WWF

FACTSHEET

MAY

2013

WWF-South Pacific

Impacts of Climate on Tuna Fisheries

Tuna are important in the Pacific. They contribute to the livelihoods and economic security of island states.

CHANGING TUNA LOCATIONS

CHANGE IN CLIMATIC PROCESS WILL IMPACT THE DISTRIBUTION OF PREFERRED HABITAT IN SPACE AND TIME OF THE FOUR MAIN TARGET TUNA SPECIES.

Impacts of Climate on Tuna Fisheries

Climatic features of the ocean such as water temperatures, current strengths, dissolved oxygen concentration and primary and secondary productivity interact to describe the habitats that tropical tuna prefer to occupy. The location of this preferred habitat varies in space and time due to seasonal, inter-annual and decadal ocean cycles (such as El Niño Southern Oscillation (ENSO) and Pacific Decadal Oscillation) that occur naturally. There are also two additional long-term shifts in global ocean conditions that are currently in progress and will continue into the future, these being ocean warming, and ocean acidification. Both occur due to increases in atmospheric CO_2. These processes will also impact the distribution of preferred habitat in space and time. Tuna fisheries in the Western Central Pacific Ocean (WCPO) are currently affected by inter-annual and decadal variability in ocean conditions and are increasingly expected to be affected by rising ocean temperatures and reduced primary and secondary production due to weakening of currents and nutrient transport. These long-term climate changes are expected to reduce the suitability of tuna spawning and forage habitats over vast areas of the tropical Pacific Ocean. The response of the four target tuna species in the WCPO to these changes vary depending on species and life stage.

Decline in tuna abundance

Abundance of skipjack is not expected to be affected in the medium term (<50years) but declines are predicted in the longer term (100 years). Bigeye, albacore and yellowfin are also expected to decline over the next 100 years due to changes associated with the climatic and oceanic variations.

Spatial redistribution of tuna resources

Changes in ocean temperatures and currents and the food chains that support tuna, are projected to affect the location of tuna species. Concentrations of skipjack, bigeye and albacore tuna are likely to be located further east than in the past due to the warming of surface waters and the decline in primary productivity in the western Pacific.

Under current climate conditions the distribution of skipjack fisheries is affected by the location of the western Pacific warm pool (WPWP), an area of warm surface waters (more than 28°C) that produces virtually all of the tuna caught by purse seine (a fishing method used to collect surface water tuna for canning), while catch of tuna by longline (a method used to collect deep water tuna for the sashimi market) is more widely distributed over the whole tropical and sub-tropical ocean.

Skipjack fisheries move with the WPWP (Fig. 1). Countries in the central Pacific, such as Kiribati and Samoa experience higher purse seine catches during El Niño years. In the western Pacific, countries such as Papua New Guinea and Solomon Islands enjoy higher catches during La Niña years. Countries like Kiribati, whose economies have a high dependence on tuna fisheries, are more vulnerable to these changes, and points to the need to closely collaborate with other coastal states in minimizing the impact of year to year fluctuations on the total fish catch.

What does this mean for the Pacific Islands

Based on scientific modelling it is assumed that tuna stocks would permanently move eastwards. This would greatly affect small PICs that are heavily reliant on tuna for economic and food security potentially leading to the colapse of a US$4billion fishing industry.

Know your terms

Primary Productivity – refers to the production of organic compounds (e.g. glucose or other sugars) through photosynthesis by primary producers. Primary producers include microscopic organisms called plankton which form the basis of all oceanic food chains.

El Niño – the name given to the occasional return of warm water in the normally cold water (upwelling) region along the western coast of South America, disrupting bird and fish populations. It is often used interchangeably with ENSO (El Nino Southern Oscillation) which describes changes in air-sea interaction throughout the whole equatorial Pacific. This occurs every 4-12 years.

La Niña – opposite of El Nino. This phase consists of a basin wide cooling of the tropical Pacific. It is often associated with better catches of fish and higher productivity for primary producers.

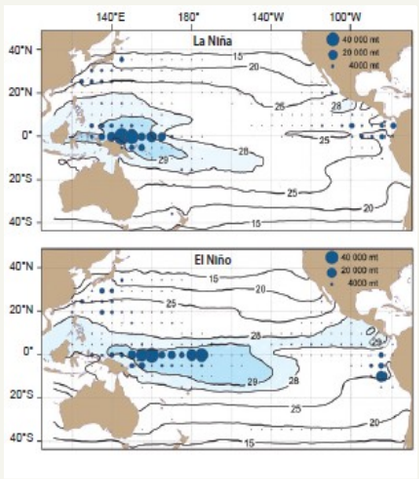

Figure 1:

Representative skipjack tuna catches (blue circles) in the WCPO during La Niña and El Niño. Source: SPC (2011)

Acknowledgement

WWF South Pacific acknowledges the input of the Oceanic Fisheries Programme, SPC Noumea, in the development of this factsheet.

For more information

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