

## Science &amp; Society

## Is Aichi Target 11 Progress Correctly Measured for Developing Countries?

Pierre Failler,<sup>1</sup>  
Grégoire Tournon-Gardic,<sup>1,\*</sup> and  
Marie-Suzanne Traore<sup>2</sup>

**Developing countries are struggling to meet Aichi Target 11, which calls for 10% of national marine area under protection. In addition, the official tool to measure their progress, the World Database on Protected Areas (WDPA), tends to overestimate it. To reach this target, developing countries must set up large offshore Marine protected areas.**

Aichi Target 11, defined at the sixth meeting of the Conference of the Parties signatories of the Convention on Biological Diversity, states that by 2020, 10% of the coastal and marine areas of the signatory countries will be officially protected. Progress is recorded in the WDPA ([www.protectedplanet.net](http://www.protectedplanet.net)), which is the reference instrument [1]. Under this basis, marine protected areas (MPAs) cover 17.3%, on average, of the exclusive economic zones (EEZs) of coastal countries [2]. The progress towards Aichi Target 11, however, is very disparate among countries based on national income; 40% of high-income countries already exceed the 10% aim of protected national marine surface area, with >50% above 5% protected area. Contrastingly, of the 55 low to medium-low income coastal countries [following the World Bank classification: <https://datahelpdesk.worldbank.org/knowledgebase/articles/906519-world-bank-country-and-lending-groups> and the gross national income (GNI) per capita list: <https://data.worldbank.org/indicator/>

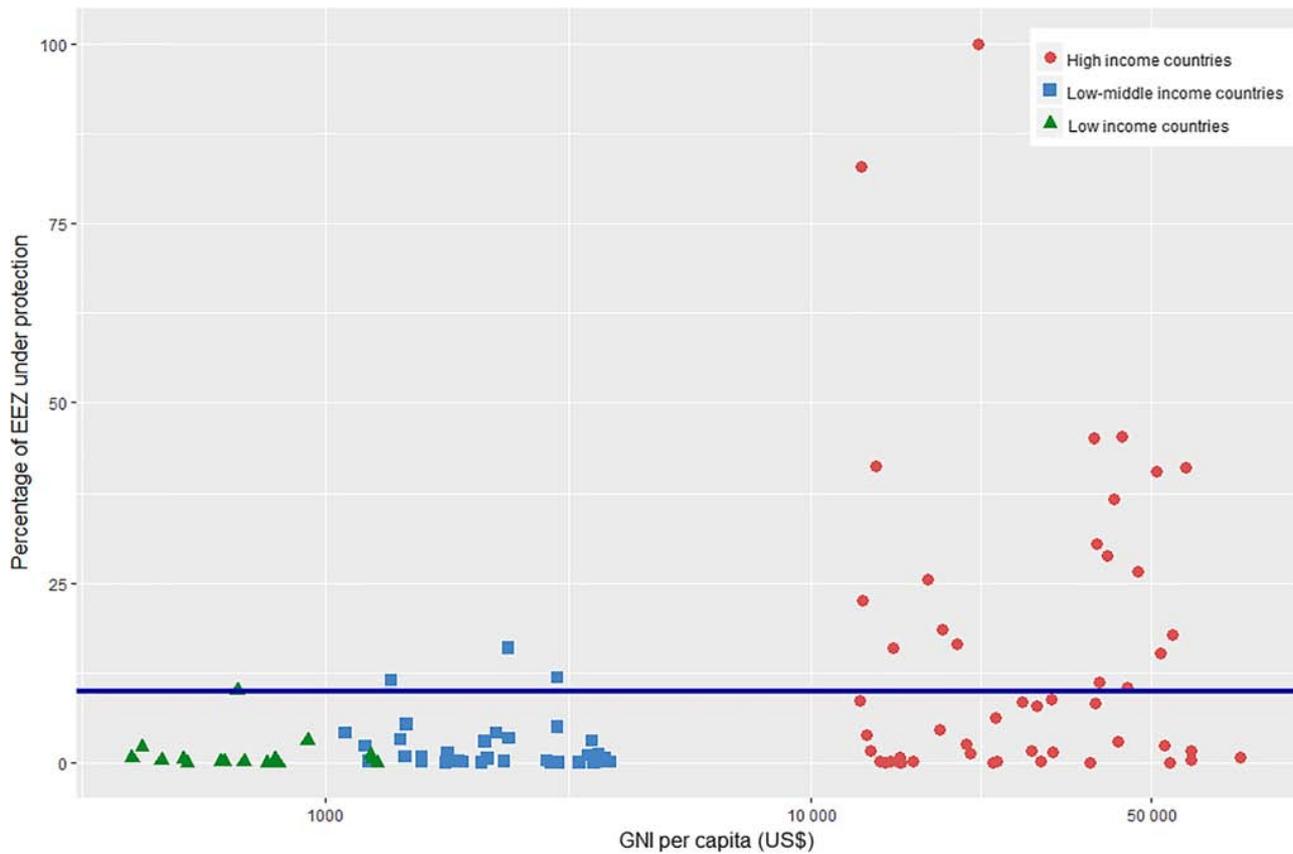
[NY.GNP.PCAP.CD](https://data.worldbank.org/indicator/NY.GNP.PCAP.CD)], only four reached these 10%. For another 40 countries, nearly 75% of the total, the level of achievement is less than 2% (Figure 1).

The poor coverage of protected marine areas in low and medium-low income countries reflects the context in which conservation is implemented in these countries: institutions are too weak to meet their international commitments [3] while economic development is the main public policy concern [4]. In addition, the lack of funding and the political instability in some countries are adding to the difficulties of implementing measures to protect the environment [5].

Worryingly, low and medium-low income countries may be actually further from meeting Aichi Target 11 because the actual percentage of marine area protected in these countries is often overestimated in the WDPA [6,7] [Overestimation also affects high-income countries. Thus, the WDPA states that Slovenia has a protected marine area that is larger than its EEZ (see <https://www.protectedplanet.net/country/SI>).] This situation arises first and foremost due to the quality of the data provided by the national institutions in charge of MPAs. The lower the income of a country, the more likely its institutions will provide incomplete, erroneous, or obsolete data [8,9]. A second source of error comes from potential double-counting in the reporting process to the WDPA: when an MPA has several statuses, national status and Ramsar labeling, for example, the area can be counted more than once (this is the case for several MPAs in Guinea-Bissau, which cumulatively include the status of 'Natural Park', 'National Park', or Ramsar site) [10]. A third bias arises from the counting of areas with inadequately low protection status, or even before the MPA has been set up. These statuses, such as classified forests, areas of regulated use, and proposed MPAs, does not justify taking them into

account to reach Aichi Target 11, which seems to be a recurring fact [8,11]. Finally, an additional potential source of error is introduced by the WDPA. This happens when it does not have the outline of a protected site and considers its bounds as a regular circle centered on a point ([www.protectedplanet.net](http://www.protectedplanet.net)). An average 25.2% of the data on protected areas provided by low and middle-low income countries are given without boundaries, and this drops to 8.8% for high-income countries. In the case of Mauritania, although their actual contours are not of this form, 56% of protected areas in the country are represented by points, including several coastal MPAs. When these sites are located at the interface between land and sea, it becomes impossible to obtain an accurate measurement of the marine surface. Finally, the validation of the data is minimal since the WDPA considers that the data have been previously verified by the countries. Even though countries are responsible for the accuracy of data and for the verifications, low and middle-low income countries rarely communicate about possible errors contained in the WDPA.

An examination of the situation of West African countries, ranging from Mauritania in the north to Sierra Leone in the south (i.e., Mauritania, Senegal, Cabo Verde, Gambia, Guinea-Bissau, Guinea, and Sierra Leone), is an example of the potential error from repeated counting due to a site having multiple designated statuses. In 2018, an assessment of protected areas composed of the regional network of MPAs in West Africa (RAMPAO) was completed. This collaboration with the national administrations provided the most complete and exhaustive cartography of the region, specifying the surfaces of protected marine and terrestrial areas (Figure 2). [The coastline used comes from the most recent work (2018) of the Marine Flanders Institute. The coastline used by the WDPA is an



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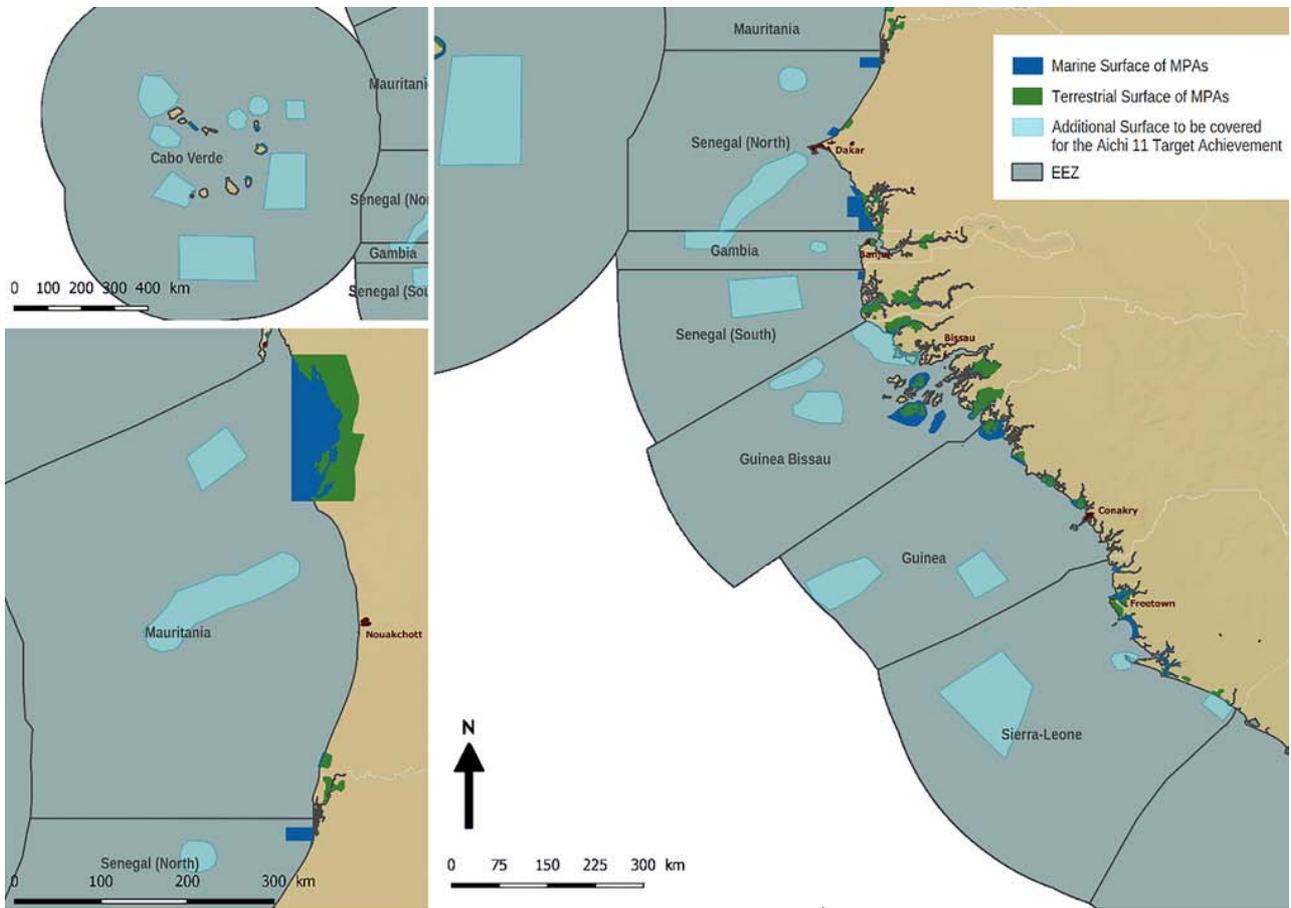
Figure 1. Percentage of Exclusive Economic Zone (EEZ) with Designated Marine Protected Areas (MPAs) According to the Gross National Income (GNI) of the Country. Aichi Target 11, imposing 10% of EEZ with protected status, is shown by the blue line. Sources: GNI per capita and countries classification, latest update from World Bank (only countries whose GNI per capita was calculated by World Bank between 2011 and 2017 are shown in the figure); MPA surface, latest update from World Database on Protected Areas (2019) (see online Supplemental Information). Note: the horizontal axis is a log<sub>2</sub> scale.

older version (2014) of the work by the same Institute.]

From our study, we show that the MPA for seven West African countries in the WDPA is overrepresented by nearly 30%. The total marine area obtained from this assessment is 14 424 km<sup>2</sup> but is recorded as 20 382 km<sup>2</sup> in the WPDA. Furthermore, of the 88 MPAs listed in the 2018 assessment, 54 are not included in the WDPA. [The WDPA also contains two sites in Guinea-Bissau, Varela and Rio Grande in Buba, which were not included in this work due to their absence in the reference documents of the Institute for Biodiversity and

Protected Areas in Guinea-Bissau and whose executives did not mention it.] In other words, the WDPA records about 40% of the legally existing MPAs, while their total surface is about 30% overestimated. Other inaccuracies can be found in the WDPA in the use of MPA surface (the Gundjur/Fenyo Bolong Reserve in the Gambia has, for example, a correct outline in the WDPA but the indicated area does not correspond to that officially recognized), as well as in the digitization of their outlines (the Diawling National Park has a wrong outline in the WDPA although its area is well referenced). Consequently, Guinea Bissau, which was the only low-income country

to reach Aichi Target 11 in Figure 1, would in fact only have 2.15% of its national marine surface under protection. Mauritania would be at 3.71%, Senegal at 1.61%, while other countries would be below 1%. In Guinea-Bissau, the double-counting of some protected areas provides the most important source of surface error, followed by the counting of two 'not implemented yet' MPAs. Overall, the obsolete modeling of the coastline by the WDPA is a minor source of error compared with the erroneous boundaries and the arbitrarily modeled boundaries that introduce an important bias. [However, GIS data used by the WDPA contain other errors such as EEZ outlines. For example, Mauritania's



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Figure 2. Contours of Current Marine Protected Areas (MPAs) (Dark Blue and Green) and Sites of High Habitat and Biodiversity That are Prime Candidates for MPAs, Which Cumulatively Would Meet the 10% Coverage for Aichi Target 11. Source: own realization. Abbreviation: EEZ, exclusive economic zone.

EEZ in WDPAs is measured at 156 198 km<sup>2</sup> (using Flanders Marine Institute’s data from 2014), while more recent data from Flanders Marine Institute consider that this EEZ is 173 728 km<sup>2</sup>.] Beyond the surface calculation, the quality of the information such as the presence or absence of MPAs in the WDPAs must also be considered, as more than 30 West African MPAs were not recorded there. As such errors have been identified for these seven West African coastal countries, there is a high probability it also exists for other low-income countries in Africa and other parts of the world [12].

Notwithstanding the issues with misreporting of protected areas, there needs to be a shift in how the protected areas are designated. Since the beginning of the 2010s, West African coastal countries have been implementing many small MPAs along the coastline with limited extension further out to sea. However, pursuing such close-to-shore initiatives would not be enough to reach the area imposed by Aichi Target 11. Thus, the use of large offshore MPAs has to be considered [13,14]. These large MPAs should include underwater canyons and shoals with the highest biodiversity,

including breeding or migration areas of fish and cetaceans (Figure 2). The creation of offshore MPAs, however, creates conflicts of interest and faces administrative and financial obstructions [15]. The development objectives of these countries currently focus on the exploitation of oil, gas, and fisheries resources, notably by granting concessions (drilling) and access rights (fishing) to foreign companies, and these are contradictory to the protection of biodiversity. The same applies to all coastal countries of Africa and other continents that rely heavily on the growth of the blue economy to ensure their economic emancipation [4].

In conclusion, the progress towards Aichi Target 11 is poorly informed by the WDPA for some low and middle-low income countries, such as Guinea Bissau, whose surface is largely overestimated. In case of overestimation, these countries may be distracted from the Target. However, most of these countries are still far from the 10% protected marine area. A potential solution would be to adopt a new implementation strategy for establishment of offshore MPAs [13,14]. However, this is a huge challenge given their institutional, human, and financial deficit. Moreover, doing so is in contradiction with their current economic development strategies that are insufficiently geared towards environmental protection. Countries should receive substantial support for the maintenance and improvement of the health of coastal ecosystems, which makes a significant contribution to achieve the mitigation and adaptation goals set by countries.

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#### Supplemental Information

Supplemental information associated with this article can be found online at <https://doi.org/10.1016/j.tree.2019.07.007>.

<sup>1</sup>Centre for Blue Governance, Faculty of Economics and Law, University of Portsmouth, Portsmouth, PO1 3DE, UK

<sup>2</sup>General Secretariat, Marine Protected Areas Network of West Africa (RAMPAO), Dakar, Sacred Heart 3, Senegal

\*Correspondence:

[gregoire.touron-gardic@port.ac.uk](mailto:gregoire.touron-gardic@port.ac.uk) (G. Touron-Gardic).

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#### References

1. Smallhorn-west, P. and Govan, H. (2018) Towards reducing misrepresentation of national achievements in marine protected area targets. *Mar. Policy* 97, 127–129
2. UN Environment World Conservation Monitoring Centre *et al.* (2018) *Protected Planet Report 2018*, UNEP-WCMC, IUCN, and NGS
3. United Nations Development Programme (2018) *Climate Change Adaptation in Africa - UNDP Synthesis of Experiences and Recommendations*, UNDP
4. World Bank and United Nations Department of Economics and Social Affairs (2017) *The Potential of the Blue*

*Economy: Increasing Long-term Benefits of the Sustainable Use of Marine Resources for Small Island Developing States and Coastal Least Developed Countries*, World Bank

5. Amengual, J. and Alvarez-Berastegui, D. (2018) A critical evaluation of the Aichi Biodiversity Target 11 and the Mediterranean MPA network, two years ahead of its deadline. *Biol. Conserv.* 225, 187–196
6. Knowles, J.E. *et al.* (2015) Establishing a marine conservation baseline for the insular Caribbean. *Mar. Policy* 60, 84–97
7. Thomas, H.L. *et al.* (2014) Evaluating official marine protected area coverage for Aichi Target 11: appraising the data and methods that define our progress. *Aquat. Conserv. Mar. Freshw. Ecosyst.* 24, 8–23
8. Han, X. *et al.* (2017) Monitoring national conservation progress with indicators derived from global and national datasets. *Biol. Conserv.* 213, 325–334
9. Vanhove, M. *et al.* (2017) Joining science and policy in capacity development for monitoring progress towards the Aichi Biodiversity Targets in the global South. *Ecol. Indic.* 73, 694–697
10. Spalding, M.D. *et al.* (2013) Protecting marine spaces: global targets and changing approaches. *Ocean Yearb.* 27, 213–248
11. Sala, E. *et al.* (2018) Assessing real progress towards effective ocean protection. *Mar. Policy* 91, 11–13
12. Visconti, P. (2013) Effects of errors and gaps in spatial data sets on assessment of conservation progress. *Conserv. Biol.* 27, 1000–1010
13. Doherty, T.S. *et al.* (2018) Expanding the role of targets in conservation policy. *Trends Ecol. Evol.* 33, 809–812
14. Ban, N.C. *et al.* (2017) Social and ecological effectiveness of large marine protected areas. *Glob. Environ. Chang.* 43, 82–91
15. Soares, M.O. and Lucas, C.C. (2019) Towards large and remote protected areas in the South Atlantic Ocean: St. Peter and St. Paul's archipelago and the Vitória-Trindade Seamount Chain. *Mar. Policy* 93, 101–103