# Indicators in support of fisheries allocation in the IOTC: Special considerations for developing coastal States

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*"The success or otherwise of an allocation process has the potential to permeate almost all other decisions taken by an RFMO, and thus has the potential either to secure or to undermine the primary conservation regime…"*

Lodge et al., 2007

Photo: P. Wessels

## Summary

Despite the warning from Michael Lodge and colleagues in 2007[1] featured on the title page, allocation of internationally shared fish stocks remains a challenge across regional fisheries management organizations (RFMOs) the world over. While RFMOs like the Indian Ocean Tuna Commission (IOTC), the International Commission for the Conservation of Atlantic Tuna (ICCAT), and the Western and Central Pacific Fisheries Commission (WCPFC) are all actively speaking about allocation in the context of socio-economic dependency, it remains an elusive concept to define, let alone put into practice. Given the importance of allocation to RFMO cooperation and conservation effectiveness, however, finding ways to agree on an allocation protocol remain paramount.

To that end, the TCAC process, and the G16 sub-group, have been working to define principles and criteria for the allocation of fishing opportunities in the IOTC. In this document, indicators are explored as potentially of use in upholding responsibilities outlined in the United Nations Fish Stocks Agreement for special considerations for developing coastal States. The allocation structure currently contains a portion of the allocation to be directed towards coastal states (Chair's proposal, 6.4(2)). As outlined in 6.6 of the Chair's proposal, one of three elements here is reserved for the special consideration of developing coastal States. It is proposed here that a suite of internationally-agreed upon indicators can be used to support allocation implementation in line with this principle.

It is proposed that the indicators used be linked to principles laid out in UNFSA Article 24(2), which states that "in giving effect to the duty to cooperate in the establishment of conservation and management measures for straddling fish stocks and highly migratory fish stocks, States shall take into account the special requirements of developing States, in particular:"

- (2a) vulnerability of developing states which are dependent on the exploitation of living marine resources, including for meeting the nutritional requirements of their populations or parts thereof;
- (2b) the need to avoid adverse impacts and ensure access to fisheries by subsistence, small-scale and artisanal fishermen and woman fishworkers, as well as Indigenous people in developing States, particularly small island developing States;
- (2c) the need to ensure that such measures do not result in transferring, directly or indirectly, a disproportionate burden of conservation action onto developing States.

As these differentiated responsibilities are accepted under the UNFSA international regime, it is recommended that they can lay the basis for a legitimate and credible set of indicators in line with principles of equitable allocation for developing coastal States. Over the past year, G16 members have undertaken a participatory and consensus-based process through which six indicators have been identified These indicators include per capita fish consumption and Commonwealth Universal Vulnerability Index (to support 2a), proportion of fishing fleet that is <24 m and whether a country is a SIDS (to support 2b), contribution of fisheries to national GDP and proportion of export value made up of fisheries exports (to support 2c). These indicators and the process by which they were agreed upon are discussed in this information paper.

## Introduction

The management and governance of shared fish stocks is one of the most fundamental challenges to sustainable fisheries[2], as shared stocks remain highly susceptible to the tragedy of the commons[3,4]. Shared stocks are those that are transboundary (spending time in more than one exclusive economic zone (EEZ)), and those that are straddling or highly migratory (spending time in more than one EEZ and in the high seas), and it is generally agreed that cooperative management is essential for sustainability of such stocks[4,5]. Highly migratory species are particularly problematic, and for all intents and purposes, this refers to tuna and tuna-like species[6].

As the challenge of sustainable shared stocks management became increasingly clear, the United Nations Fish Stocks Agreement (UNFSA), building on the United National Convention on the Law of the Sea, put forward the "duty to cooperate", essentially admonishing fishing states to seek cooperative management through regional fisheries management organizations (RFMOs)[6]. RFMOs have the responsibility to help fishing states towards agreement on "participatory rights such as allocations of allowable catch or levels of fishing effort"[6]. But even with this recognition in international law, allocations within RFMOs remain contentious, due to disagreements or different interpretations of what equitable sharing agreements should look like[7,8].

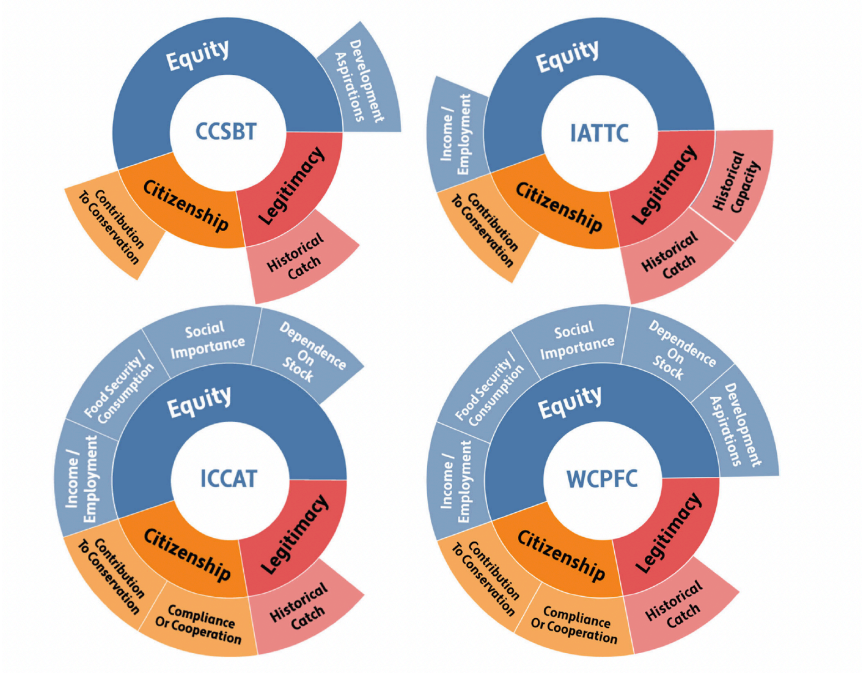
Allocation refers to "the process of providing temporary or permanent access, use, or presumptive rights to fish"[9]. Allocation in a transboundary fishery is difficult, and one of the major issues to be worked out in RFMO allocations is that of equity (often referred to as fairness). The UNFSA makes specific reference to fairness in the sense that it requires nations to take into account developing States, and in particular, to recognize the need for food security and considerations that may be unique to Indigenous communities[6,10]. In this context, 'distributive justice', comes to the fore. Distributive justice is a tenant of social justice, and is concerned with the social just allocation of goods throughout society, and thus supports the notion of equitable utilization and equitable opportunity.

The extent to which a country relies on a fishery for benefits above and beyond just catch[7] needs to be included in allocation discussions. But what is unclear is how can and should we understand equity in the context of different fishing nations. What should be considered (catch, domestic consumption, processing investment, jobs for marginalized groups)? And how should we consider it (what is measurable, what are acceptable inputs/data)? The scope of this report is to summarize a process taken by the G16 group of countries to tackle this question through the application of internationally accepted differentiated responsibilities in UNFSA, and agreement of potential indicators of relevance to such responsibilities.

## Allocation in tuna RFMOs

It is impossible to ignore the issue of allocation in fisheries management. Fully open access fisheries quickly became poster children of the tragedy of the commons and prisoner's dilemma, where self-interest trumps the collective good. In almost all cases, a 'race to fish' has continued to dominate global fisheries and overfishing and overfished stocks have become the norm. A move to catch shares (or quotas or allocation) then took place, where the limits to effort and/or catch were further broken up into access rights or privileges, giving each harvester or vessel, or in the case of internationally shared fish stocks, each country, a proportion of the total catch and/or effort. Not surprisingly, the process by which access is allocated is extremely contentious, certainly within a country, but perhaps even more so, between countries[7].

There are many different criteria and principles for allocation determination, but allocation is usually negotiated based on the amount of fishing that a nation has historically participated in, in addition to considerations for coastal states. The historical catch criteria almost always disproportionately benefits distant water fishing nations[11], DWFNs, as historically they developed their fishing capacity earlier (often through subsidies[12]) and thus have larger records of historical catch.




In a recent review of RFMO allocation processes, the criteria occurring in policy and conservation and management measures related to allocation were compiled across four tuna RFMOs[13]. The criteria were grouped under the categories of legitimacy, citizenship, and equity (Figure 1), and it is this third principle that concerns us in this document.

*Figure 1. Sunburst plot of allocation principles defined across four tuna RFMOs[13].*

## The IOTC allocation process to date

In this section, the history of the allocation process in the IOTC, including formation of the TCAC and proposals on allocation from almost a decade ago are reviewed (Figure 2). The Indian Ocean Tuna Commission agreement[14], which was adopted on 25 November 1993 and entered into force on 27 March 1996, article V(2j) – objectives, functions and responsibilities of the Commission states

*"to keep under review the economic and social aspects of the fisheries based on the stocks covered by this Agreement bearing in mind, in particular, the interests of developing coastal states;"*

It was this attention to economic and social aspects that prompted, or at the very least, underlined the first discussions around socio-economic indicators in the IOTC in 2013. These discussions came with the Seychelles (Proposal C)[15] and Iran (Proposal D)[16] – to the 2nd Session of the IOTC Technical Committee on Allocation Criteria (TCAC) negotiations – almost 20 years after the adoption of the agreement. Seychelles proposal noted the development of a verifiable socio-economic criteria for disadvantaged coastal States and Iran's proposal noted the importance for the TCAC to start developing a record of socio-economic indicators such as *"the number of fishermen, vessels, fishing harbours, processing centers, cold storage, refrigerator facilities"*.

In 2017, Seychelles submitted a proposal to the 21st Session of the Commission to develop a working party on socio-economic aspect of the fisheries in the IOTC area of competence to advice the Commission on the socio-

economic consequences to CPCs, arising from the implementation of conservation and management measures. The proposal was not adopted due to concerns around the lack of socio-economic data available to the Commission.

In 2018, Maldives supported by 9 other coastal States submitted a proposal to 4th Session of the TCAC[17], which included the need to develop four types of indicators

- Social dependency of relevant developing coastal States (which may include employment, food security needs, etc)
- Economic dependency of relevant developing coastal States (which may include export value and fisheries as a proportion or rank of GDP)
- Cultural dependency of relevant developing coastal States (criteria for which will be determined
- The development status of developing coastal States

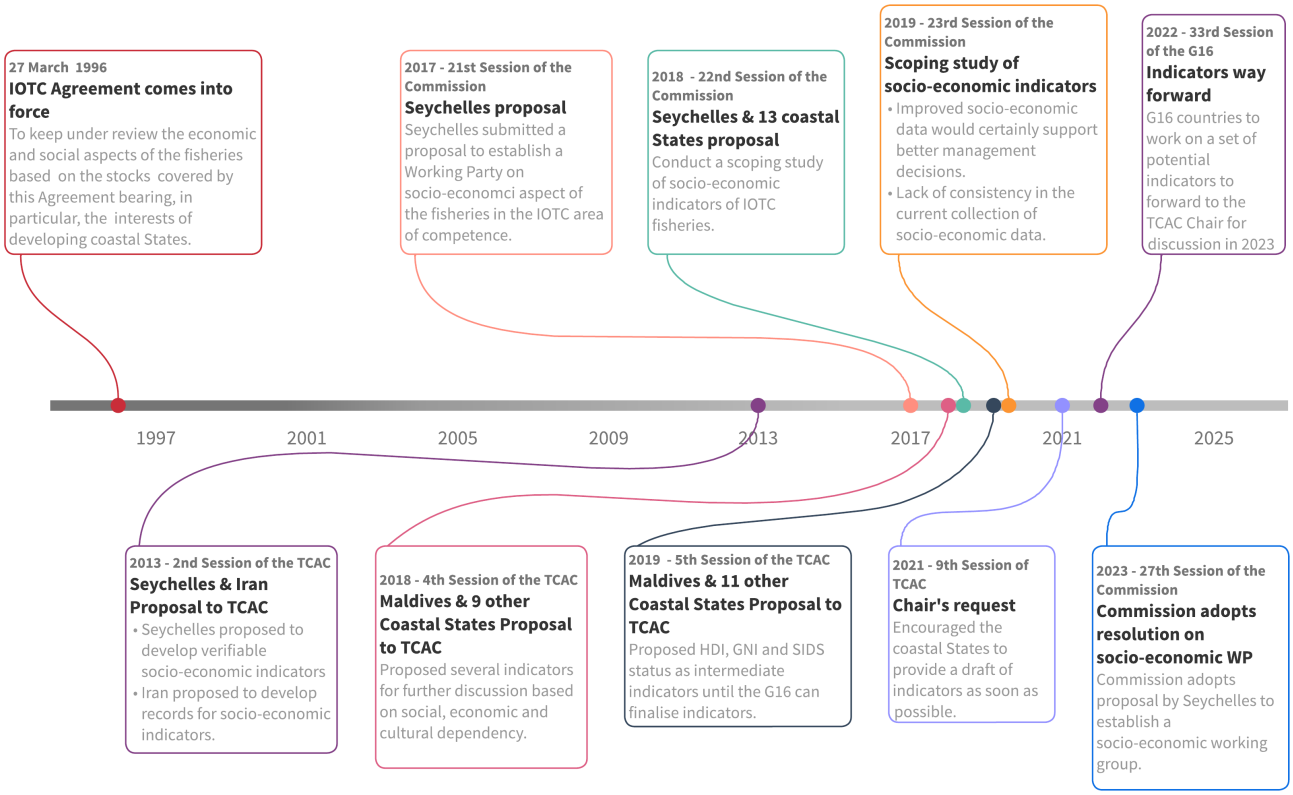



*Figure 2. Milestones in the IOTC allocation process, including around socio-economic dependency.*

Also in 2018, Seychelles with 13 other coastal States submitted a proposal[18] on scoping study of socio-economic indicators of IOTC fisheries to the 21st session of the Commission. The Commission adopted the proposal. In 2019, the consultants presented a report on the scoping study of socio-economic data and indicators[19] to the 23rd Session of the Commission. The report noted that improved socio-economic data would certainly support better management decisions. However, it was also noted that the current collection of both economic and social data by CPCs is patchy and lacks consistency. The consultants recommended at least a basic set of prioritised data would be a good starting point. However, the report noted that CPCs consulted as part of the scoping study were not unanimously in favour of expanding data collections.

In 2019, Maldives with 11 coastal States submitted a proposal[20] to the 5th Session of the TCAC which includes, three broad criteria in the absence of socio-economic indicators: Coastal State CPCs, Developing Coastal State CPCs (HDI GNI, SIDS); and EEZ proportion. The proponents noted that they will report back once there is progress on the indicators.

| | CCSBT | IATTC | ICCAT | IOTC | WCPFC |
|---|---|---|---|---|---|
| **A) Discourse & Policymaking** (Allocation principles defined) | Convention Article 8(4); Resolution on the Allocation of the Global Total Allowable Catch | IATTC Resolution on Fleet Capacity | 2001 Criteria for allocating fishing opportunities | Current proposals to Technical Committee on Allocation Criteria (TCAC) | Convention Article 10(3)a-j |
| **B) Implementation** (Allocation principles used) | Mostly historical catch, though rights of range states and development aspirations increasingly considered | Historical use, development aspirations, and coastal states' priorities | Mostly historical catch, consideration for new aspirations of developing, coastal states in the form of quota exemptions | Negotiations underway | In zone– coastal state interests, influenced by historical catch; High seas– Historical catch, considerations for developing and coastal states in the form of exemptions |
| **C) Evaluation** (Allocation principles systematically applied) | Directly negotiated on a rolling basis for 3 year periods, not systematic | Directly negotiated, not systematic | Directly negotiated, not systematic | Negotiations underway | Directly negotiated, not systematic; Negotiations underway |

*Figure 3. Comparison of relative status of tuna RFMOs with regard to allocation disclosure, implementation and evaluation*[13].

With the appointment of the new independent chair in 2020, the Chair has asked the G16 to report back on the progress of the development of the indicators. In 2021's Chair's summary of the proceedings[21], she states "

*"In terms of the coastal State allocation criteria, the Chair acknowledged the desire on the part of a number of coastal States to develop alternative indicators for the developing status of coastal States to those currently provided in Annex 3, and encouraged coastal States to share a draft of these as soon as possible for all delegations to consider during the next session of the TCAC".* It is in response to this desire that the current document has been prepared. Notably, IOTC is only marginally 'behind' other RFMOs in its implementation of an allocation approach.

IOTC is still working on defining principles, and thus is still a ways from implementation and evaluation, but all RFMOs are struggling (Figure 3). In 2023 during the 27th Session of the Commission, the IOTC adopted a Resolution based on Seychelles proposal to establish a working party on socioeconomics. The Working Party is responsible to identify, review, and recommend appropriate, robust metrics and indicators to assess the social and economic dynamics of fisheries. Moreover, the Working Party is mandated to develop an assessment framework to analyze the social and economic impacts arising from the implementation of CMMs, allocation of quotas and catch limits, and recommendations of the IOTC Scientific Committee.

## Rationale for UNFSA and differentiated responsibilities in equitable allocations

What is being discussed in this report is allocation in relation to the socio-economic benefits that arise from the fishery and in relation to the burden that arises from fisheries management decisions. It is this language of conservation burden that has found its way into the mainstream in negotiations in the WCPFC[22]. In the case of something like yellowfin tuna in the IOTC, conservation and management measures put in place to help rebuild or protect the stock are likely to mean conservation burdens must be borne by different nations. These can also be thought of as allocation, that is, putting a management measure in place means that costs will have to be taken on, and those costs will be allocated to different nations depending on the nature of the management measure.

Costs or burdens in this sense can be direct, for example, a reduction in access or licensing fees, or monitoring and enforcement expenses. They can also be more indirect and broader, for example, forgone employment and forgone food security options[23]. The common thread between allocating benefits and allocating burdens, is the idea of fairness and equity. But this presents another challenge, and that is the fact that equitable allocation is itself contextual and controversial[23]. Here the principle of 'common but differentiated responsibility' becomes important[24]. This principle recognizes that while nation states need to share responsibility for conservation, states are not necessarily similarly capable of contributing to conservation[24]. So what this ultimately means is that conservation and management by RFMOs will allocate benefits through fishing opportunities and burdens through management measures, and that these benefits and burdens need not be equally allocated across states[23].

To try to address these questions, we can go to UNFSA Article 24 to understand the language used in common but differentiated responsibilities[25] in relation to developing coastal states. Article 24(2) of UNFSA states that
"in giving effect to the duty to cooperate in establishment of conservation and management measures for straddling fish stocks and highly migratory fish stocks, States shall take into account the special requirements of developing States, in particular:

a) the vulnerability of developing States which are dependent on the exploitation of living marine resources, including for meeting the nutritional requirements of their populations or parts thereof;
b) the need to avoid adverse impacts on, and ensure access to fisheries by, subsistence, small-scale and artisanal fishers and women fishworkers, as well as indigenous people in developing States, particularly small island developing States; and
c) the need to ensure that such measures do not result in transferring, directly or indirectly, a disproportionate burden of conservation action onto developing States."

It is recommended here that development of indicators associated to each of these sub-articles could create some enabling conditions for incorporating dependency and fairness into allocations.

### Incorporating equity indicators

The issue with negotiating around the issue of vulnerability and dependency is a relative and subjective term. Different countries have different interests[23], and see their dependence manifest itself in different ways. Indicators are a way of trying to measure things, making them more objective and comparable in a relative way, even if the interests themselves differ. In the context of allocations, we can think about indicators around socio-economic dependency and vulnerability as things that could support equitable distribution of benefits and burdens. When we talk about benefits and burdens (dependency) for fishing countries, communities, households, etc., what are we talking about? What does it mean to be dependent, to be vulnerable? How do we measure that dependence? In this section, potential indicators will be reviewed.

Here we return to the three components of Article 24(2) in UNFSA, and discuss what could and should be measured or measurable to account for these sub-articles.

### Article 24(2a): Vulnerability

> **From UNFSA:** ***the vulnerability of developing States which are dependent on the exploitation of living marine resources, including for meeting the nutritional requirements of their populations or parts thereof;***

Vulnerability can be thought of as referring to the potential for harm and is relative. Where that potential is large, a country might be thought to be more vulnerable than another country. In their development of a vulnerability index for SIDS, a UN expert group agreed that vulnerability should reflect 'relative economic and ecological susceptibility to exogenous shocks." They also agreed that vulnerability indicators should be "easy to comprehend and intuitively meaningful, and suitable for inter-country comparisons or reflecting relative vulnerability of SIDS and non-SIDS."[26] The sub-article goes on to specify that dependency on the resource is an important pre-determinate of vulnerability, with a specific mention to nutritional needs (something we may more broadly refer to today as food security).

Suggested indicator to include based on G16 discussion:

- **Contribution of fish to food security |** According to the FAO, food security refers to having adequate access to safe and nutritious food that meets the dietary needs and food preferences of a given population. There is another less oft referred to component of the food security debate, which is about food sovereignty. Food sovereignty is the right of peoples to culturally appropriate foods that are ecologically sound, and their right to define their own food systems. If food is to be a component of allocation, as has been argued for[24], then sovereignty and security both will be important concepts to put forward, as will more granular indicators around nutrition and micronutrient availability. For many SIDS, consumption of fish remains vital for food security and sovereignty, and the costs of replacing fish protein with alternatives are untenable. Additionally, some alternative forms of protein production (such as cattle farming), may have disproportionately high environmental costs, when compared to fishing. **Indicator to be used here: Per capita fish consumption (available through FAO).**

- **Commonwealth vulnerability index |** The Commonwealth defines the vulnerability of a country as "the risk of being affected by exogenous shocks of various form, origin and intensity, the effect of which is contingent on a country's specific characteristics and features, including its ability to respond to shocks as reflected in its level of resilience[27]" (p vii). **It is suggested that the Commonwealth Universal Vulnerability Index be used here. It is available for all developing coastal States in the IOTC.** This combination of vulnerability and resilience is used to reflect a country's relative ranking according to the following:

## Classification of Vulnerability in the UVI

| | | |
|---|---|---|
| **UVI > 1.5:** | Vulnerability significantly greater than resilience: | Extremely Vulnerable |
| **1.5 < UVI > 1:** | Vulnerability somewhat less than resilience: | Highly Vulnerable |
| **1 < UVI > 0.5:** | Vulnerability partially matched by resilience: | Vulnerable |
| **UVI < 0.5:** | Resilience significantly exceeds vulnerability: | Resilient |

### Article 24(2b): Small-scale, artisanal, and Indigenous fishworkers

**From UNFSA:** ***the need to avoid adverse impacts on, and ensure access to fisheries by, subsistence, small-scale and artisanal fishers and women fishworkers, as well as indigenous people in developing States, particularly small island developing States;***

There is often a dichotomy made between small-scale and large scale fisheries[28]. Small-scale fisheries are often inefficient, meaning more labour is required to catch the same amount of fish. This is seen as inefficient by economists, but is also put forward as a positive for something like a one-by-one fishery.

The current FAO definition for small-scale fisheries is inadequate to deal with the complexity of the sector today. Many small-scale fisheries supply to export markets, for example, despite their gear being classified as small-scale. Each country has its own way of defining the scale of operations, and most, if not all, likely license operations differently based on scale. A major barrier to operationalizing 24(2b) however, remains that small-scale and artisan tuna operations often remain data-poor[29]. With the added emphasis here of SIDS requiring special attention, this particular criteria (SIDS country or not) will need to be taken into account here for equity concerns. **The indicator that is suggested here is the proportion of the country's fleet that is made up of small-scale and artisanal vessels (under 24 m long). Some countries have this data, others may need support from FAO to provide estimates.**

Because small-scale fisheries are often underreported, it may be important to rely on catch reconstruction methods, like through the Sea Around Us, or other alternative metrics for estimating their contribution. For countries who know that the small-scale sector is important, but do not currently have strong data collection and reporting protocols in place, this could be an important investment opportunity for fisheries managers.

The particular reference to SIDS in 24 2(b) need not be forgotten, and it was agreed that including this as a simple yes or no would suffice for capturing on aspect of special considerations of SIDS.

### Article 24(2c): Avoiding disproportionate burden

> **From UNFSA:** ***the need to ensure that such measures do not result in transferring, directly or indirectly, a disproportionate burden of conservation action onto developing States***

Disproportionate burden continues to be an important but undefined concept in RFMO governance. An attempt to develop and provide a framework for calculating it was undertaken in Hawaii in 2014, led by the Western Pacific Regional Fishery Management Council. At this meeting, a formal way of defining disproportionate burden was developed[30]. The biggest challenge here that disproportionate is relative to something, namely a proportionate burden. This is equally relevant for the issue of socio-economic dependency and likely something that should be seen in relative terms. The issues that came up in the Hawaii workshop that are pertinent here, are that to determine proportionality (and in this case, dependency), several things must be considered. These are listed below and the word "dependency" has been inserted here for relevance to the current issue, whereas in the original document, this would have been referring to disproportionate burden[30].

- Whose costs and benefits count? While we may calculate economic dependency for all members using costs and benefits, is there a sub-section of members for whom dependency is deemed more important? (*Note: Based on UNFSA, developing States and SIDS are deemed more important);*
- Who has the responsibility to demonstrate dependency?
- What is the baseline (this is a similar issue to window for historical catch)? (*Note: this is important from the perspective of aspirations, which has been used in other RFMOs as part of equity considerations in allocation conversations*);
- What and how do we measure for dependency? *(Note: This is what we are hoping to achieve through a and be above)*.

Two indicators related to disproportionate burden that could be included in allocation criteria now are:

- **Fisheries contribution to GDP |** On average, fisheries contribute between 0.5-2.5% to national GDPs, meaning they appear to be only a minor economic sector[31]. However, this is not the case for all countries, and for those countries for whom fisheries constitute a disproportionately large amount to national GDP, an argument for dependency and vulnerability to shocks may be possible. It is also important to note, however, that solely relying on GDP as an indicator of dependency is largely inappropriate. Firstly, contribution to GDP largely ignores the economic contribution of the post-harvest sector and the importance of exports. Secondly, a national level indicator such as GDP may not adequately account for more regional or local dependencies. Countries may need support from other agencies to support reporting of this.

- **Fisheries exports as a proportion of total exports |** Available through the UN Comtrade database for most countries, the contribution of fisheries exports to total exports is suggested as an indicator to address potential for disproportionate burden.

## Next steps

Recognition of the need for allocations to address the special considerations of developing coastal States has become commonplace in IOTC, so much so, that the Chair of the TCAC has asked G16 members to submit a list of potential indicators around vulnerability and dependency. The G16 undertook a participatory process to come to a tacit agreement on a first set of indicators to be included in allocation discussions. This was achieved through multiple in-person meetings and online document sharing over the past 12 months. The indicators included in this report represent that first set, which are in line with UNFSA Article 24, and recognize the duty IOTC States have to uphold their responsibilities.

From a resource management standpoint, indicators can help to calibrate the importance of something, or can help to track progress towards sustainability goals[32]. Note that some indicators may be easier or less costly to measure, while others may necessitate high investment in data collection. It will be important for IOTC members to determine what they want to include as indicators now at low cost versus in the future at likely higher cost. The 2023 adoption of the Working Group on Socio-economic Indicators (at the 27th IOTC Session) can hopefully take this challenge on in its program of work.

To recap, the following indicators are proposed:

| 2a Vulnerability | | 2b Priorty sectors | | 2c Disproportionate burden | |
|---|---|---|---|---|---|
| per capita fish consumption | Commonwealth vulnerability index (RANK) | Prop Fleet that is SSF | Country is SIDS | Fisheries contribution to GDP (%) | Fisheries export as % of total export |

## Conclusion

It is clear from the directions that many tuna RFMOs are taking, ICCAT, WCPFC, and the IOTC itself, that allocation remains an important and contentious issue. The socio-economic dependency of member States has been recognized in UNFSA, Convention texts and meeting documents, but formalization of its inclusion in allocation formulae remains to be seen. In this way, IOTC could take a leading role in forwarding a transparent and replicable process of moving forward, by developing the methodology and application of equity indicators linked with Article 24(2) of UNFSA[6].

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Appendix: Data tables

The following table contains the currently-available indicator values for those indicators agreed upon by G16 countries as for consideration in allocation criteria. Some countries have since provided updated or higher resolution data, however this table showcases only those available through publicly available databases.

| | 2a Vulnerability | | 2b Priorty sectors | | 2c Disproportionate burden | |
|---|---|---|---|---|---|---|
| Country | per capita fish consumption | Commonwealth vulnerability index (RANK) | Prop Fleet that is SSF | Country is SIDS | Fisheries contribution to GDP (%) | Fisheries export as % of total export |
| Bangladesh | 26.27421 | 73 | | 0 | | 1.4* |
| Comoros | 15.435959 | 90 | | 1 | | 0 |
| India | 7.886377 | 101 | | 0 | | 1.949147923 |
| Indonesia | 44.712276 | 133 | | 0 | | 1.949435535 |
| Iran, Islamic Re | 12.143301 | 70 | | 0 | | 0.38* |
| Kenya | 2.9789176 | 50 | | 0 | | 0.4* |
| Madagascar | 3.885057 | 43 | | 0 | | 4.50676162 |
| Malaysia | 53.32593 | 137 | | 0 | | 0.318531643 |
| Maldives | 87.30368 | 23 | | 1 | | 73.69543644 |
| Mauritius | 23.50829 | 114 | | 1 | | 6.583127314 |
| Mozambique | 13.463253 | 36 | | 0 | | 1.413024764 |
| Oman, Sultana | 29.301771 | 69 | | 0 | | 0.582029816 |
| Pakistan | 1.5847697 | 19 | | 0 | | 1.999590054 |
| Seychelles | 52.89067 | 106 | | 1 | | 7.936772516 |
| Somalia | 2.4 | 1 | | 0 | | |
| South Africa | 6.515673 | 86 | | 0 | | 0.554097529 |
| Sri Lanka | 28.567335 | 109 | | 0 | | 2.332944655 |
| Tanzania | 6.234363 | 87 | | 0 | | 3.358042076 |
| Thailand | 28.476368 | 115 | | 0 | | 0.79183127 |
| Notes | Data from 2020 FAO database | Data from CUVI 2021 report | | | | From 2019 UN Comtrade database, except where * is indicated (*=2015) |