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OPTIONS FOR OPERATIONALIZING THE ECOSYSTEM APPROACH TO FISHERIES MANAGEMENT IN TUNA RFMOs

FAO Workshop Report
Rome, Italy
17-19 September 2019



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Executive summary

In September 2019, managers, scientists and other stakeholders from all tuna Regional Fisheries Management Organisations (RFMOs) met at FAO headquarters in Rome to discuss how best to progress the operationalization of the Ecosystem Approach to Fisheries Management (EAFM). This was the second joint tuna RFMO EAFM workshop organized under the ABNJ (Common Oceans) Tuna project. It focused on how best to apply the growing level of scientific understanding of marine ecosystems to a fisheries context and integrate that understanding into operational measures at the RFMO level to improve fisheries management outcomes.

Using presentations, live polling questions, breakout groups and plenary discussions, the workshop identified a number of key challenges currently hindering EAFM implementation in tuna RFMOs. It then developed a range of solutions that could make a substantial contribution to the implementation of EAFM.

In considering what EAFM represents in a tuna RFMO context, the workshop participants agreed that operationalization of EAFM generally commences with the management of single species via stock assessment and bycatch management, progressing towards consideration of the less tangible elements of ecosystem structure and socioeconomic impacts. In this sense, it was noted that all tuna RFMOs have already implemented a number of EAFM elements.

The workshop considered that there are a number of legal, administrative and market-based incentives for implementing EAFM. However, the lack of a clear institutional mandate was considered the major reason why progress has been slow thus far. Gaps in scientific strategic planning, and limited communication between working groups with responsibilities for EAFM-related topics, were also considered to be contributing factors.

The workshop developed a four-part action plan for advancing EAFM implementation in tuna RFMOs. The first and most critical step is for each Commission to approve the establishment of an EAFM implementation process and task the appropriate subsidiary bodies with the necessary work. The second would be to prepare the implementation plan itself, with each tuna RFMO adjusting the elements of the plan to meet its own needs. Technical tools — such as capturing data from ongoing monitoring programmes to develop ecosystem indicators, risk assessments or models — are an important third step in the plan. Finally, planning for successful implementation will require attention to improving channels of communication, capacity building and greater stakeholder collaboration. Workshop participants noted that they themselves could use these recommendations as an opportunity to create momentum and advance discussions of EAFM implementation.

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Acknowledgements

The second workshop on EAFM implementation in tuna RFMOs was organized by the Common Oceans Program Tuna Project towards the end of the first phase (2014–2019). Sincere thanks are due to all the participants of this workshop which brought together managers, scientists and other stakeholders from all tuna Regional Fisheries Management Organizations (RFMOs) to meet in Rome at FAO headquarters. This provided a unique and excellent opportunity to discuss how best to progress the operationalization of the Ecosystem Approach to Fisheries Management (EAFM).

Special thanks should go to the following persons for the preparation of this summary workshop report.

- Ian Cartwright, Thalassa Consulting
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Abbreviations and acronyms

ABNJ	areas beyond national jurisdiction
ANABAC	<i>Asociación Nacional de Armadores de Buques Atuneros Congeladores</i>
BET	bigeye tuna
CCSBT	Commission for the Conservation of Southern Bluefin Tuna
CMM	conservation and management measures
CNM	cooperating non-Member
CPC	Cooperating Non-Contracting Parties
DML	dolphin mortality limits
EAFM	ecosystem approach to fisheries management
EASI-Fish	Ecological Assessment of the Sustainable Impacts of Fisheries
EBFM	ecosystem-based fisheries management
EEZ	exclusive economic zone
ETP	endangered, threatened and protected
EPO	eastern Pacific Ocean
ERA	ecological risk assessment
ERS	ecologically related species
FAD	fish aggregating device
FAO	Food and Agriculture Organization of the United Nations
FIP	Fishery Improvement Project
FFA	Pacific Islands Forum Agency
FSM	Federated States of Micronesia
GEF	Global Environment Facility
GFCM	General Fisheries Commission for the Mediterranean
IATTC	Inter-American Tropical Tuna Commission
IGO	inter-governmental organization
IOTC	Indian Ocean Tuna Commission
ICCAT	International Commission for the Conservation of Atlantic Tunas
IPTP	Indo-Pacific Tuna Development and Management Programme
MP	management procedure
MSC	Marine Stewardship Council
MSE	management strategy evaluation
MSY	maximum sustainable yield
NAFO	North Atlantic Fisheries Organization
NGO	non-governmental organization
NOA	Non-associated
NOAA	National Oceanic and Atmospheric Administration
NTADS	non-target or associated or dependent species
OPAGAC	<i>Organización de Productores Asociados de Grandes Atuneros Congeladores</i>
PRM	post-release mortality
RFMO	regional fisheries management organization
SAC	Scientific Advisory Committee
SBT	southern bluefin tuna
SC	Scientific Committee
SCRS	Standing Committee on Research and Statistics
SEAPODYM	Spatial Ecosystem and Population Dynamics Model
SIDS	Small Island Developing States
SPC	Pacific Community

TCC	Technical and Compliance Committee
UNCLOS	United Nations Convention on the Law of the Sea
UNFSA	United Nations Fish Stocks Agreement
WCPFC	Western & Central Pacific Fisheries Commission
WCPO	Western Central Pacific Ocean
WPEB	Working Party of Ecosystems and Bycatch
YFT	yellowfin tuna

1. Introduction to EAFM in tuna RFMOs

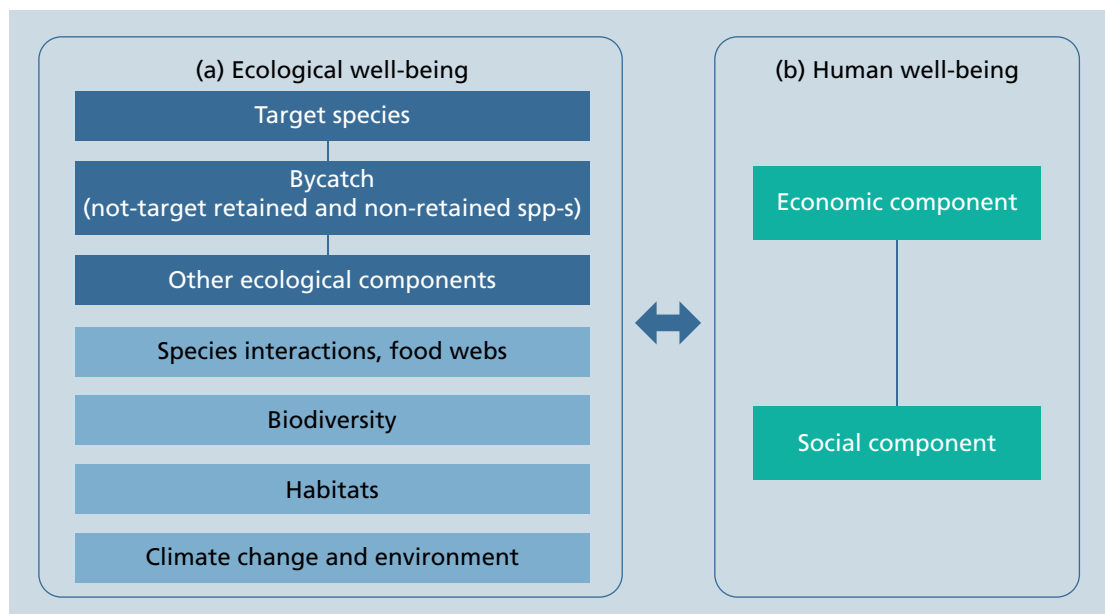
1.1 Defining EAFM for tuna fisheries

Over the last two decades, there have been several attempts to define and operationalize the concept of an Ecosystem Approach to Fisheries Management (EAFM) (FAO 2003, Garcia *et al.* 2003, Garcia & Cochrane 2005, De Young *et al.* 2008, Fletcher & Bianchi 2014, Staples *et al.* 2014). Most definitions contain the basic elements of 1) addressing both human (social and economic) as well as ecological aspects and 2) the need to transition to a more holistic view of fisheries and their ecosystems. For the purposes of the workshop, the following definition, based on FAO (2003), was used to guide the discussion:

EAFM strives to balance fishery management objectives by taking into account the knowledge and uncertainties about ecological, physical and human components of ecosystems and their interactions, and applying an integrated approach.

All tuna Regional Fisheries Management Organizations (RFMOs) make reference to the core principles of EAFM in their Convention Agreements or conservation and management measures (see Annex 1). Furthermore, under the Joint Tuna RFMO process (Kobe process), it was recognized that “tuna fisheries must be conducted in full respect of international commitments regarding the conservation of biodiversity and the implementation of the ecosystem approach” (Anonymous 2007, 2009, 2011). Nevertheless, the progress of implementing EAFM has been relatively slow in all of the tuna RFMOs, reflecting the challenges of operationalizing the concept in a multi-national context (Figure 1).

FIGURE 1. Generalized view of EAFM in the context of tuna RFMOs encompassing (a) ecological and (b) human well-being. The current focuses of tuna RFMOs are indicated in dark blue.



The workshop noted that tuna RFMOs are already implementing the ecological component of EAFM, albeit with a focus on the management of target species and the mitigation of fishing impacts on bycatch species. The workshop also recognized that there is potential to use this existing focus as the first step towards a decision-making process that eventually also considers marine ecosystems and the protection of biodiversity hotspots while accounting for the environmental impacts, including the effects of climate change. The workshop noted that there is an ongoing debate about whether social and economic objectives should be considered as part of EAFM at the RFMO level or whether these issues would be better left to domestic authorities and decision processes.

Tuna RFMO progress with EAFM is currently focused mainly on target species and bycatch, but this focus can be used as the first step towards broadening the approach to encompass other ecosystem elements.

1.2 Progress towards EAFM in tuna RFMOs under the ABNJ Tuna Project

To date, the ABNJ (Common Oceans) Tuna Project has held two workshops to discuss the state of EAFM implementation and seek areas of collaboration to enhance its implementation (Common Ocean Project 2016). During the first workshop, held in December 2016 (Common Oceans Tuna Project 2016), it was noted that:

1. The tuna RFMOs lacked a common definition of EAFM.
2. While some of the elements necessary to implement an EAFM in tuna RFMOs were in place, there were no long-term objectives, vision statements or formal implementation plans.
3. Major impediments to advancing EAFM include:
 - a. Lack of a clear mandate from Commissions
 - b. Lack of effective communication among scientists, and between scientists and managers
 - c. A lack of capacity and resources to implement EAFM
4. Examples from management strategy evaluation (MSE) processes used to test and implement harvest strategies, when reinforced by a science–management dialogue, could provide a useful approach for implementing EAFM.

Recognizing that engagement of Commissioners is critical to progressing EAFM, the first workshop recommended that (1) each tuna RFMO work to bring EAFM implementation to the attention of its Commissioners and (2) another EAFM workshop involving both scientists and Commissioners be held.

This report summarizes a second joint tuna RFMO EAFM workshop entitled “Options to Operationalize the Ecosystem Approach to Fisheries Management in Tuna RFMOs”, which took place between 17 and 19 September 2019 at FAO headquarters in Rome. Approximately 40 participants representing managers, scientists and other stakeholders (including the private sector and NGOs) engaged in all the tuna RFMOs, along with other RFMOs (e.g. North Atlantic Fisheries Organization [NAFO] and General Fisheries Commission for the Mediterranean [GFCM]), attended the workshop (Annex 2).

The overarching objective of this workshop was to discuss how best to advance the implementation of EAFM in tuna RFMOs. Specifically, the objectives for the second joint tuna RFMO EAFM workshop were to:

- Allow managers, scientists and other stakeholders with a wide range of experience in tuna RFMO processes to have an open dialogue on how best to progress EAFM implementation in the context of tuna RFMOs.
- Discuss current practices of tuna RFMOs that assist in EAFM implementation and identify the main challenges hindering its effective implementation.
- Provide a range of options, ideas and new initiatives that could be considered by tuna RFMOs to progress EAFM implementation, appreciating the need to take into account each RFMO's unique circumstances and priorities.
- Examine how FAO and the Common Oceans Tuna Project can assist further in the process of developing and implementing EAFM.

The three-day workshop was highly interactive, employing a range of approaches including presentations, live polling questions, breakout group activities, and panel and plenary discussions (Annex 3). The remainder of this report summarizes the workshop's discussions of obligations and incentives for implementing EAFM (Section 2), progress with EAFM in tuna RFMOs (Section 3), and considerations for future EAFM implementation (Section 4). Conclusions are presented in Section 5.

The second workshop on implementing EAFM in tuna RFMOs extended the scope of the first workshop in 2016 but allowed for more interaction between scientists and managers, with the aim of generating more concrete ideas for EAFM operationalization.

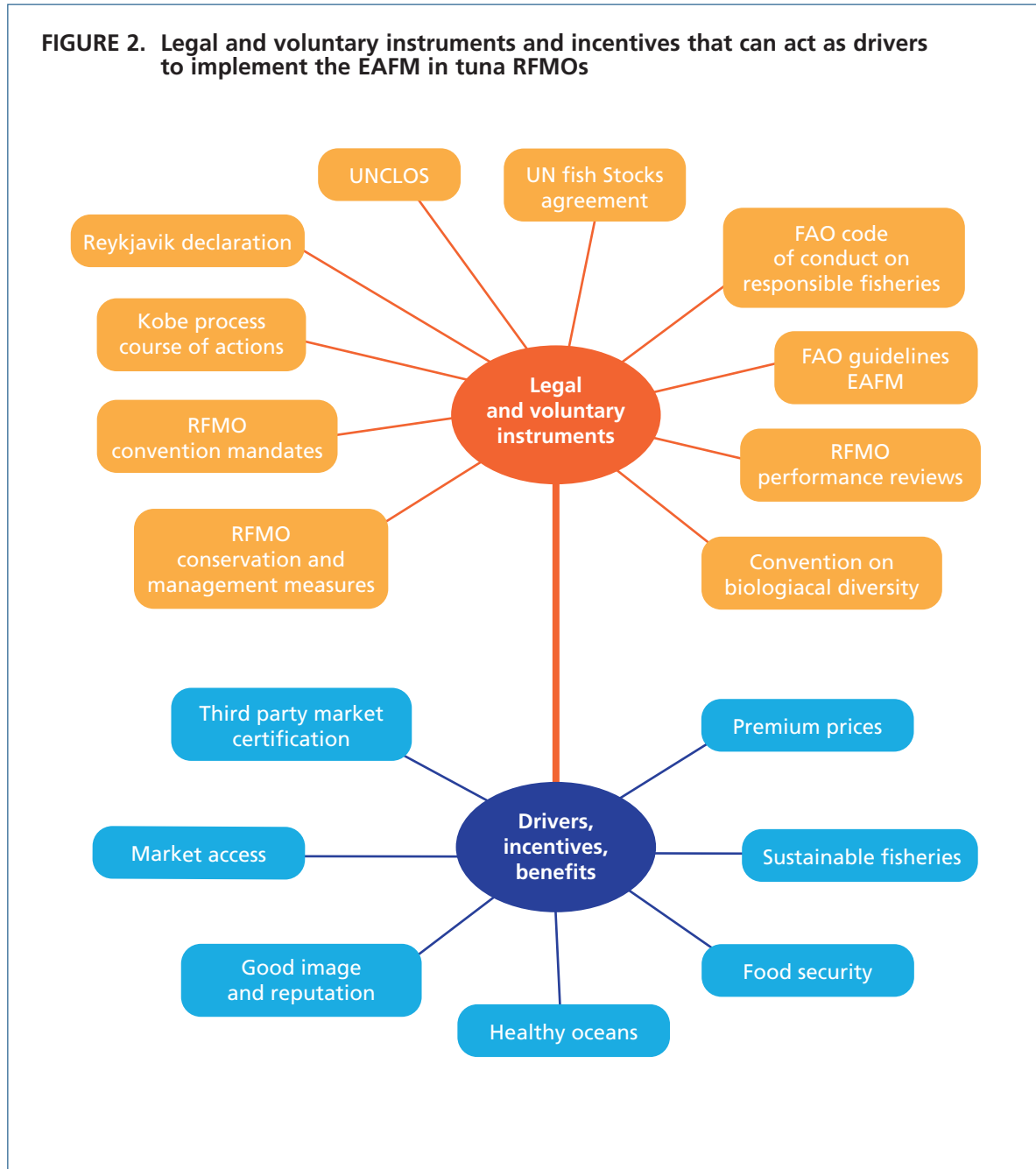
2. Obligations and incentives for implementing EAFM in tuna RFMOs

2.1 Legal and administrative considerations

Many international regulatory and voluntary instruments and incentives work in combination as drivers for EAFM implementation in tuna RFMOs (Figure 2). Among these, international binding and non-binding instruments such as the 1982 UN Convention on the Law of the Sea, the 1995 Fish Stocks Agreement, the 1995 Code of Conduct for Responsible Fisheries and the 2001 Reykjavik Declaration on Responsible Fisheries in the Marine Ecosystem have established the general guidelines and requirements for implementing EAFM in tuna RFMOs. Participants considered these international requirements to be important drivers for the implementation of EAFM in tuna RFMOs (Annex 4, Question 9). Despite this, participants noted that the lack of a specific mandate in the tuna RFMOs can hamper and slow progress towards EAFM implementation. As a result, although Member States may have signed on to these general international guidelines and principles, the guidelines are often not reflected in tuna RFMO management measures. Issues surrounding the existence and/or interpretation of institutional mandates for EAFM were seen by the workshop participants as the main constraints to progress.

The Joint Tuna RFMO (Kobe) process was also mentioned as a key driver. The Kobe process includes the implementation of EAFM as one of its courses of action for tuna RFMOs to embrace, without explicitly stating what would be required to implement it (Anonymous 2007, 2009, 2011). The workshop discussed how the interpretation of the existing international requirements and

guidelines has to date, in the context of RFMOs, been focused primarily on how to sustainably manage target species and reduce the impacts of fisheries on bycatch species. In some cases, performance reviews of the tuna RFMOs have touched upon how tuna RFMOs are implementing EAFM and have reflected the current target and bycatch species focus.



The participants recognized that some elements to support EAFM operationalization have been adopted at the RFMOs through conservation and management measures, in particular with respect to the protection of bycatch species. However, there is still room for the explicit adoption of an overall EAFM operationalization plan that would include definitions, timelines and a sequence of steps to be implemented, similar to what was done in several RFMOs with the MSE implementation plan.

Finally, it was also noted that there are currently initiatives and negotiations to enhance EAFM provisions under the 15th Informal Consultations of States Parties (Fish Stock Agreement revisions informally called Reykjavik +20). This could provide an opportunity to clarify what EAFM entails and how it should be operationalized in the context of RFMOs.

The lack of a formal mandate and/or clear interpretation of institutional mandates for EAFM were seen by the workshop participants as the main constraints to progress in some tuna RFMOs.

2.2 Market and economic considerations

Market-driven and economic incentives via third-party certification (such as the Marine Stewardship Council [MSC]) were also seen as major drivers of EAFM implementation in tuna RFMOs. A fishery seeking to use a label that certifies that it meets independently set sustainability criteria often needs to improve management performance to achieve certification. This may require collaborating with NGOs on Fishery Improvement Projects (FIPs), which formalize action plans to address shortfalls in the fishery that could work against attaining a passing score in the certification assessment. The workshop noted that FIPs can assist in accelerating some of the more tangible elements of EAFM, such as setting appropriate reference points for target species; mitigating impacts on bycatch and endangered, threatened and protected (ETP) species; and reducing habitat damage from marine debris.

Industry-led initiatives that do not involve labelling per se can also be important drivers for elements of EAFM. The voluntary establishment of the Code of Good Practices for Responsible Purse Seining, developed by OPAGAC and ANABAC to reduce bycatch mortality, is an example of an industry-led activity. The International Seafood Sustainability Foundation (ISSF) described how a joint collaboration among scientists, the fishing industry and NGOs has been effective in finding, testing and promoting practical, cost-effective solutions for mitigating the impacts of fishing operations, a key element of the EAFM. Participants noted that the fishing industry can sometimes respond more quickly than the RFMOs, especially if they perceive there could be a market reward (e.g. access to new markets or a price premium). Market incentives can accelerate and reinforce compliance with regulations, and there are already examples of how they have reduced fishery impacts on ecosystems towards EAFM application.

The workshop noted that market and economic incentives such as labelling schemes or industry-led initiatives can facilitate the adoption of EAFM elements by management authorities and reinforce compliance once they are adopted.

3. Current status of EAFM implementation in tuna RFMOs

Five presentations summarized the current debates on the status of EAFM implementation in each tuna RFMO. Participants familiar with each of the five tuna RFMOs provided a brief overview of their current status of EAFM implementation (Annex 1). The following sections represent a summary of the discussions arising from these presentations at the workshop.

3.1 Structural factors influencing the implementation of EAFM in tuna RFMOs

3.1.1 EXISTENCE OF A CLEAR MANDATE FOR IMPLEMENTING EAFM

As none of the tuna RFMOs have held formal discussions on EAFM, there is uncertainty about the extent to which Member States believe there is a clear mandate to implement the concept. The workshop noted, however, that tuna RFMOs make reference in their Convention Agreements, or in their adopted conservation and management measures, to at least some of the core principles of EAFM.

3.1.2 Incorporation of EAFM into the scientific strategic plans

Participants considered that all tuna RFMOs have developed scientific strategic plans that make explicit or implicit reference to some elements of the EAFM, including data collection, research priorities, monitoring of ecosystem indicators and the provision of ecosystem-based management advice. However, these strategic plans lack the vision and objectives necessary to guide EAFM implementation, which ultimately is decided by the managers at the Commission level. The workshop also noted that the different natures and competencies of each RFMO have contributed to different approaches and options for progressing EAFM implementation.

3.1.3 Sufficiency of institutional structure for EAFM implementation

The workshop considered that all tuna RFMOs have a subsidiary body charged with reviewing ecosystem-related research and providing advice to the Commission. However, these ecosystem working groups often have limited capacity and expertise to effectively integrate and coordinate all relevant ecosystem research activities, and there is often limited communication between the ecosystem and target species working groups. The workshop participants recognized that this can be a major impediment to integrating and coordinating ecosystem research to provide the Commissions with the integrated advice necessary for EAFM.

The workshop noted that market and economic incentives such as labelling schemes or industry-led initiatives can facilitate the adoption of EAFM elements by management authorities and reinforce compliance once they are adopted.

3.2 Current status of EAFM implementation by ecosystem component

3.2.1 Target species

The workshop noted that tuna RFMOs devote most of their resources, time and personnel to the monitoring, assessment and management of target species. All tuna RFMOs have also recently started to allocate considerable resources and time to developing harvest strategies and testing them through management strategy evaluation (MSE) to adopt management procedures (MPs) for a selection of target stocks. This was considered an important factor in reducing ecosystem impacts and thus an important element under the EAFM umbrella.

3.2.2 Bycatch species

The workshop participants discussed that all tuna RFMOs, to a greater or lesser extent, monitor catches of sharks and other bony fishes, as well as the interactions of their fisheries with bycatch species such as seabirds, marine turtles and marine mammals. Tuna RFMOs have a long track record of developing ecological risk assessments and using them to identify potentially vulnerable species for data collection, management and conservation. Furthermore, there are multiple examples of bycatch mitigation measures adopted at the RFMO level, including non-retention policies for various shark species, gear restrictions for marine turtles and seabirds, and dolphin mortality limits in the eastern Pacific purse seine fishery. However, the workshop noted that, unlike target species under a harvest strategy, changes in the population status of bycatch species do not directly trigger new or different management responses.

3.2.3 Other ecosystem components

The workshop participants appreciated that tuna RFMOs have experience, to different degrees, in assessing the effects of fishing on food webs and biodiversity, evaluating the possible impacts of climate change on species of interest, monitoring marine debris derived from fishing vessels and fishing activities, and identifying habitats of ecological significance to species of interest. Some examples of recent progress cited at the workshop are highlighted below:

- In all tuna RFMOs there has been recent progress in purse seine FAD monitoring and management. This has led to a better understanding of the effects of FAD fishing on the pelagic ecosystem.
- IATTC has recently developed a new ecological risk assessment (ERA) approach called Ecological Assessment of the Sustainable Impacts of Fisheries (EASI-Fish) for data-poor bycatch species.
- Since 2017, IATTC annually updates the Eastern Tropical Pacific ecosystem model (ETP-21). Updates include effort, catch and discard data for industrial fisheries that, in conjunction with other data, are used to produce six ecological indicators to monitor changes in the structure and function of the ETP ecosystem.
- Since the mid-1990s, the Pacific Community (SPC) has been developing and using a spatially based model (SEAPODYM) to investigate the dynamics and spatial distributions of main target tunas and their responses under several fishing and climate change scenarios.
- ICCAT and IOTC Scientific Committees have started to develop indicator-based ecosystem report cards.

The workshop participants discussed the extent and use of emerging tools and ongoing ecosystem research activities. It was noted that indicator-based ecosystem report cards, ecological risk assessments and ecosystem models have the potential to provide more integrated advice to the Commissions, but they are not currently being used in a meaningful way to inform decision-making processes, primarily due to a lack of reliable biological and/or ecological reference points from which management action may be initiated.

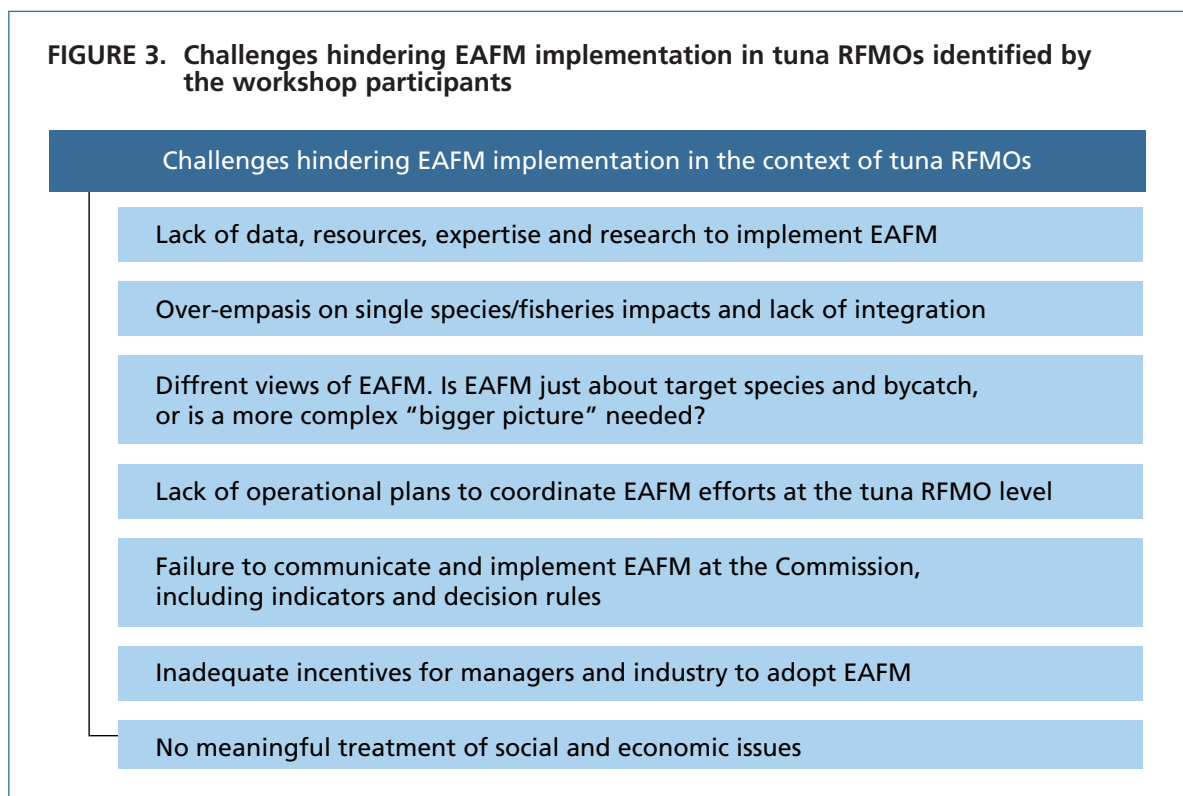
The workshop also stressed that there are insufficient resources devoted to discussing and further developing additional EAFM considerations beyond target and bycatch species. While this is currently an issue within the Scientific Committees, there are even fewer opportunities to discuss ecosystem implications of tuna fisheries at the Commission level. These views were also reflected in the survey results where two-thirds of respondents noted a “medium” or “major” improvement in ecological science in recent years, but only one-third believed there has been a “medium” or “major” improvement in the use of this information in management decision-making (Annex 4, Question 11).

The workshop noted that market and economic incentives such as labelling schemes or industry-led initiatives can facilitate the adoption of EAFM elements by management authorities and reinforce compliance once they are adopted.

4. Considerations for future EAFM implementation

4.1 Existing challenges to EAFM implementation

As discussed above, the workshop participants identified several common characteristics across tuna RFMOs that have helped to shape EAFM implementation thus far. Similarly, the workshop identified a list of challenges that currently impede effective EAFM implementation, which, if addressed efficiently, could accelerate progress (Figure 3).

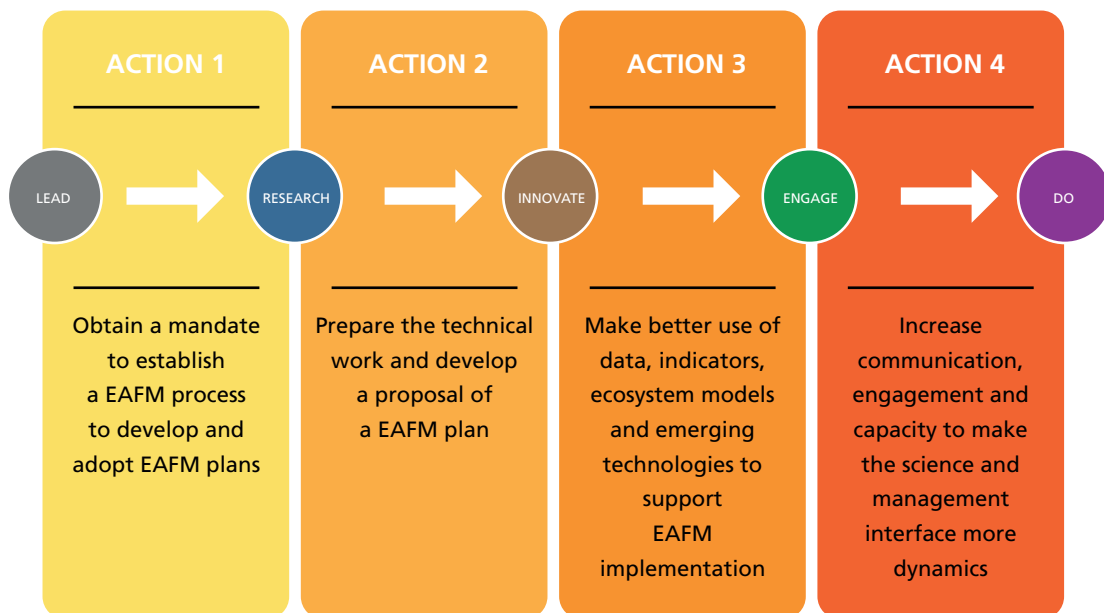


Challenges impeding EAFM implementation include unclear definitions of what EAFM means in practical terms, lack of a formal plan at Commission level, absence of suitable socioeconomic considerations, lack of adequate incentives, and insufficient communication about the EAFM implementation plans.

4.2 Actions to progress EAFM implementation in tuna RFMOs

Workshop participants were divided into groups to discuss the root causes of and potential solutions to the challenges identified in Figure 3. Results from the breakout groups were discussed in plenary with a view to developing a small set of practical actions that can be easily advanced by Scientific Committees or the Commissions themselves. From these discussions, four concrete actions towards the implementation of EAFM in tuna RFMOs were agreed upon: developing a process, developing an implementation plan, making better use of data and tools, and strengthening the enabling environment (Figure 4). Each of these actions is presented below.

FIGURE 4. Actions to progress EAFM implementation in tuna RFMOs

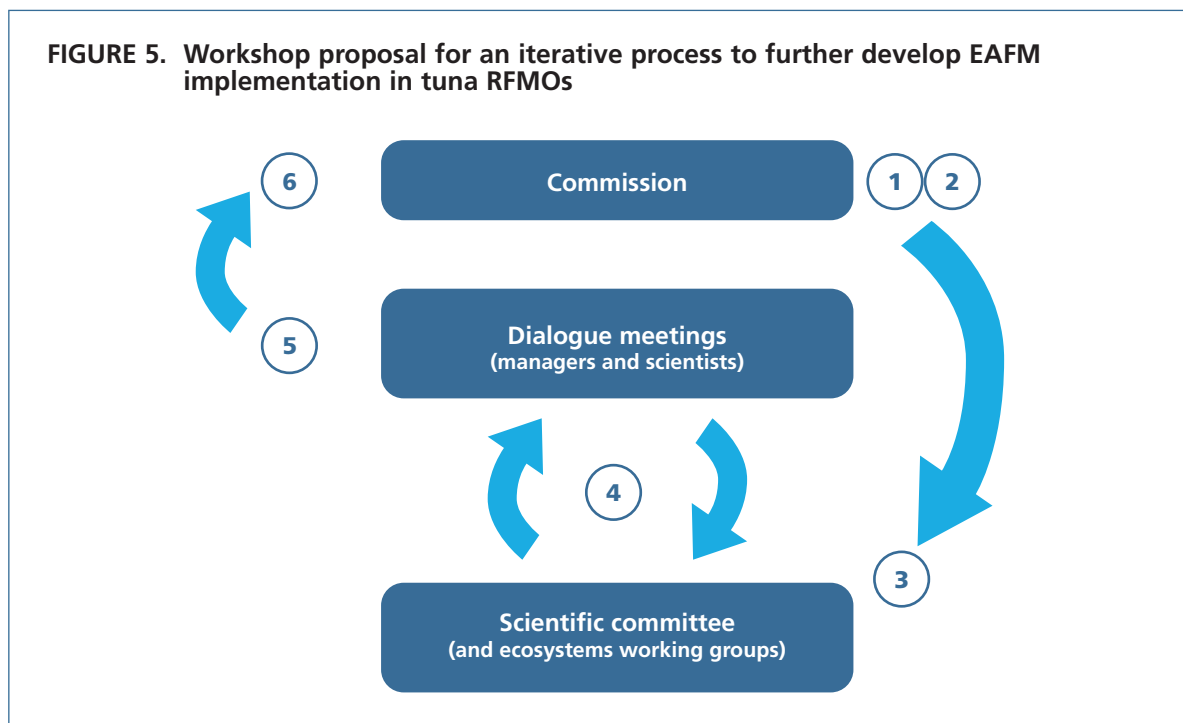


Challenges impeding EAFM implementation include unclear definitions of what EAFM means in practical terms, lack of a formal plan at Commission level, absence of suitable socioeconomic considerations, lack of adequate incentives, and insufficient communication about the EAFM implementation plans.

4.2.1 ACTION 1 – Establish a process to develop and adopt EAFM plans

The workshop participants considered that the tuna RFMO Commissions' mandate to implement EAFM is necessary to guide and progress its effective implementation. At the workshop they drafted a proposal for an iterative process that would i) facilitate getting a clear mandate from the Commission to initiate and accelerate the work on EAFM, and ii) obtain a firm commitment to its implementation. The workshop proposal can be summarized in six steps (Figure 5):

1. At the Commission level, a Member State (or group of Member States) raises the need for a dialogue and process to guide how the EAFM would be effectively operationalized in the RFMO.
2. If the Commission agrees on this need, it makes an explicit request to its Scientific Committee (or other subsidiary body) to initiate technical work and report back.
3. The Scientific Committee (with the support of other subsidiary bodies) initiates the technical work¹ to design an EAFM implementation plan in collaboration with a specialized technical working group.
4. The EAFM implementation plan is presented at science–management dialogue meetings and iteratively reviewed by the Scientific Committee and the specialized technical working group.
5. Once the science–management dialogue meeting agrees on the final EAFM plan, the EAFM implementation plan is presented to the Commission for its consideration and adoption.
6. The Commission adopts the EAFM Implementation Plan.



The workshop participants noted that each tuna RFMO would need to adjust the process according to its own context, realities and needs. For example, some tuna RFMOs like CCSBT do not currently have a specialized technical working group composed of managers and scientists that could advise and support this process. Each Commission would need to task its own most appropriate subsidiary bodies or specialized technical groups to assist in this process.

¹ This technical work and advice could include an assessment of what the RFMO (the Commission and the Scientific Committee) has done and is already doing in terms of EAFM implementation, including an identification of current gaps and a proposal of concrete actions and priorities to address those gaps, together with the potential benefits and costs of doing it.

Most participants agreed that work should take place in a dedicated EAFM dialogue forum or working group inclusive of managers and scientists (Annex 5, Session 4, Question 3). At the same time, they noted that existing subsidiary bodies should be used to the extent possible to lead the technical work, as forming additional technical groups could have cost implications.

The workshop noted that the proposed process is similar to that discussed in the first joint tuna RFMO EAFM workshop except that the earlier workshop suggested that the process begin with the tuna RFMOs' Scientific Committees bringing EAFM to the attention of the Commission. The current workshop participants, which included a broader mix of scientists, managers and NGO stakeholders, recognized the potential for the Scientific Committees to make a recommendation to the Commission, but considered that without a clear Commission mandate it might be difficult for the Scientific Committees alone to drive the process. Appreciating that a Commission mandate is required to prevent the process from being low priority and stagnant, participants agreed that the workshop recommendations should be presented at both the Scientific Committees and Commissions as an opportunity to create momentum and advance discussions for the implementation of EAFM in tuna RFMOs.

Finally, the workshop noted important parallels between EAFM implementation and the ongoing process of developing robust management procedures tested through MSE: (1) Commission mandated the development of MP/MSE, (2) the Scientific Committee carried out the technical work, (3) which was presented at, and fine-tuned by, the dialogue meeting (e.g. update/agree on management objectives and referent points), and (4) the Scientific Committee developed final candidate MPs for Commission consideration and adoption. The tuna RFMOs' MSE process provides best practices and lessons learned to inform the development of EAFM.

An important step in the tuna RFMO EAFM implementation action plan is for each Commission to approve the establishment of an EAFM implementation process and task the appropriate subsidiary bodies with the necessary work.

4.2.2 ACTION 2 – Develop and adopt an EAFM implementation plan

As a second action, the workshop participants highlighted the importance of identifying and defining the key elements of EAFM, together with a sense of priorities and recognition of gaps, for its implementation. There was also acknowledgement of the value of developing and adopting EAFM implementation plans to legitimize, prioritize and integrate ongoing and potential future EAFM-related activities under an overarching EAFM umbrella. Each tuna RFMO would ideally develop its own EAFM implementation plan reflecting its own degree of progress and its individual priorities.

Tuna RFMO Commissions' EAFM implementation plans were considered by workshop participants to be important for a number of reasons:

1. To facilitate the identification of key elements under the EAFM umbrella
2. To stimulate the production and uptake of integrated advice to improve EAFM management
3. To improve visualization of trade-offs, e.g. multi-species fisheries interactions
4. To increase transparency
5. To prioritize management resources wisely

The workshop discussed and identified five core elements that would be contained in an EAFM implementation plan:

1. **Definition:** The EAFM implementation plan adopted by the Commission should establish a broad umbrella definition of EAFM in tuna RFMOs.
2. **Scope:** The broad ecosystem components under the EAFM umbrella could be derived from understanding those interactions arising from direct and indirect fishery impacts on the ecosystem, as well as those direct and indirect interactions of the ecosystem, e.g. including the environment and climate change, on the main species and fisheries. The spatial and temporal scales of the ecosystem components to be monitored should also be defined.
3. **Gap Identification:** This element would include setting objectives, selecting and monitoring indicators, identifying targets and thresholds, and understanding what management measures are already in place and whether additional ones are needed for each EAFM component. It could also involve compiling a list of target, non-target and dependent species, and identifying which are “core” species under the management of the RFMO versus “associated/dependent” species that would still need close monitoring by the RFMOs. Finally, current research practices and progress should be assessed, and pressing research gaps and needs for EAFM implementation should be identified. An example of this type of exercise can be found in Annex 6.
4. **Prioritization:** Ecosystem components should be prioritized based on their relevance to the Commission (i.e. maintaining a focus on target species and bycatch species most at risk from tuna fisheries) and those having the most pressing need. Prioritization of tasks could be informed by risk type assessments², the availability of information, cost of action versus inaction, and the potential for using new technologies and innovative tools.
5. **EAFM Integration of advice:** EAFM-related activities typically take place in multiple scientific working groups of each tuna RFMO’s Scientific Committee, and the workshop noted that at present there are limited opportunities for integrated discussions. The workshop also noted the need for better coordination between working groups to facilitate better integration of knowledge and advice, and also pointed out that this could raise the visibility and relevance of EAFM components. The potential need to consult and collaborate with external groups of different natures and expertise was also noted and recommended to be incorporated into the EAFM implementation plan as necessary.

The workshop stated that this list of elements for EAFM implementation plans should not be considered exhaustive and may need to be adjusted to meet the needs of individual tuna RFMOs. It was agreed that EAFM implementation plans should focus first on the ecological aspects of EAFM implementation, with social and economic issues added later as appropriate.

The second step in the tuna RFMO EAFM implementation action plan involves developing the plan itself, including establishing a definition, defining the scope, identifying gaps, prioritizing tasks and deciding how EAFM advice should be integrated.

² Use of traditional ecological risk assessments (based on productivity–susceptibility type assessments) provide only a relative measure of risk, and not an absolute measure of risk, which limits the ability of these assessments to provide meaningful management advice. Similarly, it was noted that there is also an emerging use of ecosystem models to generate and test relevant ecosystem-based harvest strategies (see Action 3), which could be used in the near future to provide better integrated management advice. The role of emerging tools and new technologies to assist in EAFM implementation is further discussed under Action 3.

4.2.3 ACTION 3 – Make better use of data, indicators and modelling as tools to support EAFM implementation

The workshop discussions then focused on existing data collection programmes and technical tools, including the development of ecosystem indicators and models, designed to provide integrated advice and operationalize EAFM. Three questions addressed by the group were:

- Are existing data collection programmes used to their full potential?
- What are the roles of indicators, risk assessments and ecosystem models in providing better integrated advice?
- Can emerging technologies help to fill data gaps?

Concerning existing data, the workshop considered that it is critical to make better use of existing data already being collected by members under the tuna RFMO's data requirements. The investment already made in collecting and maintaining these data can be used as a springboard to develop indicators and models that can support EAFM. The workshop agreed that efforts should be focused on improving existing data collection programmes (e.g. basic catch, effort and size data; fishery vessels statistics; and observer data) and ensuring that members comply with the data requirements. Concerning indicators, risk assessments and ecosystem models, the workshop participants noted that tuna RFMO Scientific Committees are already using many different types of tools to monitor multiple ecosystem components. The workshop defined several types of tools in each category that have the potential to support EAFM implementation:

- **Ecosystem indicators:** Noting that ecosystem report cards, including ecosystem indicators, are already being developed by some tuna RFMOs (see Annex 7), the workshop agreed that producing a set of ecosystem indicators, even without reference points or decision rules, would be useful. Various benefits were acknowledged, including providing an “early warning”, elucidating inherent ecosystem connections and increasing the visibility of ecosystem data and research. The workshop distinguished between operational indicators (which are designed to guide specific management responses) and surveillance indicators (which are designed only to monitor key ecosystem elements) (Annex 7-a). Ecosystem indicators could be empirically derived using the existing data collection programmes maintained in the RFMOs or derived from ecosystem models (see risk assessments and ecological models below). Above all, it was recognized that managers want predictable and simple tools; therefore, it might be best to begin with a small selection of relevant ecosystem operational/surveillance indicators for fostering the dialogue with managers using concrete examples, and then expand to more complex applications as the level of comfort increases.
- **Risk assessments:** These tools can be applied to fisheries, climate or habitat and have the potential to help in prioritizing limited management resources. They can also be helpful in considering the potential cost of inaction. The workshop noted that most risk assessments to date have been fishery-based, productivity–susceptibility analyses that provide only relative risks and thus are limited in the type of advice that can be provided. The workshop also noted the new risk-based Ecological Assessment of the Sustainable Impacts of Fisheries (EasiFish) tool for data-poor bycatch species recently developed in IATTC (Annex 7-b). This new tool offers great potential to assess the “vulnerability status” of data-poor bycatch species since it utilizes traditional reference points (F_{MSY} , $F_{0.1}$, $SPR_{40\%}$) that are biologically meaningful and familiar to scientists and managers, which may improve the process to identify and monitor vulnerable species and guide their management (Griffiths *et al.* 2019b). For now, the development and use of other risk-based approaches such as climate risk assessments and habitat risk assessments remain poorly explored in the context of tuna RFMOs.
- **Ecosystem models:** The availability and practice of using ecosystem models to potentially inform management outcomes varies between tuna RFMOs. Since the mid-1990s, the SPC, as Science Services Provider to the WCPFC, has been developing and using SEAPODYM to investigate the

dynamics and spatial distributions of main target tunas and their responses under several fishing and environmental scenarios (Lehodey *et al.* 2014). Since the early 2000s, both the scientific staff of IATTC and SPC have also been developing and using trophic mass–balance ecosystem models (e.g. Ecopath with the Ecosim) to generate hypotheses to better understand the impacts of multiple gears on the structure and dynamics of marine ecosystems, explain the key dynamics of the ecosystems, and test alternative ecosystem-based harvest strategies (Annex 7-c) (Allain & Griffiths 2015; Griffiths & Fuller 2019; Griffiths *et al.* 2019a). Despite these efforts, the group noted that ecosystem models are not generally used to advise and inform the management process, but this may be changing as the models improve and begin to complement single-species assessments and advice.

- Emerging technologies: The workshop participants noted several new and emerging technologies that can facilitate EAFM implementation. For example, dynamic ocean management can identify fishing areas where target species catch can be optimized while reducing bycatch and costs (Annex 7-d). The increasing use of electronic monitoring systems as a complementary tool to human observers was also mentioned as an emergent new technology and tool to increase the collection and quality of observer data.

The third step in the tuna RFMO EAFM implementation action plan calls for making better use of tuna RFMOs' data collection programmes, as well as harnessing new tools such as ecosystem indicators, risk assessments and models.

4.2.4 ACTION 4 – Improve communication, engagement, partnerships and capacity building

The successful use of the emerging tools presented under Action 3 and their impact on EAFM management advice will depend on how they are packaged and communicated to the Commission. The workshop acknowledged that the current channels of communications are not always efficient, and as a result management decisions are not always made on the basis of the scientific advice. The workshop discussed several ways to improve the science–management interface to facilitate the implementation of EAFM including:

- Improve the dialogue within the Commission both between scientists and managers, and amongst scientists participating in different working groups
- Increase capacity building
- Increase exchanges across tuna RFMOs;
- Improve collaboration with external organizations

Each of these areas of work is discussed below.

The workshop considered that **greater opportunities for dialogue** between scientists and managers are essential to advance EAFM implementation, especially given the limited time available on the Commission agendas to discuss EAFM. Most participants agreed that discussions on the development of EAFM approaches should take place in a dedicated EAFM science–management dialogue working group (Annex 5, Session 4, Question 3), and the development of processes to promote dialogue between scientists and managers was ranked as the highest priority activity (Annex 4, Question 7). The workshop noted the example of NAFO, which has developed a hybrid science–management working group that meets annually before the Commission meetings to discuss progress on EAFM and guide its implementation. The workshop also recommended presenting practical examples of ongoing tuna EAFM-related activities at the science–management

dialogue working groups to create a greater understanding of the potential benefits and costs of EAFM in the long and short term. Greater opportunities to dialogue and improve communication between scientific working groups was also seen as essential to produce more integrated advice and to advance EAFM implementation. While all tuna RFMOs have designated a working group to lead bycatch and ecosystem-related research, it was noted that these ecosystem working groups often have limited capacity and expertise to effectively integrate and coordinate all the relevant ecosystem research activities.

Capacity building activities aimed at practical skills and tools to operationalize EAFM were also considered important in developing a common EAFM understanding. These activities should be aimed at both scientists and managers as well as other interested stakeholders, similar to the long-term MSE capacity building activities in tuna RFMOs. The workshop also noted the importance of engagement from the tuna RFMO Secretariat and the private sector in the development and implementation of capacity building activities.

The workshop acknowledged the benefits of having more **exchanges across tuna RFMOs** to discuss common issues. Such exchanges could help to overcome budget limitations by sharing information and preventing duplication. While best practices may be discussed, the exchanges would not seek harmonization per se. Rather, they would focus on establishing a common terminology and concept map, and allow each tuna RFMO to develop its own solutions.

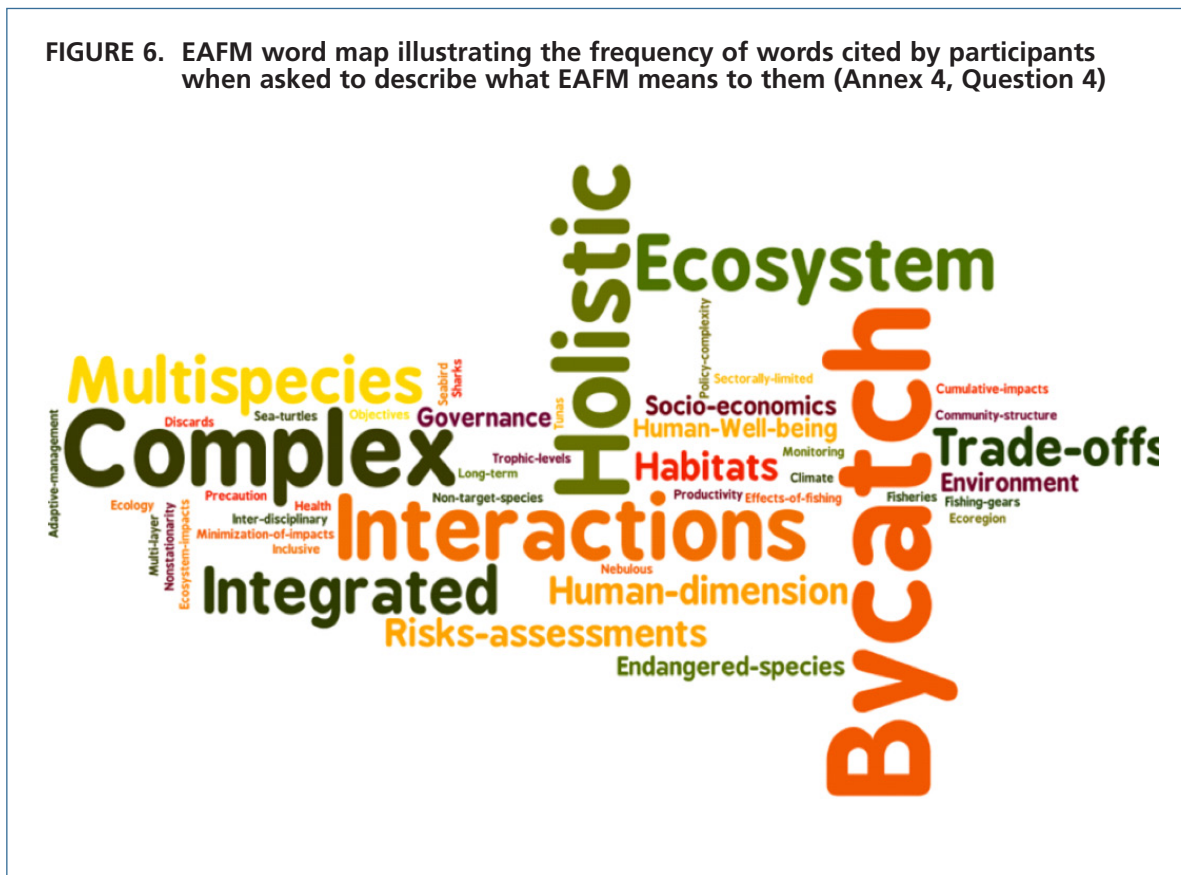
The workshop noted the importance of finding ways to improve and increase tuna RFMOs' **collaboration with external organizations** that can bring new expertise and knowledge, and reduce the cost of implementation. Intergovernmental organizations, non-governmental organizations and the private sector can all be sources of assistance. The workshop also noted that industry cooperation and engagement has, in many cases, been pivotal to finding solutions on the water. The workshop also noted that the Common Ocean Tuna project can support this process.

The fourth and final step in the tuna RFMO EAFM implementation action plan is focused on creating a more receptive environment for EAFM implementation, including improved RFMO channels of communication (scientist–manager dialogue and within scientific groups), capacity building, and greater collaboration with external stakeholders.

5. Conclusions and future steps

In the pre-workshop online survey, all participants were asked to list three words that came to mind when hearing the term “Ecosystem Approach to Fisheries Management”. The most frequently used words were bycatch, complex, holistic, interactions, ecosystem, multispecies, integrated, trade-offs, human dimensions and risk assessments (Figure 6). These words exemplify the multi-dimensional and interdisciplinary nature of EAFM, and the necessity to phase its implementation into a small number of manageable, easily understood and coordinated steps. The workshop highlighted that this kind of compartmentalized planning may be necessary to engage each tuna RFMO and begin developing a process, even though the ultimate goal of EAFM is to overcome fragmentation and integrate all components into a coherent and overarching EAFM management system.

FIGURE 6. EAFM word map illustrating the frequency of words cited by participants when asked to describe what EAFM means to them (Annex 4, Question 4)



In concluding the workshop, participants agreed that bringing together a mix of managers, scientists and other stakeholders with broad experience in RFMO processes to discuss EAFM was very informative. The open exchange of views that took place during the workshop was instrumental in clarifying and answering four critical questions that are precursors to advancing EAFM implementation in tuna RFMOs:

1. **What is EAFM?** The workshop agreed that the ecological component of EAFM implementation goes beyond the management of target and bycatch species, and that other ecosystem components (e.g. structure and function of food webs, FAD management, and marine debris) are already being addressed in tuna RFMOs to differing extents. There was also a general agreement that tuna RFMOs should continue focusing on operationalizing the monitoring, assessment and reporting of the ecological aspects under the EAFM umbrella until clear objectives are obtained from the Commissions on how EAFM’s social and economic aspects can best be considered.

2. **What are the obligations and incentives for implementing EAFM?** The workshop agreed that there are sufficient requirements, obligations and incentives in place to motivate the implementation of EAFM in tuna RFMOs. However, a Commission mandate to develop EAFM implementation plans in each tuna RFMO would make explicit the unique benefits (and costs) for each tuna RFMO.
3. **Who is responsible for implementing EAFM?** The workshop came to the realization that implementation of EAFM is not just about science, even though the Scientific Committees of the tuna RFMOs will play a key role in supporting and informing the process. EAFM should reflect each Commission's members' own visions, needs and priorities. Collaboration with relevant stakeholders such as the private sector, IGOs and NGOs can also play an important part in designing an appropriate plan for implementing EAFM.
4. **What immediate actions can be taken to progress EAFM?** There was a common understanding that improving existing data collection programmes and developing tools such as ecosystem indicators or models would be useful investments for future EAFM implementation. In order to create a more receptive tuna RFMO environment for EAFM implementation, the workshop recommended improving RFMO channels of communication (scientist–manager dialogue and within scientific groups), capacity building and greater collaboration with external stakeholders. The workshop agreed that the next immediate step would involve conveying the workshop results to each tuna RFMO's Commission with an invitation to consider initiating a process to develop an EAFM implementation plan according to their own modalities. Other ideas raised at the workshop to accelerate the adoption of EAFM implementation plans at tuna RFMOs were to convey to tuna RFMOs through available channels (e.g. Scientific Committee meetings, Commission meetings, etc.) the following messages, among others:
 - The need to secure time for the workshop report recommendations to be presented under an EAFM agenda item for upcoming Scientific Committee meetings and Commission meetings
 - Tasking FAO with presenting the report at all tuna RFMOs and integrating feedback into an evolving way forward
 - Reporting on the outcomes of the workshop at tuna-related international conferences
 - Organizing and/or supporting EAFM capacity building workshops activities (e.g. general background training courses as well as more technical courses on indicators and ecosystem modelling)

The ABNJ II Common Ocean Tuna Project could serve as a vehicle to bring discussions forward to tuna RFMO Commissions, preparing white papers for EAFM implementation to be presented at the Commission meetings.

The ABNJ II Common Ocean Tuna Project could also support and organize EAFM capacity building workshop activities and joint work across tuna RFMOs on the best ways to implement EAFM operationalization plans.

The ABNJ II Common Ocean Tuna Project could also support and contribute to more technical work on developing ecosystem indicators (selection, types, data sources, development, analysis and thresholds, with practical examples) and on ecosystem modelling for EAFM implementation.

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7. Annexes

7.1 Annex 1. Overview of the state of EAFM implementation in the five tuna RFMOs

Prior to the workshop a template with a series of questions aimed to summarize the state of affairs regarding the implementation of the EAFM was prepared. This template was circulated to all tuna RFMO Secretariats who were asked to prepare a 10-15 minutes presentation to summarize the state of affairs regarding the implementation of the EAFM in their respective tuna RFMOs (Table A1.1).

Table A1.1. Template prepared for tuna RFMO Secretariats

EAFM approaches in tuna RMOs
<p>EAF definition provided</p> <p><i>“The ecosystem approach to fisheries strives to balance fishery management objectives, by taking into account the knowledge and uncertainties about ecological, physical and human components of ecosystems and their interactions, and applying an integrated approach to fisheries.”</i></p>
<p>Section A - Institutional structure, mandate and strategic planning</p> <ol style="list-style-type: none"> 1. Has your RFMO accepted EAFM (see definition on first slide) in dealing with fisheries-related ecosystems. If not, why not? In a few words. 2. Does your RFMO's convention and/or management measures make explicit reference to EAFM? If yes, please provide a brief description. 3. Has your RFMO adopted a strategic vision and objectives to guide EAFM implementation? 4. Is there a subsidiary body within your RFMO structure responsible for providing ecosystem advice to the Commission and supporting the implementation of EAFM? If yes, please describe how the process works.
<p>Section B - Current status of EAFM implementation</p> <ol style="list-style-type: none"> 1. What ecosystem impacts of the fishing activity are monitored by your RFMO? 2. How is ecosystem advice provided to the Commission? Please provide two to three examples. 3. Are any indicators and reference points used to monitor the health of the ecosystem and inform fisheries management decisions? If there are, please describe them – if not, does your RFMO have any plans for developing them? 4. Provide two to three examples of ecosystem considerations in fisheries management responses. 5. Are socioeconomic factors accounted for under current fisheries management decision-making? If yes, please describe how this happens.

Section C - Success stories, main challenges and impediments implementing EAFM

1. What has worked well in implementing the EAFM? Please provide two examples.
2. What are the main challenges and bottlenecks affecting implementation of EAFM?
3. What needs to change to facilitate the implementation of EAFM?
4. In a couple of points, how would you summarize likely future approaches to EAFM within your RFMO?
5. How do you think this workshop and the ABNJ Project can most usefully contribute to the development of EAFM in tuna RFMOs?

Below we summarize the information presented and discussed at the workshop. This gives an overview of the state of EAFM implementation in tuna RFMOs and provides some examples of success stories, main challenges and impediments implementing EAFM.

BACKGROUND

CCSBT

- The Commission for the Conservation of Southern Bluefin Tuna (CCSBT) was established in 1993 and entered into force in 1994.
- The CCSBT is a single-species RFMO and has no Convention Area.
- It covers fishing for Southern Bluefin Tuna (SBT) wherever it occurs.
- All fishing for SBT currently occurs within the Convention Areas of IOTC, WCPFC and ICCAT.
- All CCSBT Members and Cooperating Non-Members (CNMs) are also members or CNMs of the other tuna RFMOs in which they fish (except for the Fishing Entity of Taiwan which is not able to be a Member/CNM of IOTC).
- By virtue of their Membership of the other tuna RFMOs, all CCSBT Member vessels must also comply with any management measures adopted by the tuna RFMO within whose Convention Area they are fishing.
- Secretariat in Deakin, Australia.

ICCAT

- The International Commission for the Conservation of Atlantic Tunas (ICCAT) is responsible for the conservation of tunas and tuna-like species in the Atlantic Ocean and adjacent seas.
- ICCAT was established in 1966 and its Convention Agreement entered into force in 1969, before the UN Convention on the Law of the Sea (UNCLOS) and the UN Fish Stocks Agreement (UNFSA) entered into force.
- There are currently 51 contracting parties and 5 cooperating non-contracting parties.
- Secretariat in Madrid, Spain.

IOTC

- The Indian Ocean Tuna Commission (IOTC) was formally established in 1993 (agreement entered into force in 1996) and is the direct successor of the work conducted under the Indo-Pacific Tuna Development and Management Programme (IPTP).

- The Agreement was negotiated prior to the conclusion and entry into force of the 1995 United Nations Fish Stocks Agreement.
- There are currently 32 contracting parties (4 cooperating non-contracting countries), and membership is open to all Indian Ocean coastal countries and to countries or regional economic integration organizations that are members of the UN and that actively conduct harvesting activities in the Convention Area.
- Secretariat in Victoria, Mahe, Seychelles.

IATTC

- The IATTC was established in 1949 and its Convention Agreement entered into force in 1950. Its Convention was replaced in 2008 by the Antigua Convention, which entered into force in 2010.
- The IATTC is responsible for the conservation and management of tuna and other marine resources in the eastern Pacific Ocean.
- The IATTC also has significant responsibilities for the implementation of the International Dolphin Conservation Programme (IDCP).
- There are currently 21 members and 4 cooperating non-members. Each member has up to 4 Commissioners appointed by the respective governments.
- Secretariat in La Jolla, San Diego, USA.

WCPFC

- The WCPFC was established in 2004 (post-UNFSA).
- Its mandate is highly migratory species, and it includes the world's largest single tuna fishery.
- Its Convention area covers 20% of the earth's surface and is responsible for around 55% of the world's tropical tuna catch.
- Its Commission bodies include a Northern Committee, a Scientific Committee (SC) and Technical and Compliance Committee (TCC), as well as ad-hoc working groups.
- There are 26 members, 7 territories and 7 cooperating non-members (CNMs).
- Secretariat in Pohnpei, FSM.
- There are 9 professional staff and 25 support staff.

Section A – Institutional structure, mandate and strategic planning

Q1. Has your RFMO accepted EAFM (see definition in Box1) in dealing with fisheries-related ecosystems. If not, why not? In a few words.

CCSBT

- The CCSBT has not held discussions in relation to the definition of EAFM.

IOTC

- The IOTC Agreement has no explicit mandate to address EAFM. EAFM has not been explicitly pursued or requested by the Commission to date.

ICCAT

- ICCAT has accepted EAFM but not fully implemented it. In addition to proposed Convention amendments, Res.15-11 states that ICCAT should apply an ecosystem-based approach to fisheries management.
- In practice, ICCAT has implemented many management measures to reduce the impact and mortality of non-target species that interact with fishing in the ICCAT area.

WCPFC

- No response

IATTC

- Initially, there was some reluctance to adopt EAFM because of the extent of its practical implications. In 2005 there was a proposed resolution entitled “*Ecosystem approach to fisheries management in the EPO*” that was rejected because of concerns by some members regarding “*complex and costly implementation, especially regarding the many species included in the different categories*”.
- The Antigua Convention then entered into force in 2010, and although EAFM is not explicitly mentioned, its components are found throughout the text of the Convention and arguably provides the Commission with the mandate to apply EAFM.
- As confirmed by the IATTC Director at the SAC workshop in 2015, EAFM is considered as being applied in practice: “The SAC considered the extent to which the Commission is applying an ecosystem management approach. The Director indicated that the Commission is already applying it as an approach, but not as a model.”

Q2. Does your RFMO's convention and/or management measures make explicit reference to EAFM? If yes, please provide a brief description.

CCSBT

- CCSBT Convention or management measures do not contain explicit references to EAFM. However, the CCSBT's Convention requires the Scientific Committee to report to the Commission “its findings or conclusions, including consensus, majority and minority views, on the status of the southern bluefin tuna stock and, where appropriate, of ecologically related species”. In the CCSBT's convention, “ecologically related species” means living marine species that are associated with southern bluefin tuna, including but not restricted to both predators and prey of southern bluefin tuna.

IOTC

- The IOTC Agreement makes no reference to EAFM. EA is mentioned in two CMMs. The WP on Ecosystem and Bycatch TORs includes EAFM.

ICCAT

- ICCAT has now a new Convention amendment which states “*the Commission and its Members shall act to: (a) apply the precautionary approach and an ecosystem approach to fisheries management in accordance with relevant internationally agreed standards and, as appropriate, recommended practices and procedures; (b) use the best scientific evidence available; and (c) protect biodiversity in the marine environment*”.

WCPFC

- The Convention does not make explicit reference to EAFM.
- However, the Convention does include EAFM elements. The WCPFC convention Article 5 specifically calls for an ecosystem approach to fisheries management: 5d – “assess the impacts of fishing, other human activities and environmental factors on target stocks, non-target species, and species belonging to the same ecosystem or dependent upon or associated with the target stocks...”, and also, 5f – “protect biodiversity in the marine environment”.IATTC
- The Convention does not make explicit reference to EAFM. However, the Antigua Convention does include EAFM elements.
- First in Article VII regarding functions of the Commission: “(a) promote, carry out and coordinate scientific research concerning the abundance, biology and biometry in the Convention Area of fish stocks covered by this Convention and, as necessary, of associated or dependent species, and the effects of natural factors and human activities on the populations of these stocks and species”; “(f) adopt, as necessary, conservation and management measures and recommendations

for species belonging to the same ecosystem and that are affected by fishing for, or dependent on or associated with, the fish stocks covered by this Convention, with a view to maintaining or restoring populations of such species above levels at which their reproduction may become seriously threatened.”

- In the Preamble: “considering the importance of fishing for highly migratory fish stocks as a source of food, employment and economic benefits for the populations of the parties and that conservation and management measures must address those needs and take into account the economic and social impacts of those measures.”
- And directing the IATTC scientific staff in Article XIII: “g) collect statistical data and all kinds of reports concerning catches of fish stocks covered by this Convention and the operations of vessels in the Convention Area, and any other relevant information concerning fisheries for such stocks, including, as appropriate, social and economic aspects.”

Q3. Has your RFMO adopted a strategic vision and objectives to guide EAFM implementation?

CCSBT

- CCSBT has not adopted a strategic vision and objectives to guide EAFM implementation, however, the CCSBT’s Strategic Plan does contain some items relating to EAFM implementation, including:
 - o That risks to ecologically related species caused by fishing for SBT are identified and appropriately managed (*medium/high priority*);
 - o Improve knowledge of SBT fisheries ecosystems (*medium/high priority*);
 - o Consideration of reviewing the Convention text to include management principles and/or standards (e.g. ecosystem-based management) (*medium priority*); and
 - o Review parameters for the Management Procedure that ensure the precautionary approach is applied and that ecosystem-based management is incorporated as appropriate (*medium priority*).

IOTC

- IOTC has not adopted a strategic vision and objectives to guide EAFM implementation. However, in 2019 the IOTC Commission did adopt the 2020–2024 Strategic Science Plan which contains an objective for advancing ecosystems-based management advice.

ICCAT

- ICCAT has not adopted a strategic vision and objectives to guide EAFM implementation, although the SCRS adopted the 2015–2020 Strategic Science Plan for the functioning and orientation of the SCRS at its workshop in 2014. Therein are objectives related to ecosystems associated with data collection, research opportunities, stock assessments, advice and communication. This document formed the basis for the Sub-Committee on Ecosystems to develop its own short-term and long-term EAFM-related objectives in 2016.
- ICCAT’s Sub-Committee on Ecosystems has a draft framework. And, in practice the Commission has imposed several regulatory instruments to limit the impact and mortality of both target species and bycatch species, especially sharks, birds and sea turtles.

WCPFC

- WCPFC has not adopted a strategic vision and objectives to guide EAFM implementation. However, the 2011 SC Strategic Research Plan does include explicit EAF/EBFM consideration, and more recently was included in the development of the Management Strategy Evaluation framework.
- The five-year Strategic Research Plan (2012-2016) included explicit EFM considerations: “The Commission has four overall research and data collection priorities:

- o Monitoring of fishing activities through the collection, compilation and validation of data from the fishery;
- o Monitoring and assessment of target stocks;
- o Monitoring and assessment of NTADS and of the pelagic ecosystems of the WCPO;
- o Evaluation of existing Conservation and Management Measures (CMMs) and of potential management options.”

IATTC

- IATTC has not adopted a strategic vision and objectives to guide EAFM implementation, yet the scientific staff of the Commission has developed a strategic plan for the 2019-2023 period, including sections regarding “*interactions among the environment, the ecosystem and fisheries*”.
- In accordance with the plan:
 - o “*The scientific staff’s mission is “to undertake state-of-the-art scientific research to inform sound management advice, aimed at the conservation and sustainable use of the marine species and ecosystems covered by the Antigua Convention.”*
 - o “The scientific staff’s vision includes, among others, the following two elements: “minimizing mortality of unutilized bycatch species, thus reducing impacts on the ecosystem” and “minimizing the impacts of fishing on the integrity and functioning of the ecosystem, while maintaining the profitable and sustainable use of target species”.

Q4. Is there a subsidiary body within your RFMO structure responsible for providing ecosystem advice to the Commission and supporting the implementation of EAFM? If yes, please describe how the process works.

CCSBT

- The subsidiary body responsible for providing advice to the Commission on ecologically related species (ERS) is the Ecologically Related Species Working Group (ERSWG).

IOTC

- Ecosystem-related issues are addressed by the IOTC WP on Ecosystems and Bycatch. The advice developed by the WP is fed to the Scientific Committee who in turn reports to the Commission on an annual basis.

ICCAT

- The Sub-Committee on Ecosystems is directly responsible for developing analysis and management recommendations as they pertain to non-target species including birds, turtles and marine mammals. The Sub-Committee on Ecosystems is also developing elements of an EAFM framework.

WCPFC

- The Scientific Committee has *Ecosystem and Bycatch SWG (SC1-SC5) / Ecosystem and Bycatch Mitigation Theme* in the plenary.

IATTC

- The organization of IATTC staff includes an “*Ecosystem subprogramme*” which is responsible for providing scientific recommendations on EAFM, but the *Scientific Advisory Committee (SAC)* also has responsibility.
- Both the IATTC scientific staff and the SAC can formally submit recommendations to the Commission for consideration. Once adopted by the Commission, the effectiveness of such measures would be evaluated by the same, while implementation by the CPCs would be reviewed by the IATTC Compliance Committee.

Section B – Current status of EAFM implementation

Q5. What ecosystem impacts of the fishing activity are monitored by your RFMO?

CCSBT

- The only ecosystem impacts of the southern bluefin tuna fishing activity that are monitored by the Commission is the impact on ecologically related species that interact with southern bluefin tuna fishing.
- There are specific reporting requirements for Members but no elements of these specifically concern ecosystem components apart from ecologically related species. ICCAT

ICCAT

- conducts a range of work on biometry, ecology and oceanography, with a principle focus on the effects of fishing on stock abundance, including stock assessment and Management Strategy Evaluation (MSE) for major target species of tunas, billfishes and some sharks. In addition, it does bycatch fisheries monitoring, including work on FADs, and live and dead discards. It has initiated impact evaluations of seabirds, sea turtle and bycatch shark species.

IOTC

- IOTC monitors catches of target and bycatch fish species as well as interactions with non-target species such as seabirds and marine turtles. Preliminary work has been conducted to monitor marine debris from purse seine fisheries. Research has been conducted to monitor and reduce the effect of FADs on the pelagic ecosystem.

WCPFC

- WCPFC has focused their work on developing single-species harvest strategy approaches and are now beginning to address multiple target species considerations. WCPFC members are at very different levels of development when it comes to applying the precautionary approach to target stocks.
- WCPFC monitors catches of target and bycatch fish species as well as interactions with non-target species such as seabirds and marine turtles, and is now applying bycatch mitigation measures with some success.
- The WCPFC is continuously fine-tuning bycatch mitigation measures and guidelines, particularly seabirds and sharks. For example, Mobula safe release guidelines were proposed this year.
- There has been recent progress in purse seine FAD monitoring and management.

IATTC

- IATTC has conducted formal stock assessments for key tuna and billfish species.
- Ecological Risk Assessments (ERA) are conducted to identify potentially vulnerable species that become a priority for data collection, management and conservation.
- Observers in the purse seine fishery monitor a large number of ecosystem components and report in detail regarding interactions with non-target species.
- IATTC also has examples of measures that deal with the disposal of plastics bags at sea (C-04-05) and the deployment/retrieval of FADs (C-17-02; C-19-01).

Q6. How is ecosystem advice provided to the Commission? Please provide two to three examples.

CCSBT

No response

ICCAT

- EAFM-related research and advice is provided to the Commission via the SCRS (via the Sub-Committee on Ecosystems). The Scientific Committee Chair presents the recommendations and advice from the Sub-Committee on Ecosystems at the Commission workshop.
- Several Ecological Risk Assessments (ERAs) have been conducted to identify potentially vulnerable species that become a priority for data collection, management and conservation. For example, in 2011 the Sub-Committee on Ecosystems carried out an Ecological Risk Assessment for major seabird species in the Atlantic. In 2008, the SCRS provided an Ecological Risk Assessment for 11 shark species in the ICCAT area, and there is now a dedicated working group for shark stock assessments.
- The Sub-Committee on Ecosystems has recently started developing an indicator-based ecosystem report card which aims to assist the Commission in incorporating ecosystem considerations into their management decisions. ICCAT provided a first draft ecosystem report card for consideration by the Commission.

IOTC

- EAFM-related research and advice is provided to the Commission via the Scientific Committee (via the Working Party of Ecosystems and Bycatch). The Scientific Committee Chair presents the recommendations and advice from the WPEB at the Commission workshop.

WCPFC

- EAFM-related research and advice presented to annual workshops of the Commission and Scientific Committee which includes a specific Ecosystems and Bycatch Theme.

IATTC

- Both the scientific staff and the SAC adopt and submit recommendations to the Commission, and either implement or review them once they have been endorsed by the Commission. The same process applies to other subsidiary bodies (e.g. Working Group on Bycatch).
- Some examples of ecosystem-based advice include: (a) Dolphin Mortality Limits (DML) are established for dolphin species annually; and (b) for identified vulnerable bycatch species, recommendations for mitigation measures are made such as resolutions on best release practices for mobulid rays in the purse seine fishery, and a resolution on silky shark retention prohibition in purse seine fishery.

Q7. Are any indicators and reference points used to monitor the health of the ecosystem and inform fisheries management decisions? If there are, please describe them – if not, does your RFMO have any plans for developing them?

CCSBT

- No indicators or reference points have been agreed for any ecosystem components, and there are no current plans to develop such indicators or reference points.

ICCAT

- All major species of tunas, billfishes and sharks are managed on an MSY basis.

- The Sub-Committee on Ecosystems has a series of indicators under development for the following ecosystem components including habitat, trophic levels, mammals, , seabirds, sea turtles, assessed/not assessed stocks, sharks, environment and socioeconomic factors.IOTC

IOTC

- No indicators or reference points have been agreed for any ecosystem components other than for major species of tunas and billfishes. The concept of developing ecosystem indicators is being discussed by the WPEB, but these discussions are at an early stage and no indicators have been agreed. Socioeconomic indicators resulting from the IOTC funded socioeconomic pilot study have been recently presented to the Commission.

WCPFC

- All major species of tunas, billfishes and sharks are managed on an MSY basis.
- Some ecosystem indicators have been developed, mostly for bycatch and shark species. Developing these as specific indicators in an EAFM approach was revisited by the SC in 2016, but this has not yet been adopted.
- WCPFC's Harvest Strategy Framework includes explicit reference to target fishery, social, economic and ecosystem issues.

IATTC

- Observers in the purse seine fishery have monitored a large number of ecosystem components over the last 20 to 30 years. The IATTC monitors multiple bycatch and ecosystem level indicators regarding interactions between the purse seine fishery with non-target species and broader ecosystem, and for some of them it has also established some reference limits. Some examples are provided below:
- For dolphins, there is a Stock Mortality Limit (10% of minimum abundance estimate) and Dolphin Mortality Limit (DML) by vessel (DML < 1997 DML)
- From 2010, the mean trophic level of the catch has been calculated manually back to 1993.
- Since 2017, the Eastern Tropical Pacific ecosystem model (Olson & Watters, 2003) has been updated annually with effort, catch & discard data to produce 6 ecological indicators. However, this research is not yet used to guide management, though it is planned.
- In 2017, staff developed a new ERA approach called Ecological Assessment of the Sustainable Impacts of Fisheries (EASI-Fish) for data-poor bycatch species. This approach provides traditional reference points (F_{MSY} , $F_{0.1}$, $SPR_{40\%}$) for "vulnerability status". This will be used to identify and monitor vulnerable species and guide their management.

Q8. Provide two to three examples of ecosystem considerations in fisheries management responses

CCSBT

- CCSBT's primary conservation measure for ecologically related species (ERS) is its "*Resolution to Align CCSBT's Ecologically Related Species measures with those of other tuna RFMOs*". This is a binding measure that was adopted in 2018. It is intended to minimize the impact of fishing for SBT on ERS. It also ensures that CCSBT's measures are harmonized with the measures of the tuna RFMOs in whose Convention Areas SBT is being fished by requiring CCSBT Members to implement specific ERS measures of those RFMOs. What's more, it is focused on ERS that may be relevant to the SBT fishery, particularly seabirds, sharks, sea turtles and cetaceans. The Secretariat is tasked with annually updating the list of measures contained in the Resolution for any decisions taken on ERS by the IOTC, WCPFC and ICCAT for consideration by the Extended Commission.

ICCAT

- Target species are managed with stock assessments and MSY-based reference points.
- ICCAT has directly responded with mitigation measures for stocks/species when there were conservation concerns to reduce mortality.
- For the major tuna and major shark species there are policy instruments in place that include spatial protections, gear and size limits, and quota management.
- As least 40 other recommendations pertaining to data collection, assessment, management, and compliance issues related to non-target species particularly, birds, turtles and sharks.

IOTC

- Target tuna species are managed with stock assessments and MSY-based reference points.
- Most ecosystem considerations are related to non-target species and FAD management.
- Some examples of fisheries management measures include: (a) a mobulid ray conservation measure, (b) a BioFAD experiment that was adopted as Res 18/04, and (c) science-based advice on the conservation of sharks that was adopted as Res 17/05.

WCPFC

- As of 2016, over 20 fishery-related CMMs, including target and non-target or associated or dependent species (NTADS).
- Target tunas species are managed with stock assessments and MSY-based reference points.
- Most ecosystem considerations are related to non-target species and FAD management. Examples of measures include target and non-target fish species, FADs and catch retention, sharks in general, oceanic whitetip, whale shark, silky shark, seabirds, sea turtles, cetaceans and shipborne pollution.

IATTC

- Below are three examples of how ecosystem considerations are incorporated into fisheries management responses.
- Example 1: An increase in FAD effort, putting pressure on small BET & YFT. Based on stock assessment and indicators of stock status, scientific staff proposed a cap on FAD & NOA sets (15,837 sets per year, FAD sets increase by 1% per year, NOA sets decrease accordingly).
- Example 2: Ecosystem model projections supported stock assessment model, strengthening the case for an effort cap. Proposal not yet adopted. Shows potential for EAFM tactical management.
- Example 3: Use of EASI-Fish to explore plausible CMMs for mobulids as a case study for EPO data-poor bycatch species. Several options have been examined, including EPO-wide closure, 'hotspot' closures, improvement of release practices, and a combination of hotspots and post-release mortality (PRM).

Q9. Are socioeconomic factors accounted for under current fisheries management decision-making? If yes, please describe how this happens.

CCSBT

- Socioeconomic factors are not explicitly accounted for under current fisheries management decision-making. However, these factors have occasionally been raised during discussions on quota allocation.

ICCAT

- Socioeconomic factors are not formally accounted for under current fisheries management decision-making, but contracting parties take socioeconomic aspects into consideration in their discussions and allocation decisions.

IOTC

- Socioeconomic factors are not explicitly accounted for. However, the IOTC Commission passed Res 18/09 on a Scoping Study of Socioeconomic Data and Indicators of IOTC Fisheries. The study was conducted, but the CPC response was poor. The process is currently awaiting further buy-in from all Member States.

WCPFC

- The WCPFC Article 6 referring to the precautionary approach mentions “socioeconomic conditions”.
- As with other tuna RFMOs, the WCPFC has concentrated on biological science and has not done much at the Commission level to address the economic and social aspects of the EAFM.
- WCPFC is currently developing guidelines for the voluntary provision of economic data to WCPFC.
- Regarding the economic aspects, the SC12 in 2016 recommended that (a) an annual update of “Analyses and projections of economic conditions in WCPO fisheries”, in a similar manner to SC12-ST-WP-04, continue to be provided at SC workshops; (b) these economic analyses be made available to, and be used by, the Commission in the development of harvest strategies and management measures; and (c) the SC13 considers *Guidelines for the voluntary submission of economic data to the Commission* by CCMs, recognizing the value of economic data to the work of the Commission.

IATTC

- Socioeconomic aspects are reflected in the Antigua Convention (preamble) “...that conservation and management measures must address those needs and take into account the economic and social impacts of those measures”. The scientific staff is expected to collect statistical data on catches and the operations of vessels, “and any other relevant information concerning fisheries for such stocks, including, as appropriate, social and economic aspects” (Article 13).
- In practice, socioeconomic factors are not included systematically in decision-making processes, but referred to in some resolutions (C-02-03 fleet capacity).
- Socioeconomics are considered for specific issues. In recent years, the capacity of the fleet was considered through a traditional approach (e.g. buyback schemes) or more innovative approaches (e.g. economic incentives to reduce the capacity or to mitigate the negative consequences of its current overcapacity).

Section C – Success stories, main challenges and impediments implementing EAFM

Q10. What has worked well in implementing the EAFM? Please provide two examples

CCSBT

- EAFM implementation has not been explicitly discussed in CCSBT; however, there are some activities that fall under the umbrella of EAFM implementation. For example:
 - CCSBT has succeeded in developing and operationalizing management strategy evaluation for southern bluefin tuna.

ICCAT

- There are many ongoing relevant activities that fall under the umbrella of EAFM implementation. For example:
 - Single-species management, including MSE development that defines management procedures applied to select stocks. This is an important element for reducing ecosystem impacts.

- o ICCAT has also a long track record using ecological risk assessments (ERAs) to put in place measures to (partially) address impact and mortality imposed on non-target sea birds, marine turtles and sharks.
- o ICCAT has adopted several measures for banning the retention of several selected species (e.g. porbeagle shark).

IOTC

- There are many ongoing relevant activities that fall under the umbrella of EAFM implementation. For example:
 - o There are some measures addressing key elements of the ecosystem which have led to management interventions on some key aspects (e.g. measures to implement mitigation practices to reduce fishing impacts on non-target species).

WCPFC

- There are many ongoing relevant activities that fall under the umbrella of EAFM implementation. For example:
 - o A WCPFC strength is the availability of standardized data across the region, and other basic elements are also being developed (e.g. tissue bank and FAD data collection).
 - o Many ad-hoc EAFM practices (e.g. bycatch mitigation, FAD-tracking and provision of economic data to the commission).
 - o There is a CMM that addresses the discarding of fishing gear and pollution at sea.
 - o There are guidelines for the voluntary provision of economic data
 - o The development of a Shark Research Plan to improve shark data and assessments.
 - o The development and use of SEAPODYM to examine the potential effect of different fishing and environmental/climate change scenarios on target stocks

IATTC

- There are many ongoing relevant activities that fall under the umbrella of EAFM implementation. For example:
 - o Multi-species harvest control rule (HCR) for the tropical tuna (YFT, BET and SKJ; F-multiplier of species to define duration of EPO closure).
 - o Adoption of several bycatch mitigation measures as a result of the collection of reliable scientific data by trained observers.
 - o Although ecosystem models and EASI-Fish were only introduced in 2018-19, they have clearly shown how their outputs may be used to formally implement EAFM if specific reference points can be agreed upon by IATTC Members.

Q11. Are socioeconomic factors accounted for under current fisheries management decision-making? If yes, please describe how this happens.

CCSBT

- There has not been sufficient discussion of EAFM implementation within the CCSBT to indicate what the main challenges may be for implementing EAFM within the CCSBT.
- The single-species nature of the CCSBT, its lack of a Convention Area and the complete overlap of the fishing area for SBT with the Convention Areas of the other tuna RFMOs are likely to give rise to unique challenges in developing and agreeing an appropriate EAFM strategy for the CCSBT.
- Historically, these issues have caused some difficulties in achieving consensus among Members as to the role of CCSBT in addressing issues beyond those stated in the CCSBT Convention's single objective "to ensure, through appropriate management, the conservation and optimum utilization of southern bluefin tuna".

ICCAT

- Lack of mandate;
- Lack of resources (in scientist's and commissioner's time);
- Clear policy on what EAFM is (and isn't). What and how to include in the decision-making.

IOTC

- The lack of a key mandate from the Commission, as well as finding agreement on how best to proceed;
- Lack of clear management operationalized objectives;
- Lack of data spatially disaggregated to support development of ecosystem indicators;
- Insufficient expertise, capacity and critical mass;
- Data gaps and modelling difficulties to support ecosystem modelling;
- Lack of political will from CPCs.

WCPFC

- No major driver at the moment. No agreed way forward at WCPFC level.
- Ecosystem indicators need to be chosen, and form part of management at the RFMO level.
- Not enough time and resources devoted to EAFM-specific projects, and their inclusion in the developing MSE framework.
- The uptake of key data collection initiatives and the complexity of workshop agendas are key bottlenecks.
- WCPFC is currently still at the "Develop Management Systems" stage of the EAFM process.

IATTC

- Reluctance of some Members to adopt the full extent of EAFM. The "tuna commission" is not an "ecosystem commission", so tunas are seen as a priority.
- Full EAFM implementation requires meaningful metrics of nebulous social and cultural constructs (e.g. "well-being", "quality of life" and "cultural values").
- Full EAFM implementation also requires meaningful metrics for seemingly simple concepts like "biodiversity". Depending on the definition of biodiversity (e.g. species richness, species diversity, genetic diversity, ecosystem structure and function), there will be different data and funding requirements.

Q12. What needs to change to facilitate the implementation of EAFM?

CCSBT

- There has not been sufficient discussion of EAFM implementation within the CCSBT to indicate what needs to change to facilitate its implementation.

ICCAT

- Continue enhanced dialogue between scientists and managers.
- Develop capacity to define, demonstrate and consider trade-offs produced by considering interaction of multiple species and other factors in decision-making.

IOTC

- Explicit instructions from the Commission to organize its activities under an EAFM framework. IOTC working parties may need to adjust their focus.
- Data collection and capacity building – Commission/CPCs level.

- Further ecosystem indicators and ecosystem model development – CPCs and SC level.
- A change in science structure: perhaps a WP dedicated to ecosystem considerations.

WCPFC

- A common understanding of the specific term EAFM.
- Development of specific EAFM guidelines at the UNFSA Informal Consultation next April. Presumably in the same way as Annex II of the UNFSA provides guidance on the implementation of the precautionary approach.

IATTC

- Clearer operational objectives of EAFM.
- Define the desired ecosystem state (target and limit reference points for ecosystem state).
- Address the enormous data deficiencies in hard-to-sample fisheries (e.g. artisanal, recreational and indigenous) even for basic social, economic and catch data. • Each tuna RMFO will need a range of in-house expert staff for supporting EAFM implementation, including social scientist, fisheries economist and physical oceanographer/climatologist.
- Buy-in from managers, commissioners and stock assessment scientists. Ecosystem issues continue to be perceived as too complex, expensive and time-consuming to tackle on top of target species issues. Scepticism of ecosystem model reliability continues, yet the EAFM is too complex to handle holistically without the use of ecosystem models, and ecosystem models are no longer considered “toys” if sufficient data is available.

Q13. In a couple of points, how would you summarize likely future approaches to EAFM within your RFMO?

CCSBT

- There has not been sufficient discussion of EAFM implementation within the CCSBT to indicate what the likely future approaches to EAFM may be within the CCSBT.

ICCAT

- Complete and validate the full suite of ecological indicators.
- Coordinate and implement a plan to provide science advice as it pertains to the conservation of other species that are dependent on or associated with ICCAT species. Support for specific case studies by region or species.
- External collaborations. Integrate SC-ECO with species groups.

IOTC

- Ongoing – albeit without a formal EAFM structure. Continued definition of ecoregions to organize data. Agreement on key indicators for ecosystem monitoring. Development of appropriate/useful ecosystem report cards. Education on how to implement EAFM would be needed. Increased understanding of socioeconomic factors.

WCPFC

- Progress SC15-MI-WP-04 on “mixed fishery and multi-species issues in harvest strategy evaluations”. FFA members favour the hierarchical approach in this paper, and this may have prospects for incrementally adding non-target species into fishery control rules. FFA members favour an incremental approach by controlling effort on target stock to achieve the TRP and secondary targets trigger action if they hit the buffers. There is a prospect of adding associated species into this multispecies approach, using appropriate limit reference points that “keep populations above levels at which reproduction may be seriously threatened” (Article 10c) –

possibly as qualified by relevant environmental and economic factors including SIDS special requirements (Article 5).

- Our understanding of the EAFM is of three pillars – biological/physical, economic and social. Tuna RFMOs are set up for region-wide stock maintenance – but social and economic issues are more heterogeneous. Shared regional/national implementation may be more appropriate – t-RFMO + EEZ measures. (FFA SIDS have been applying EAFM as the basis for the last round of national tuna management plans, for example. We look to the region to set the framework for ensuring the overall health of the stock, but most of the action for achieving the national share of that responsibility is national. The t-RFMO may not have to implement ALL of EAFM, but split the responsibility with members.)
- Climate change is a policy issue at the highest level for Pacific SIDS. EAFM is about what fisheries managers can control – fishery impacts on biological/physical, economic and social ecosystem. It can't control environmental impacts on fishery – it can only inform other processes. How to tackle climate change impacts on tuna fisheries?

IATTC

- Strong science base, available ecosystem, social and economic indicators that could potentially be used for management advice.
- But EAFM objectives need to be clearer (see previous slide).

Q14. How do you think this workshop and the ABNJ Project can most usefully contribute to the development of EAFM in tuna RFMOs?

CCSBT

- No response

ICCAT

- Develop best practices for implementing EAFM that can help guide future tuna RFMO efforts.
- Invest in a joint scientist–manager project to illustrate some of the cross-taxa trade-offs involved in applying management measures to specific case studies.

IOTC

- Provide guidelines on what are the benefits of operating under an EAFM framework, what are the key elements of an EAFM framework and how might IOTC's implementation of the EAFM be assessed.

WCPFC

- No response

IATTC

- Specify EAFM objectives and how to operationalize them.
- Make the objectives (e.g. ecosystem reference points) consistent across RFMOs. Important for adjacent RFMOs (e.g. WCPFC and IATTC)

7.2 Annex 2. Participants list

Name	Affiliation/Country
Agustinus Anung Widodo	Research Institute for Marine Fisheries, Ministry of Marine Affairs and Fisheries, Indonesia
Alberto Martin	Marine Stewardship Council
Alejandro Anganuzzi	FAO
Alena Goebel	FAO
Alessandro Buzzi	WWF
Ana Justel	ISSF
Bernal Alberto Chavarría Valverde	Dirección General de Pesca y Acuicultura, Secretaría de Agricultura y Ganadería, Honduras
Brad Wiley	IATTC
Christopher O'Brien	IOTC
Deirdre Warner-Kramer	Office of Marine Conservation (OES/OMC), U.S. Department of State
Emelie Martensson	FAO
Fabio Hazin	Universidade Federal Rural de Pernambuco - UFRPE, Brazil
Francisco Leotte	Thai Union
Gary Melvin	Fisheries and Oceans Canada, Canada
Guillermo Morán	Tuna Conservation Group TUNACONS
Guillermo Ortuño	Nicholas School of the Environment, Duke University
Gustaf Daud Sirait	Coordinator Multilateral Affairs of Indonesia Embassy
Hilario Murua	ISSF
Hussain Sinan	Dalhousie University, Canada
Ian Cartwright	FAO consultant
Joe Scutt Phillips	FAME (SPC Division of Fisheries, Aquaculture and Marine Ecosystems)
Kathrin Hett	FAO
Mandy Karnauskas	NOAA, USA
Maria Jose Juan Jordá	FAO consultant
Mariano Koen Alonso	Fisheries and Oceans Canada, Canada
Miguel Herrera	OPAGAC
Morley Knight	International Fisheries Consultant

Naohito Okazoe	Embassy of Japan in Italy
Nathan Taylor	ICCAT
Rui Coelho	IPMA, Portugal
Sachiko Tsuji	National Research Institute of Far Seas Fisheries, Japan
Sampan Panjarat	Department of Fisheries, Thailand
Serge Garcia	IUCN-CEM-FEG, International expert
Shane Griffiths	IATTC
Shiham Adam	Ministry of Fisheries and Agriculture, Maldives
Shingo Ota	Fisheries Agency of Japan, Japan
Terra Lederhouse	NOAA Fisheries Office of International Affairs and Seafood Inspection, USA
Tim Adams	Forum Fisheries Agency
Valerie Allain	FAME (SPC Division of Fisheries, Aquaculture and Marine Ecosystems)
Wetjens Dimmlich	Forum Fisheries Agency

7.3 Annex 3. Workshop agenda

SESSION	TIME
TUESDAY, 17 SEPTEMBER	
Registration	9:30-10:00
Welcome	10:00-10:30
opening	
workshop objectives - operationalizing EAFM in a RFMO context (Alejandro Anganuzzi)	
agenda and workshop format	
polling exercise	
Coffee break	10:30-11:00
SESSION 1: PERCEPTIONS ABOUT EAFM AND ITS IMPLEMENTATION IN TUNA RFMOS	11:00-12:30
what is EAFM?	
an overview of the pre-workshop online survey	
group discussion	
Lunch	12:30-14:00
SESSION 2: RECOGNIZING INCENTIVES FOR IMPLEMENTING EAFM IN TUNA RFMOS	14:00-15:30
international instruments, guidelines and processes as drivers to implement EAFM and emergent requirements (Fabio Hazin)	
MSC approach to ecosystem fisheries management: increasing public perception and demand for sustainable certified products (Alberto Martin)	
the opagac road to certification in the context of EAFM (Miguel Herrera)	
coffee break	15:30-16:00
session 2: continuation	16:00-17:30
ISSF – a journey towards sustainable tuna fisheries (Hilario Murua)	
panel discussion (presenters)	
summary and conclusions day 1	

SESSION	TIME
WEDNESDAY, 18 SEPTEMBER	
SESSION 3: RECOGNIZING ONGOING EFFORTS BY TUNA RMFOS AND THEIR KEY CHALLENGES IN IMPLEMENTING EAFM	9:00-10:30
RFMO presentations on EAFM implementation	
CCSBT	
IATTC	
ICCAT	
IOTC	
coffee break	10:30-11:00
session 3: continuation	11:00-12:30
WCPFC	
panel discussion: main challenges and impediments in EAFM implementation (presenters)	
lunch	12:30-14:00
session 3: continuation	14:00-15:30
guidelines for session 3 break-out group activity	
break-OUT group activity	
break-OUT group presentations	
coffee break	15:30-16:00
session 3: continuation	16:00-17:30
break-out group presentations	
summary and conclusions day 2	

THURSDAY, 19 SEPTEMBER

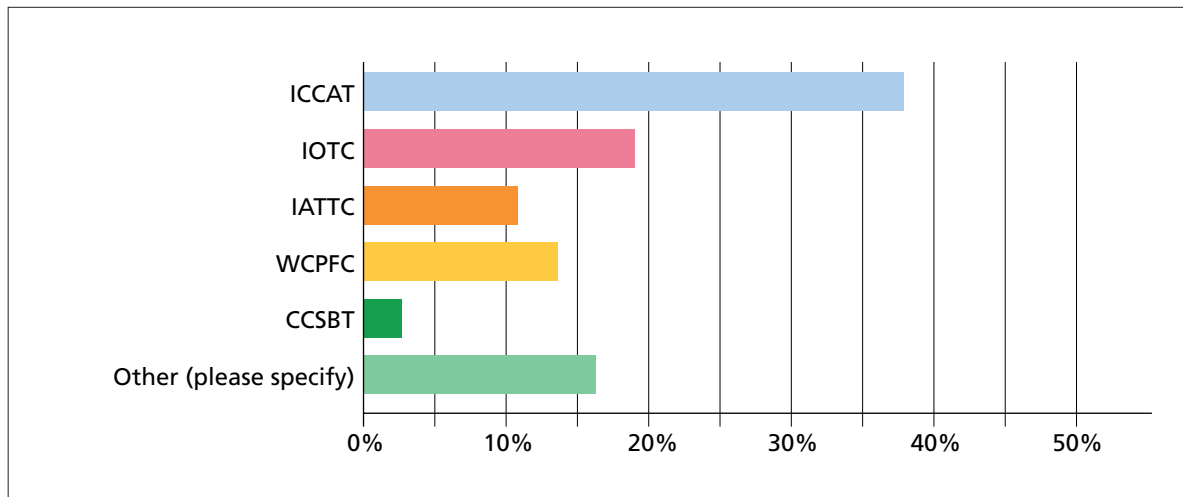
SESSION 4: OPTIONS FOR PROGRESS. HOW CAN WE MAKE EAFM MORE FUNCTIONAL AND EFFICIENT IN TUNA RFMOS?	9:00-10:30
options for progress	
EAFM – a historical perspective (Keith Sainsbury)	
options for EAFM implementation (Maria Jose Juan Jorda, Sachiko Tsuji)	
guidelines for session 4 break-out group activity on potential solutions	
coffee break	10:30-11:00
potential solutions	11:00-12:30
break-out group activity	
lunch	12:30-14:00
break-out group presentations with discussions	14:00-15:30
coffee break	15:30-16:00
next steps	16:00-17:30
group discussion	
workshop summary and conclusions	

7.4 Annex 4. Pre-workshop survey results

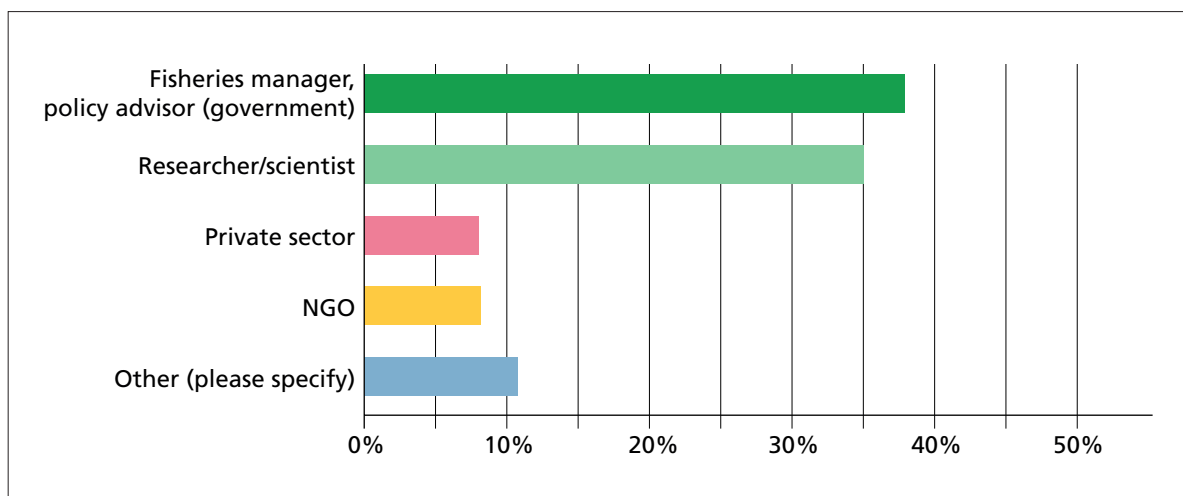
A pre-workshop online survey with 15 questions was prepared and distributed to all participants a month before the workshop took place. The objective of the survey was to gather information to better understand prevailing perceptions about the implementation of EAFM, and to get the participants' views on current practices, in the context of tuna Regional Fisheries Management Organizations (RFMOs).

The results of these surveys were presented in the workshop and are summarized below. The response rate among participants was 95% (37 responses), and the average time spent by each participant on completing the survey was around 16 minutes. These survey results provided a useful starting point for discussions throughout all the workshop sessions.

Q1. Which RFMO are you most familiar with. Select one.

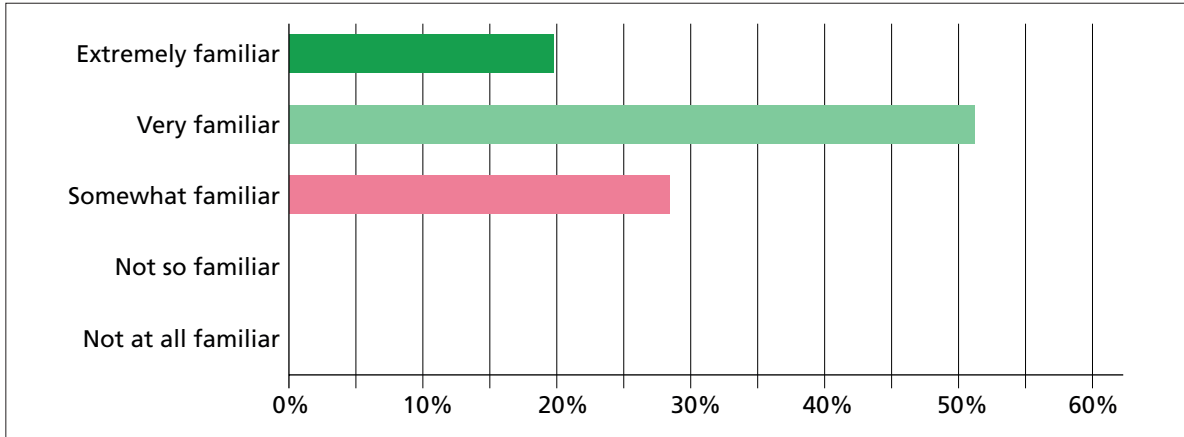


Q2. What is your role?



Part A – Your views on EAFM as a concept and a process

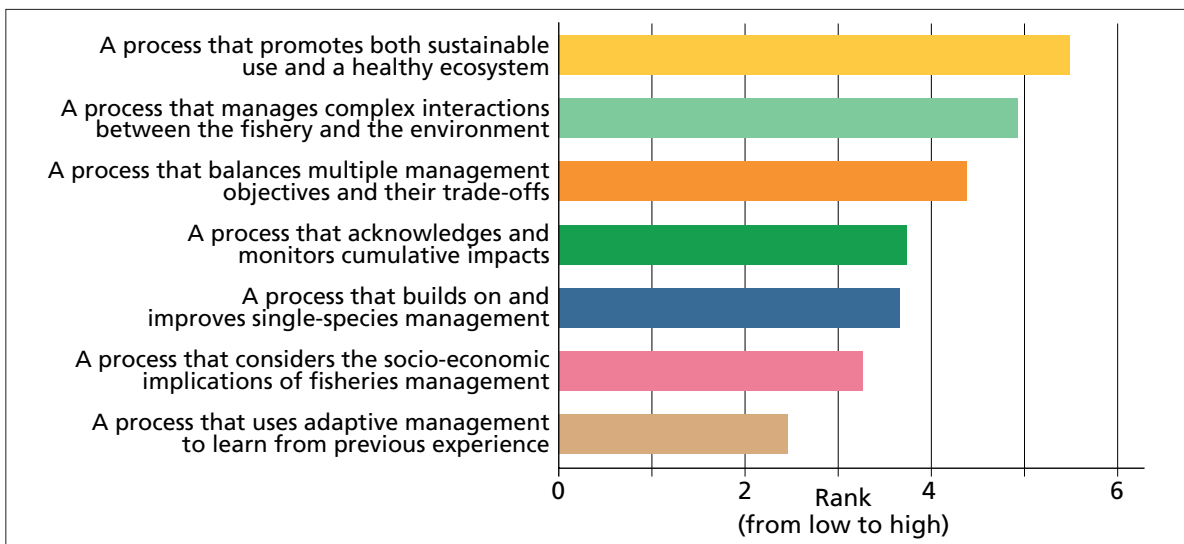
Q3. How familiar are you with the EAFM concept and its implementation? Please rate your level of familiarity.



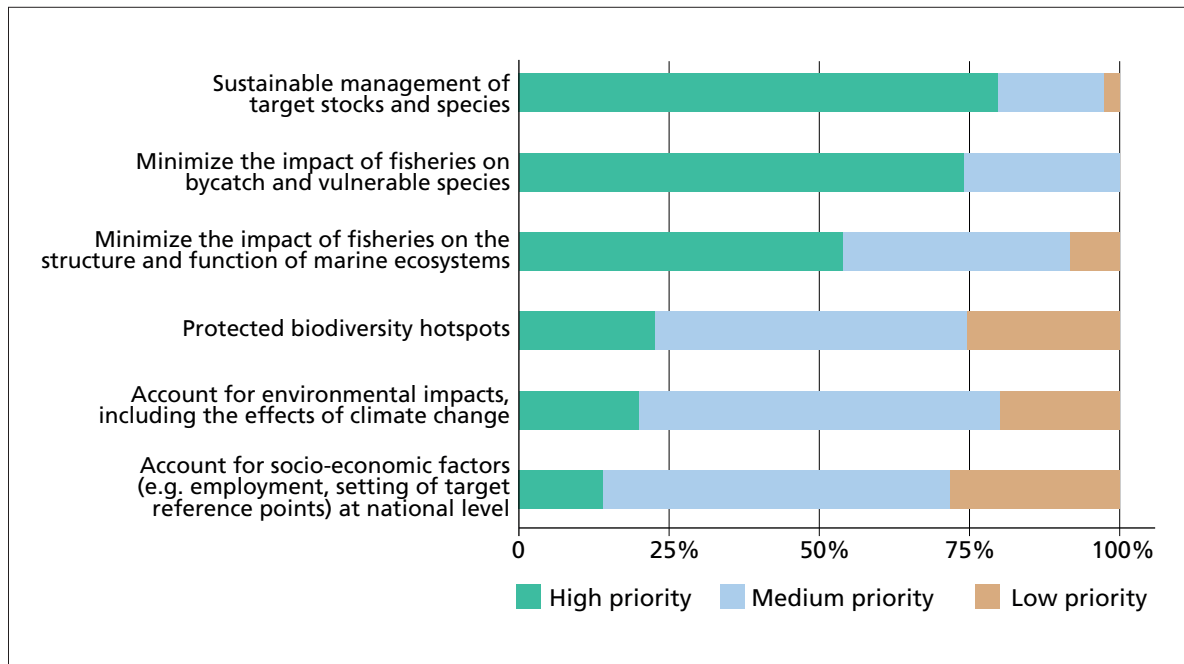
Q4. List three words that come to your mind when you hear the term “Ecosystem Approach to Fisheries Management”.



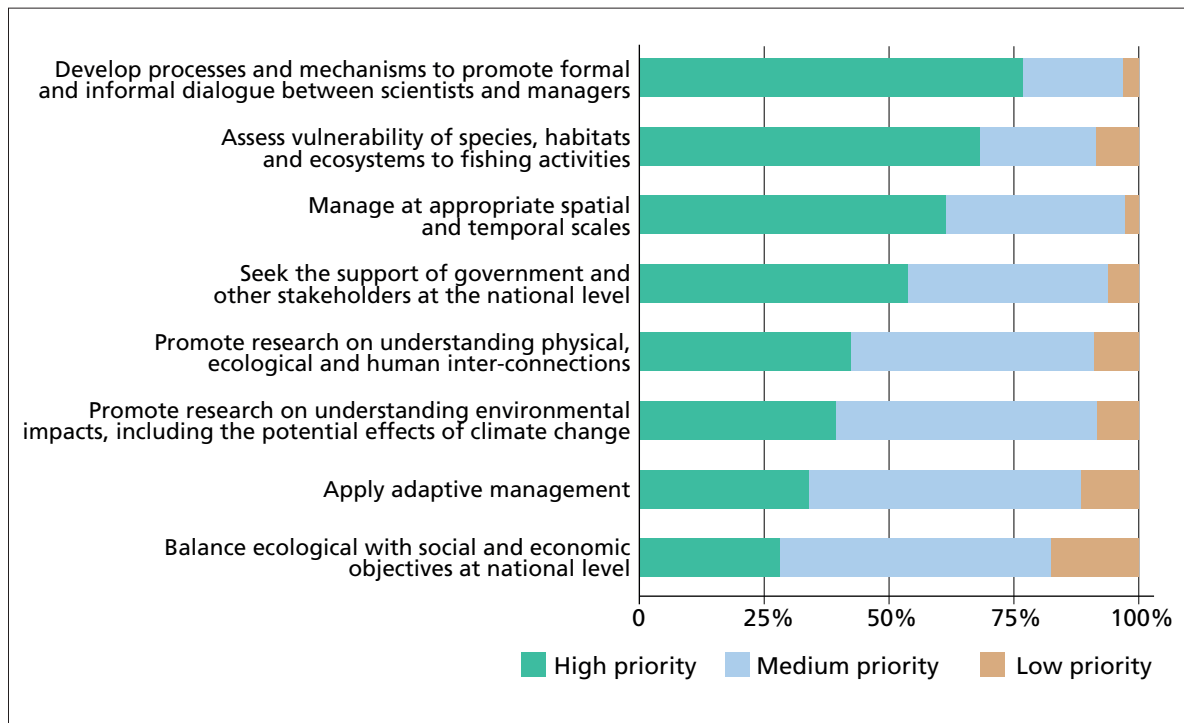
Q5. The following are common ways used to describe EAFM in international guidelines, policy and vision statements. Please rank your view on their relevance (from highest to lowest) when describing EAFM as a process in the context of t-RFMOs?



Q6. How you would prioritize the following key objectives for the implementation of EAFM in the context of t-RFMOs?

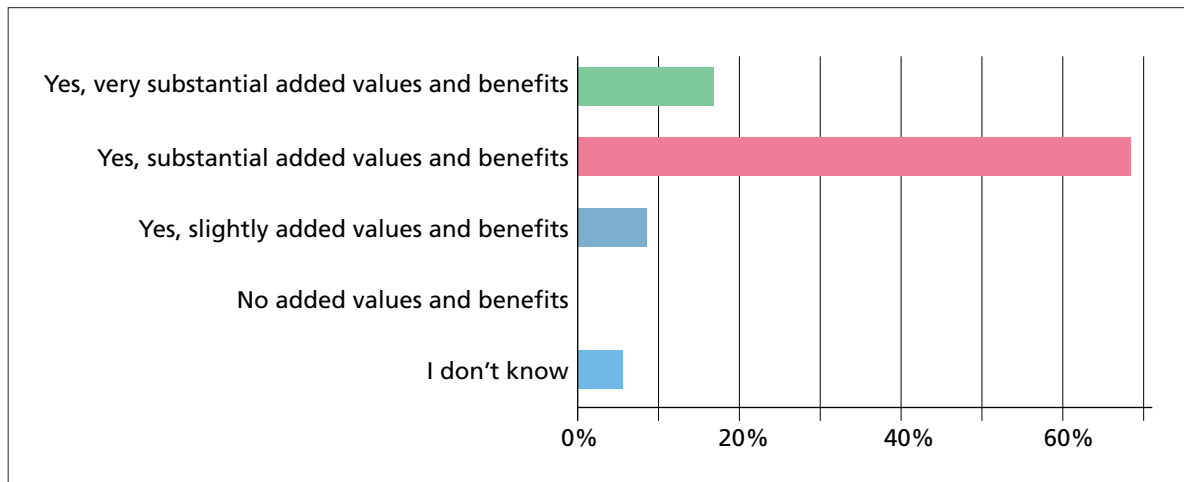


Q7. What priority would you give to the following actions or activities to facilitate the implementation of the EAFM in the context of t-RFMOs?

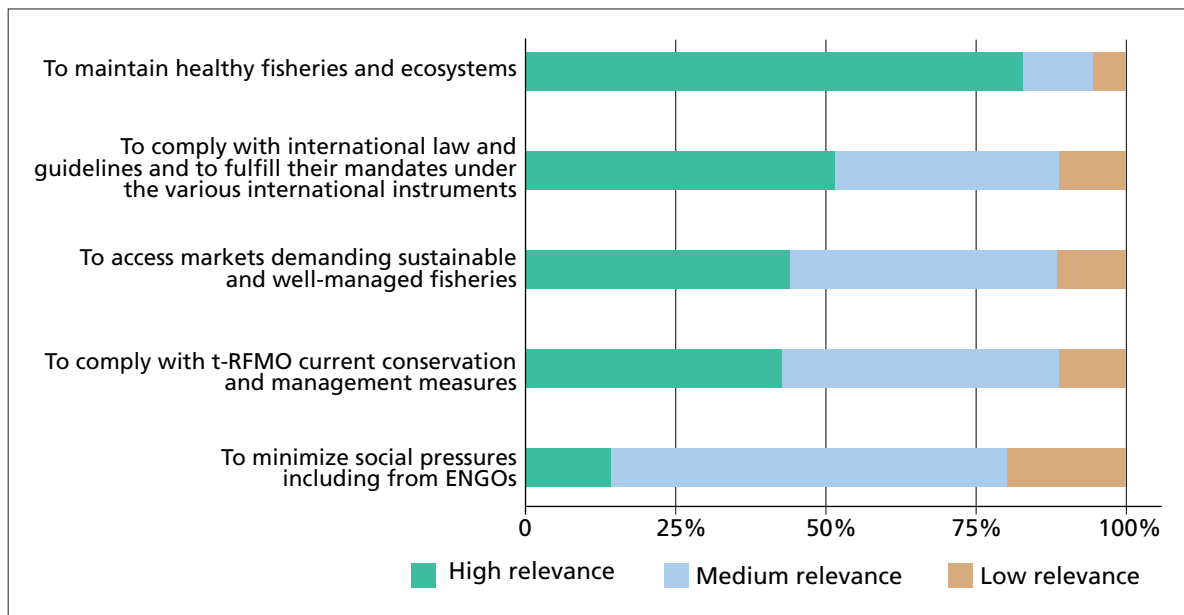


Part B – The main drivers and benefits of implementing the EAFM

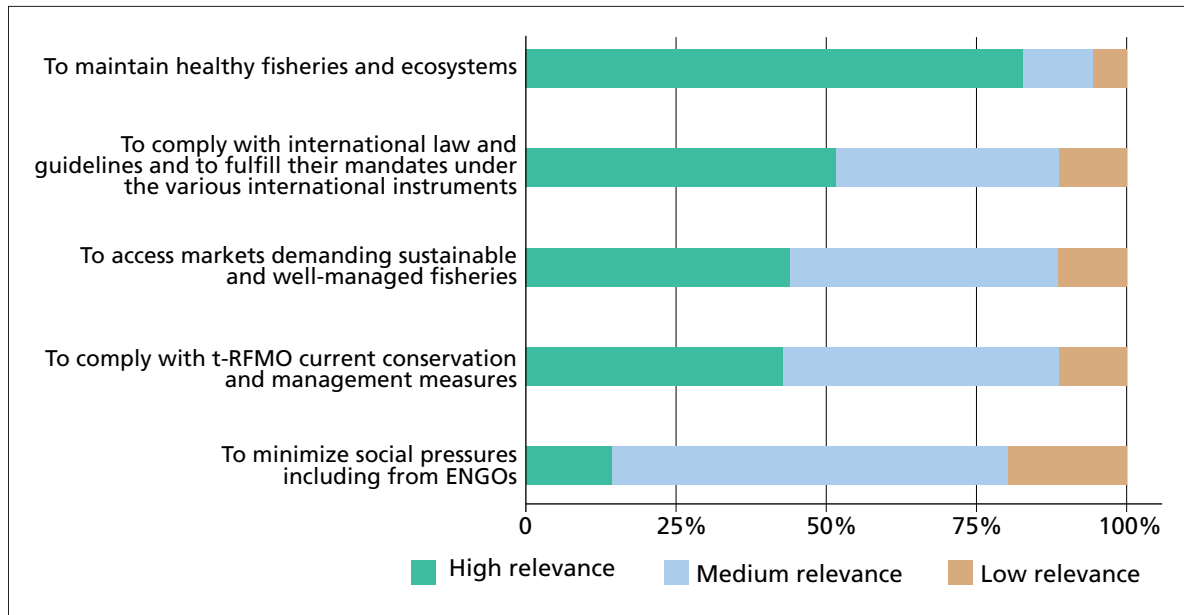
Q8. Will implementing the EAFM in t-RFMOs bring substantial added value and benefits?



Q9. How would you rank the following main driving forces behind the implementation of EAFM in t-RFMOs?

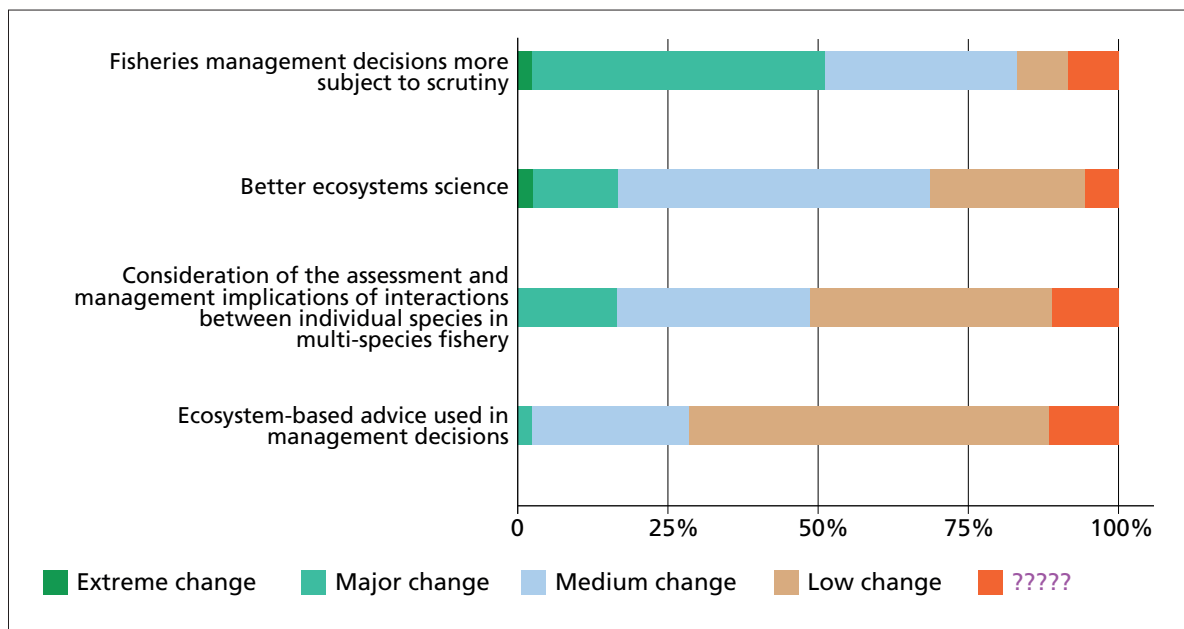


Q10. How likely do you think the following potential benefits are from implementing EAFM in t-RFMOs?

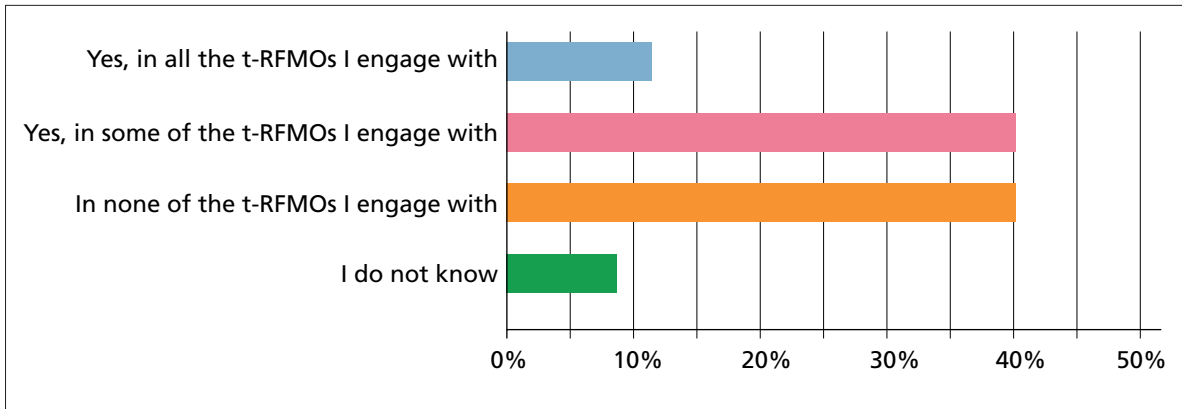


Part C – Current practices and main challenges implementing EAFM

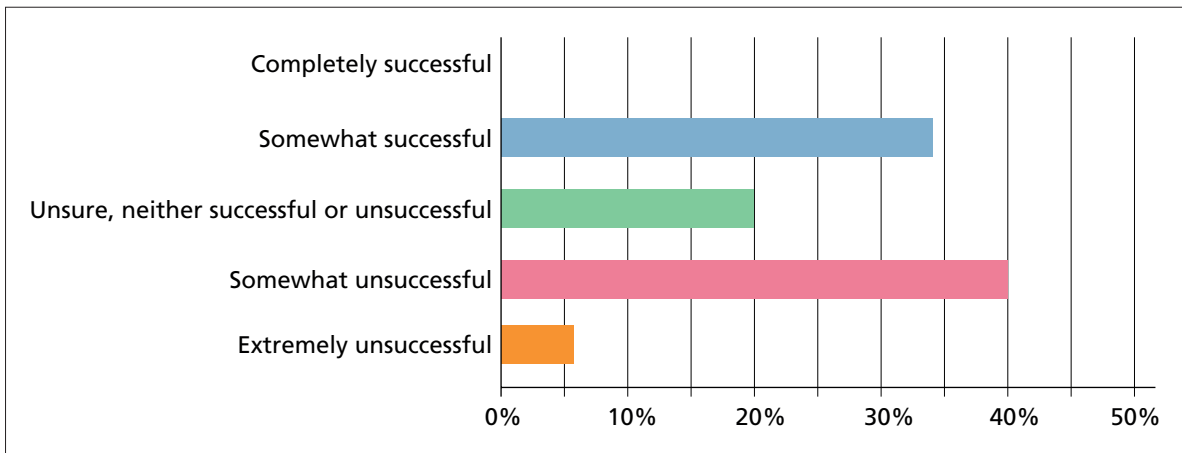
Q11. During your career, what major changes have you observed in how t-RFMOs have accounted for ecosystem considerations in fisheries management?



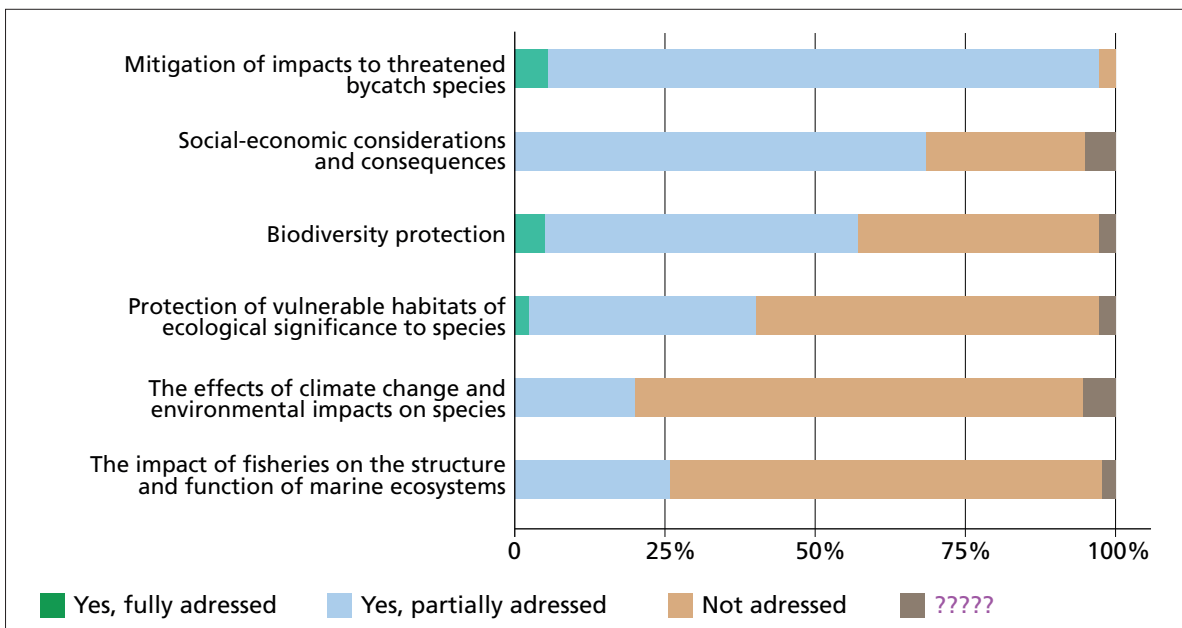
Q12. Do you believe t-RFMOs are implementing EAFM when managing their fisheries?



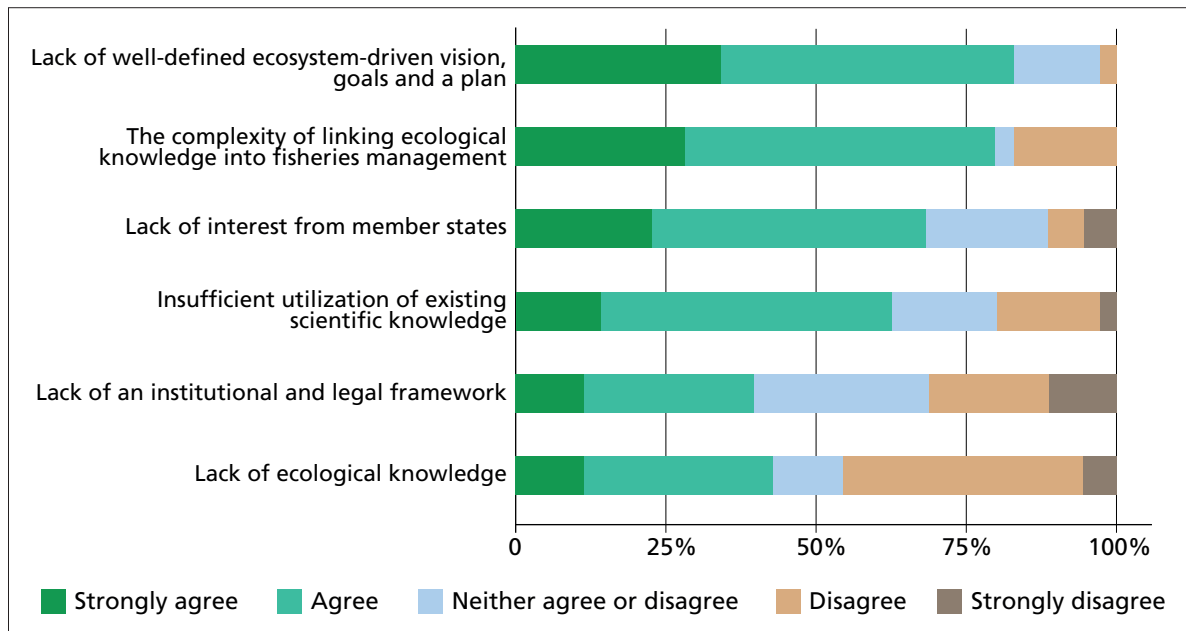
Q13. How successful do you consider the overall EAFM implementation is working in the RFMO you are most familiar with?



Q14. In the RFMO you are most familiar with do any of the existing management measures address the following ecosystem considerations?



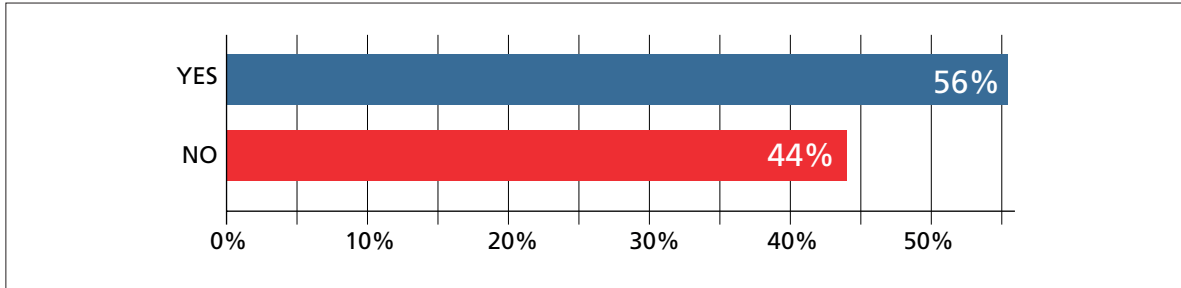
Q15. In your experience, do you agree or disagree that the following are the main impediments and challenges hampering the implementation of EAFM in t-RFMOs?



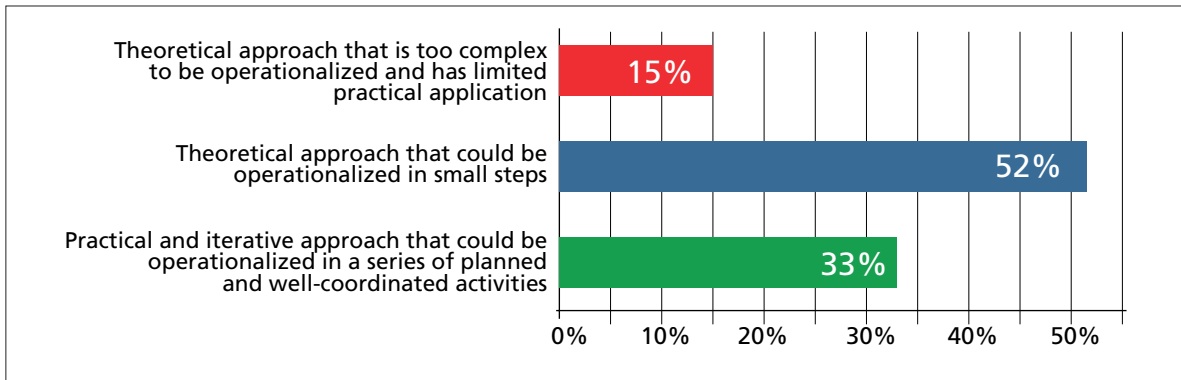
7.5 Annex 5. In-workshop survey results

"Session 1" – Perceptions about EAFM and its implementation in tuna RFMOs

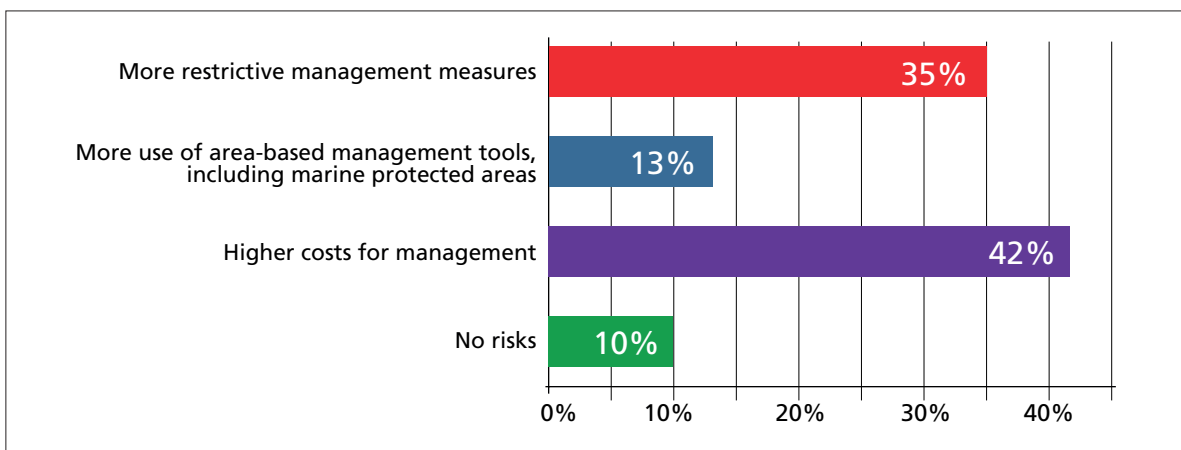
Q1. Do you struggle with the definition of EAFM and the linguistic jargon around its definition?



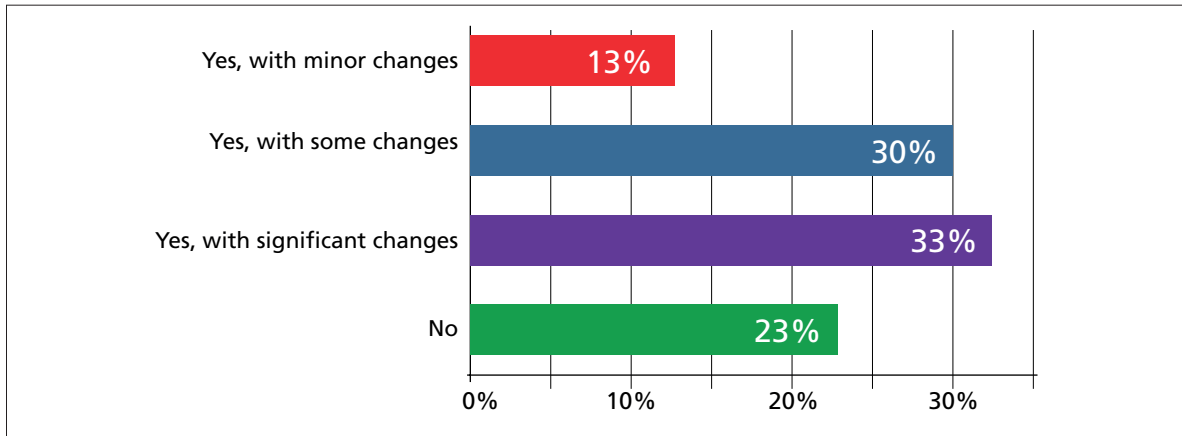
Q2. What is the first thing that comes to your mind when considering the term “EAFM” in the context of RFMOs?



Q3. In your view, which is the main perceived risk of implementing the EAFM?



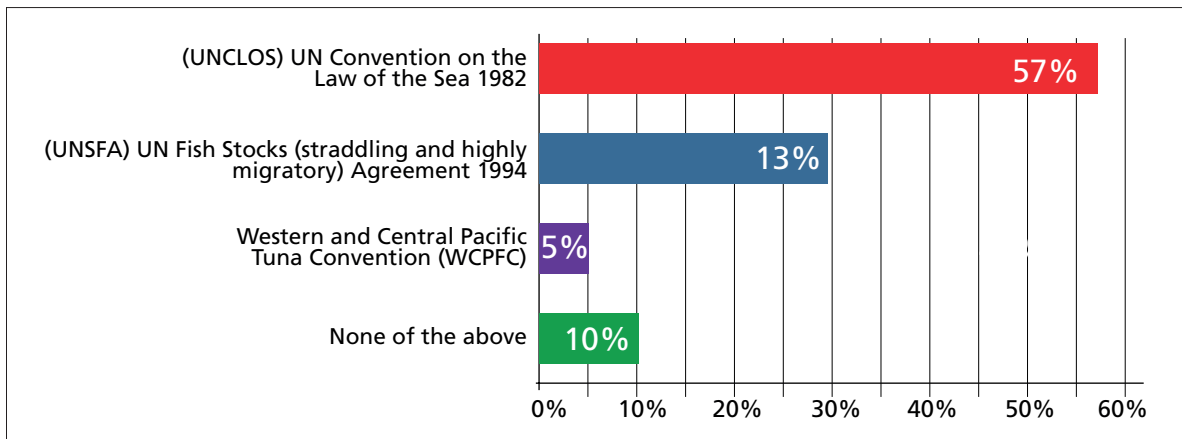
Q4. In your view, can the implementation of the EAFM to fisheries under national jurisdiction be applied in the same way to areas beyond national jurisdiction e.g. by tuna RFMOs?



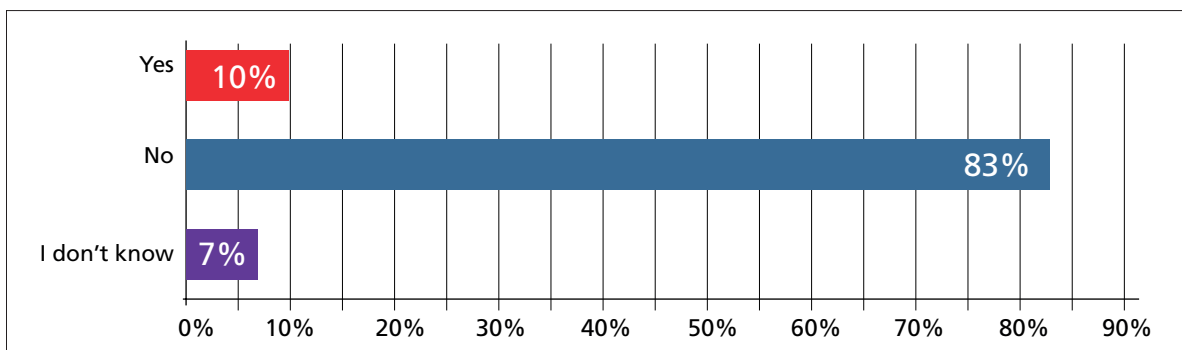
"Session 2" – Recognizing the main drivers and benefits for implementing EAFM in tuna RFMOs

Session 2A – Understanding international instruments, guidelines, processes and emerging requirements as drivers to implement EAFM

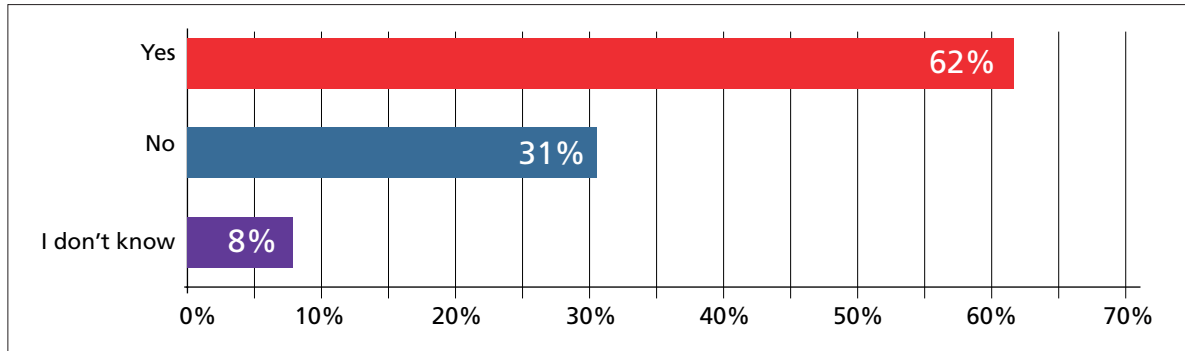
Q1. When was the first mention of ecosystem protection in international fisheries conservation and management instruments?



Q2. Do you think that the existing tuna RFMO mandates explain adequately the scope of the implementation of the EAFM?

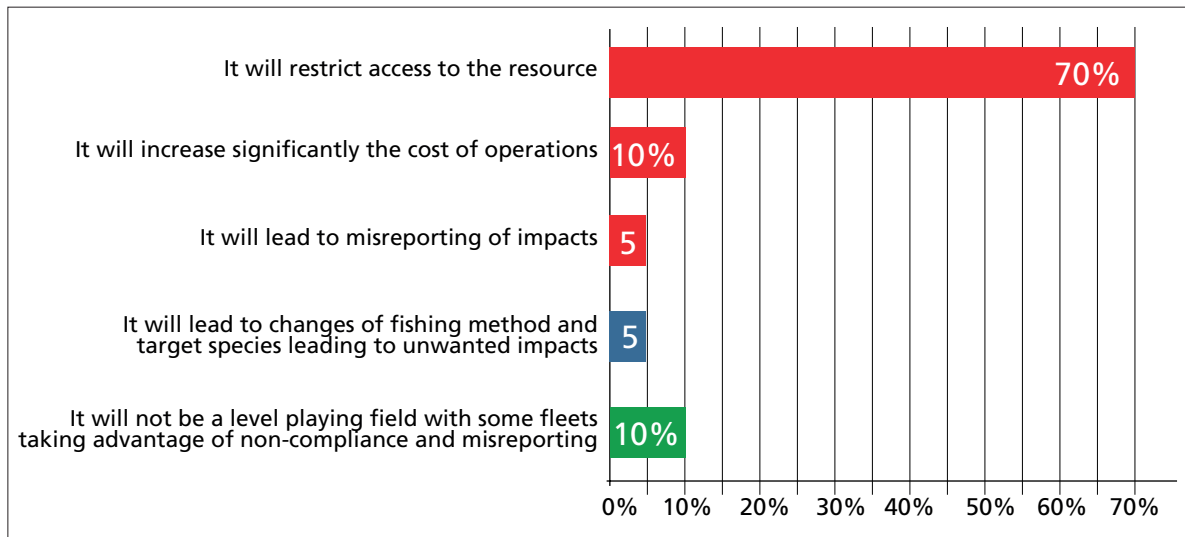


Q3. Do you think that the tuna RFMOs have the necessary governance structures and legal mandates in place to support EAFM implementations?

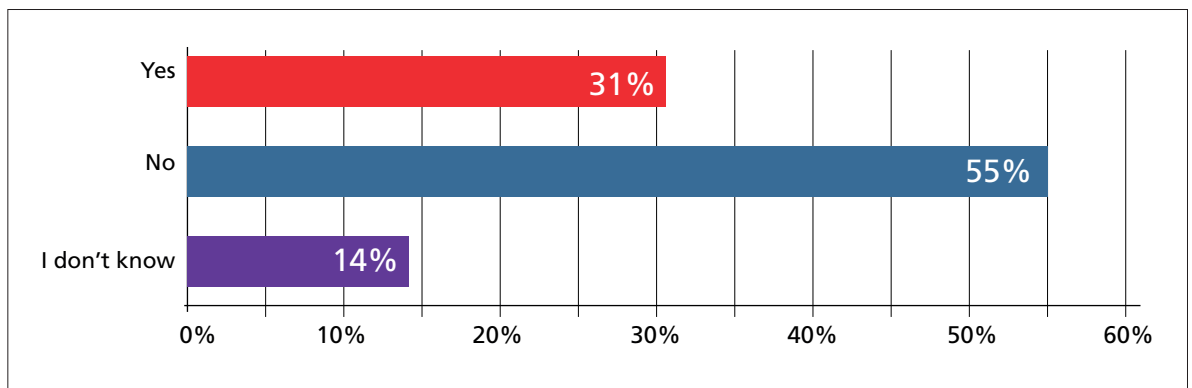


Session 2B – Understanding the contribution of FIPs in improving overall fisheries health and sustainable seafood: main benefits and challenges

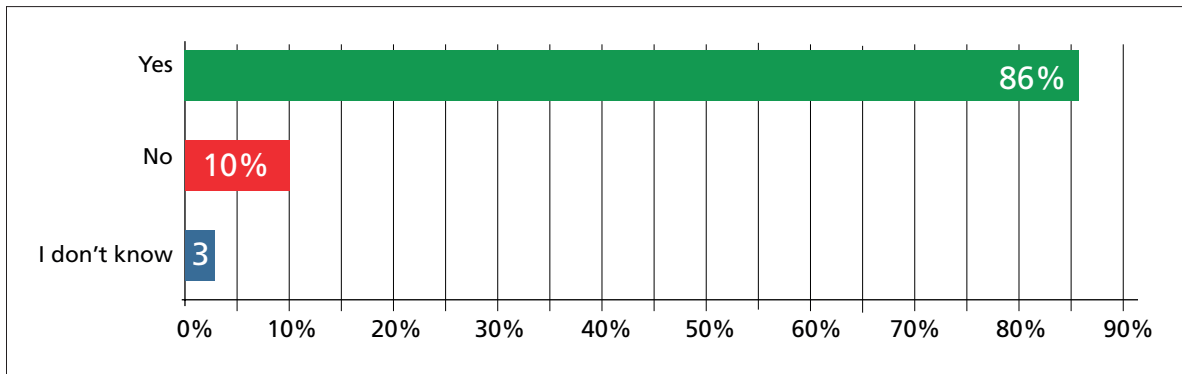
Q1. Which of the following do you think is the main concern of the private sector concerning the implementation of the EAFM?



Q2. In response to the increase in market incentives, especially those sensitive to ecosystem concerns, do you think the existing certification schemes are suitable to respond adequately to these emergent requirements?

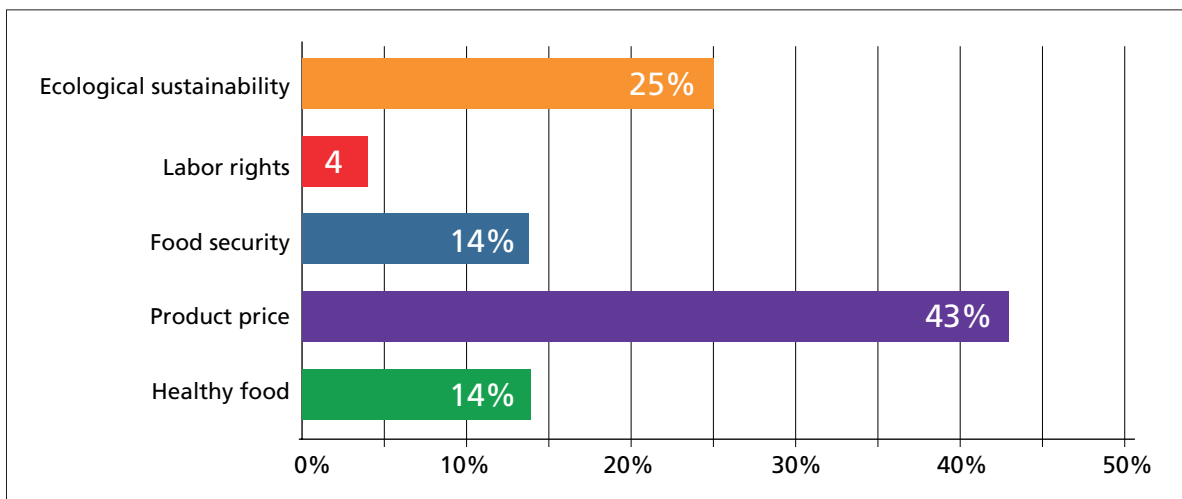


Q3. Do you think certification schemes can promote/trigger improvements on EAFM in RFMOs?

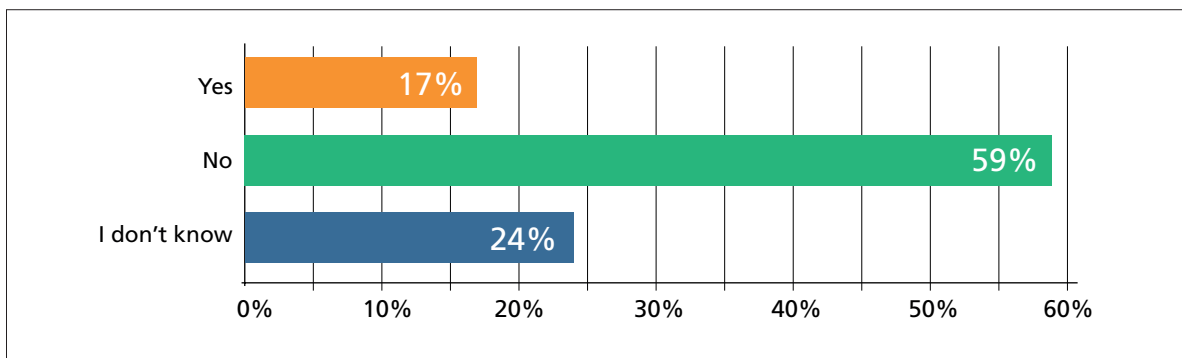


Session 2C – ISSF Experience and vision with respect to ecosystem considerations requirements faced by tuna fisheries and tuna RFMOs

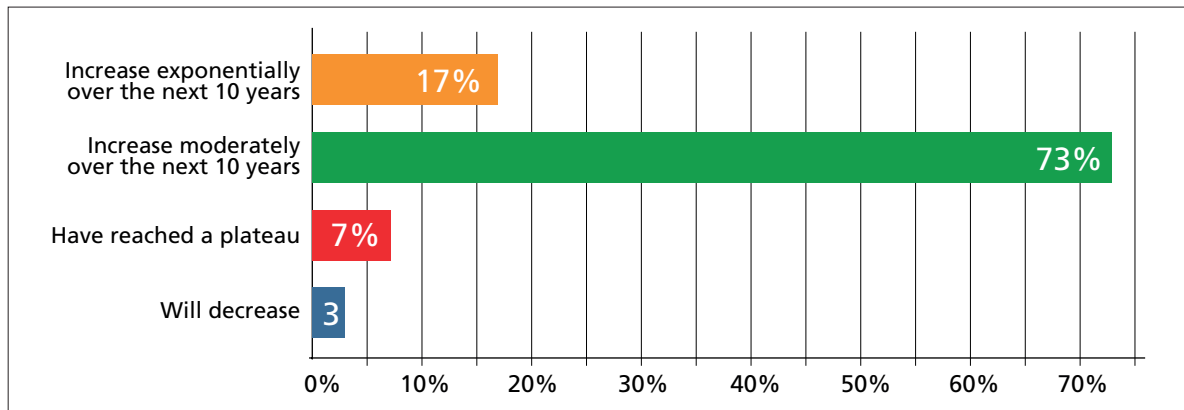
Q1. What will be the main concerns of consumers in the next 10 years? Pick one.



Q2. Are the right mix of drivers and incentives in place to support the implementation of the EAFM in tuna RFMOs?



Q3. Do you consider that main drivers and incentives in place will:

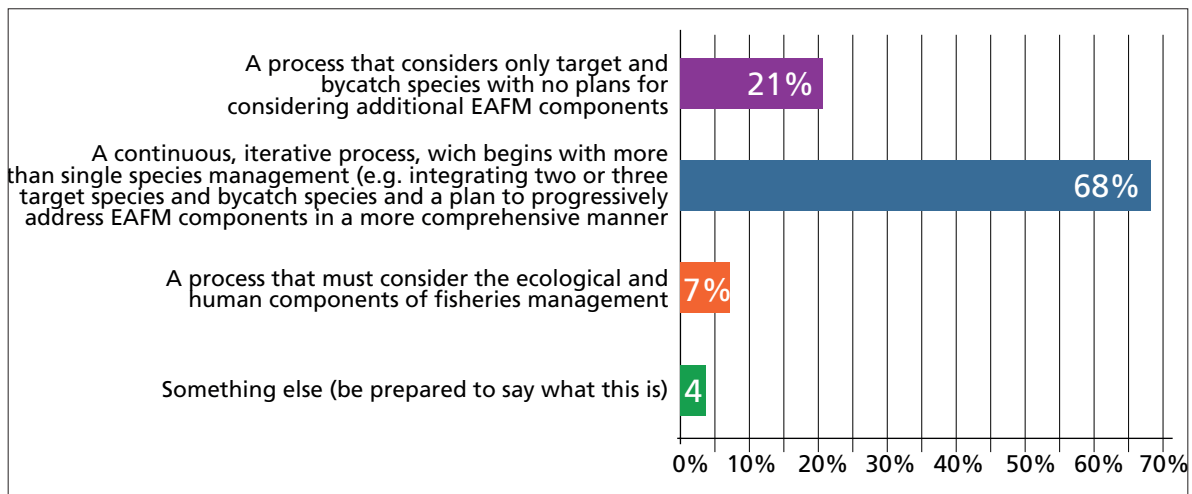


"Session 3" – Recognizing ongoing efforts by tuna RFMOs and their key challenges in implementing EAFM

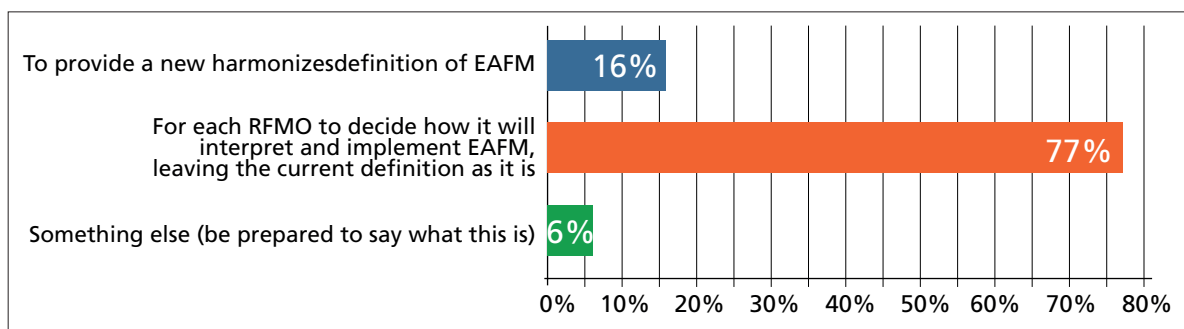
Polling was not done.

"Session 4" – Options for progress. How can we make EAFM more functional and efficient in tuna RFMOs

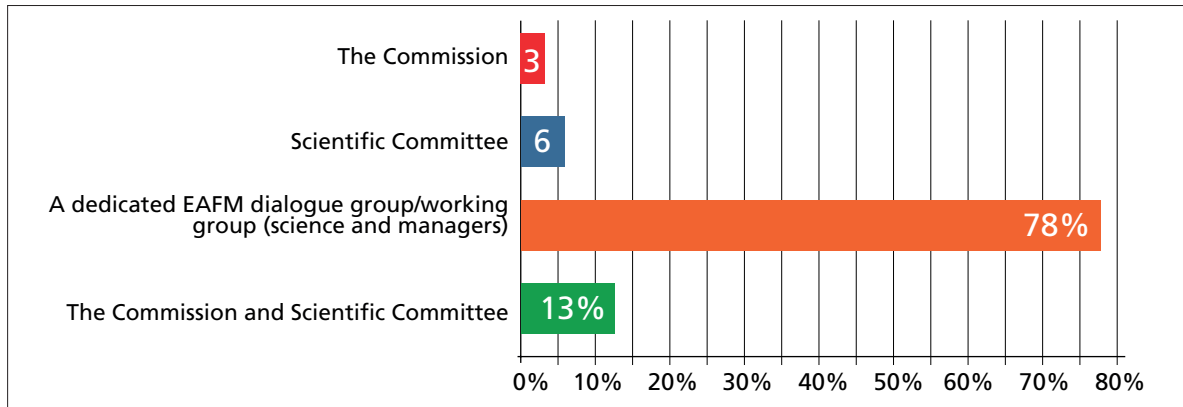
Q1. Is a minimal approach to EAFM ...



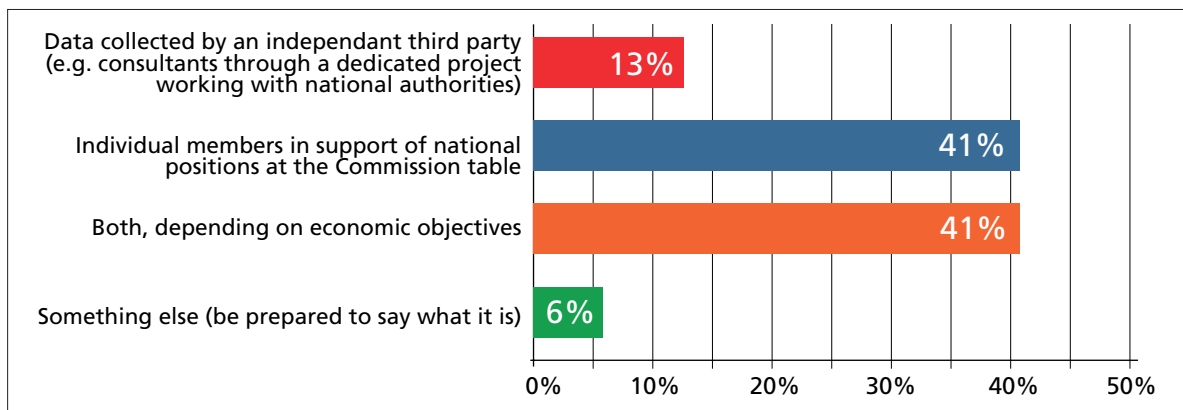
Q2. Is there a need ...



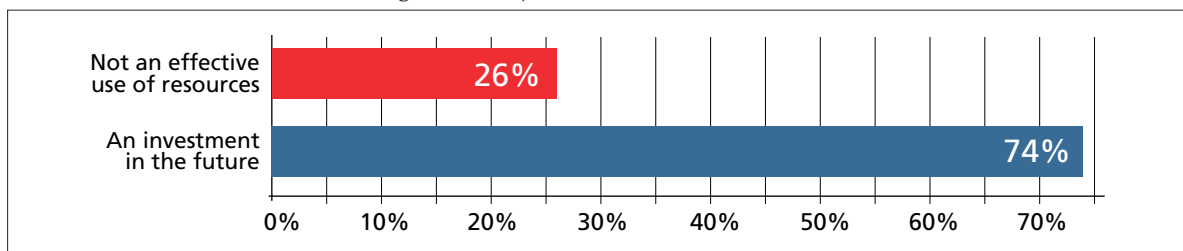
Q3. Where should most discussion on the development of EAFM approaches take place:



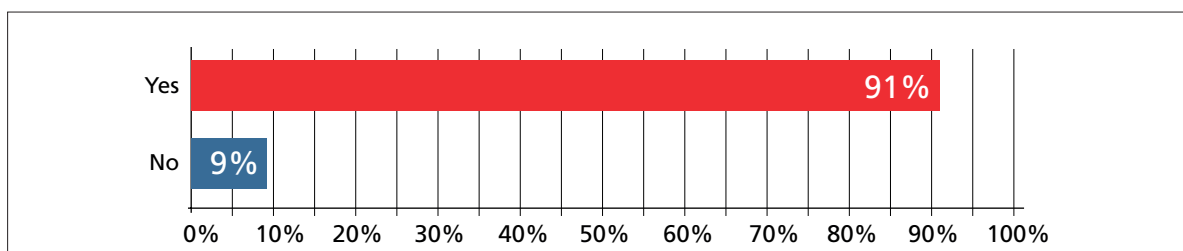
Q4. Which of the following should undertake the collection and analysis of social and economic data:



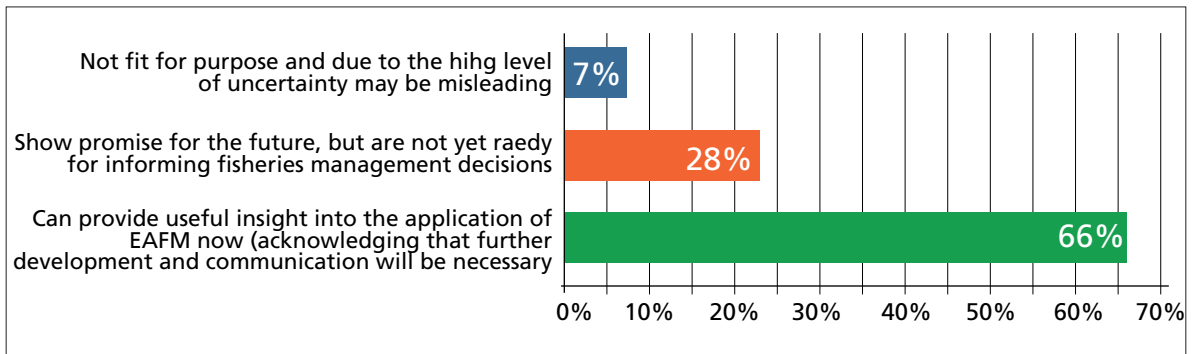
Q5. Producing ecological indicators without reference points and some form of threshold/decision rule associated with a management objective is:



Q6. Should tuna RFMOs compile a list of target, non-target and dependent species they monitor?



Q7. Current ecosystem models and the data to support them are:



7.6 Annex 6. EAFM issues and the scope of tuna RFMO control

The workshop considered a summary of the type of ecosystem components already being addressed at the tuna RFMO level and what ecosystem components could be additionally addressed at the RFMO level in conjunction with external support in the table below. The table shows an overview of the current state of monitoring and the extent of management control for each ecosystem component. This table is not intended to represent the state of EAFM progress of any tuna RFMO in particular. Instead, it provides a snapshot overview of the current progress and where the ongoing debates lay in tuna RFMOs.

FIGURE 7. State of progress in relation to EAFM as perceived by the workshop participants

Ecosystem components	Monitoring	Management/Control
Pressure - Fishing effort	✓	✓
Pressure - Target species fishing mortality	✓	✓
Pressure - Bycatch interactions and mortality	✓	✓
Pressure - Fishing activity, intensity per area/time (e.g. FADs deployment)	✓	✓
Pressure - Marine debris (e.g. lost gear)	✓	✓
Non-managable pressure - climate and environment including climate change	✓ ✋	⤴
State - Target species	✓	✓
State - Bycatch species	✓ ✋	✓ ✓
State - Foodwebs/trophic relationships	?	✓
State - Habitats	?	✓

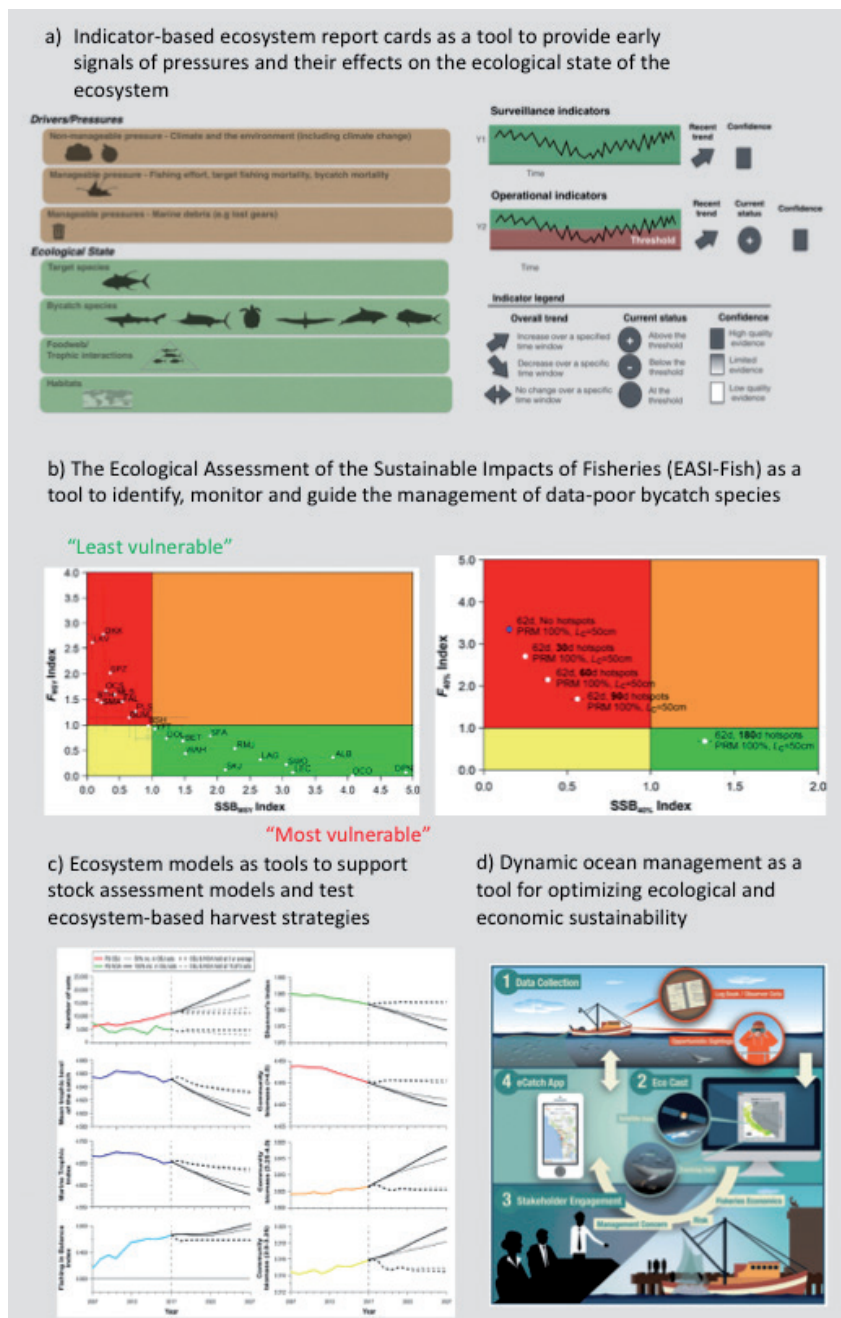
LEGEND

- ✓ Ongoing with some success
- ✓ Ongoing with limited success
- ⤴ Cannot be controlled at the RFMO level, but could be accounted for
- ✋ Required external collaborations and support
- ? Early stages of development debatable
- ✓ Debatable extent of control

7.7 Annex 7. Ecosystem tools that can aid in the implementation of EAFM

Examples of technical tools that are central to the provision of integrated advice to tuna RFMOs and central to making the implementation of EAFM more operational. These include (a) the development of indicator-based ecosystem report cards in ICCAT and IOTC (Juan-Jordá *et al.* 2017; Juan-Jordá *et al.* 2018), (b) the development of the new EASI-Fish Risk assessment in IATTC (Griffiths *et al.* 2019b), (c) the development of ecosystem models in IATTC and WCPFC, and (d) dynamic ocean management, an example of emerging new technologies and tools (illustration extracted from (Hazen *et al.* 2018)).

FIGURE 8. Tools considered central to operationalizing EAFM and the provision of integrated advice to tuna RFMOs





The Common Oceans Tuna project brings together a global partnership dedicated to sustainable tuna fisheries aiming to advance responsible tuna fisheries management and biodiversity conservation in areas beyond national jurisdiction (ABNJ). Funded by the Global Environment Facility (GEF) and led by the United Nations Food and Agriculture Organisation (FAO), it works in collaboration with five regional tuna fisheries management organizations, intergovernmental organizations, national governments, civil society, and the private sector.

COMMON OCEANS | Tuna project

Food and Agriculture Organization of the United Nations (FAO)

common-oceans@fao.org

IN COLLABORATION WITH: Agreement on the Conservation of Albatrosses and Petrels (ACAP), BirdLife International (BLI), Conservation International (CI), INFOPECA, International Seafood Sustainability Foundation (ISSF/ISSA), International MCS Network (IMCSN), International Pole and Line Foundation (IPNLF), International Whaling Commission (IWC), Marine Stewardship Council (MSC), Mercator Ocean International (MOi), US National Oceanic and Atmospheric Administration (NOAA), Pacific Community (SPC), Pacific Islands Forum Fisheries Agency (FFA), PEW Charitable Trusts, Secretariat of the Pacific Regional Environment Programme (SPREP), The Nature Conservancy (TNC), The Ocean Foundation (TOF), World Wide Fund for Nature (WWF).

