The Sustainable Development Goals Extended Report 2023

14 LIFE BELOW WATER

Note: This unedited 'Extended Report' includes all indicator storyline contents as provided by the SDG indicator custodian agencies as of 30 April 2023. For instances where the custodian agency has not submitted a storyline for an indicator, please see the custodian agency focal point information for further information. The 'Extended Report' aims to provide the public with additional information regarding the SDG indicators and is compiled by the Statistics Division (UNSD) of the United Nations Department of Economic and Social Affairs.

Contents

Target 14.1 By 2025, prevent and significantly reduce marine pollution of all kinds, in particular from land-based activities, including marine debris and nutrient pollution

Indicator 14.1.1 (a) Index of coastal eutrophication; and (b) plastic debris density

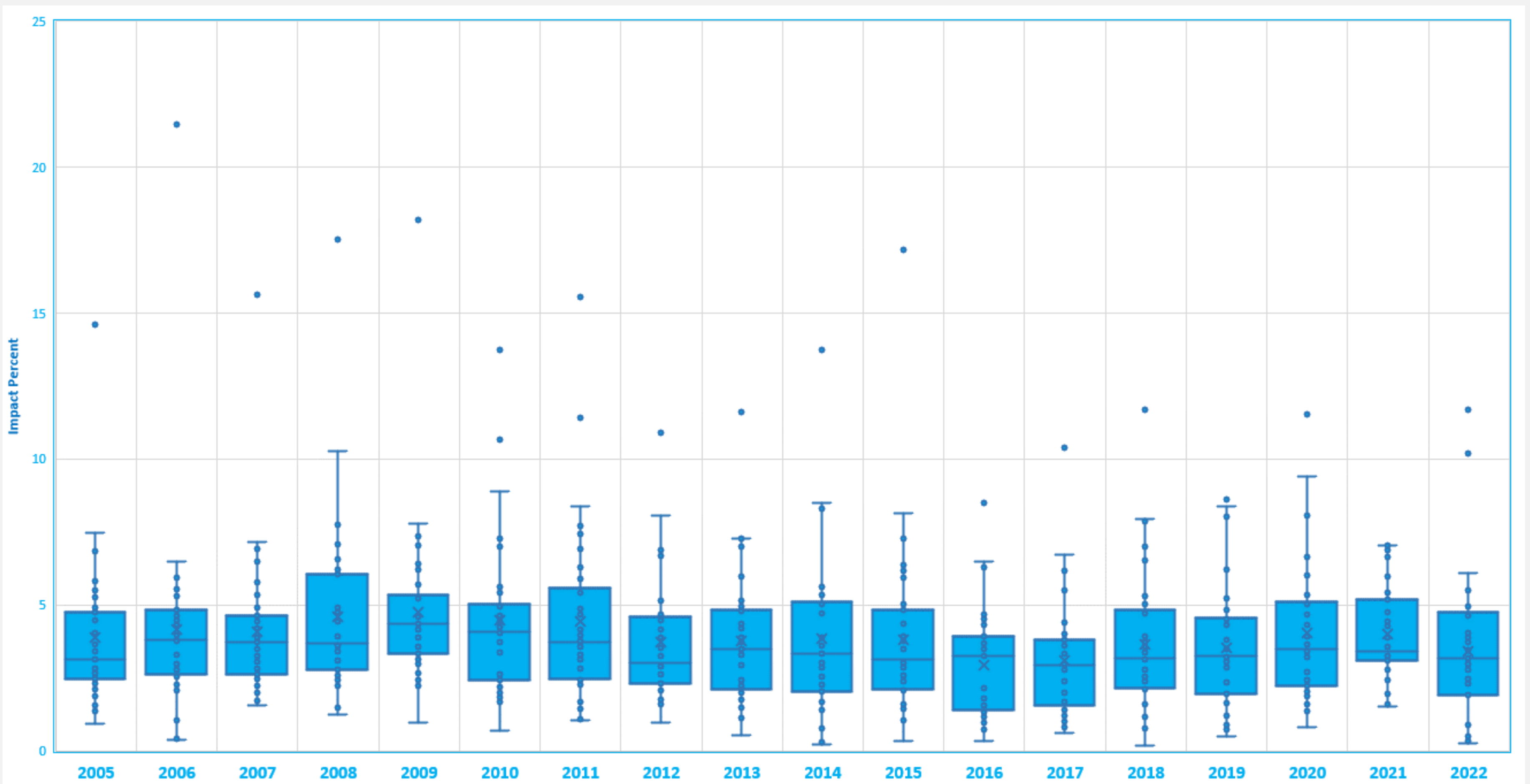
The global trend of elevated coastal eutrophication continued in 2022 above the 2000-2004 baseline conditions with the highest rates in the Arabian Sea

The discharge of excess nutrients into coastal areas mainly stems from human activities and results in coastal eutrophication, which negatively impacts marine ecosystem health and the provision of sustainable services and goods. One manifestation of coastal eutrophication is the excessive growth of algae. These can be harmful and secrete toxins or clog the gill rakers of fish resulting in the death of fish, crustacean's walkout, and marine mammal beaching. These harmful algal blooms can generate a chain reaction, leading to the deterioration of seagrass, coral reefs, and nearshore hard-bottom communities while also posing substantial risks to the health of seafood consumers, swimmers, and fishermen.

The main pigment of algae and plants is chlorophyll-a, which absorbs visible sunlight for photosynthesis and converts it into energy for growth and reproduction. Chlorophyll-a can be monitored with satellites by analysing the ocean colour. Changes in the chlorophyll-a signals can help identify areas where algae are blooming. These blooms can be caused by natural processes or human-generated eutrophication. Direct analysis of nutrient levels, algae and related environmental conditions is needed to determine the cause of a bloom.

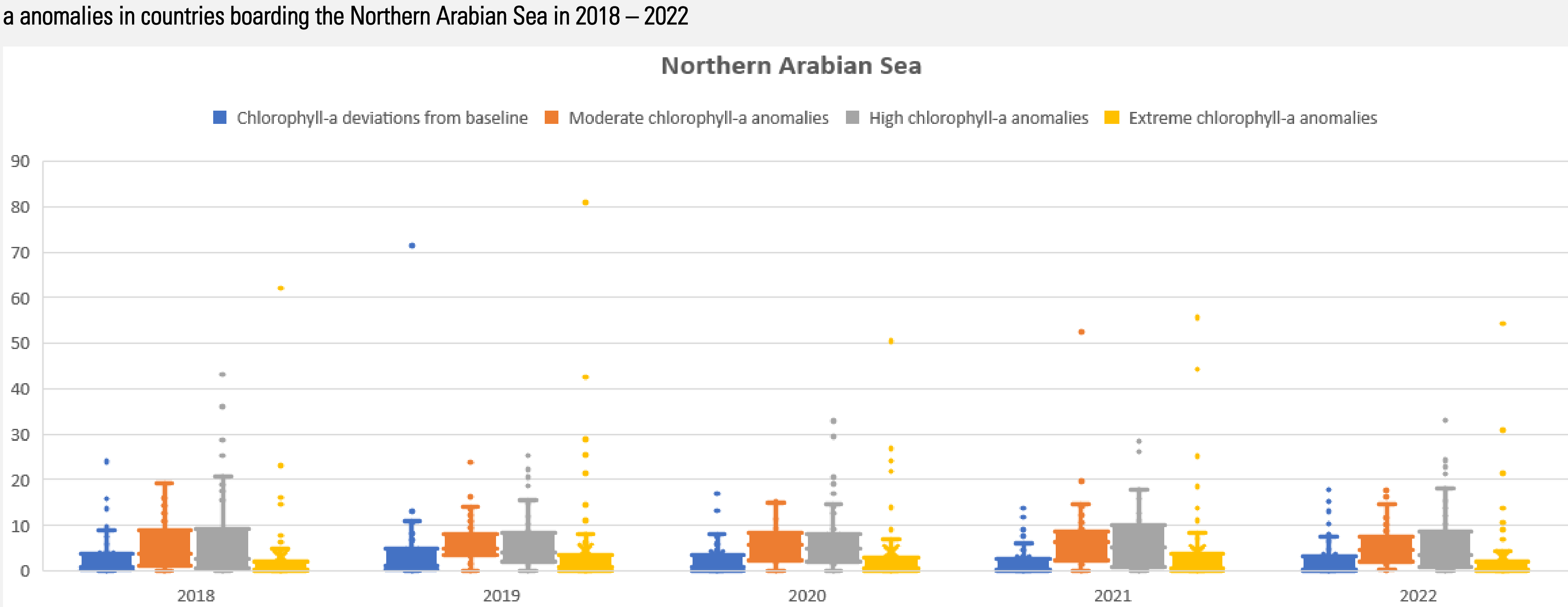
Due to a lack of country nutrient and algal data, the Coastal Eutrophication indicator uses two global satellite-derived sub-indicators to detect changes in the amount and distribution pattern of chlorophyll-a in a country's coastal waters (defined as the Exclusive Economic Zones). Sub-indicator 1 (chlorophyll-a deviations) monitors monthly deviations in distribution of chlorophyll-a in EEZs relative to a 2000-2004 monthly baseline. The chlorophyll-a deviation indicator is produced from a global chlorophyll-a that contains merged information from several satellites, spanning the years from 1997-2022). The chlorophyll-a deviation indicator reveals the monthly deviations of chlorophyll-a above the 2000-2004 baseline, reveals areas that are increasingly eutrophic over time – as revealed in high frequency of recurring elevated chlorophyll events more than 30 days in duration (Figure 1).

Figure 1: Distribution of global Exclusive Economic Zone chlorophyll-a deviations from the baseline years of 2000-2004



Sub-indicator 2 (intra-annual chlorophyll-a anomalies) monitors intra-annual changes in chlorophyll-a concentration anomalies in country's EEZs and territorial seas. The intra-annual chlorophyll-a anomalies are classified as moderate (in the 90^{th} percentile), high (in the 95^{th} percentile) and extreme (in the 99^{th} percentile). Sub-indicator 2 (intra-annual chlorophyll-a anomalies) is calculated using a daily chlorophyll-a product and defines anomalies as the daily chlorophyll-a concentration subtracted from a rolling 61-day mean baseline with a 15-day lag, then normalized to the rolling 61 day mean to create the proportional difference anomaly. The intra-annual chlorophyll-a anomalies indicator highlights geographic EEZ regions where chlorophyll dynamics are especially variable within a year.

Figure 2: Chlorophyll-a deviations from the baseline (2000 – 2004) and moderate (90th percentile), high (95th percentile) and extreme (99th percentile) intra-annual chlorophyll-a anomalies in countries boarding the Northern Arabian Sea in 2018 – 2022



Global impact percentages (defined as the amount of country EEZs that show chlorophyll-a deviations relative to the baseline) show an upward trend from 2016 to the present. This could be due to persistent physical conditions that trigger short term algal growth (such as runoff or upwelling of nutrient rich waters) or conditions that trigger stationary, long duration blooms (such as thermally stratified or low flow water).

In the Arabian Sea, during later winter and early spring of 2018 - 2022, chlorophyll-a anomalies are consistently high (Figures 2 & 3). These anomalies likely result from blooms of *Noctiluca scintillans,* a type of algae known as a dinoflagellate. Blooms of *Noctiluca* have been observed in the Arabian Sea since the early 2000s. While blooms of *Noctiluca* can trigger spectacular bioluminescence (a natural production and emission of light by living organisms), these blooms are negatively impacting fisheries by causing low-oxygen levels and clogging fish gills, tourism by discolouring the water, and desalination plants in the region by clogging plant's seawater intake systems.

Researchers are still working to determine the cause of these increasing blooms, but the region is known to suffer from large quantities of sewage and agricultural runoff. The blooms have also been linked to loss of ice cover in the Himalayan-Tibetan Plateau which increases runoff and changes to vertical mixing of the water column.

Figure 3: Top left: Distribution of chlorophyll-a deviations from the baseline (2000 – 2004) for March 2022. Top right: Distribution of moderate (90th percentile) chlorophyll-a anomalies for March 2022. Bottom left: Distribution of high (95th percentile) chlorophyll-a anomalies for March 2022. Bottom right: Distribution of extreme (99th percentile) chlorophyll-a anomalies for March 2022

Additional resources, press releases, etc. with links:

- https://www.nature.com/articles/ncomms5862
- https://news.mongabay.com/2020/10/blooms-driven-by-climate-change-threaten-to-smother-marine-life-in-arabian-sea/
- Seasonal blooms of the dinoflagellate algae Noctiluca scintillans: Regional and global scale aspects - ScienceDirect
- Massive outbreaks of Noctiluca scintillans blooms in the Arabian Sea due to spread of hypoxia (nature.com)
- Satellite-derived global chlorophyll-a anomaly products - ScienceDirect
- Monitoring Karenia brevis blooms in the Gulf of Mexico using satellite ocean color imagery and other data - ScienceDirect
- NOAA STAR Ocean Color Viewer

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Custodian agency(ies): UNEP

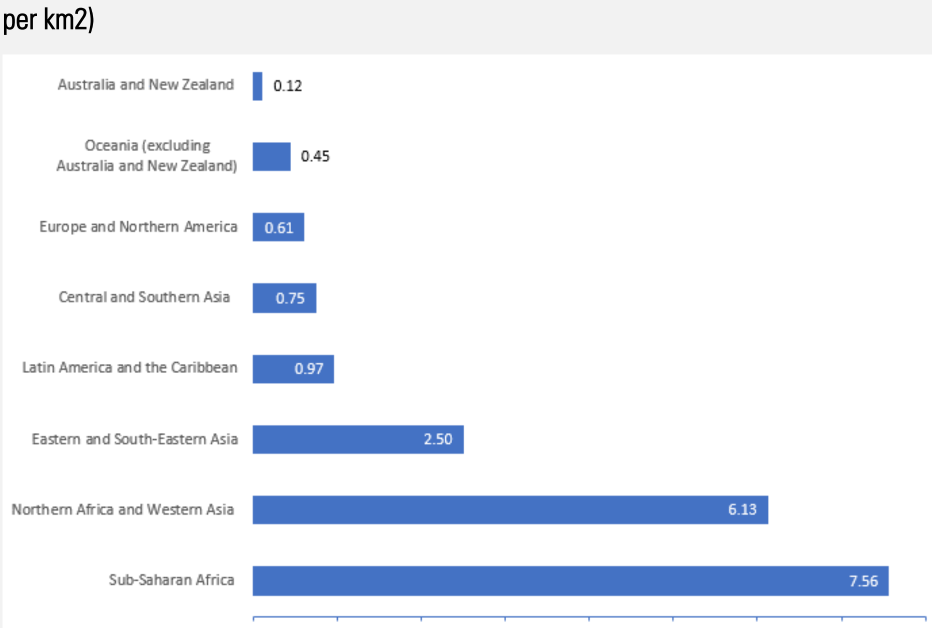
Citizen science data support the estimation of plastic beach litter density and public involvement in achieving the 2030 Agenda

Plastic litter is the largest, most persistent and most harmful fraction of marine litter. Global plastic production has increased while the recycling rate of plastics is lagging, making plastic litter abundant. The Florida State University estimates that more than 17 million metric tons of plastic entered the world's oceans in 2021, and that number is increasing every year.

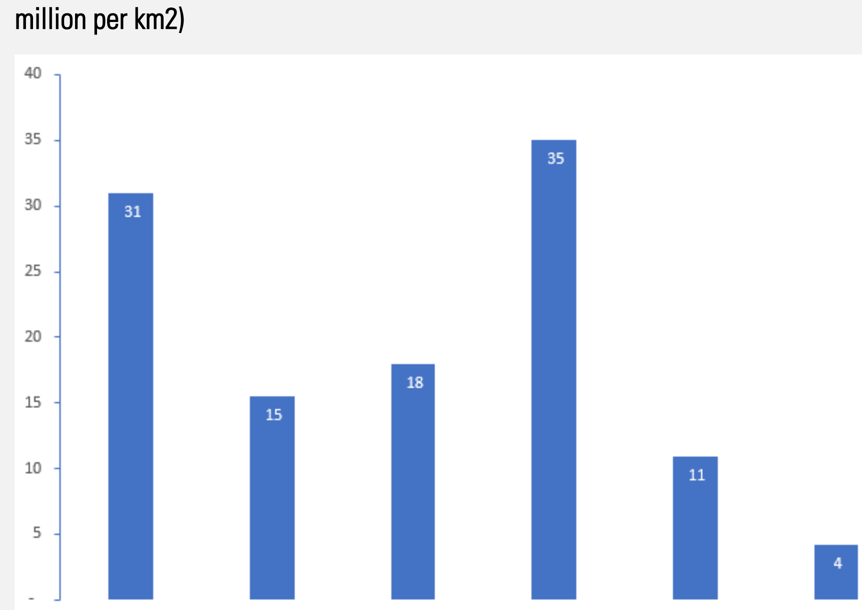
Plastic debris density can be analyzed from different perspectives and using different sources of data. One of the approaches is to use plastic beach litter density obtained by citizen science data. UNEP obtains estimated data on beach litter from the Global Earth Challenge, which is an initiative that integrates data points from different citizen science projects. The three datasets integrated here are compiled from TIDES (Trash Information and Data for Education and Solutions), MDMAP (Marine Debris Monitoring and Assessment Project) and MLW (Marine Litter Watch). The data are available for 142 countries, most of which have access to the sea. At the same time, since a majority of the polluting plastic flows from rivers into the oceans, the landlocked countries are equally important as the coastal ones.

From 2015 to 2020, no clear trend can be seen for the global estimates of plastic beach litter density (see chart 1). However, the nature of the data must be taken into account when comparing the numbers. The citizen science data used for SDG indicator 14.1.1b relies on public volunteers conducting beach cleanups and reporting the number of collected items

Estimated plastic beach litter density by region, averages for 2015-2020 (count in million per km2)



Yearly average of estimated plastic beach litter density, 2015-2020 (count in million per km2)



to a beach cleanup initiative or directly to a designated database. Due to the social distancing measures following the beginning of the COVID-19 pandemic in 2020, many volunteering initiatives came to a halt. Although the counts are extrapolated to items per km^2, decreased data flow leads to less variability and precision.

When analyzing the estimated plastic beach litter density by region, averaged for the years 2015 to 2020, the data shows that the highest density is recorded in Sub-Saharan Africa, reaching 7.6 million items per km^2 (see chart 2). This is followed by Northern Africa and Western Asia and Eastern and South-Eastern Asia. The lowest average density is observed for Australia and New Zealand, with 0.1 million items per km^2.

Although Citizen Science is not the most precise form of data collection, it is extremely useful when other data sources are not available. The practice of public contribution to scientific research is an important step towards achieving the 2030 Agenda for Sustainable Development.

Additional resources, press releases, etc. with links:

- United Nations Environment Programme (2021). *Understanding the State of the Ocean: A Global Manual on Measuring SDG 14.1.1, SDG 14.2.1 and SDG 14.5.1*. Nairobi: https://wedocs.unep.org/handle/20.500.11822/35086
- United Nations Environment Programme (2021). *From Pollution to Solution: A global assessment of marine litter and plastic pollution*. Nairobi: https://www.unep.org/resources/pollution-solution-global-assessment-marine-litter-and-plastic-pollution

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Custodian agency(ies): UNEP

Target 14.2 By 2020, sustainably manage and protect marine and coastal ecosystems to avoid significant adverse impacts, including by strengthening their resilience, and take action for their restoration in order to achieve healthy and productive oceans

Indicator 14.2.1 Number of countries using ecosystem-based approaches to managing marine areas

Countries are developing national plans using ecosystem-based approaches to managing marine areas, but more concerted efforts at the regional and global levels are needed to collect country data and ensure no one is left behind

To monitor the target of sustainable management and protection of marine and coastal ecosystems to avoid significant adverse impacts, including by strengthening their resilience, and take action for their restoration in order to achieve healthy and productive oceans, it was proposed to count the number of countries using ecosystem-based approaches to managing marine areas (SDG indicator 14.2.1).

The ecosystem-based approach can be interpreted from different perspectives. From an ecological perspective, ecosystem approaches consider the connections between the living organisms, habitats, physical and chemical conditions within an ecosystem, focusing on the importance of ecological integrity, biodiversity and overall ecosystem health. From a management perspective, ecosystem-based approaches refer to integrated management strategies for socio-ecological systems that consider ecological, social and economic factors and apply principles of sustainable development. Both perspectives should be reflected in various national management plans related to integrated coastal zone management and other area-based integrated plans and management in waters under national jurisdiction, including exclusive economic zones.

To determine the status of implementation of national plans using ecosystem-based approaches to managing marine areas, UNEP suggest to using four categories: (1) initial plan preparation; (2) plan development; (3) plan adoption/designation; and (4) Implementation and adaptive management.

As of the end of 2021, UNEP, through the Regional Seas Programme, identified 33 countries that reported the level of implementation of such plans: 8 countries reported having developed national plans using ecosystem-based approaches to marine area management, 7 countries informed that such plans had been adopted at the national level, and 18 countries reported about the last stage of the process – national activities on Implementation and adaptive management.

At the same time, not all countries with access to the sea, are parties of the Regional Seas Programme. Another reason that influenced the data collection process is that not all Regional Seas have an existing reporting mechanism. To fill the gaps, UNEP will initiate a data collection exercise in 2023 using a single, harmonized data collection tool for all countries with access to the sea. The results are expected to be available by the end of 2023, and in line with SDG reporting, they will also contribute to the global work on climate change-related indicators, since in 2021 the UNSC adopted the Global Set of Climate Statistics and Indicators, and indicator 14.2.1 SDG is one of them.

Additional resources, press releases, etc. with links:

- Regional Seas Programme website
- Understanding the State of the Ocean: A Global Manual on Measuring SDG 14.1.1, SDG 14.2.1 and SDG 14.5.1 (UNEP, 2021)
- Conceptual guidelines for the application of Marine Spatial Planning and Integrated Coastal Zone Management approaches to support the achievement of Sustainable Development Goal Targets 14.1 and 14.2 (UNEP, 2018)

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Custodian agency(ies): UNEP

Target 14.3 Minimize and address the impacts of ocean acidification, including through enhanced scientific cooperation at all levels

Indicator 14.3.1 Average marine acidity (pH) measured at agreed suite of representative sampling stations

Ocean acidification continues to increase, affecting ocean ecosystems and the global climate

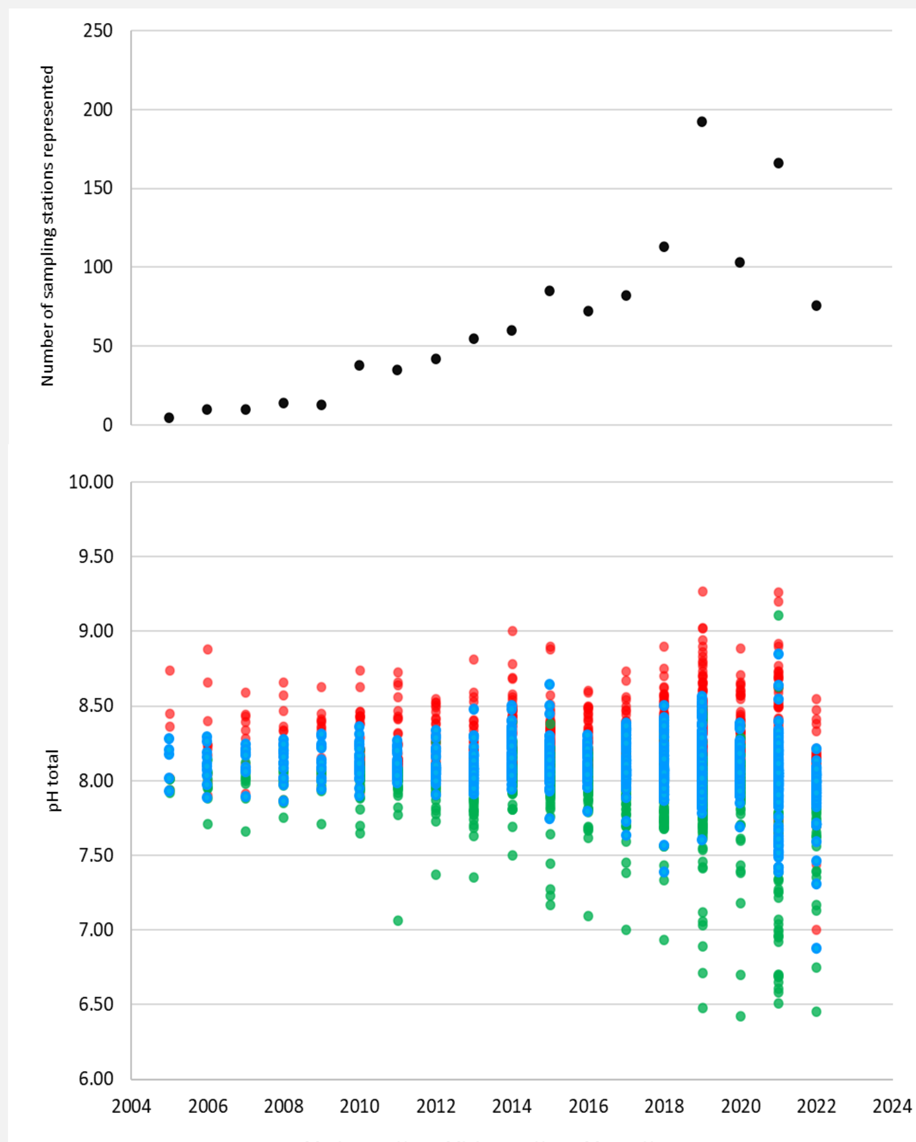
The ocean absorbs around one quarter of the annual emissions of anthropogenic CO_2 to the atmosphere(WMO Greenhouse Gas Bulletin (GHG Bulletin) - No.17: The State of Greenhouse Gases in the Atmosphere Based on Global Observations through 2020), thereby helping to alleviate the impacts of climate change on the planet(Friedlingstein, P., et al. (2022) Global Carbon Budget 2022, Earth Syst. Sci. Data, 14, 4811–4900, https://doi.org/10.5194/essd-14-4811-2022). The costs of this process to the ocean are high, as the CO_2 reacts with seawater and changes the acidity of the ocean; this process is referred to as ocean acidification. Ocean acidification threatens organisms and ecosystem services, including food security, by endangering fisheries and aquaculture. It also impacts coastal protection (by weakening coral reefs, which shield the coastline) and tourism. Ocean acidification will continue to increase (IPCC 2021: high confidence) (IPCC, 2021: Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change [Masson-Delmotte, et al. (eds.)]. Cambridge University Press.), with consequences for the global climate: As the acidity of the ocean increases, its capacity to absorb CO_2 from the atmosphere decreases, impeding the ocean's role in moderating climate change.

The number of stations in all ocean basins for which ocean acidification data was reported continues to increase, providing a clearer and more detailed regional view of the patterns and trends in ocean acidification around the globe (178 stations in 2021; 308 stations in 2022; 539 stations in 2023). There are, however, still strong inequalities in the distribution of these global ocean acidification observations: gaps in observations and data remain in many areas, especially in coastal Asia and Africa and the open waters of the South Atlantic, Pacific and Indian Ocean as well as the Southern Ocean. In the absence of data on ocean acidification permitting predictions of future scenarios and impacts, these regions remain particularly vulnerable.

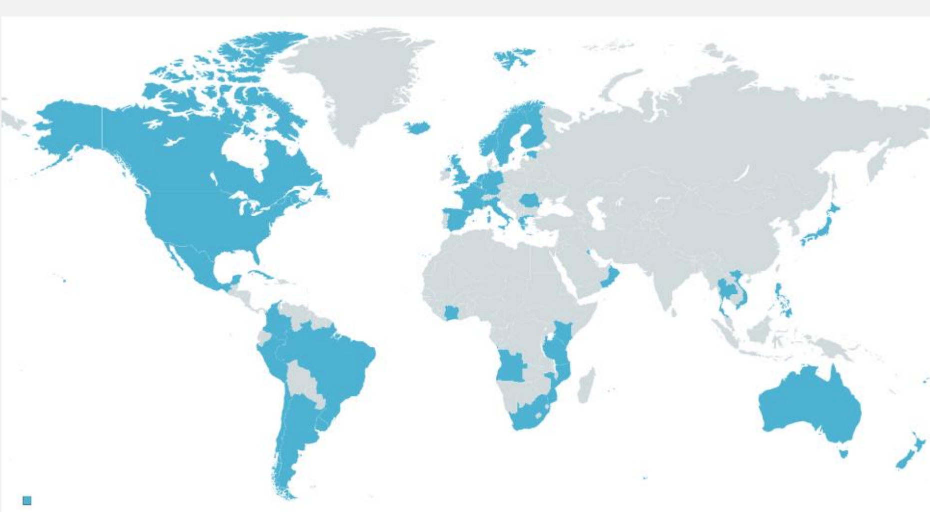
Ocean acidification has been observed globally, in all ocean basins and seas. The growing number of observations of ocean acidification, in particular the increase in coastal observations being reported towards the SDG 14.3.1 Indicator confirms the importance of continued observations at high spatial and temporal resolutions to enable predictions on the rate and scale of change, to understand variability, and to inform mitigation and adaptation strategies at relevant scales. The rate of change, as well as the scale and pattern, however, shows great regional variability. A limited set of long-term observations sites in the open ocean have shown a continuous decline in pH over the last 20 to 30 years. The national datasets submitted towards the SDG 14.3.1 Indicator present a more varied picture for coastal observations of ocean acidification. In addition to absorbing atmospheric CO_2, these areas are subject to a great range of stressors affecting the carbonate chemistry of the water, such as freshwater influx, ice-melting, nutrient input from agricultural and industrial activities, temperature change, biological activity, and large ocean oscillations. This local and regionally specific ocean acidification is of great relevance to marine organisms and biological processes which are exposed to the full range of variations during their lifetime. The combination of observations of the chemical and biological impacts of ocean acidification at fine spatial and temporal scales are necessary to determine the vulnerability and adaptation capacity of marine ecosystems and coastal communities towards ocean acidification. Long-term observations in coastal areas are therefore required to discern and map the regional patterns and scale of ocean acidification and to develop strategies supporting locally relevant plans for mitigation and adaptation in a multi-stressor world.

Continuous capacity building efforts to increase the capability of nations to measure and report on ocean acidification, particularly in currently undersampled areas, will be key to achieving the SDG Target 14.3: the reduction of local, regional, and global impacts of ocean acidification.

Calculated surface pH values based on ocean acidification data submitted to the 14.3.1 data portal (http://oa.iode.org) for the time period from 2004 to 2022. Blue circles – average annual pH; red circles – annual minimum pH; green circles – annual maximum pH.



Map illustration surface ocean carbonate chemistry measurement locations received for the 14.3.1 ocean acidification reporting. Black dots represent the location of sampling stations from which data was collected. Blue – countries whose data was reported in accordance with the SDG 14.3.1 Indicator Methodology



Additional resources, press releases, etc. with links:

- http://ioc-unesco.org/index.php?option=com_oe&task=viewDocumentRecord&docID=21938
- http://oa.iode.org
- http://goa-on.org
- http://goa-on.org/oars/overview.php

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Custodian agency(ies): IOC-UNESCO

Target 14.4 By 2020, effectively regulate harvesting and end overfishing, illegal, unreported and unregulated fishing and destructive fishing practices and implement science-based management plans, in order to restore fish stocks in the shortest time feasible, at least to levels that can produce maximum sustainable yield as determined by their biological characteristics

Indicator 14.4.1 Proportion of fish stocks within biologically sustainable levels

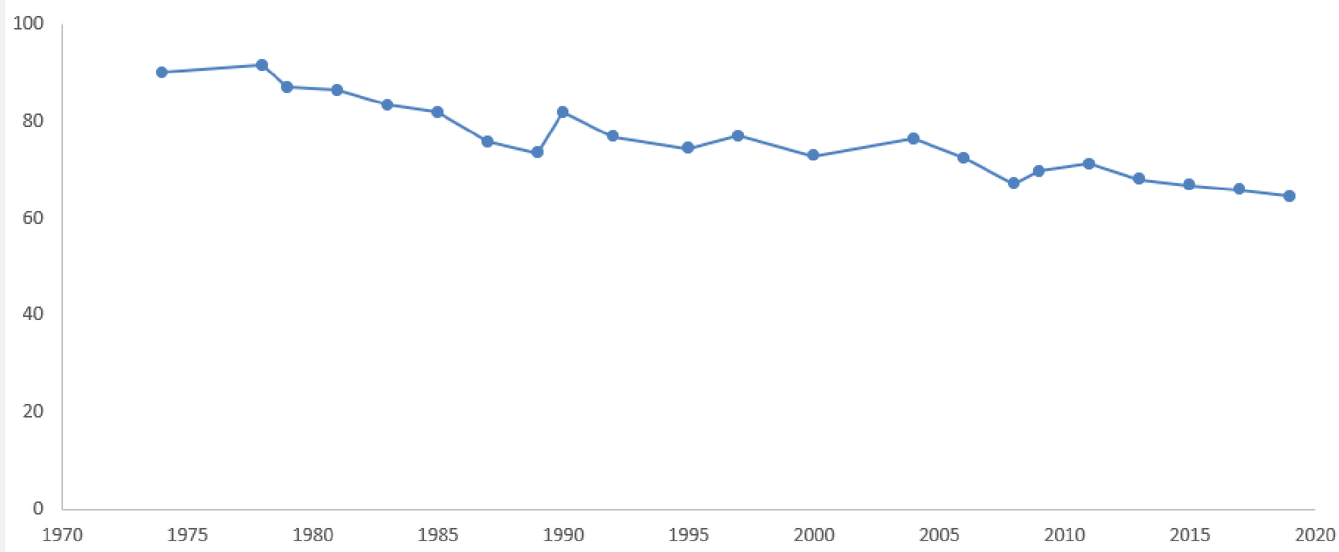
The sustainability of global fishery resources continues to decline, although the rate of decline has decelerated in recent years

Sustainability of global fishery resources has declined from 90 per cent in 1974 to 64.6 per cent in 2019, while global marine fish landings have remained relatively stable at around 80 million tonnes since 1995. Fish stocks within biologically sustainably levels contributed to 82.5 percent of the global marine fish landings in 2019. Despite the continuous deterioration, the rate of decline has slowed down in the most recent period.

The global trend masks great variations in the proportion of sustainable fish stocks across regions. In 2019, the Southeast Pacific (66.7 per cent) had the lowest share of sustainable stocks, followed by the Mediterranean and Black Sea (63.4 per cent). By contrast, the Eastern Central Pacific, Southwest Pacific, Northeast Pacific, and Western Central Pacific had the lowest proportion (13–23 per cent) of stocks fished at biologically unsustainable levels.

Improved regulations combined with effective monitoring and surveillance have proven successful in reverting overfished stocks to biologically sustainable levels. However, the adoption of such measures has generally been slow, particularly in many developing countries. This situation is reflected in the reports of the thirty countries' indicators that are reliably validated – majority of the validated country reports come from the developed world that indicate a higher proportion of biologically sustainable stocks than the world average of 64.6 percent.

Proportion of fish stocks within biologically sustainable levels (1974–2019)



Custodian agency(ies): FAO

Target 14.5 By 2020, conserve at least 10 per cent of coastal and marine areas, consistent with national and international law and based on the best available scientific information

Indicator 14.5.1 Coverage of protected areas in relation to marine areas

Growth in protected area coverage of Key Biodiversity Areas, crucial for achievement of SDGs 14 and 15 as well as the new Kunming-Montreal Global Biodiversity Framework, has slowed over recent years, and remains low in Central, Southern, and Western Asia, Northern Africa, and Oceania.

Protected areas and "other effective area-based conservation measures" are the cornerstone of efforts to safeguard living nature – biodiversity – and contribute to sustainable development and the persistence of all life on Earth.

However, biodiversity and drivers of its loss are distributed highly unevenly around the world, and so to track progress towards nature conservation targets, it is extremely important to measure how well protected area cover areas of particular importance for biodiversity, that is, "Key Biodiversity Areas". Key Biodiversity Areas have been identified in all the world's countries, through application by National Coordination Groups of the "Global Standard for Identification of Key Biodiversity Areas". More than 16,000 Key Biodiversity Areas have been so-identified to date, documented in the World Database of Key Biodiversity Areas. Importantly, a new training course to build national capacity in identification of Key Biodiversity Areas was released in 2022.

Over recent years, mean coverage of Key Biodiversity Areas by protected areas has continued to increase, across marine, terrestrial, freshwater, and mountain environments, but worryingly, growth in coverage is slowing. The adoption of the new Kunming-Montreal Global Biodiversity Framework in December 2022 provides a new political commitment and motivation to increase this rate.

Coverage is also very uneven regionally, with Northern America and Europe having an average of more than half of each of their Key Biodiversity Areas covered by protected areas across most environments (and thus commensurate progress towards SDGs Targets 14.5, 15.1, and 15.4, as well as the new Kunming-Montreal Global Biodiversity Framework Target 3). Meanwhile, Central Asia and Southern Asia, Western Asia and Northern Africa, and Oceania still have rather low coverage, with an average of less than a third of each of their Key Biodiversity Areas covered by protected areas across most environments.

A timely example of a Key Biodiversity Area being targeted for site safeguard is the Ross River KBA, in Canada. The site is identified as a KBA because it holds a range restricted plant – Yukon Goldenweed; it also harbours nationally threatened and declining species such as Caribou and Wolverine. This KBA identification will help support the proposal for a 41,000 sq km Indigenous Protected and Conserved Area by the Ross River Dena First Nation.

Additional resources, press releases, etc. with links:

- A Global Standard for the Identification of Key Biodiversity Areas (IUCN 2016) https://portals.iucn.org/library/node/46259
- World Database of Key Biodiversity Areas (BirdLife International et al. 2023) https://www.keybiodiversityareas.org
- Protected Planet (UNEP-WCMC & IUCN 2023) https://www.protectedplanet.net/en
- Key Biodiversity Areas Training Course https://www.keybiodiversityareas.org/kba-news/key-biodiversity-areas-training-website
- Key Biodiversity Areas Annual Report https://www.keybiodiversityareas.org/kba-news/kba-annual-report_2021
- Key Biodiversity Area National Coordination Groups https://www.keybiodiversityareas.org/working-with-kbas/programme/national-coordination-groups
- Ross River Dena propose Indigenous protected area in Yukon https://www.cbc.ca/news/canada/north/yukon-ross-river-indigenous-protected-area-1.6748453
- Ross River (World Database of Key Biodiversity Areas) https://www.keybiodiversityareas.org/site/factsheet/100107

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Custodian agency(ies): UNEP-WCMC,UNEP,IUCN

Target 14.6 By 2020, prohibit certain forms of fisheries subsidies which contribute to overcapacity and overfishing, eliminate subsidies that contribute to illegal, unreported and unregulated fishing and refrain from introducing new such subsidies, recognizing that appropriate and effective special and differential treatment for developing and least developed countries should be an integral part of the World Trade Organization fisheries subsidies negotiation[b]

Indicator 14.6.1 Degree of implementation of international instruments aiming to combat illegal, unreported and unregulated fishing

Countries have made progress in combatting illegal, unreported and unregulated fishing, but a more concerted effort is needed

Illegal, unreported and unregulated (IUU) fishing threatens the social, economic and environmental sustainability of global fisheries, hindering countries' abilities to manage their fisheries effectively. Countries' adoption and implementation of the relevant international instruments is key to curbing IUU fishing. Notably, by the end of 2022, the Agreement on Port State Measures, the first binding international agreement to specifically target IUU fishing, which entered into force in 2016, reached 74 Parties, including the European Union (which counts as one Party on behalf of its 27 Member States), meaning the Agreement now effectively covers over 100 States.

In addition, during the 2018-2022 period, globally, the degree of implementation of these instruments has risen from 3 to 4 (out of a maximum score of 5), indicating good overall progress with close to 75 percent of States scoring highly in their degree of implementation of relevant international instruments in 2022 compared to 70 percent in 2018. While Small Island developing States (SIDS) and least developed countries (LDCs) face specific challenges in fully implementing these instruments, the former registered an improvement from a medium level of implementation in 2018 and 2020 to a high level in 2022, while for the latter implementation has remained at a medium level. In terms of regional groupings, fluctuation can be seen over the years in certain regions, resulting in no clear trend in the aggregate levels of implementation.

The status of the indicator suggests that while improvements are being made, further efforts are still needed to implement relevant international instruments and hence maximise their potential to effectively combat IUU fishing.

Custodian agency(ies): FAO

Target 14.7 By 2030, increase the economic benefits to small island developing States and least developed countries from the sustainable use of marine resources, including through sustainable management of fisheries, aquaculture and tourism

Indicator 14.7.1 Sustainable fisheries as a proportion of GDP in small island developing States, least developed countries and all countries

The contribution of sustainable fisheries to GDP is declining worldwide

Growing economies and declining stocks have led to a lower contribution of sustainable fisheries to GDP at the global level. Having risen slightly between 2015 and 2017, the value fell again by 6 percent in 2019. The most significant regional declines have been observed in smaller and developing countries, which are, on average, the most reliant on fisheries for national income. In Small Island Developing States (SIDS) and least developed countries (LDC), sustainable fisheries' contribution fell to 0.5 percent and 0.7 percent of GDP, respectively. This decline was largely due to economic growth in other sectors, which reduced the relative importance of fisheries. At the same time, the value-added of the fisheries sector has increased consistently, by several percentage points year on year. This has led to a positive trend in the contribution of sustainable fisheries in regions such as Western Africa, where it rose as a proportion of GDP from 0.24 per cent in 2011 to 0.34 per cent in 2019.

The health of fish stocks, which underpins the sustainability of fisheries, continues to face several human-induced pressures. While the volume of catches has remained consistent since 1995, capture fisheries declined in global stock sustainability. While this decline has slowed in recent years, action is needed to ensure that stocks are monitored and maintained, and to ensure that they can benefit future generations. Some regions are experiencing significant pressures on their stocks, with the Pacific Ocean seeing average sustainability levels falling across the board. This has led to a worsening overall trend in regions such as Southern and South-eastern Asia, where sustainable fisheries as a proportion of GDP fell from 0.76 per cent in 2011 to 0.57 per cent in 2019.

Custodian agency(ies): FAO,UNEP-WCMC

Target 14.a Increase scientific knowledge, develop research capacity and transfer marine technology, taking into account the Intergovernmental Oceanographic Commission Criteria and Guidelines on the Transfer of Marine Technology, in order to improve ocean health and to enhance the contribution of marine biodiversity to the development of developing countries, in particular small island developing States and least developed countries

Indicator 14.a.1 Proportion of total research budget allocated to research in the field of marine technology

Funding for ocean science is insufficient to fill existing knowledge gaps and deliver the information required for decisions, tools and solutions leading to a sustainable ocean (SDG 14).

The availability and allocation of funding for ocean science continues to vary widely between countries and regions, with much lower budgets in developing countries. Currently, national governments are the key sources of financing for ocean science, however national mechanisms collecting this information remain to be established in many countries. Based on the global assessments conducted in 2020 and 2023, biggest economies also report the greatest investment in ocean science, the USA reports the highest absolute budget for ocean and coastal activities, a figure which includes ocean science as well as other ocean and coastal government programmes, with more than US$12 billion (2016), followed by Japan (US$600 million, 2017). Recent data are more limited, nevertheless they show an increased ocean science budget in Germany (2017 to 2021 35%) and France (2017 to 2021 22%) compared to the previous assessment in 2020. Given the estimated US$1.5 trillion contribution of the ocean to the global economy in 2010 and the 2.5% of world gross value added (OECD, 2016) ocean science funding seems remarkably small, given that the ocean covers more than 70% of the surface of our planet. On average, around 1.1% of total GERD was attributed to ocean science between 2013 to 2021 (1.2% for 2013-2017; 1.0% for 2018-2021), with shares ranging from around 0.01% to 9.5%. And while the number of countries contributing to the assessment is not consistent for all years, it can be stated ocean science budgets have varied significantly between 2013 and 2021 within the individual countries. The lowest global averages were recorded for 2019 and 2020, which might be the result of changing priorities, particularly in 2020 possibly due to the global sanitary crises COVID-19.

Future assessments will provide the necessary information to verify the detected trends and related assumptions in ocean science funding as well as the impact of the UN Decade of Ocean Science for Sustainable Development.

Figure 1. Countries' national ocean science funding as a share of GERD (%) from 2013 to 2021 with shares less 1%.

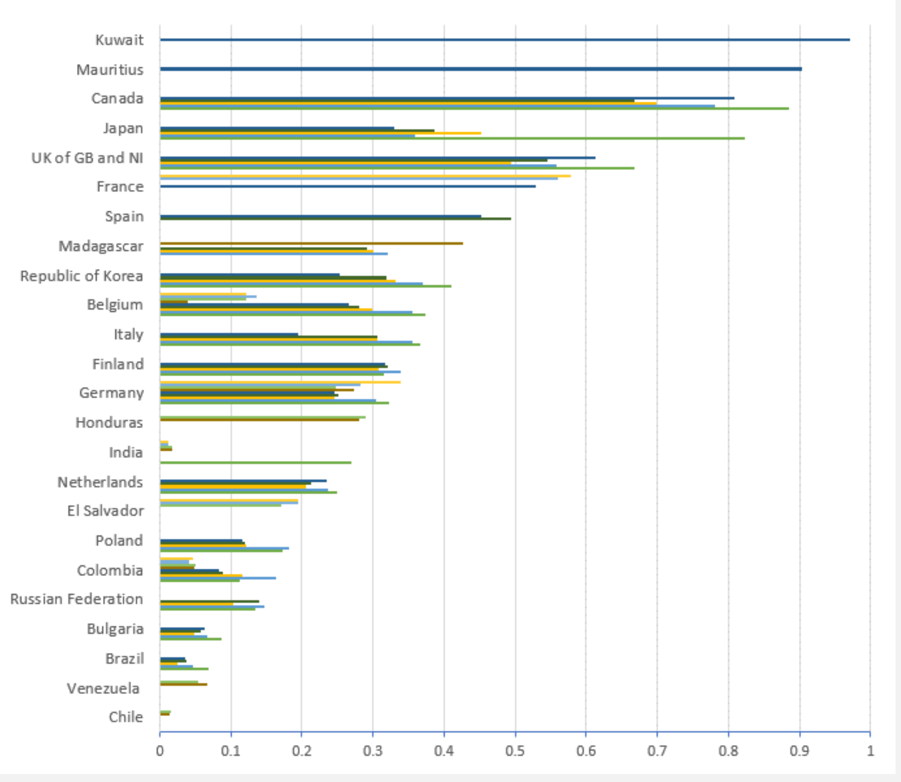
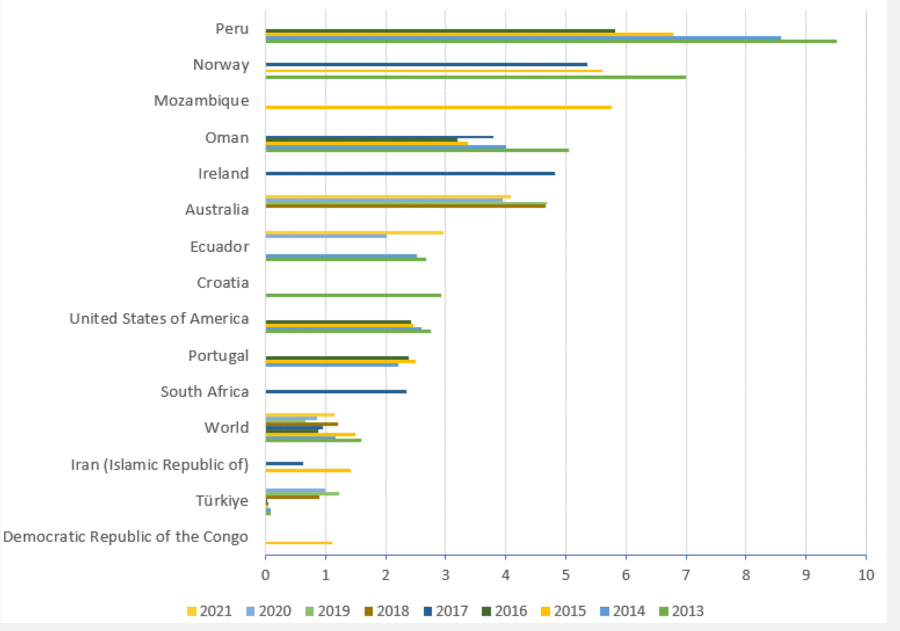


Figure 2. Countries' national ocean science funding as a share of GERD (%) from 2013 to 2021 with shares of minimum 1%.



Additional resources, press releases, etc. with links:

- GOSR portal: https://gosr.ioc-unesco.org/home
- Jolly, C., Olivari, M., Isensee, K., Nurse, L., Roberts, S., Lee, Y.-H. and Escobar Briones, E. 2020. Funding for ocean science. IOC-UNESCO, Global Ocean Science Report 2020–Charting Capacity for Ocean Sustainability. K. Isensee (ed.), Paris, UNESCO Publishing, pp 69-90.

Storyline authors(s)/contributor(s): Kirsten Isensee, Intergovernmental Oceanographic Commission of UNESCO; Aude Flamand, Intergovernmental Oceanographic Commission of UNESCO

Custodian agency(ies): IOC-UNESCO

Target 14.b Provide access for small-scale artisanal fishers to marine resources and markets

Indicator 14.b.1 Degree of application of a legal/regulatory/policy/institutional framework which recognizes and protects access rights for small‐scale fisheries

The end of International Year of Artisanal Fisheries and Aquaculture 2022 marks the beginning of a new era of support for small-scale fisheries

Globally, the degree of application of a legal / regulatory / policy /institutional framework which recognizes and protects access rights for small-scale fisheries in 2022 was at the highest level based on available data, reaching a maximum score of 5 out of 5. However, this score conceals a reduced number of countries that contributed to the reporting. The celebrations of the International Year of Artisanal Fisheries and Aquaculture 2022 (IYAFA 2022) provided opportunities to focus the world's attention on the role of small-scale artisanal fishers, fish farmers and fish workers in ensuring food security and nutrition, poverty eradication and sustainable use of natural resources, thereby increasing global understanding and action to support them.

Providing access for small-scale artisanal fisheries to marine resources and markets was a recurrent theme in the over 260 events, over 300 publications and extensive social media campaigns that marked the celebrations of the Year.

Global public goods supporting the achievement of improving reporting on this target have been created during IYAFA 2022. These include a legal and policy database on small-scale fisheries that contributes to the implementation of the Voluntary Guidelines for Securing Sustainable Small-Scale Fisheries in the Context of Food Security and Poverty Eradication (FAO SSF Lex). The study *Illuminating Hidden Harvests: the contributions of small-scale fisheries to sustainable development* provides new evidence of how small-scale fisheries engage in global markets, and how access to resources is governed.

The IYAFA 2022 has catalysed collective learning and advancements through further research on topics such as the impacts of industrial fishing on the rights of indigenous peoples in regard to traditional fishing, the Right to Food focussing on fisheries and aquaculture, and the upcoming biannual Small-Scale Fisheries summits which will provide a space for engagement for small-scale fisheries actors themselves.

In relation to access to markets, the new WTO agreement on fisheries subsidies is the result of years of negotiations, prohibiting member countries from funding illegal fishing and fishing of overexploited stocks. The follow-up to finalize related provisions and implement the agreement will have important consequences also for small-scale artisanal fisheries, and it will be crucial to ensure nuanced, inclusive approaches that translate the agreement in a context-specific and socially just way to ensure sustainable fisheries for all.

The IYAFA 2022 recommendations, informed by the voices of small-scale artisanal fishers, fishfarmers and fishworkers, advise supportive action in line with existing commitments, in particular the implementation of the *Voluntary Guidelines for Securing Sustainable Small-Scale Fisheries in the Context of Food Security and Poverty Eradication*. Thus, the end of IYAFA 2022 marks the beginning of a new era of support for small-scale fisheries and aquaculture.

Additional resources, press releases, etc. with links:

- FAO SDG 14.b - website
- IYAFA 2022 - website
- FAO SSF Lex - website
- Illuminating Hidden Harvests - website
- Official side event at UN Ocean Conference: Small in scale, big in value: Stocktaking, partnerships and solutions in support of small-scale fisheries. An inspiring journey across regions to inform deliberations on SDG 14.b on the occasion of the International Year of Artisanal Fisheries and Aquaculture 2022 as a major milestone to achieving this SDG
- DIHR webinar: Addressing human rights of indigenous peoples in SDG 14 and the blue economy
- TBTI regional small-scale fisheries congresses: To contribute to the 2030 Agenda for Sustainable Development, especially the Sustainable Development Goal (SDG) 14 'Life Below Water,' the regional congresses aim to highlight the fundamental role that small-scale fisheries play in achieving all SDGs, since they are closely connected to 'Life Above Water.'

Custodian agency(ies): FAO

Target 14.c Enhance the conservation and sustainable use of oceans and their resources by implementing international law as reflected in the United Nations Convention on the Law of the Sea, which provides the legal framework for the conservation and sustainable use of oceans and their resources, as recalled in paragraph 158 of "The future we want"

Indicator 14.c.1 Number of countries making progress in ratifying, accepting and implementing through legal, policy and institutional frameworks, ocean-related instruments that implement international law, as reflected in the United Nations Convention on the Law of the Sea, for the conservation and sustainable use of the oceans and their resources

Custodian agency(ies): UN-DOALOS and other UN-Oceans members