Scientific Committee on the potential impacts of climate change on target stocks, non-target species, and species belonging to the same ecosystem or dependent on or associated with the target stocks.

³ The WCPFC Scientific Services Provider (SSP) is the Pacific Community (SPC)

⁴ CCMs – members, cooperating non-members and participating territories

- d. Consider how climate change and fishing activities may be related and address any potential impacts in a manner consistent with the Convention.
- e. Consider options to reduce the environmental impacts of the Commission related to headquarters operation and meetings of the Commission and its subsidiary bodies.

7. In 2022, SC18 recommended making “Ecosystem and Climate Indicators” a standing agenda item of the Ecosystem and Bycatch Mitigation Theme session at SC. This would provide a mechanism for the Scientific Committee to annually consider adopting candidate indicators presented to the Committee but also review and respond to existing trends/triggers identified in adopted indicators. SC18 also recommended the development and testing of “Ecosystem and Climate Indicators” as a project of the Scientific Committee. The establishment of a project is intended to ensure there is a mechanism for the Scientific Committee to track its progress toward evaluating and adopting candidate indicators. Another recommendation includes that available information and updates on the impacts of climate change be included or combined with the status of stock reporting.

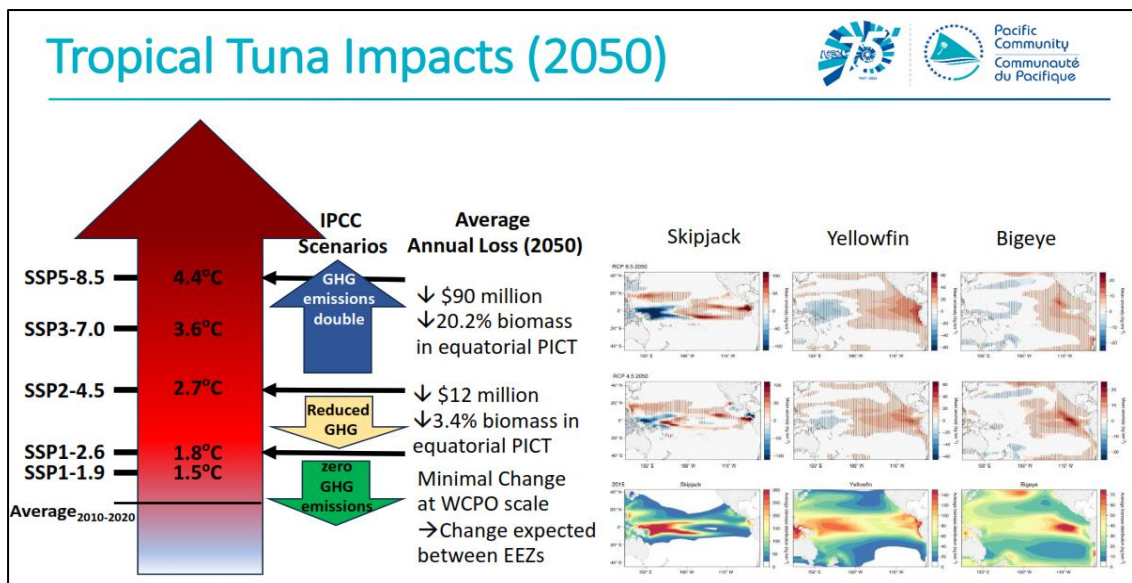


Figure 1. Five Intergovernmental Panel on Climate Change scenarios and the predicted potential effects, using the SEAPODYM model on the future biomass (Red = more biomass and Blue = less biomass) of tuna stocks in the WCPO. (Source: SPC. 2023)

8. Figure 1 illustrates the results of analyses evaluating potential impact on future tuna stock biomass from the five Intergovernmental Panel on Climate Change scenarios. It shows that tuna biomass particularly for skipjack and yellowfin will decrease in the Western and Central Pacific Ocean (WCPO). These predicted potential impacts of tuna stock biomass were initial results provided through SPC’s SEAPODYM analyses. SPC’s work will be progressed and supported through the second phase of the Common Oceans Tuna Project (FAO).

9. The climate change discussions as they relate to a harvest strategy framework continued within SC, and WCPFC19 adopted SC18’s recommendation in 2022 to provisionally adopt the robustness set of operating models (OM) used to test candidate harvest strategies, as listed in Table 1 of SC18-MI-WP-01. SC18 also discussed expanding this set of OMs to include additional uncertainties, including likely changes on skipjack productivity due to the impacts of climate change, and a lower productivity (lower recruitment) ‘stress test’. This further work is an integral part of the MSE and was provided to SC19 (SC19-MI-IP-01).

Accordingly, at SC19, the climate change scenarios (robust set), in particular the effects of warm pool expansion in the WCPO, were reflected in the *WCPO skipjack management procedure monitoring report* ([Attachment 3, SC19 Outcomes Document](#)). This requires further analysis of the SEAPODYM outputs and this work may occur over an extended timeframe.

10. At WCPFC19 in 2022, the Commission agreed that climate change will be a standing agenda item of the Commission and its subsidiary bodies (SC, NC⁵, TCC⁶) and to prioritize discussion of how best to incorporate climate change information and analyses into the Commission's work. Accordingly in 2023, the NC19, SC19, and TCC19 included climate change considerations within the meeting agendas.

11. SC19 in 2023 reviewed South Pacific albacore operating models provided by WCPFC's scientific services provider within [SC19-MI-WP-04](#) (*Selecting and Conditioning Operating Models for South Pacific Albacore*), which focuses on outlining important sources of uncertainty that should be considered when conditioning operating models for the south Pacific albacore management procedure. Several CCMs noted the importance of considering expanded areas of uncertainty as part of the robustness set and proposed, at this stage, that these include scenarios of climate change.

WCPFC Updates on 2023 activities

Scientific Committee Outcomes⁷

12. WCPFC reviewed [SC19-EB-WP-01](#) (*Ecosystem and Climate Indicators*), which updated WCPFC on progress regarding the development of the candidate ecosystem and climate indicators for the WCPO. This paper addressed SC18's recommendation on the request of developing and testing of "Ecosystem and Climate Indicators" as a project of the Scientific Committee for the period 2024-2027. WCPFC members supported SPC's proposed work plan in the paper for the development and testing of ecosystem and climate indicators for the period 2024-2027. SPC is convening an expert workshop in 2024 for technical analyses to develop and test candidate indicators and for the development of tools for communication with WCPFC and wider stakeholders.

13. WCPFC noted that the SSP has completed a first screening of a subset of potential indicators for adoption and based on this experience recommended that the criteria identified at SC12 are appropriate for the initial screening of candidate indicators ([Attachment 1](#))⁸. However, more specific criteria are needed for testing and adoption.

14. WCPFC recommended the adoption of the proposed work plan for the development and testing of ecosystem and climate indicators for the period 2024-2027 as contained in [SC19-EB-WP-01](#) (*Ecosystem and Climate Indicators*) which was later adopted in December 2023.

⁵ NC – Northern Committee

⁶ TCC – Technical and Compliance Committee

⁷ See [SC19 Outcomes Document](#), paragraphs 203-204.

⁸ The rationale and potential design and testing criteria for ecosystem indicators are in Annex 1 and the subset of potential indicators are in Annex 2 of [SC19-EB-WP-01](#). Annex 2 of the working paper was also tabled at TCC19 as [WCPFC-TCC19-2023-IP12](#).

Northern Committee Outcomes⁹

15. The WCPFC discussed ways to incorporate climate change information and analyses in its work, particularly on considering the impacts of climate change on northern stocks. The WCPFC expressed general agreement to incorporate climate change analysis into its discussions and to progress this work through engagement with other organizations to share information, learn from their experiences, raise awareness, and strengthen bonds through international collaboration. The NC Chair noted that tasking the International Scientific Committee for Tuna and Tuna-Like Species in the North Pacific Ocean (ISC) would not be sufficient, and more research and data collection efforts are necessary. The NC Chair added that more financial and human resources should be provided to the ISC.

Technical and Compliance Committee Outcomes¹⁰

16. WCPFC received updates from the SSP on the status of WCPO tuna stocks and climate change impacts. Two aspects of climate change were described – the El Niño Southern Oscillation (ENSO) cycle and global warming. ENSO was noted to have had a major effect on tuna fisheries, and the knowledge it provided about the responses of tuna stocks and tuna fisheries to both warming and cooling events contributed to the predictions that were being made about their likely responses to continued global warming. The SSP explained several scenarios and their potential effects on the biomass of tuna stocks. In summary, it was noted that climate change can impact a stable fishery and make stocks unhealthy even without a change in fishing effort. Work is still to be done on establishing harvest strategies to maintain stocks at desired levels and improving the health of some non-target species.

17. In the discussions, WCPFC recognized that there is increased importance for the Commission to ensure information and data collection to better understand the impacts of climate change and implications for the management of WCPFC fisheries. The Secretariat and some participants suggested that TCC could have a role in ensuring that the Commission can acquire the data to enable scientists in their work in understanding climate change impacts and to support managers who are charged with ensuring the conservation and sustainable use of WCPO fisheries and ecosystems. The TCC Chair noted that TCC is expected to have an ongoing role in monitoring activities, including in adaptive management, in the implementation of monitoring strategies under the harvest strategy approach, and in supporting the SC work to test climate change indicators.

18. WCPFC recommended that the TCC Chair and Secretariat consider how ongoing work on developing monitoring strategies for management procedures and SC19's recommendation to develop and test ecosystem and climate indicators would intersect with the work of TCC, including how these may be included in the TCC workplan. WCPFC also noted it would be beneficial to receive direction from the Commission on incorporating climate change discussions into its agenda.

WCPFC20 Outcomes¹¹

19. From the Commission's 2024 subsidiary body meetings, WCPFC20 agreed on updating the Ecosystem and Climate Indicator Report Card, and identification of co-leads to develop a

⁹ See [NC19 Summary Report](#), paragraphs 40-45.

¹⁰ See [TCC19 Summary Report](#), paragraphs 181-204.

¹¹ See [WCPFC20 Outcomes and Attachments](#), paragraphs 18-26.

workplan for addressing climate change on WCPFC fisheries in the Convention Area. Key details are discussed below.

20. The Commission noted with appreciation the Ecosystem and Climate Indicator Report Card (Attachment 1 of [WCPFC20-2023-12](#)). The Commission requested that the Ecosystem and Climate Indicator Report Card be updated and presented annually to the Commission and its subsidiary bodies.

21. The Commission recognized that there is an increased importance for the Commission to ensure relevant information and data collection is adequate to support improved and updated understanding by the Commission on the impacts of climate change and implications for the management of WCPFC fisheries. The Commission tasked SC and TCC to include as part of the standing agenda item on climate change a review of available data to inform the Commission on climate change impacts to stocks and ecosystems in the WCPO, and the potential effects of climate change on related fishing activities.

22. The Commission tasked the Secretariat with continuing to provide a brief that summarises updates on international and regional fishery bodies (RFB) developments.

23. The Commission requested the Secretariat with the SSP explore the scope and feasibility of undertaking an assessment of active CMMs and to determine specific CMM provisions that may be susceptible to be impacted by climate change, and present the findings to the Science Committee, the Technical and Compliance Committee and the Commission.

24. The Commission recommended co-leads are identified to develop a Commission workplan for addressing climate change on WCPFC fisheries in the Convention Area. The co-leads would use the [WCPFC Convention](#) and [Resolution 2019-01](#) as guides for that work. The draft workplan will be discussed and considered by each subsidiary body in 2024, to take this to WCPFC21 for consideration. The work plan will include, but not be limited to:

- a. the scoping and feasibility study of an assessment of CMMs and their susceptibility to be affected by climate change
- b. tasking for the SC to explore:
 - i. how to capture potential effects of climate change on WCPFC fisheries and fish stocks.
 - ii. mechanisms to test the robustness of existing and candidate management procedures under plausible climate change scenarios within the MSE framework.
- c. Engagement with other Regional Fisheries Management Organizations (RFMOs) and the Food and Agriculture Organization (FAO) and their members to discuss shared challenges, leverage available resources, and identify potential pathways for cooperation on addressing climate change effects on fisheries.

25. The co-leads on Climate Change will initially be one representative from the SIDS and one from the USA. The co-leads (RMI and the USA) seek to ensure the workplan addresses the risks of climate change to CMMs and other obligations, taking into account relevant Scientific Committee recommendations and the results of the scoping exercise regarding the assessment of active CMMs' susceptibility to being impacted by climate change.

26. In developing the Commission's Climate Change Work Plan, WCPFC20 requested that the co-leads work with members to incorporate ongoing efforts on climate change impact on fisheries from each of the subsidiary bodies and also provide a framework for coordinating Commission-wide work on climate change.

II. Experience in Sustainable Fisheries Management in the Face of Climate Change, including relation to:

a) Assessing the impacts of climate change on fisheries

27. In terms of assessing the impacts of climate change on WCPO fisheries, WCPFC's scientific services provider (SSP), the Pacific Community (SPC), conducts scientific analyses or assessments on what the Commission requires, and this would include monitoring of climate change impacts on fish stocks.

28. In 2021 Bell, J.D. et. al, published a paper titled: "Pathways to sustaining tuna-dependent Pacific Island economies during climate change". Based upon climate-scenario driven projections of tuna populations using the SEAPODYM tool, the paper detailed the climate-driven redistribution of tuna to the uncertain economies of Pacific Small Island Developing States (SIDS) and sustainable management of the world's largest tuna fisheries. The analysis includes Pacific SIDS' guidance on negotiations within the RFMO to maintain the current benefits they receive from tuna fisheries regardless of the effects of climate change on the distribution of tuna.

29. At WCPFC20 (2023), concerns about climate change's impact on tuna resources and management measures were raised by WCPFC members. Recognizing this as a priority, they highlighted the shifting patterns of tuna resources and their implications for various conservation and management measures (CMMs). Consequently, the Commission decided to undertake a study to assess the vulnerability of CMMs to climate change. This initiative involves tasking the Scientific Committee (SC) with exploring methods to evaluate the potential effects of climate change on WCPFC fisheries and fish stocks, as well as investigating mechanisms to test the resilience of existing and potential management procedures under realistic climate change scenarios within the Management Strategy Evaluation (MSE) framework.

30. Furthermore, it was acknowledged that collaboration with other Regional Fisheries Management Organizations (RFMOs), the Food and Agriculture Organization (FAO), and its members is beneficial. This collaborative approach aims to address shared challenges and leverage available resources effectively. By fostering cooperation, discussions on evaluating and mitigating the effects of climate change on fisheries can be facilitated, enabling the identification of cooperative solutions to tackle this pressing issue.

b) Addressing the impacts of climate change on fisheries

31. In 2019, WCPFC adopted [Resolution 2019-01: Resolution on Climate Change as it relates to the Western and Central Pacific Fisheries Commission](#). Since then, the Commission has implemented actions to reduce the environmental impacts of the Commission related to headquarters operations and meetings. These include:

- i. Use of solar panels in Commission headquarters.
- ii. Use of biodegradable utensils (e.g. cups, plates, spoons, forks) in meetings/functions.

- iii. Participants are reminded to bring their water bottles for use during the meetings.
- iv. Practice recycling (e.g. aluminum cans, etc).

32. Collaborating with other tRFMOs and organizations to share information and learn from their experiences, including participation in global meetings/workshops related to climate change, are highly encouraged.

33. The support of member countries is essential to progress scientific work of the Commission related to climate change and its impacts on fisheries and stocks.

c) Accounting for cumulative impacts

34. Accounting for cumulative impacts of climate change in fisheries involves consideration of the compounding effects of climate change on fish populations, marine ecosystems, and the fishing industry, including other stressors such as pollution, overfishing, and habitat destruction that affect fish stocks and livelihoods of those dependent on them. WCPO fisheries are particularly vulnerable to climate change due to the sensitivity of marine ecosystems to changes in temperature, ocean acidity, and circulation patterns.

35. One of the cumulative impacts of climate change that affects fisheries is the shift in fish distribution. As sea temperatures change, the distribution of fish species may shift towards cooler waters or move poleward or eastward or to deeper waters. This can affect the availability of certain species to fisheries and may require adjustments in fishing practices and management strategies. Based on the observations and predictions of the SSP, some of the near-term effects are as follows (Figure 2):

- a. La Nina Conditions (June 2020-2022)
 - i. Warmer water (warm pool) squeezed towards the west and deeper, sea surface temp cooler to the central and east WCPO.
 - ii. Concentration of skipjack (SKJ) and yellowfin (YFT) to western equatorial Pacific.
 - iii. Greater reliance on Fish Aggregating Device (FAD) sets in eastern WCPO.
- b. El Nino Conditions (Nov 2023-Jan 2024)
 - i. Warmer surface water temperatures will spread towards the east.
 - ii. SKJ and YFT will disperse further to the central and eastern equatorial Pacific.
 - iii. Spread of purse seine fishing toward the east.
 - iv. More free-school fishing in central/eastern WCPO.

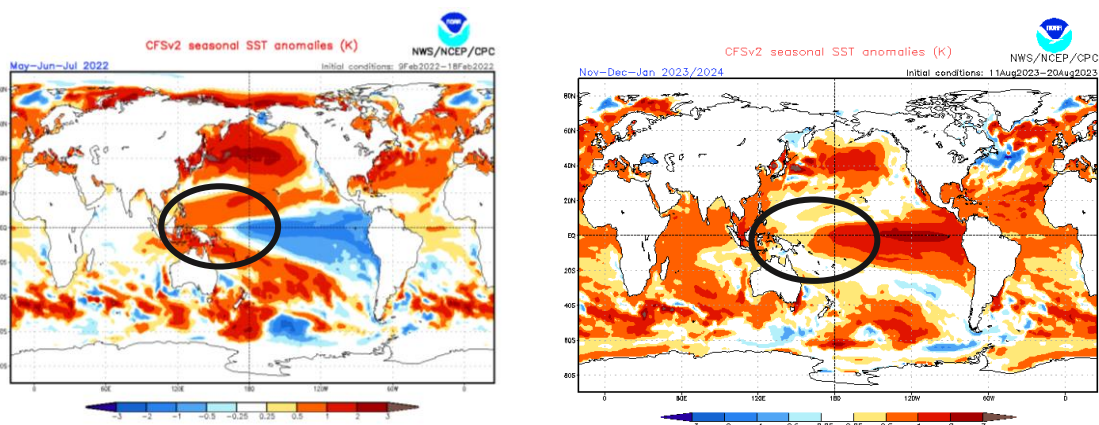


Figure 2. La Niña Conditions

El Niña Conditions

36. Climate change is also expected to increase the frequency and intensity of extreme weather events, such as storms and hurricanes, which can damage fishing infrastructure, disrupt fishing activities, and impact fish populations. WCPFC members have experienced increased severe weather disturbances such as strong and more frequent typhoons that affect fishing operations and destroy infrastructure (e.g. typhoon Haiyan).

37. Taking into consideration these cumulative impacts requires integrated approaches for both the direct and indirect effects of climate change on fisheries and incorporating this knowledge into fisheries management and conservation efforts. This may involve implementing adaptive management strategies, enhancing monitoring and research efforts, promoting precautionary and ecosystem-based approaches, and implementing a harvest strategy framework for fisheries management.

d) Application of an ecosystem approach and the precautionary approach in the face of climate change;

38. Ecosystem-based fisheries management is a holistic approach that recognizes all the interactions within an ecosystem rather than considering a single species or issue in isolation (NOAA). The precautionary approach to fisheries requires that all fishing activities be subject to prior review and authorization; that a management plan is in place that clearly specifies management objectives and how impacts of fishing are to be assessed, monitored, and addressed; and that specified interim management measures should apply to all fishing activities until a management plan is in place (FAO).

39. In WCPFC, the application of the precautionary approach and ecosystem approach is considered when CMMs are drafted, adopted, and implemented. As mentioned above in the recently concluded WCPFC20 meeting, it was agreed that the work plan for addressing climate change will encompass several key components. These include conducting a feasibility study to assess the susceptibility of conservation and management measures (CMMs) to climate change impacts and tasking the Scientific Committee (SC) to explore methods for evaluating the potential effects of climate change on WCPFC fisheries and fish stocks, as well as testing the resilience of management procedures under plausible climate change scenarios within the management strategy evaluation (MSE) framework.

40. Overall, integrating the ecosystem approach and the precautionary approach into climate change mitigation and adaptation strategies can help foster more sustainable and resilient ecosystems and societies in the face of environmental uncertainty and change.

e) Incorporating economic, social, and cultural aspects into sustainable fisheries management in the face of climate change;

41. Integrating economic, social, and cultural aspects into sustainable fisheries management is essential, particularly in the context of climate change. Climate change affects marine ecosystems, fish populations, and fishing communities in various ways, including shifts in species distribution, changes in ocean conditions, and increased frequency of extreme weather events. By considering these broader dimensions alongside ecological factors, fisheries management strategies can be more resilient, adaptive, and inclusive, ultimately contributing to the long-term sustainability of marine resources and the well-being of coastal communities.

42. In the WCPO, most of the tuna catches come from the EEZs of SIDS which are heavily reliant on their fisheries resources. Optimizing resource utilization, maximizing economic benefits, and minimizing costs associated with fishing operations including addressing issues such as food security, employment opportunities, and the resilience of coastal communities are some of the key considerations during Commission negotiations, particularly in the face of environmental challenges.

III. Lessons learned, best practices, and challenges in sustainable fisheries management in the face of climate change

43. As noted above, WCPFC Resolution 2019-01 has enabled WCPFC to implement actions to reduce the environmental impacts of the Commission's headquarters operations and meetings. WCPFC also recognized that support from members is essential to progress any scientific work of the Commission related to climate change and mitigate its impacts on WCPO fisheries and ecosystems including target and non-target stocks. In addition, collaboration with other tuna RFMOs (tRFMO) and organizations allows sharing of information and learning from their experiences, including through participation in global meetings/workshops related to climate change, whenever possible are helpful.

44. The adaptive management approach of the WCPFC, wherein environmental uncertainty and variability or factors that are linked to climate change are considered within the harvest strategy framework (consistent with CMM 2022-03) allows not only the trade-offs between sustainability, social and economic benefits and wider ecosystem considerations to be explicitly examined, and through testing against climate change impact scenarios can aid adoption of strategies that are robust to this issue, thereby contributing to the maintenance of stocks at target levels.

45. The 2023 FAO workshop on "Mainstreaming Climate Change into International Fisheries Governance - the Case of Regional Fisheries Bodies RFBs in the Indo-Pacific Region" which was attended by representatives from various regional fisheries bodies (RFB) identified the following as "good practices and lessons learned":

- Having a dedicated working group on climate change or adding climate change as a permanent agenda item.
- Stock assessment workshops incorporating climate change aspects and networks.
- Some existing CMMs that are regularly reviewed, giving a chance to assess and revise.
- Policy/Strategy that addresses climate change.
- MoUs that exist between RFBs to cooperate and share experiences.
- Projects with a focus on climate change.
- Cooperation between RFBs and Regional Seas Organizations.

IV. Actions needed to further strengthen sustainable fisheries management in the face of climate change, including addressing particular challenges faced by developing countries through capacity building in accordance with Part VII of the Agreement

46. Part VII of the UN Fish Stocks Agreement specifically addresses the need for capacity building in developing countries to support their efforts in promoting the long-term conservation and sustainable management of straddling and highly migratory fish stocks. Developing countries often face unique challenges in managing their fisheries resources along

with environmental uncertainties. These challenges may include limited financial resources, inadequate infrastructure, lack of technical expertise, governance issues, and vulnerability to the impacts of climate change. Addressing these challenges is important for ensuring the sustainable management of fisheries and the well-being of coastal communities in these countries.

47. It is also important to recognize that developing states, especially small island developing states (SIDS), often have minimal impact on climate change and contribution to greenhouse gas emissions. However, they are disproportionately threatened by its effects, such as intensified typhoons, coral bleaching, and more frequent and severe heat waves. These events jeopardize food security not only within these nations but also on a global scale, given that the WCPO region is the largest tuna producer worldwide and most of the tuna catches happen in the waters of developing states.

48. It should not be overemphasized that developing states in WCPO heavily rely on their tuna resources, and any disruptions would significantly impact their economies. Communicating this message, particularly in international forums, has proven to be challenging for developing countries, amidst the shared experience of climate change impacts worldwide. It is hoped that in the future, greater attention will be directed towards this challenge in international forums, particularly by developed countries, to help mitigate the impacts of climate change faced by developing states, particularly SIDS.

49. Article 30 of the WCPFC Convention recognizes the special requirements of developing states in the management of highly migratory fish stocks. It calls for measures to avoid burdening developing States, particularly SIDS and territories, disproportionately and establishes a fund to support their participation. Support for developing States and territories can include financial assistance, human resource development, technical support, technology transfer, joint ventures, and advisory services. This assistance aims to improve SIDS and territories' effective participation in conservation and management efforts, scientific research, and monitoring, control, and enforcement activities related to highly migratory fish stocks.

50. WCPFC has various mechanisms in place for the [Implementation of Article 30 of the Convention](#). These are the WCPFC Strategic Investment Plan, Special Requirements Fund (SRF), Japan Trust Fund (JTF), Chinese Taipei Trust Fund (CTTF), [CMM 2013-06 - Conservation and Management Measure on the criteria for the consideration of conservation and management proposals](#), and [CMM 2013-07 - Conservation and Management Measure on the Special Requirements of Small Island Developing States and Territories](#).

51. The inclusion of climate change as a standing agenda of the Commission and its subsidiary bodies has presented opportunities to enhance WCPFC's work to:

- a) Integrate climate change analyses in the stock status and management advice that will aid in formulating CMMs, including guidelines on adaptive management and monitoring of highly migratory stocks (HMS) in response to climate change.
- b) Engage with other tRFMOs and organizations to share information and learnings, raise public awareness, and foster sustainable solutions through international collaboration.
- c) Encourage cooperation and the support of member countries in progressing scientific work through the provision of necessary resources to conduct climate change analyses.

- d) Promote the development of a framework/strategies for incorporating climate change analyses and mitigating its impacts.
- e) Establish dedicated working groups on climate change.
- f) Mainstream climate change as an integrated approach (similar to the ecosystem approach).
- g) Develop creativity in approaching management measures as measures need to be flexible and adaptable.
- h) Strengthen existing mechanisms of cooperation between RFMOs/RFBs including the sharing of data, information, and tools to support management (e.g. risk assessments, and vulnerability assessments).

V. Conclusion

52. In conclusion, sustainable fisheries management in the face of climate change demands a multifaceted approach that addresses both the direct and cumulative impacts of environmental shifts on marine ecosystems, fish populations, and coastal communities. Through initiatives such as assessing climate change impacts on fisheries, implementing adaptive management strategies through harvest strategy, and integrating economic, social, and cultural considerations into management frameworks, progress can be made towards resilience and sustainability. Collaboration with other tRFMOs and international bodies is essential for sharing knowledge, resources, and best practices.

53. Moreover, recognizing the specific challenges faced by developing countries, particularly small island developing states (SIDS), and providing support through capacity building and dedicated funding mechanisms is essential for ensuring equitable and effective management of fisheries resources in the WCPO.

54. Moving forward, continued efforts to mainstream climate change considerations into fisheries governance and management frameworks will be necessary for building adaptive and resilient fisheries ecosystems and protecting the livelihoods of coastal communities in the face of environmental uncertainty.

VI. References:

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