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TITLE: Impacts of climate change on marine ecosystem production in societies dependent on fisheries

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ABSTRACT:

The future sustainability of global fisheries is unknown. Models of physical, biological and human responses to climate change are applied to 67 national exclusive economic zones, which cover 60% of global fishery catches. This allows prediction of climate change impacts on countries with different dependencies on fisheries. Growing human populations and changing dietary preferences are increasing global demands for fish1, adding pressure to concerns over fisheries sustainability2. Here we develop and link models of physical, biological and human responses to climate change in 67 marine national exclusive economic zones, which yield approximately 60% of global fish catches, to project climate change yield impacts in countries with different dependencies on marine fisheries3. Predicted changes in fish production indicate increased productivity at high latitudes and decreased productivity at low/mid latitudes, with considerable regional variations. With few exceptions, increases and decreases in fish production potential by 2050 are estimated to be <10% (mean +3.4%) from present yields. Among the nations showing a high dependency on fisheries3, climate change is predicted to increase productive potential in West Africa and decrease it in South and Southeast Asia. Despite projected human population increases and assuming that per capita fish consumption rates will be maintained1, ongoing technological development in the aquaculture industry suggests that projected global fish demands in 2050 could be met, thus challenging existing predictions of inevitable shortfalls in fish supply by the mid-twenty-first century4. This conclusion, however, is contingent on successful implementation of strategies for sustainable harvesting and effective distribution of wild fish products from nations and regions with a surplus to those with a deficit. Changes in management effectiveness2 and trade practices5 will remain the main influence on realized gains or losses in global fish production.

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