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FISHERIES MANAGEMENT PRACTICES: A GLOBAL ANALYSIS FROM THE CODE QUESTIONNAIRE

Executive Summary

This paper provides an overview on the importance of considered multi-dimensional (i.e. ecological social, economic, nutrition) objectives in fisheries management aimed at supporting food security and livelihoods. Moreover, as fisheries sustainability requires effective management, it is important to monitor its effectiveness to understand areas for improvement. Yet, no systematic global frameworks for assessing fisheries management exist. In an attempt to understand how different fisheries management practices are implemented by FAO Members, data from the Code of Conduct for Responsible Fisheries in respect to fisheries management attributes were analyzed, highlighting common practices across Members but also areas or topics that need additional efforts for their effective implementation of management measures.

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I. INTRODUCTION

1. Fisheries management is key for achieving sustainable fisheries. There is a wide diversity of fisheries and fisheries management systems around the world. Different approaches to management are used, often tailored to the local contexts of countries, fishing communities, and target species within their ecosystems. Some are centralized while others are community-based or customary systems. All of these management systems need to operate effectively so that fishery resources are maintained at productive levels while deriving social, economic, cultural, and nutritional benefits.
2. There are challenges to meeting fisheries management objectives globally, including lack of human, financial and technical capacities, particularly in least developed countries and for small-scale marine and inland fisheries. In addition, fisheries management science and management measures that have been developed and implemented in developed countries are sometimes applied to fisheries in developing countries in a different context. Management measures need to be adapted and tailored to the local socio-economic and cultural contexts of fisheries in developing countries. Further, fisheries management is mostly applied in the context of maximizing production (catches) while maintaining the function and structure of the ecosystem, but rarely include direct or explicit objectives of improving the social, economic, nutrition, or gender aspects of fisheries.
3. Currently, at the global level we do not have a good understanding of how effective our management systems are. The reason for this lack of understanding is that currently there is no comprehensive approach used for evaluating these systems. While the evaluation of fisheries management systems is conducted in some countries, in particular how well certain management measures work or do not work, no global framework for systematically monitoring the intensity and effectiveness of management systems at regional and global levels exists.

II. CHANGES IN FISHERIES MANAGEMENT OBJECTIVES

4. There are many types of potential fisheries management objectives, including those related to maintaining food production, increasing food security and nutrition, wealth creation, providing decent livelihoods, and protecting environmental integrity. For any individual fishery, many but not necessarily all these objectives may be in place, or there may be other kinds of objectives specific to the unique contexts of individual fisheries that are not stated, and/or some objectives may carry more weight than others. For some fisheries, objectives are explicitly stated, for example in a fishery management plan. For other fisheries, objectives may not be explicit, but instead may be generally understood or recognized implicitly as being management goals.
5. Throughout most of the 20th century, when what is now primarily understood as fisheries management was formally starting to be established, management objectives were largely centered around maximizing fish yield from capture fisheries, or broader objectives only informally addressed through customary local arrangements. Many of the stock assessment methods conceived in developed countries with high technical capacity focused on how to estimate optimal yield from a single-species fishery. In the latter part of the 20th century and in the 21st century, a broader view of fisheries management objectives gradually developed. Management objectives began to more commonly include reducing the risk of overfishing target stocks while protecting biodiversity of both target stocks and the wider marine ecosystems¹. These changes involved an increased recognition for, and increased implementation of, precautionary approaches to

¹ Caddy, 1999; Cochrane, 2000; FAO, 1995; Mace, 2001

management². Management objectives gradually expanded to place increased emphasis on considerations of the wider ecosystems in which fisheries operate. This resulted in widespread adoption of the Ecosystem Approach to Fisheries (EAF)³. At the same time, fisheries management objectives broadened to increasingly encompass economic and social objectives including the provision of nutrients for human consumption and tenure rights⁴.

6. As fisheries management objectives broadened over time, there was an increased acknowledgement that some of these objectives may trade off with one another. Trade-offs in fisheries management objectives have been an active area of research for many decades⁵. Some of the common trade-offs encountered have been catch (a food production objective) versus avoiding fish populations becoming depleted (a biodiversity objective), and employment (a social objective) versus greater efficiency or profitability in the harvesting sector (an economic objective). There are also trade-offs in distributional outcomes; economic performance may in some cases be maximized by selling products overseas, thus reducing food security benefits for local communities. The appropriate balance between competing objectives depends greatly on national or fishery-specific goals, and different countries (or fishery managers within the same country) may choose very different weightings of alternative objectives.

III. EVALUATING FISHERIES MANAGEMENT AROUND THE WORLD

7. Many countries evaluate their fisheries management systems, with the intention of identifying limitations and improving these systems. Some of these countries use adaptive management to compare different approaches, similarly aiming to first identify and then implement the approaches that are found to be more effective. Effective management systems can provide more benefits across the wide range of objectives outlined above. However, globally, there is no universal standard for evaluating the performance of fisheries management systems. Different countries use different approaches, and many countries are limited in their capacity to use any approach. Approaches to evaluate management systems should be inclusive across countries and across the diverse contexts of individual fisheries. Evaluations should consider the special circumstances of low technical and financial capacities of certain countries, and the low gross value of production of certain small-scale fisheries.

8. Various survey instruments, each with their own strengths and weaknesses, have been designed to evaluate the management attributes or performance of fish stocks, fisheries, or countries. Several studies have attempted to characterize various aspects of fisheries management for countries or fisheries around the world⁶. While these studies each have their own strengths and weaknesses, these have largely been academic research projects that only cover a portion of the world's fisheries and are not all representative of the diversity of global fisheries and of their management systems (particularly overlooking small-scale and inland fisheries). None have been conducted systematically across countries and over time to achieve global coverage and to identify trends over time. Moreover, these studies have characterized various measures of effectiveness, but have generally not been globally comprehensive, systematic, repeated over time, or occurring at the level of individual fisheries.

9. Quantifying the effectiveness of fisheries management will permit the evaluation of whether the inputs, efforts, actions, and budgets allocated to fisheries management systems are having the results intended, as well as to identify related challenges and needs, aiming at improving their effectiveness.

² Garcia, 1994; Hilborn et al., 2001; Restrepo, 1998

³ Garcia et al., 2003; Garcia & Cochrane, 2005.

⁴ FAO, 1995; Garcia & Charles, 2008; Grafton et al., 2006; Jentoft et al., 1998; Ostrom, 2009; Pascoe et al., 2019

⁵ Hilborn, 2007; Keeney & Raiffa, 1976; Walters & Martell, 2004

⁶ Mora et al 2009; Melnychuk et al. 2017

10. Without a quantitative measure of management effectiveness, we cannot confidently conclude whether we are currently achieving management objectives effectively at the regional or global level. Some countries may evaluate their own effectiveness, but the approaches are not consistent across countries. Some studies have evaluated the effectiveness of select aspects of fisheries management systems or evaluate the effectiveness with respect to only a subset of management objectives, but these may not provide a characterization of the overall effectiveness of a management system, or may be limited to a subset of countries or time periods. Some studies may evaluate effectiveness at a country level, but evaluation at the fishery level is more appropriate because there is often considerable variability in management intensity and effectiveness among fisheries within the same country.

11. Variability among fisheries occurs along several different dimensions, making global measures of management effectiveness challenging. Some fisheries are considered to be industrial, or ‘large-scale’, while others are considered to be ‘small-scale’ (the defining line between large-scale and small-scale fishery often varies among countries). Fisheries differ in the species they target and in the gear types they use to catch those species. Fisheries may operate across international boundaries, within national Exclusive Economic Zones (EEZ), or within intra-national jurisdictional areas (e.g., municipalities, provinces, or states), which affect how fisheries are regulated. All these factors that contribute to the variability of fisheries around the world also affect how effective fisheries management may be. Further, the implementation of management systems are likely to differ among countries or regions, tied to available financial, technical and human resources.

IV. A SUMMARY ANALYSIS OF THE CODE QUESTIONNAIRE

Methodological approach

12. The Code of Conduct for Responsible Fisheries (the Code) questionnaire⁷ covers a wide range of issues pertaining to the Code and related instruments. While some of the questions are relevant to fisheries management, the questionnaire has not been designed to assess how management systems are structured or how they perform. Responses from Members to periodic Code questionnaire surveys may be informative about the extent to which overall progress has been made on implementing the Code. Responses may also reveal specific issues where implementation has been limited, or specific countries or regions in which implementation has been more challenging.

13. The Code questionnaire⁸ has been conducted every two years, consisting of 51 questions covering a wide range of topics and management measures. In order to obtain information on country-based fisheries management systems the 2020 survey, with data from 118 Members, was analyzed through a 3-steps approach: (1) identify those questions relevant to fisheries management (e.g. exclude those related to aquaculture); (2) identify which questions provided answers that could be scored and combined into a quantitative index; and (3) convert the answer for each question into a score from 0 (least intense) to 1 (most intense). The majority of questions were answered with ‘yes’ or ‘no’, but some were scored in the survey from 1-3 or from 1-5, others were ratios, and other questions asked Members to select three main options out of eight or nine. The following examples demonstrate these scoring transformations:

⁷ FAO, 1995

⁸ FAO, 2020

- Question 7.0, “*Have you started to formally implement activities/programs seeking to mainstream the ecosystem approach to fisheries into fisheries management?*”, was scored as a 0 if the answer was “no” and a 1 if the answer was “yes”.
- Question 6.1, “*How many fisheries do you identify in your country?*” and 6.2 “*How many of the fisheries in your country have fisheries management plans in place?*”, was scored as a proportion (ranging from 0 to 1) of how many fisheries have management plans divided by the total number of fisheries identified.
- Question 5, “*Please indicate the level of priority your country attaches to the following substantive themes that are developed in the Code and in the relevant FAO Technical Guidelines for Responsible Fisheries*”. Answers were 1 for “*Top Priority*”, 2 for “*Priority*”, and 3 for “*Low Priority*”, which were scored 1, 0.5 and 0, respectively.

14. In addition to transformations into quantitative scores, the following categories or ‘topics’ focusing on broad elements of fisheries management were developed (Table S1):

- *Management plans*: included questions regarding fisheries management plans and ecosystem approaches to fisheries;
- *Management strategies*: included questions associated with the implementation of bycatch mitigation measures, strategies to monitor fisheries, or to reduce fishing effort;
- *Fisheries legislation*: included questions regarding national plans of actions for sharks and seabirds, to combat illegal, unreported and unregulated (IUU) fishing, or to manage fishing capacity, among others;
- *Enforcement*: included questions regarding the use and control of vessels through vessel monitoring systems (VMS), penalties, sanctions and mandatory logbooks and reporting systems; and
- *Data and Research*: mainly included questions related to data sources used to inform fisheries management (historical data, fishery independent surveys, tag-recapture, etc.).

15. Scores by each of the abovementioned topics were aggregated by Member and FAO Area. For most questions, responses were at the country level thus information could not be disaggregated by fishery type or scale (i.e. large-scale and small-scale marine fisheries, as well as inland fisheries). In addition, scores for each topic and Member were weighted by their proportion of landings with respect to total landings in their respective FAO Areas (Table 2).

Summary results

16. Separating scores by topic, both the average and the distributions of scores were very similar among topics (Figure 1). Although not substantially different, global average scores from all Members for *Management plans* intensity were higher (0.78 out of 1.00) among the 5 topics, and lower for *Fisheries legislation* (0.64 out of 1.00) followed by *Enforcement* (0.70 out of 1.00).

17. When looking at different FAO Areas, the Pacific Northeast was the region that scored the highest (0.90 out of 1.00) in terms of overall fisheries management intensity, and Western Central Atlantic the lowest (0.72 out of 1.00) (Table 1). When weighting scores by total landings by area, the Pacific Northeast remain the highest scored (0.9).

18. For *Enforcement*, the Pacific Northwest and the Mediterranean and Black Sea scored the lowest (0.71 out 1.00). However, the Mediterranean and Black Sea is not well represented in the enforcement topic as only 10% of the total regional catch and 20% of the Members in this region answered questions regarding this topic. Among the four questions relative to *Enforcement*, most Members responded poor implementation of vessel monitoring systems (VMS) among their fleets.

19. While the Mediterranean and Black Sea scored highest for *Management strategies* (0.82 out 1.0), which included questions on whether target reference points have been exceeded, and if yes, which specific actions are taken to rebuild stocks towards targets (e.g., effective capacity adjustments, limiting fishing effort or catches, closing the fishery, etc.), the Western and Central Atlantic and the Eastern and Central Pacific have shown the lowest scores (0.66 out 1.00).

20. When grouping Members by development status rather than by FAO Area (Figure 2), developed countries overall scored higher on average than developing countries, in particular for *Fisheries legislation* and for *Data and Research*.

21. Results shown above combined different types of fisheries: large-scale and small-scale marine fisheries as well as inland fisheries. However, the management tools used in these three types of fisheries differ substantially and they may require quite different approaches to evaluate both intensity and effectiveness. Unfortunately, questions in the Code questionnaire are not easily linked to different fishery types because they were answered at a country level. Because of this, some questions were analyzed independently for small-scale fisheries (questions 46 to 50 in the Code questionnaire, Table S1).

22. For small-scale fisheries (SSF), 93 out 118 (83%) respondent Members reported this sub-sector was present in their respective countries. However, 17%, 33% and 28% of respondent Members reported lack of available information (“unknown” in Figure 3) on the importance of this sub-sector with respect to the total landing volume, value and harvesting jobs respectively (Figure 3). When specifically asked “*Does your country collect sector-specific data for small-scale fisheries?*”, 18% of Members responded no data at all, 80% data available on landings volume, 71% on landed value, 55% on employment, 49% on trade, and 26% on consumption (Figure 4). The lack of information as reported by Members was higher in developing countries vs developed ones. It is noted that Members apply their own definitions of what constitutes a small-scale fishery therefore these results should be interpreted with caution.

23. In terms of management of small-scale fisheries, question 48 asked about the existence of any law, regulations, policies, plans or strategies that specifically target or address this sub-sector. Most of the respondent Members selected almost all these categories (Figure 5). However, there are no questions about enforcement, nor compliance with these legislations, so measures of effectiveness are not available.

24. With regards to data gaps in managing fishery resources, ca. 50% of Members identified lack of information of fish stock status, followed by information on IUU and Monitor, Control and Surveillance (MCS) (36%) and on ecosystems, including oceanographic and climate change data (35%) (Figure 6). Furthermore, ca. 20% of Members, all represented by developing countries, responded no stock status information for all their stocks (e.g. no stock assessment available for any of their stocks), while only 9% of all Members responded that more than 90% of their stocks had information on stock status (Figure 7). As a caveat, we note that country respondents may differ in what is considered a reliable estimate of stock status. These answers for any given country are also likely to depend on which fisheries in the country were included. For example, in the U.S., stock status is more commonly known for federally-managed fisheries than for state-managed or unmanaged fisheries⁹

25. When asked about how many stocks have target reference points, 31% of Members (27) responded no stocks within their jurisdictions had target reference points. While quantitative stock assessments are often considered the most reliable and accountable approach to infer stock status information needed to develop management measures (e.g. through limit and target reference points), other sources of information can be

⁹ Melnychuk et al., 2023

useful to inform management, particularly in regions and fisheries where data is scarce and technical capacities limited. In this regard, 28% of Members responded using catch and effort indicators to inform management, 22% using socio-economic data, and 19% using experts' knowledge and qualitative indicators (Figure 8).

26. Across all Members responding reference points were available, a total of 1540 stocks were counted (an average of 25 stocks per Member in these remaining Members, ranging from 1 to 388 per country). Within these Members, the most common action taken when target reference points were exceeded, included '*carrying out research*', '*limiting fishing effort*', '*strengthening MCS*' and '*closing the fishery*' in that order (Figure 9).

27. The proper design and implementation of management plans at the fishery level are most often a prerequisite for effective fisheries management. When asked the question of how many fisheries had management plans, and how many had management plans implemented, the global averages were 71% and 68% of all fisheries respectively (Table 2). When grouped by FAO region, the Pacific Northeast region reported the highest percentage of management plans implemented (100%), while the Pacific Northwest reported the lowest (0%) (Table 2). As with the rest of the indicators, percentages should be regarded with caution as results might represent only a few countries or fisheries within those countries.

28. In terms of the attributes or provisions available within fisheries management plans, the most frequent answer were the prohibition of destructive fishing methods and practices (99%), provisions for stakeholder participation in management decisions (97%), the consideration of interest and rights of small-scale fishers (94%), and provisions to manage selectivity of fishing gears (93%). The least frequent were represented by provisions to address Abandoned, Lost or otherwise Discarded Fishing Gear (ALDFG) (56%), followed by provisions to address fishing capacity under defined economic conditions (72%) and the consideration of stock specific target reference point (72%) (Figure 10).

29. As the Code questionnaire questions are mostly indicative of what is available or "in paper" for countries to manage their fisheries, there is no indication of whether the management is being effective in achieving their intended objectives. In this respect, one objective of fisheries management is often maximize or optimize long-term catches, for which stock assessments are developed to understand the state of the stock, and from there inform management measures (for example, if my stock is below my target reference point of BMSY, management measures to reduce the fishing intensity to rebuild the fish stock towards my targets need to be implemented). In this context, several initiatives, including FAO State of the Stocks Index (SoSI) and indicator 14.4.1 of the Sustainable Development Goal (SDG) 14 (proportion of stocks at sustainable level) use well established reference points (i.e. MSY-based) to assess biological sustainability and hence a measure of whether the fisheries management is being effective in maintain stocks at that level.

30. In this paper, an attempt was made to connect the Code questionnaire responses and scores, to Members responses to the SDG 14.4.1 indicator questionnaire¹⁰ on the proportion of stocks at sustainable levels. Correlations between overall management intensity and the proportion of stocks at sustainable levels was low as expected given the nature and process of the Code questionnaire, the uncertainty in the level of engagement of Members in both reporting exercises, and the fact that management objectives might not be only focused on maintaining stocks at sustainable levels (for example, management plans might also prioritize economic or social objectives not linearly related to biological objectives). However, Management plans and in less degree Enforcement have shown better positive correlation with the proportion of stock at sustainable levels (Figure 11).

¹⁰ <https://unstats.un.org/sdgs/metadata/files/Metadata-14-04-01.pdf>

Limitations of the Code questionnaire and process

31. While the Code questionnaire provided an overview of the “intensity” of fisheries management globally and by region, there are many limitations:

- Some of the questions were directly related to fisheries management systems, but other questions had weaker or less direct relevance. Of the questions that did relate to some extent to fisheries management, almost all of them focused on intensity rather than on effectiveness. For this reason, no attempts to distinguish between these was made in this analysis.
- The questions are all at country level and not at the fishery or fish stock level. While some of the responses may apply to all fisheries within the country, there may be variability among individual fisheries that is not captured by an overall measure at the country level. In particular, we may expect performance to differ between large and small-scale fisheries. Most countries have diverse fisheries where an answer would be ‘yes’ for some fisheries and ‘no’ for others, so a scoring system at the fishery level, or that distinguished between fishery types or categories, would likely provide a better reflection of the overall use of particular management actions in each country.
- Few questions are relevant to social and economic aspects of fisheries management, and few questions are designed in a way that they are likely to reflect the management of small-scale fisheries.
- Results at the FAO Area level should be interpreted with caution due to representation biases (for example, certain areas are only represented by one or two Members in the responses to the questionnaire).

V. CONCLUSIONS

31. At present, it is not possible to determine whether we are achieving fisheries management objectives effectively. The main reason for this challenge is the lack of a consistent and thorough evaluation of management systems around the world. Although previous studies have been conducted to evaluate fisheries management systems, none have been representative of the global diversity of fisheries, comprehensive of the full range of management objectives, repeated over time to allow for detection of trends, or conducted at the level of individual fisheries to allow for observing variability among fisheries within the same country.

32. Overall, while the Code questionnaire has some strengths such as global comprehensiveness and periodic updates, it appears that the questionnaire by itself is inadequate for quantitatively evaluating the overall state of global fisheries management. This is especially true for evaluating management effectiveness, and also for distinguishing performance among individual fisheries, which in turn is necessary to discern differences between large-scale and small-scale fisheries. Finally, not all country Members respond systematically to the questionnaire, thus some FAO regions might not be well represented in terms of country members or total landings (see Table 1).

Table 1. Average raw scores and weighted scores by catch (W Score) by topic and FAO region. An overall score for each region is also shown, averaged across topics. The number of Members in the FAO region and number of Members covered by the Code questionnaire are provided as a measure of survey coverage. For each dimension, the % of countries and % of catch that is represented in the Code questionnaire compared to the total FAO region are listed. Colors show higher scores in green and lower scores in red, with separate scales by topic and score type (Score and W Score).

Region	Total # Countries	# Countries survey	Overall				Data and Research				Enforcement				Legislation				Plans				Strategies			
			% Countries	% Catch	Score	W_Score	% Countries	% Catch	Score	W_Score	% Countries	% Catch	Score	W_Score	% Countries	% Catch	Score	W_Score	% Countries	% Catch	Score	W_Score	% Countries	% Catch	Score	W_Score
Pacific, Northeast	7	4	57.1	99.7	0.90	0.90	42.9	99.7	0.97	0.96	42.9	99.7	0.75	0.75	57.1	99.7	0.98	0.98	42.9	99.7	1.00	1.00	42.9	99.7	0.78	0.79
Pacific, Antarctic	10	7	70.0	47.1	0.83	0.75	60.0	39.4	0.90	0.75	60.0	39.4	0.79	0.74	70.0	47.1	0.78	0.82	60.0	39.4	0.90	0.75	60.0	39.4	0.80	0.67
Indian Ocean, Antarctic	7	5	71.4	97.0	0.83	0.43	42.9	35.96	0.92	0.35	42.9	36.0	0.72	0.28	71.4	97.0	0.87	0.86	42.9	36.0	0.89	0.36	42.9	35.96	0.73	0.29
Indian Ocean, Eastern	22	11	50.0	57.8	0.82	0.82	36.4	57.8	0.89	0.85	36.4	57.8	0.77	0.82	50.0	57.8	0.73	0.61	36.4	57.8	0.92	0.95	36.4	57.8	0.79	0.84
Atlantic, Antarctic	14	10	71.4	86.9	0.82	0.79	57.1	86.9	0.90	0.90	57.1	86.9	0.77	0.73	71.4	86.9	0.74	0.72	57.1	86.9	0.89	0.88	57.1	86.9	0.79	0.72
Pacific, Southwest	10	7	70.0	95.8	0.81	0.91	50.0	94.9	0.90	0.91	50.0	94.9	0.78	0.96	70.0	95.8	0.73	0.93	50.0	94.9	0.86	0.95	50.0	94.9	0.75	0.80
Pacific, Western Central	35	20	57.1	57.0	0.79	0.81	51.4	56.8	0.81	0.85	48.6	55.6	0.81	0.70	57.1	57.0	0.73	0.79	51.4	56.8	0.84	0.95	51.4	56.8	0.78	0.76
Pacific, Northwest	9	2	22.2	76.0	0.79	0.74	22.2	76.0	0.91	0.86	22.2	76.0	0.71	0.68	22.2	76.0	0.81	0.71	22.2	76.0	0.84	0.74	22.2	76.0	0.70	0.70
Pacific, Southeast	23	15	65.2	99.2	0.79	0.80	43.5	98.8	0.88	0.93	43.5	98.8	0.81	0.92	65.2	99.2	0.72	0.69	43.5	98.8	0.85	0.85	43.5	98.8	0.68	0.64
Atlantic, Northeast	34	19	55.9	67.0	0.79	0.55	20.6	38.4	0.85	0.53	20.6	38.4	0.77	0.48	55.9	67.0	0.79	0.80	20.6	38.4	0.83	0.53	20.6	38.4	0.70	0.44
Atlantic, Northwest	26	17	65.4	89.3	0.79	0.87	30.8	86.5	0.86	0.93	30.8	86.5	0.74	0.73	65.4	89.3	0.77	0.96	30.8	86.5	0.88	0.97	30.8	86.5	0.68	0.79
Atlantic, Southwest	27	17	63.0	86.3	0.79	0.78	44.4	79.0	0.86	0.82	44.4	79.0	0.74	0.68	63.0	86.3	0.71	0.71	44.4	79.0	0.87	0.85	44.4	79.0	0.75	0.84
Mediterranean and Black Sea	31	16	51.6	30.2	0.77	0.57	19.4	10.3	0.80	0.54	19.4	10.3	0.71	0.49	51.6	30.2	0.75	0.76	19.4	10.3	0.76	0.59	19.4	10.3	0.82	0.49
Pacific, Eastern Central	26	16	61.5	93.0	0.76	0.84	53.8	92.2	0.83	0.93	53.8	92.2	0.78	0.75	61.5	93.0	0.68	0.77	53.8	92.2	0.84	0.93	53.8	92.2	0.66	0.82
Indian Ocean, Western	49	23	46.9	74.6	0.75	0.73	38.8	70.3	0.79	0.80	38.8	70.3	0.73	0.68	46.9	74.6	0.66	0.54	38.8	70.3	0.82	0.85	38.8	70.3	0.75	0.77
Atlantic, Eastern Central	53	26	49.1	48.9	0.74	0.72	28.3	43.2	0.77	0.77	28.3	43.2	0.76	0.71	49.1	48.9	0.72	0.72	28.3	43.2	0.77	0.68	28.3	43.2	0.70	0.71
Atlantic, Southeast	26	16	61.5	62.0	0.74	0.73	38.5	58.2	0.81	0.78	38.5	58.2	0.76	0.82	61.5	62.0	0.70	0.65	38.5	58.2	0.76	0.67	38.5	58.2	0.68	0.71
Atlantic, Western Central	54	24	44.4	83.9	0.72	0.83	38.9	83.4	0.78	0.90	38.9	83.4	0.73	0.75	44.4	83.9	0.62	0.81	38.9	83.4	0.79	0.94	38.9	83.4	0.66	0.77

Table 2. Number of fisheries with management plans available and implemented globally and by FAO Area. FAO Areas with higher proportion of management plans available for their fisheries listed first.

FAO Area/Region	Number of Members with responses	Number of fisheries	Number of fisheries with management plans	Number of fisheries with management plans implemented
Global	70	1121	801 (71%)	757 (68%)
Pacific, Northeast	3	246	246	246 (100%)
Atlantic, Northwest	10	352	313	312 (89%)
Pacific, Western Central	18	316	284	275 (87%)
Pacific, Southwest	5	178	152	152 (85%)
Indian Ocean, Antarctic	3	173	147	147 (85%)
Pacific, Antarctic	6	251	203	203 (81%)
Indian Ocean, Eastern	8	284	211	211 (74%)
Mediterranean and Black Sea	7	38	24	23 (60%)
Pacific, Southeast	11	233	135	130 (56%)
Atlantic, Northeast	9	153	84	84 (55%)
Pacific, Eastern Central	16	212	119	113 (53%)
Atlantic, Antarctic	8	148	74	74 (50%)
Indian Ocean, Western	19	177	88	87 (49%)
Atlantic, Southwest	12	190	98	87 (46%)
Atlantic, Western Central	23	332	161	144 (43%)
Atlantic, Eastern Central	16	163	74	62 (38%)
Atlantic, Southeast	10	64	18	13 (20%)
Pacific, Northwest	2	26	0	0 (0%)

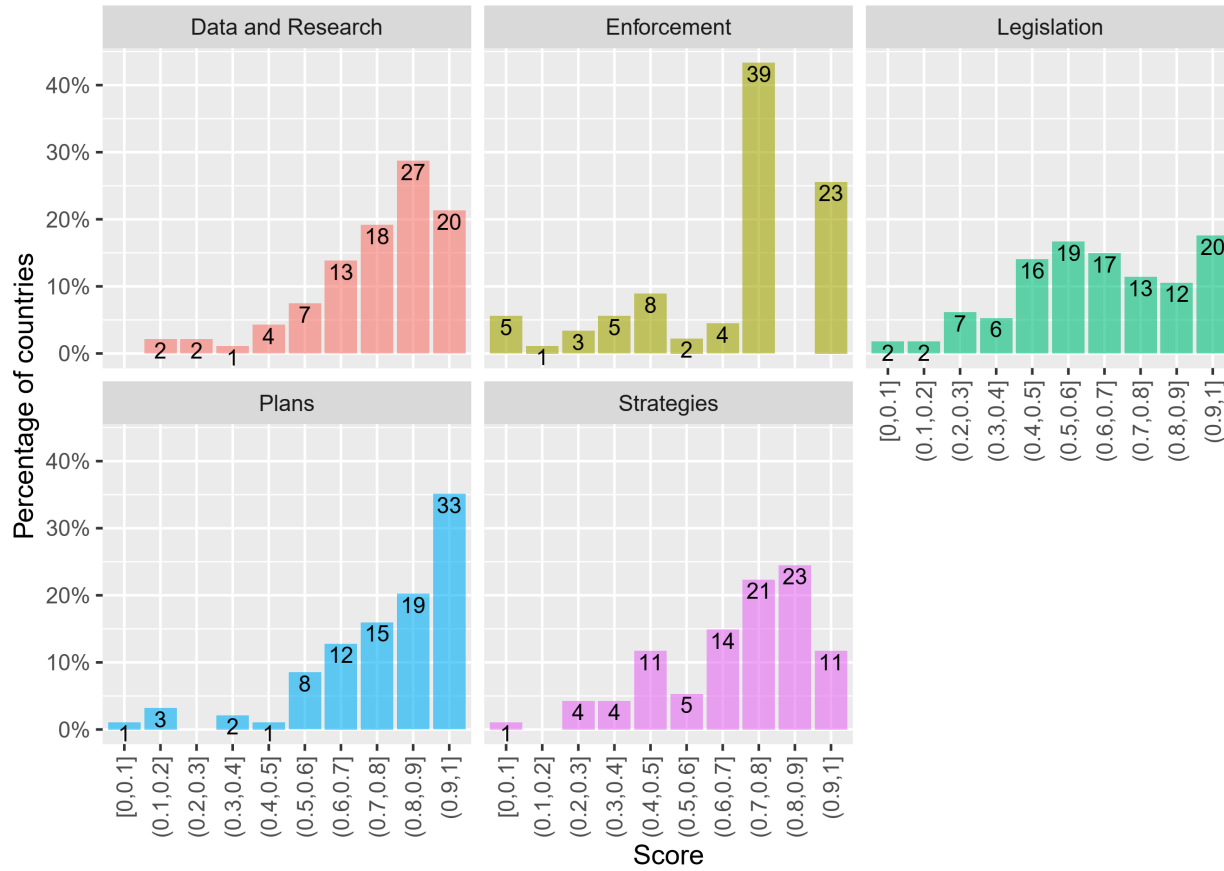


Figure 1. Distribution of global average scores per topic. Y-axis: percentage of countries by score bin; X-axis: scores binned from 0 to 1, by 0.1. Labels in bars indicate the number of countries by scores bin. Note: Countries with high scores (closer to 1, to the right of the distribution) represent higher intensity in management components or topics.

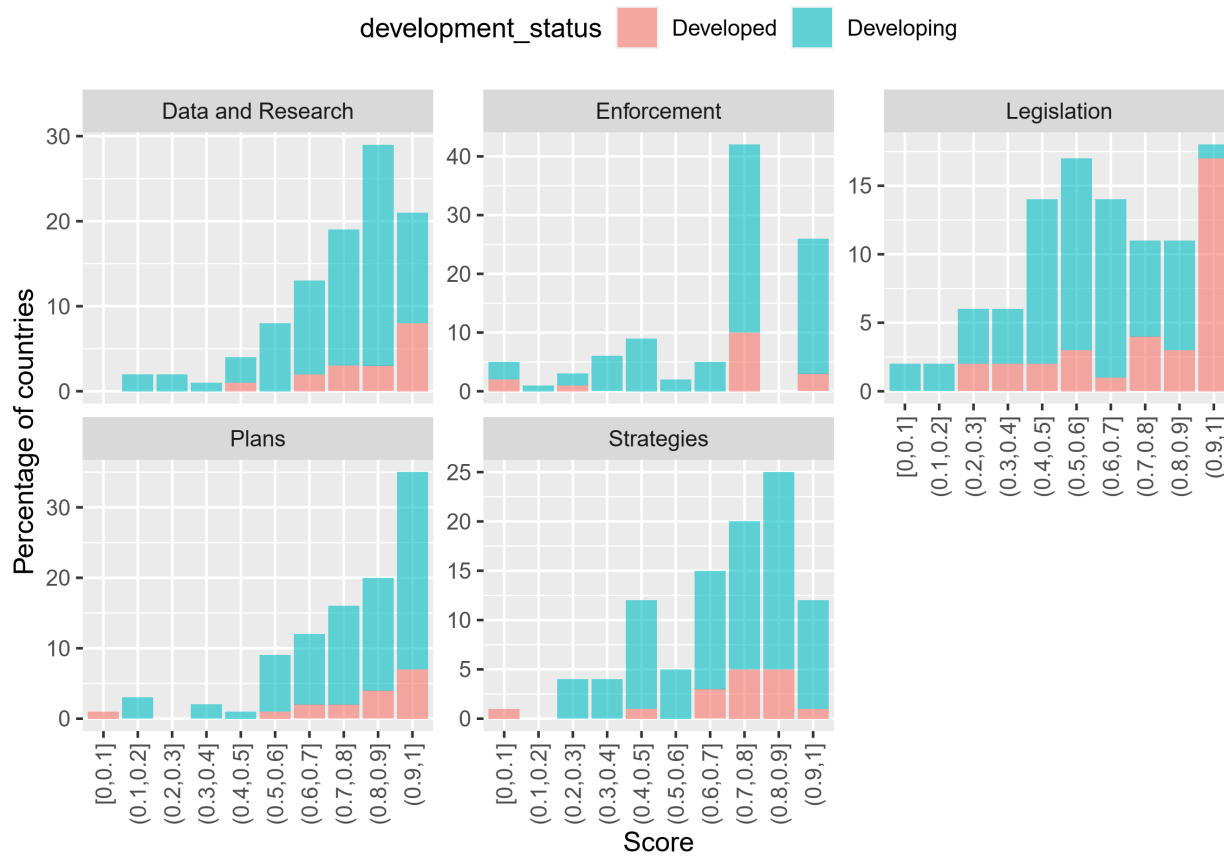


Figure 2. Distribution of global average scores per topic and development status. Y-axis: percentage of countries by score bin; X-axis: scores binned from 0 to 1, by 0.1. Note: Countries with high scores (closer to 1, to the right of the distribution) represent higher intensity in management components or topics.

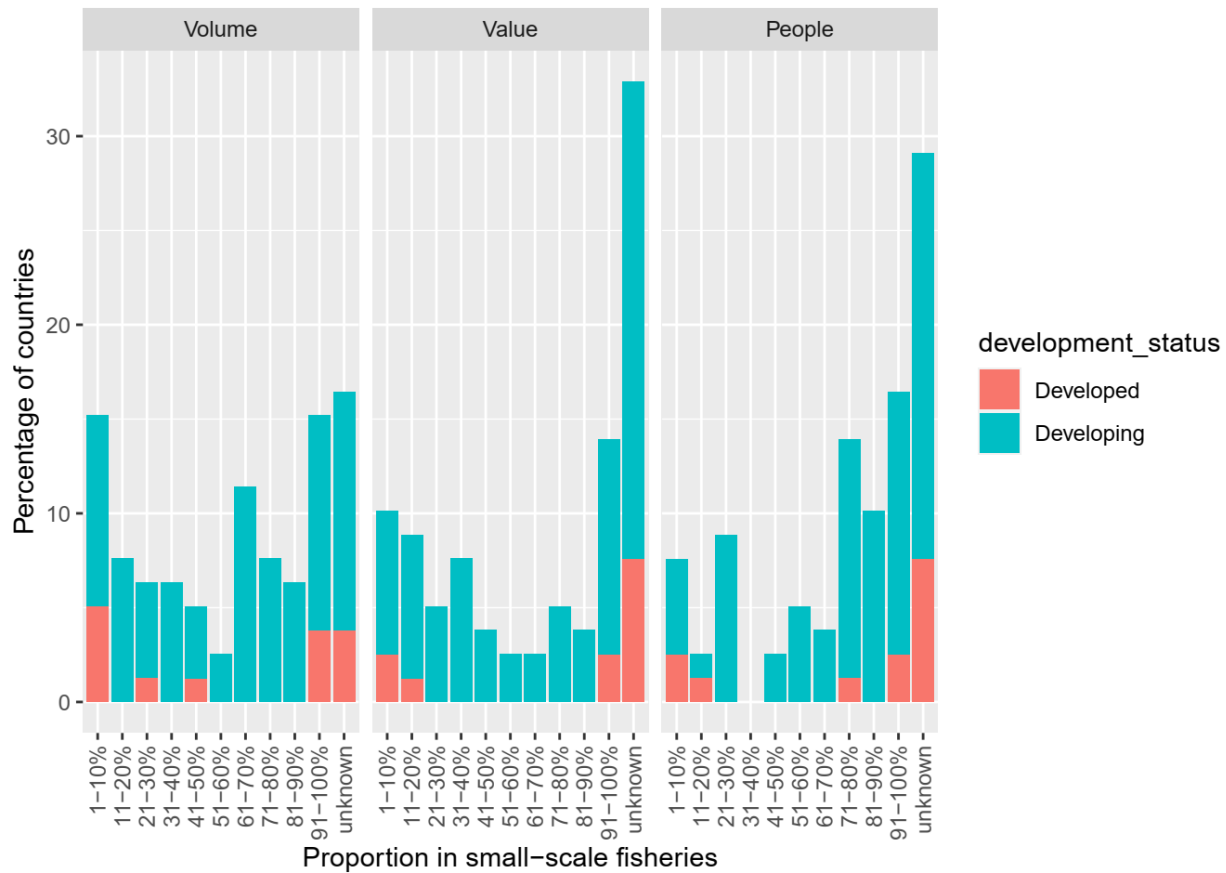


Figure 3. Proportion of country-wide landed tonnage and value derived from small-scale fisheries, and proportion of country-wide harvesting jobs involved in this sub-sector. Proportions are based on questions about small-scale fisheries in the Code questionnaire. Country percentages are separated by development status.

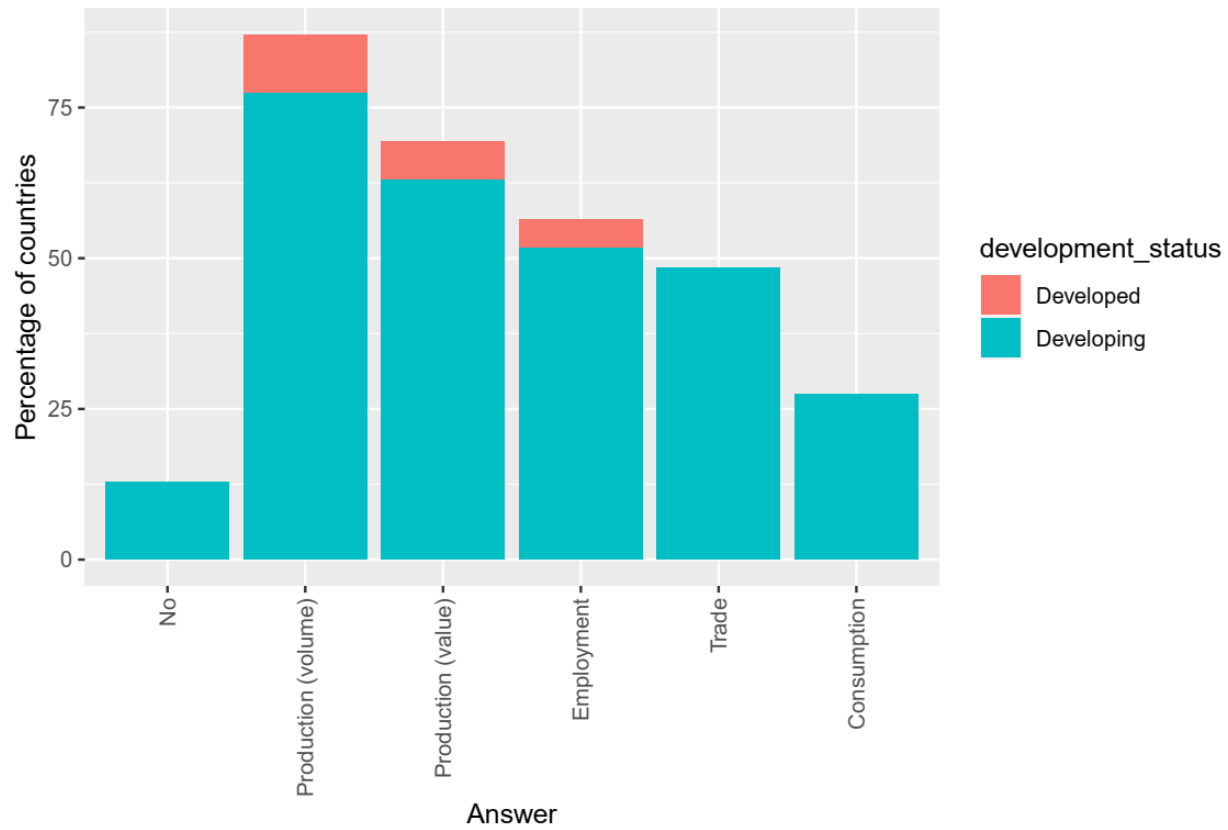


Figure 4. Responses to question 47: “Does your country collect sector-specific data for small-scale fisheries?” Responding Members had all indicated that they had a small-scale fishery sector. Country percentages are separated by development status. Members may answer ‘yes’ for more than one data type.

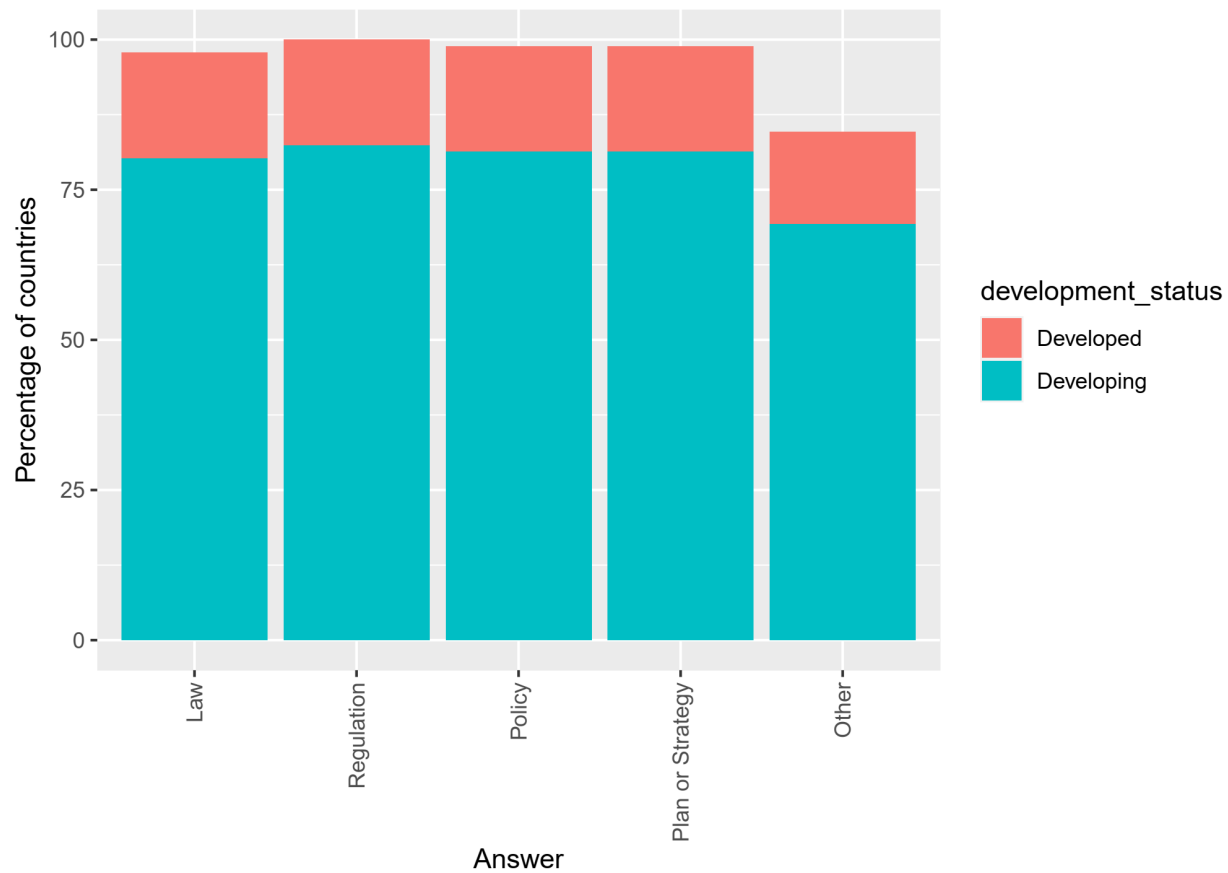


Figure 5. Responses to question 48: “Are there any laws, regulations, policies, plans or strategies that specifically target or address the small-scale fisheries sector?” Responding Members had all indicated that they had a small-scale fishery sector. Country percentages are separated by development status. Members may answer ‘yes’ for more than one category.

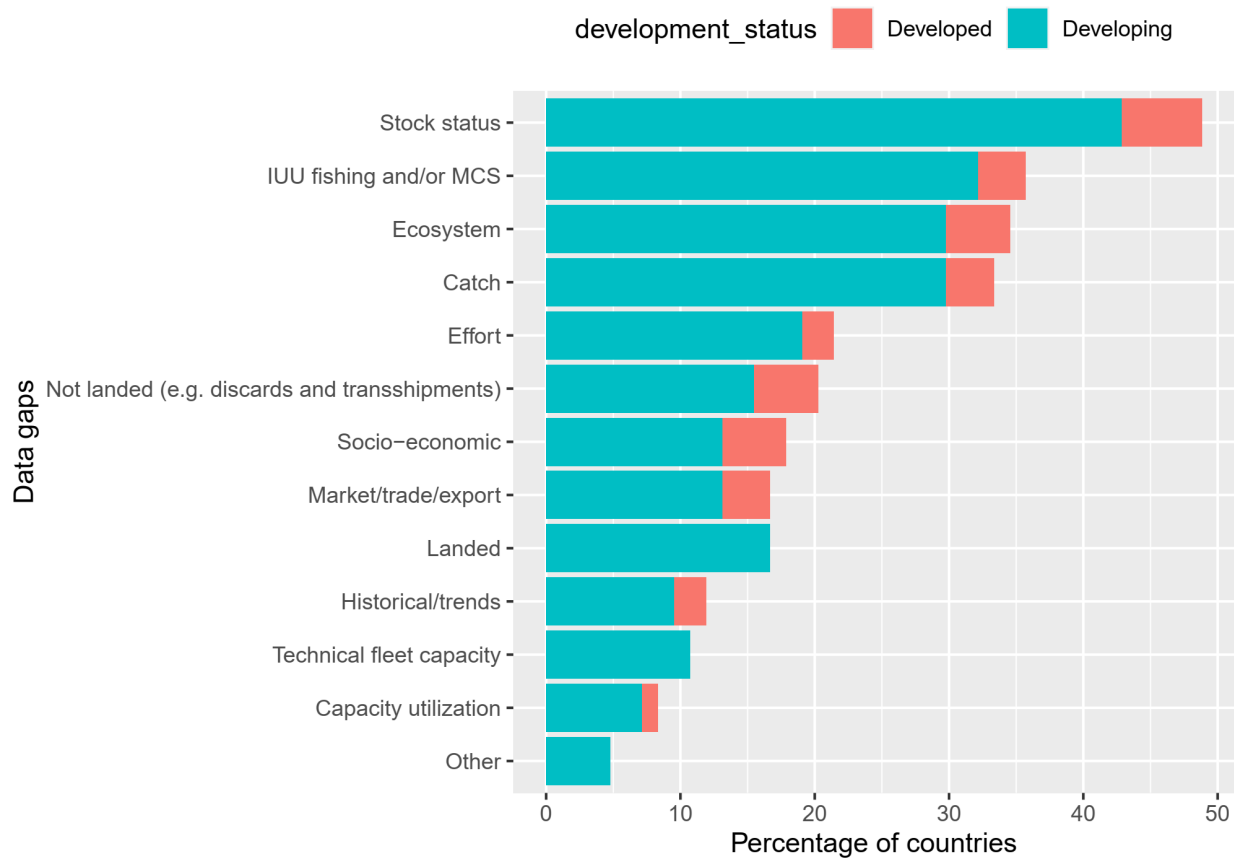


Figure 6. Responses to question 30: “Please identify up to three key data gaps in managing your country's fisheries resources.” Country counts are separated by development status.

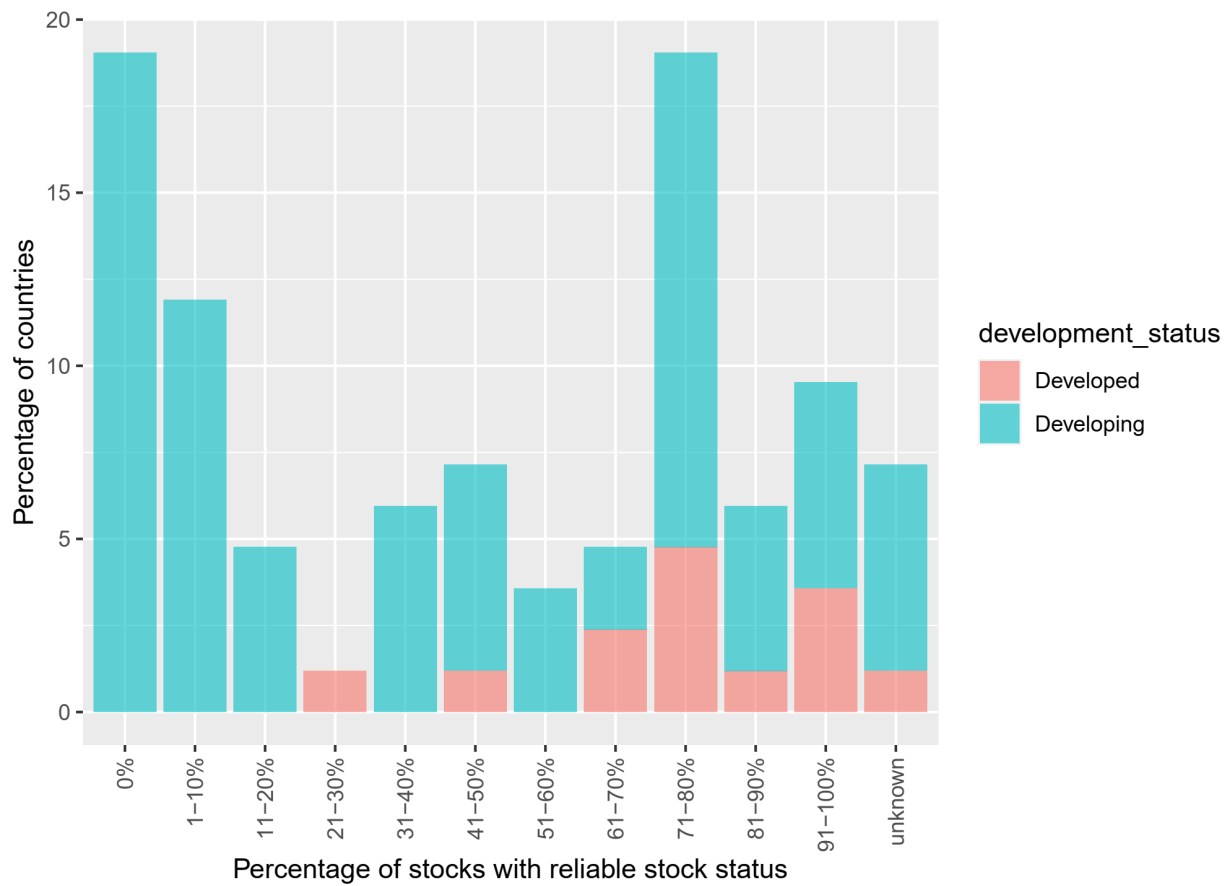


Figure 7. Answers to question 27: “For how many stocks has your country obtained reliable estimates of the status of the stocks (e.g., biomass or state of exploitation) within the last three years.?” Country percentages are separated by development status.

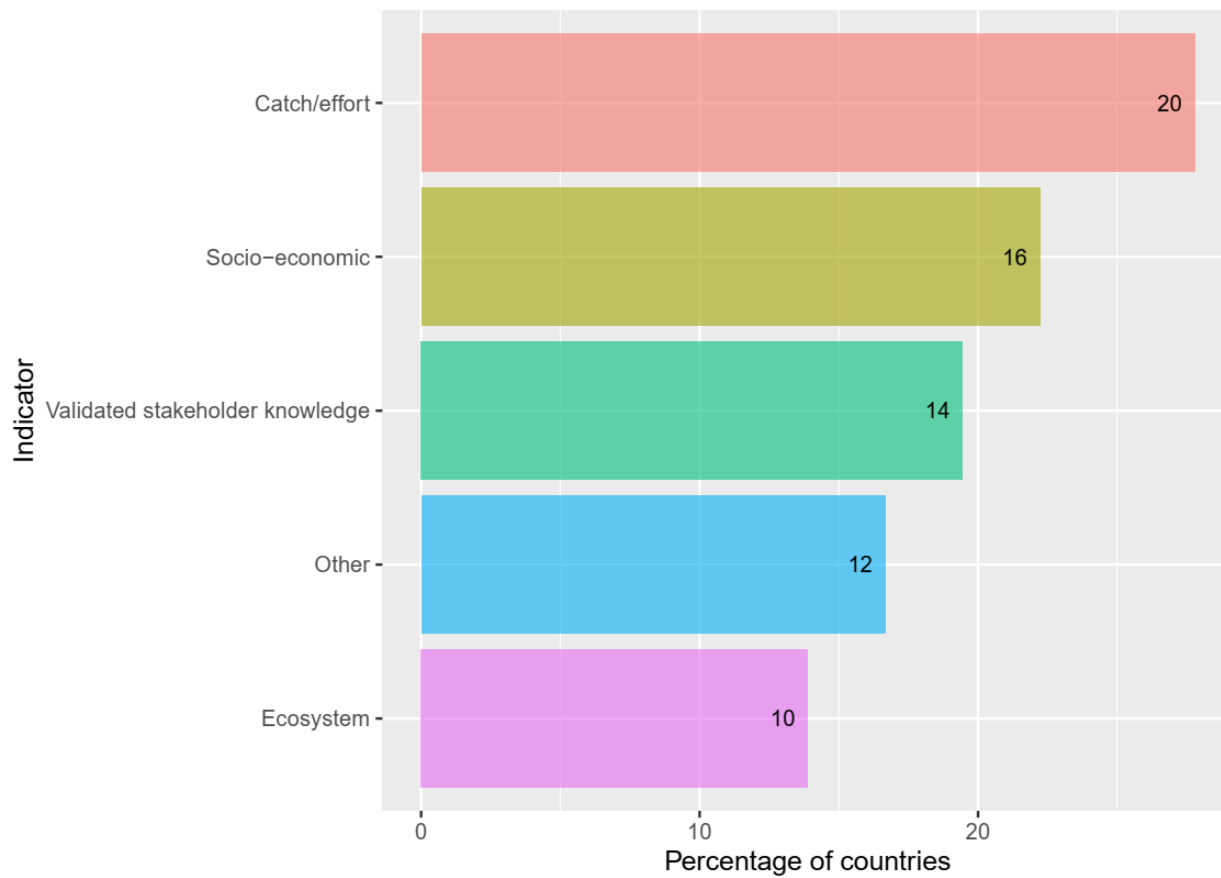


Figure 8. Responses to question 8.2: “If countries have not developed stock specific target reference points, what other indicators or thresholds are used for managing stocks?” Countries may list more than one indicator; answers were provided by 27 Members.

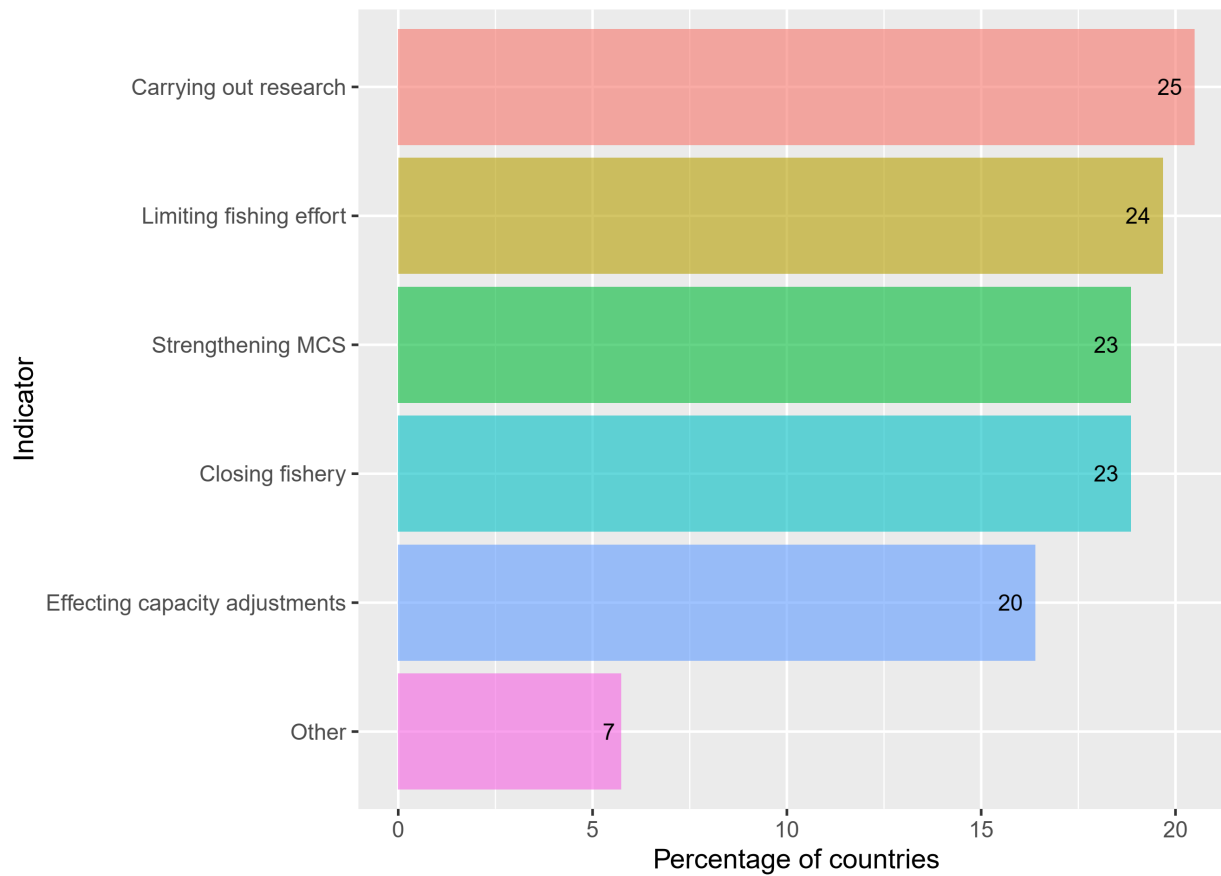


Figure 9. Responses to question 8.3: “If reference points were exceeded, what action has been taken to remedy the situation?” Members may list more than one action; answers were provided by 51 Members.

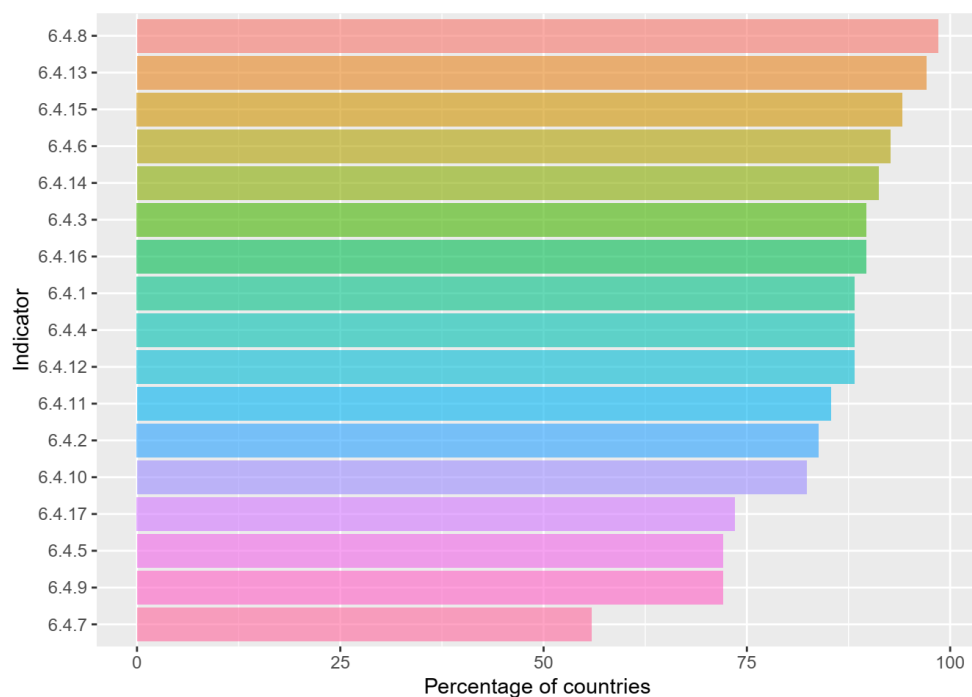


Figure 10. Responses to question 6.4: “Does your management framework...” (6.4.1) Contain measures to ensure the level of fishing is commensurate with the state of fisheries resources? (6.4.2) Recognize a process for identifying a species as 'threatened', 'endangered', 'at risk', or another similar status, which would make the species of serious conservation concern? (6.4.3) Contain additional measures for the protection of species identified as 'threatened', 'endangered', 'at risk', or another similar status, should they be encountered by fisheries. (6.4.4) Contain measures to allow depleted stocks to recover. (6.4.5) Contain stock specific target reference points. (6.4.6) Address selectivity of fishing gear. (6.4.7) Specifically target or address ALDFG and/or ghost gear? (6.4.8) Prohibit destructive fishing methods and practices (e.g., dynamiting and poisoning). (6.4.9) Address fishing capacity including the economic conditions under which the fishing industry operates. (6.4.10) Address the biodiversity of aquatic habitats and ecosystems, including the identification of essential fish habitats. (6.4.11) Recognize a process for identifying 'vulnerable habitats' or other types of significant and/or sensitive/vulnerable areas. (6.4.12) Contain additional measures for the protection of these habitats or areas, with regards to fisheries activity. (6.4.13) Provide for stakeholder participation in determining management decisions. (6.4.14) Address the protection of endangered species. (6.4.15) Address the interests and rights of small-scale fishers. (6.4.16) Use precautionary approaches which provide for conservative safety margins in decision making. (6.4.17) Fall within (or constitute an integral part of) wider management plans of the coastal zone/basin or catchment areas.

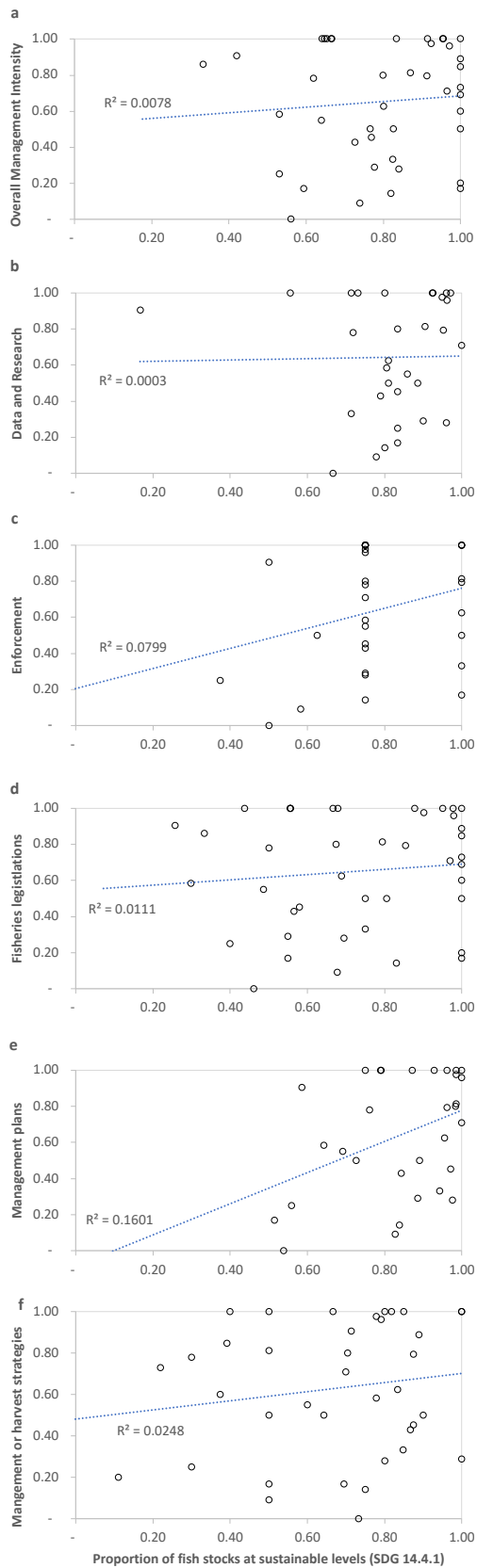


Figure 11. Correlations between proportion of stocks at sustainable levels by country (data from SDG 14.4.1 questionnaire) and scores for management intensity by topic (from the Code questionnaire): a. overall management intensity; b. data and research; c. enforcement; d. management legislation; e. management plans; and e. management strategies. Note higher correlation between proportion of sustainable stocks and enforcement intensity at country levels.