

New paper: Pathways to sustaining tuna-dependent economies during climate change

The following article briefly summarises a paper published in July 2021 in the journal *Nature Sustainability*, which is available online as open access.¹

This comprehensive analysis by 30 authors, representing 21 institutions, provides the strongest evidence so far that the effects of climate change on Pacific Island countries and territories are highly likely to include negative impacts on the economies that depend on the region's valuable tuna resources. The analysis builds on earlier work published by the Pacific Community (SPC)² and the Food and Agriculture Organization of the United Nations (FAO)³, and shows that climate-driven redistribution of tuna threatens to affect 10 Pacific Island countries and territories that depend heavily on tuna access fees for government revenue (Fig. 1). The threat to these tuna-dependent economies comes from the redistribution of tuna from their combined jurisdictions to the high seas.

The new study estimates that the total biomass of skipjack, yellowfin and bigeye tunas in the combined exclusive economic zones (EEZs) of these 10 Pacific Island countries and territories is likely to decrease by an average of 13% (range = 5% to 20%) by 2050 under continued high greenhouse gas (GHG) emissions. As a result, the total purse-seine catch from the combined EEZs is expected to decrease by an average of 20% (range = 10% to 30%) by 2050. The reason that the projected decline in catch is greater than the decline in biomass is that skipjack tuna responds more to climate change than yellowfin and bigeye tunas, and the proportion of skipjack tuna is higher in purse-seine catches than in total tuna biomass.

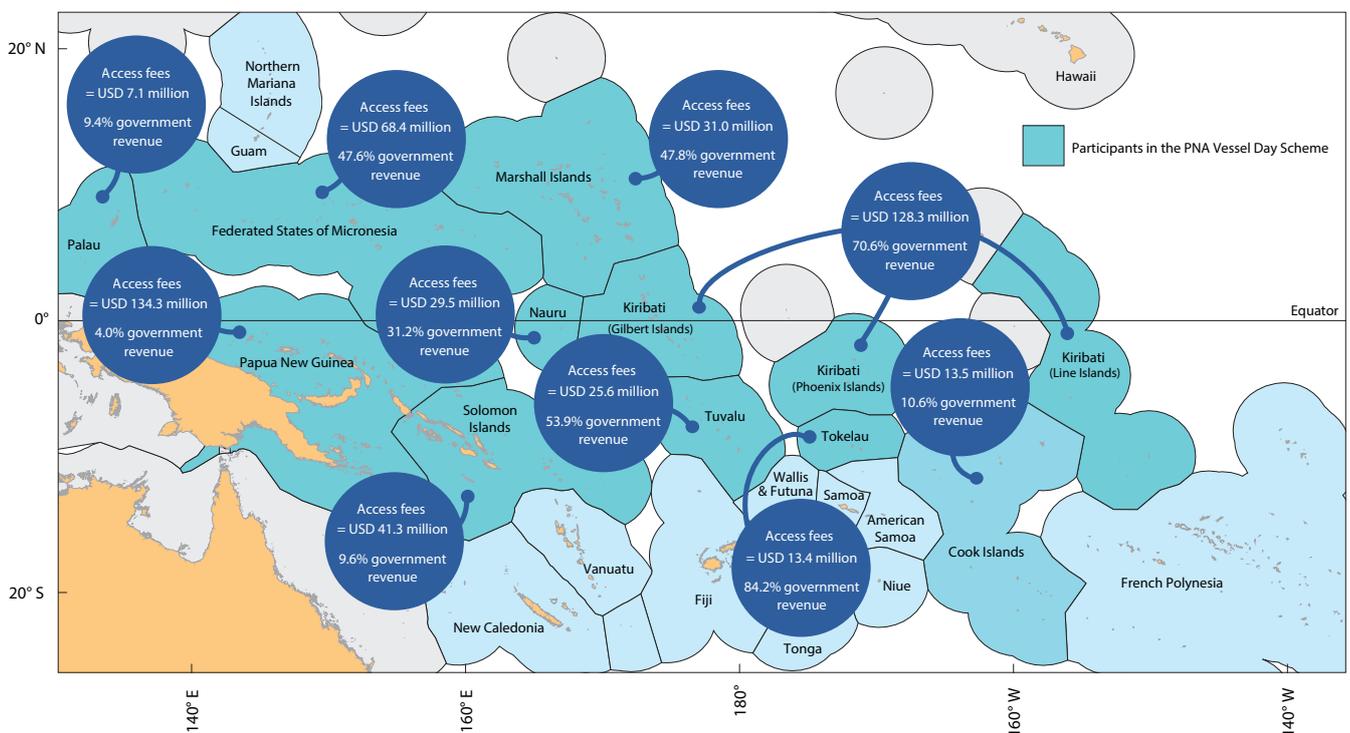


Figure 1. The 10 Pacific Island countries and territories that depend on fishing access fees for government revenue. The information in blue circles shows the average annual tuna fishing access fees (in USD) for the period 2015–2018, together with the average percentage contributions of access fees to total government revenue (excluding grants). Source: Pacific Islands Forum Fisheries Agency

¹ <https://www.nature.com/articles/s41893-021-00745-z>

² Chapter 8 in: https://coastfish.spc.int/index.php?option=com_content&Itemid=30&id=412

³ <http://www.fao.org/3/i9705en/i9705EN.pdf>

The new analysis also shows that purse-seine catches are expected to decrease in the waters of all 10 countries and territories by 2050 under a high emissions scenario. These projections are in contrast to previous modelling, which indicated that tuna catches in countries in the western portion of the region would be lower, and catches in countries in the eastern portion would be higher.

The implications of continued high GHG emissions for the 10 tuna-dependent economies are substantial. If high levels of GHG emissions continue until 2050, the annual loss in combined access fees is estimated to be USD 90 million (range = –USD 40 million to –USD 140 million), representing reductions in government revenue of up to 13% (range = –8% to –17%) for individual countries and territories.

The loss of government revenue due to the redistribution of tunas is a climate justice issue. Pacific Island countries and territories make negligible contributions to global GHG emissions but will lose a substantial proportion of the finance they rely on to support government functions, including the provision of health and education systems. In contrast, the developed countries that catch tuna in the region have contributed 60% of GHG emissions and will be able to fish at lower costs because a higher proportion of their catches will be taken from the high seas where fees do not apply.

The study identifies two pathways for addressing this climate justice issue. The first involves achieving the goal of the Paris Agreement to limit global warming to 1.5° C by the end of the century. The modelling described in the analysis indicates that meeting this goal would largely prevent the redistribution of tunas. SPC, the Pacific Islands Forum Fisheries Agency and other Council of Regional Organisations of the Pacific agencies will be assisting Pacific Island countries to emphasise this vital need at the 26th United Nations Climate Change Conference in Glasgow, Scotland in November 2021.

The second pathway is to empower the governments of Pacific Island countries and territories to negotiate effectively through the Western and Central Pacific Fisheries Commission's Convention on the Conservation and Management of Highly Migratory Fish Stocks in the Western and Central Pacific Ocean to retain the rights to historical levels of tuna

catches made within their EEZs, regardless of the effect of climate change on the distribution of the fish. This pathway is also essential, in case the global community does not succeed in implementing the Paris Agreement successfully.

The analysis also highlights that climate-driven redistribution of tuna has implications for the sustainable management of the region's rich tuna resources. At present, the tuna sustainability goal of the Regional Roadmap for Sustainable Pacific Fisheries⁴ is being achieved largely through the successful implementation of the Vessel Day Scheme operated by the Parties to the Nauru Agreement (PNA).⁵ Nine of the 10 tuna-dependent countries and territories participate in this cooperative fisheries management scheme (Fig. 1). The sustainability of tuna catches could, however, be at greater risk once a higher proportion of the fish occur in the high-seas areas because the monitoring, control and surveillance required to combat illegal, unreported and unregulated fishing is more difficult there than within EEZs. The redistribution of tunas to the east will also require greater collaboration between the WCPFC and the regional fisheries management organisation for the eastern Pacific Ocean, the Inter-American Tropical Tuna Commission (IATTC). In future, discrete tuna stocks are expected to span the jurisdictions of the WCPFC and IATTC to a greater extent, necessitating the development of a more robust framework for collaborative management of shared tuna resources.

The analysis concludes by identifying the research needed to reduce the considerable uncertainty that still remains in the models used to forecast the redistribution of tunas during climate change. Examples of the research required include improving the spatial resolution of SEAPODYM,⁶ and identifying the number of self-replenishing populations (stocks)⁷ within the distribution of each tuna species so that the response of each stock to climate change can be modelled separately. Investment in such research will not only enable the information on the timing and extent of tuna redistribution to be predicted with greater confidence, it will also help identify stocks shared by WCPFC and IATTC and improve stock assessments.

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⁴ <https://fame1.spc.int/en/publications/roadmap-a-report-cards>

Chapter 12 in: <https://doi.org/10.4060/cb3095en>

⁶ <https://doi.org/10.1139/cjfas-2018-0470> and www.seapodym.eu

⁷ <https://www.sciencedirect.com/science/article/pii/S0165783620300412>