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EVALUATION OF REGIONAL FISHERY MANAGEMENT ORGANIZATIONS FOR SUSTAINABLE ECONOMIC DEVELOPMENT

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Abstract:
RFMOs are international bodies established by countries that are regarded as members to protect and conserve fish stocks and marine ecosystems in the convention area. The economy of various counties, the livelihood of indigenous people, and the interest of fishing communities rely on such marine ecosystems. This study documents the performance of RFMOs under different categories. The study includes five randomly selected studies namely, ICCAT, CCAMLR, NAFO, NEAFC, and SEAFO. Based on the literature review significant questions from the checklist provided by FAO for fisheries resource management issues have been selected and answers for such questions have been searched across various recent publications from respective RFMOs. It has been found that the lowest mean value of performance under different categories i.e. 67% is identified in the case of ICCAT and the highest 95% by NEAFC.
Keywords: Sustainability, Economy, Cooperation, Conservation, Fish stock

1. Introduction

An economy can be understood as an ecosystem and there are different role players, with different abilities to play their roles in the economy. In the economy some players produce and some consume those produced items. If the economy is cleaved into parts, it will be easier to observe and understand the several parts there under and duties of the different actors and how they provide the industries and final products. And the fishing industry is out of those one industries, which should be understood in the manner thereof. Dyck & Sumaila,(2010). Fisheries serve as a vital fount of livelihoods, cultural recognition, and most importantly nutrition for the world. 3.1 billion People are receiving 20% of animal protein and micronutrients which are indispensable for children and pregnant women's health. On the other side, 12% of the world's population is devoted to the livelihood opportunities furnished by both the capture and aquaculture. Sainsbury et al., (2018). Among other highly traded commodities, seafood is another one. The fishery sector is significant in generating rural livelihood and eradicating poverty. Apart from Livelihood, food security, and poverty alleviation fisheries also contribute to foreign exchange and the development of coastal and rural people. (Haughton, n.d.) Acknowledging the predictions for increasing global population and demand for seafood, updated approaches should be called for enhancing yields. Stentiford et al.,(2012). The part of the total production of fish and fishery products being exported has increased due to the liberal policies, innovative technology, upgraded processing, packing, and transportation. Also, the marginal exporters exporting fish and fishery products acquire a notable share of the overall merchandise trade. The capture fishery is expected to be dominating for numbers of commercially traded species and responsible for domestic as well as global food security Bellmann et al., (2015) but the marine ecosystem is intensively changed due to commercial fishing, as it impacts the benthos adversely. Cavan & Hill,(2022). The advancement of technology in fishing accompanied by cheap fossil fuel since the middle of the 20th century has permitted the fishers around the world to break

out the high seas and which eventually resulted in increased catches. Fishing on the high seas is more beneficial as it provides treasures of commercially demanded and valued species like toothfish, tuna, sharks, and billfish. Clark et al., (2010). At the international level shared fish resources are accounted for one-third of the global capture fishery and adequate management of such shared fish resources represents the challenges being faced to reach sustainable fisheries. (Long 2008). This study aims to understand the significance of RFMOs in ensuring sustainable economic development through different management activities, cooperation, and conservation activities by evaluating performance under different categories.

2. Methods:

2.1 RFMO selection

RFBs (Regional Fishery Bodies) are widely recognized bodies in the field of fishery management, conservation, and advising. According to FAO, (2022) RFBs are a group of states that are linked to international fishery agreements and RFBs have the potential to serve long-term sustainable fisheries. Such RFBs can be classified into two board categories as RFMOs (Regional Fishery Management Organizations) and Advisory RFBs. Again RFMOs can be divided into Tuna RFMOs and Non-Tuna RFMOs. RFMOs are the important organizations that are engaged in managing the living resources in the marine ecosystems in their respective areas. RFMOs are significant in fisheries governance and obtaining cooperation between nations relating to fishing. Haas et al., (2019). There are 21 RFMOs out of which 5 RFMOs are Tuna RFMOs and the remaining 16 are non-tuna RFMOs. Billé et al., (2016). For the study all the RFMOs both tuna and non-tuna are assigned numbers separately, 1 to 5 for tuna RFMOs and 1 to 20 for non-tuna RFMOs. Using a random number generator of 5 RFMOs (tuna and non–tuna FRMOs) has been selected randomly. The selection of tuna and non-tuna RFMOs has been done in the manner shown in figure no 1. Out of 5 selected RFMOs, one is Tuna RFMO and 4 are non-tuna RFMOs. Randomly selected RFMOs are ICCAT (Tuna RFMO), CCAMLR, NAFO, NEAFC, and SEAFO.

Table no 1: Acronyms and respective titles of the selected Regional Fishery Management Organizations:

Selected Regional Fishery Management Organizations	
ICCAT	International Commission for the Conservation of Atlantic Tunas
CCAMLR	Commission for the Conservation of Antarctic Marine Living Resources
NAFO	Northwest Atlantic Fisheries Organization
NEAFC	North East Atlantic Fisheries Commission
SEAFO	South East Atlantic Fisheries Organization

2.2 Categories and Questions

To assess the selected RFMOs significance in terms of different management activities, cooperation, research, projects, and implementations for sustainable economic development questions are categorized into seven categories. The assessment of the RFMOs is done with the help of the checklist provided by FAO for fisheries resource management issues. (Caddy 1996) Irrespective of the fact that the checklist Caddy, (1996) had complied with way before, it still holds relevant questions to this date. The checklist mentions several questions but all questions are not significant for this study. The questions are selected based on developed criteria (such criteria are extracted through literature review) and data available on the RFMOs. The questions relevant for the study are initially selected by one author and then later those questions are reviewed for their significance to be included in the study by the other author and addition and subtraction to the initially selected set of questions were made. The categories, questions, and justifications are mentioned in table no 2. Some questions also include sub-questions.

2.3 Scores and Assessment materials

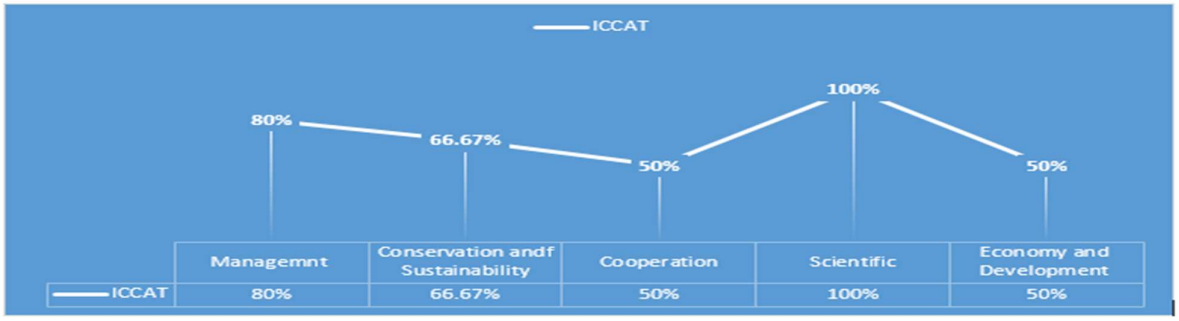
The selected questions involve total scores of 18, where yes to the question provides 1 score and No provides 0 except the question no 7.5.1(b), which contains 1 score for No and 0 for Yes. Originally some questions were provided in the checklist Caddy, (1996) half score for partial fulfillment of the question but to avoid complexity the partial portion of the answers were dropped and only considered as yes or no. Hence the scores were assigned to individual RFMOs by answering the questions in only 'yes' and 'no' answers. Ã & Pauly, (2010). The selected questions are answered by reviewing the recent annual reports, statistical data, implementation publications, and project publications of the five RFMOs available on their websites. Pentz et al., (2018). The Assessment materials which were issued recently are considered. The scores were converted into percentages taking the total scores of questions under the category as 100%.

2.4 Analysis of Scores of individual RFMOs

The scores are calculated for individual RFMOs and scores are manifested in percentage terms. The results are represented and summarized according to categories to stipulate the significance of RFMOs in sustainable economic development. Pentz et al., (2018). After questions selection and fixing scores to such questions, assessment materials were taken into consideration for finding the answers to the respective queries, and scores are recorded against individual RFMOs in an excel sheet.

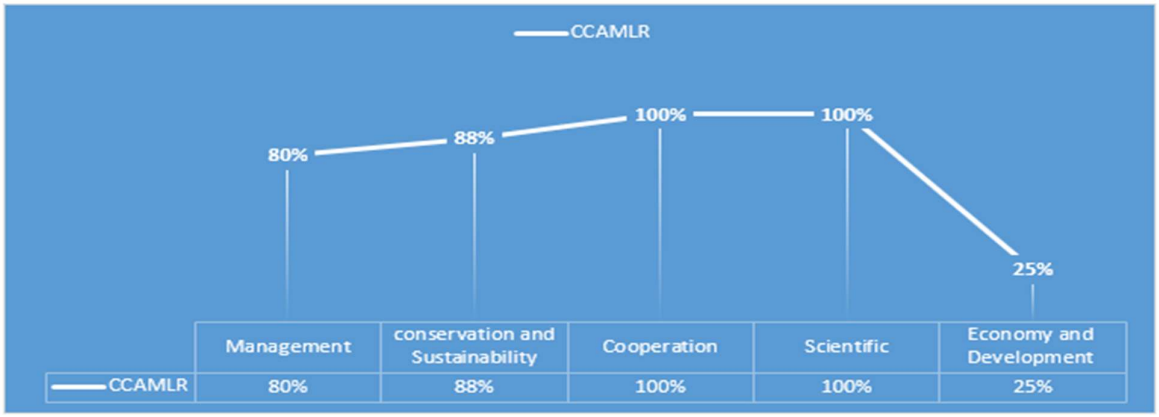
3. Results and Discussion:

3.1 ICCAT: Figure no 1: Performance of ICCAT in different categories:



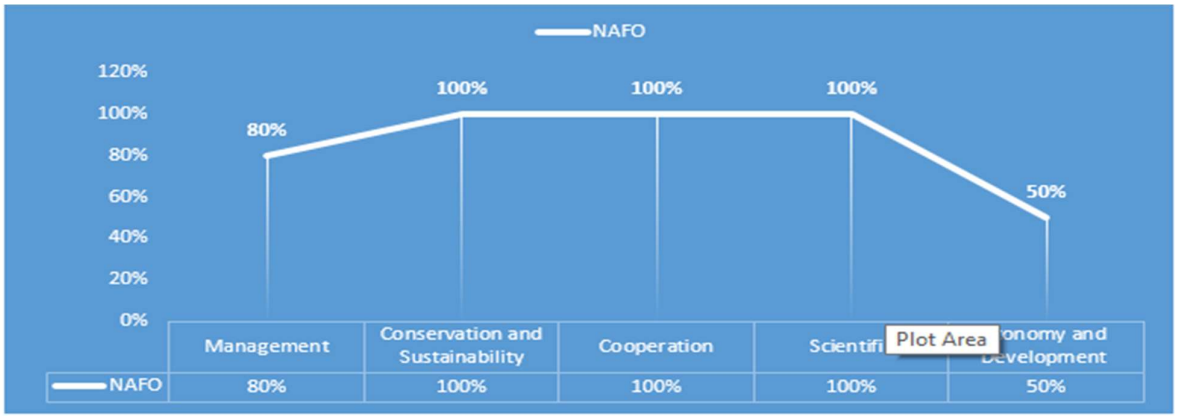
In terms of ICCAT, descriptive statistics of the results represent a mean value of 69.33% and a standard deviation of 21.3%. The median of the results is found to be 67%. The performance in both economy and development and cooperation category is 50%. The performance of ICCAT is not close to equal in the categories. It performed satisfactorily in the field of management. ICCAT is associated with building a Multi-Annual Management Plan for Bluefin Tuna in the Eastern Atlantic and the Mediterranean Sea, which is a joint fishing activity. ICCAT(2021). Performance in the category of conservation and sustainability was found to be low as compared to performance related to management. Based on the report submitted by the standing committee of research and statistics it was evident that the subcommittee on ecosystem and bycatch has granted financial assistance to finalize the development quasi-quantitative tool to identify species of priority for management and as well as for supporting the presence of five to seven CPC scientists in the collaborative workshop to discuss on different key matters. Performance in terms of cooperation and economy is very low i.e. 50%. Melvin, (2021).

3.2 CCAMLR: Figure no 2: Performance of CCAMLR in different categories:



The Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR) is an RFMO that was established in the year 1982 to conserve the marine ecosystem and lives. To protect and preserve the marine ecosystem CCAMLR adopts ecosystem-based management. CCAMLR, (2021).The descriptive statistics of the performance of CCAMLR under the five categories represent a mean value of 78.6% and a standard deviation of 31.14%. Performance under the economy and development category is very low i.e. 25%. The standard deviation is high which speaks for uneven performance under different categories and fields. While considering or preparing measures and policies acknowledgment of the economic factors like the interest of small-scale fishermen, indigenous people and local communities associated with fishing are significantly low. Performance towards conservation and sustainability is satisfactory. CCAMLR conservation procedure involves monitoring and compliance in terms of making vessels, gears for fishing, an inspection of vessels, and so forth. The scientific category is well performed as CCAMLR establishes management measures based on the advice generated and supplied by the CCAMLR's scientific committee. Such scientific advice is based on various factors including catch limits and underpins the elimination of mortality of seabirds and mammals. The ecosystem monitoring program attempts to find out the significant changes among the important components in the marine ecosystem within the convention area. CCAMLR, (2020). 80% has been found under the category management which is not enough as a primary fishery management organization but CCAMLR's constant efforts can be observed for better management through alignment for acquiring the ultimate objective of conservation, desired conservation measures which generate MPA (marine protected area) to work simultaneously with different fishery management conservation measures has considered by the scientific committee. Scientific Committee, (2020).

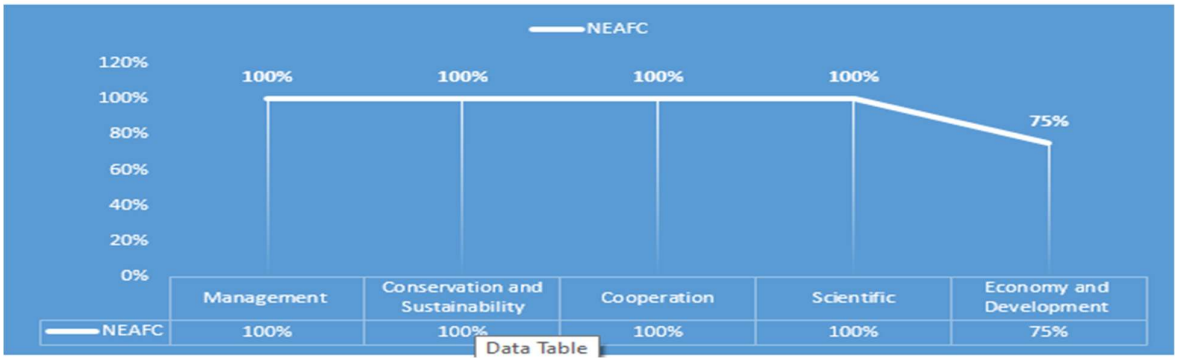
3.3 NAFO: Figure no 3: Performance of NAFO in different categories:



NAFO is a successor to ICNAF and an intergovernmental fisheries science and management body, which was founded in the year 1979. NAFO, (2021). At a 95% confidence level, the mean value of the

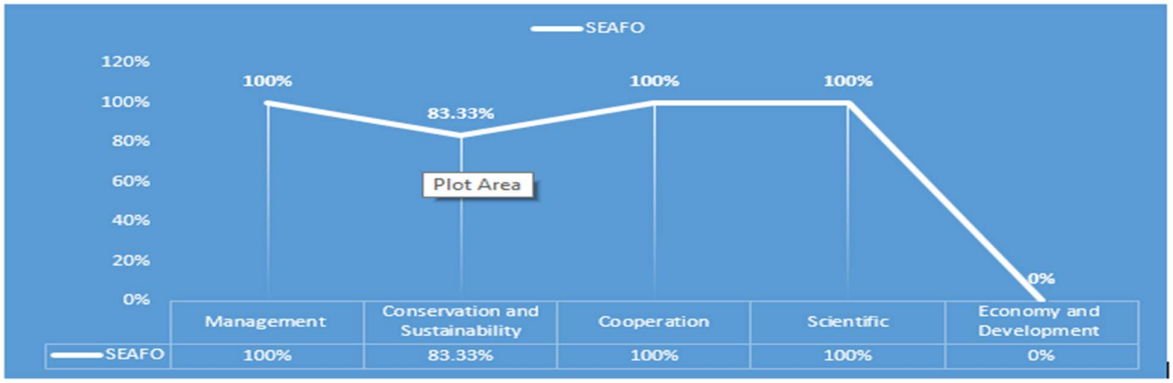
performance is 86% and the standard deviation is 22%. Equivalent performance has been seen among three categories namely Conservation and sustainability, cooperation, and scientific. NAFO has shown satisfactory performance in the management field i.e. 80% and a satisfactory mean value of 86%. In 2020 NAFO has undertaken numerous decisions associated with improving the NAFO's ecosystem approach framework to managing fisheries and evaluating existing measures to conserve fragile marine ecosystems. NAFO, (2020).

3.4 NEAFC: Figure no 4: Performance of NEAFC in different categories:



The North-East Atlantic Fisheries Commission (NEAFC) is one of the RFMOs and it works in one of the world's most copious fishing areas i.e. North-East Atlantic. The main motive of NEAFC is to promise long-term conservation and optimum utilization of fishery. Considering the findings of NEAFC, it has been found that mean of the performance in different categories is 95% and the standard deviation is identified as 11.18%. 100% has been assigned to four categories out of five selected categories. NEAFC, (2022). Deviation in performance across different categories was found to be low as compared to other selected RFMOs, which indicates that NEAFC has performed evenly under different categories. Performance in four categories was found as 100%, except in the economy and development section. Even though NEAFC has not performed the same as other categories in economy and development, it certainly has performed well as compared to other RFMOs in the study. The mean value of performance also signifies stable performance in different sections. In the annual general meeting 2021 of NEAFC, it accepted management measures for the year 2022 associated with different fish stocks, based on the updated advice received from the International Council for the Exploration of the Sea (ICES).

3.5 SEAFO: Figure no 4: Performance of SEAFO in different categories:



The southeast Atlantic Fisheries Organization (SEAFO) is an RFMO, which is associated with intergovernmental fishery science and management. The main objective of SEAFO is to conserve in a log run and sustainable utilization of marine resources in its convention area. SEAFO, (2022). Concerning SEAFO a standard deviation of 43.4% was found and the mean value was 76.67%. The scores under economy and development were 0% and 100% under management, cooperation, and

science. All the selected RFMOs performed very low in the economy and development field and SEAFO is the lowest in this case. In the field of management, the result was 100%. The management of SEAFO is based on an ecosystem and precautionary approach. SEAFO acknowledges the recommendations and advice received from the scientific and compliance committee in implementing the management measures. Various measures are also undertaken by SEAFO for dealing with IUU fishing activities. SEAFO, (2020). The assessment of the marine resources in the convention area of SEAFO is done by the scientists from contracting parties. SEAFO, (2022b).

4. Overall performance of the selected RFMOs:

The mean value of the overall performance of all five selected RFMOs is 82.26% and the standard deviation is 24.06%. The lowest percentage is seen under the economy and development category and the highest percentage is seen under the category scientific, which represents the measures adopted by the RFMOs are based on scientific evidence. The RFMOs certainly need to push their operations towards the economic and developmental factors by considering the fishermen, acknowledging the indigenous people, and the fishing communities who consider these natural fisheries as their income source. The environmental measures should not hamper the economic developments and vice versa. In the other categories, all the five RFMOs' performance appeared to be at a satisfactory level. Management and other measures were constructed on scientific advice and recommendations. The performance of RFMOs is taken into the discussion to criticize its performance in different aspects like not being successful in limiting fishing efforts, continuous reduction in fishing stocks, lack of responsible implementation of conservation and other measures, and non-compliance of the member states with existing policies. Haas et al., (2020) but the overall results of the performance evaluation of all the five selected RFMOs in this study are on the positive side. The significantly essential matter of criticism of RFMOs is not considering the economic and commercial aspects of fisheries along with sustainability and other environmental measures.

5. Conclusion:

There is no doubt that the RFMOs are working more or less under different categories except economy and development. There should be more focus on contemplating the economic interests of different parties while establishing conservation and management measures. The management measures are based on scientific councils' advice and other statistical data generated, which is a positive sign of the utilization of scientific data in management. RFMOs' performance across different categories should be tried to make equal for acquiring an impressive performance for the most part.

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