

# As climate changes, our fish are at sea

CMFRI Study Finds That Fishes On Eastern Coast Of The Country Were More Vulnerable To The Effects Of Climate Change

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**Kochi:** There is growing, substantial evidence that climate change has affected fish and other marine population over the decades. A national study on the vulnerability of Indian fish stock due to climate change showed that fishes on the east coast were more vulnerable (72%) than those on the west coast (30-33%).

A team of scientists at Central Marine Fisheries Research Institute (CMFRI) undertook the study in four coastal zones after assessing pan-Indian historical marine data and taking into account a host of parameters such as temperatures, fish data, life history, reproductive capacity, food availability and different environmental indicators. The study showed that changes in ocean currents, water column mixing (that could alter larval dispersal) and food availability were likely to impact fishery resources in the next few decades.

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The study classified the vulnerability as high, medium and low for 68 species in India. Around 69% of the total species were found to be highly vulnerable. Along the east coast, 72% of the species studied were found to be highly vulnerable in northeast zone, while it was 77% in southeast zone. In southwest and north west zones on the opposite coast, it was 30% and 33% respectively. Almost 83% of the pelagic (upper layer of ocean) fishes studied were highly vulnerable, followed by demersal (closer to the sea floor) fishes (66%), molluscs (60%) and crustaceans (53%).

Prawns and catfish were assessed as highly vulnerable in southwest, southeast and northeast zones. Black pomfret was assessed as highly vulnerable in the southwest, southeast and northeast zones. One of the major changes in Indian waters was the variation of sea surface temperature (SST) from 1976 to 2015. SST increased by 0.602°C along northeast India, by 0.597°C along northwest India, by 0.690°C along southeast India and by 0.819°C along southwest India. However, the rate of change was highest in northwest India (0.0156°C/annum) followed by southwest India (0.0132°C/annum), indicating greater climate change impact along the west coast.

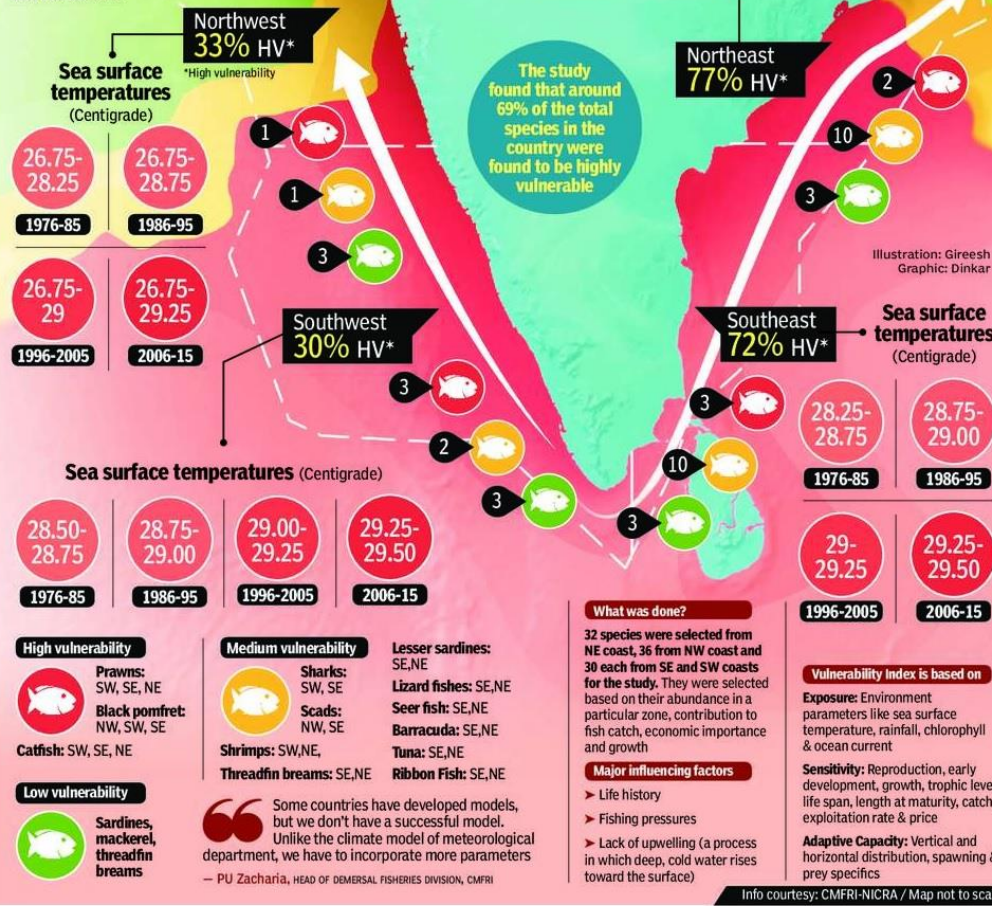
Following this report, scientists are now all set to develop a new, computerized model to estimate the state of oceanic marine resources in the coming decades. The model, similar to the IMD's climate model but would factor in the above mentioned parameters.

This will help in estimating species availability and its vulnerability to changes in climate and environment. "Some countries have developed models, but we don't have a successful model. We hope to run the model (akin to IMD) so that it can provide a strong base to evolve strategic management plans for highly-vulnerable stocks to counter the likely impacts of a changing climate in the long run," said CMFRI's head of demersal fisheries division PU Zacharia.

Another study by Central Institute of Fisheries Technology (CIFT) assessed the carbon emissions by different boats and fishing gear right from the production stage. "We have looked at carbon emission involved in the production of steel and fibreglass used for making boats as well as polyethylene used for making fishing gear. A detailed assessment was done on the use of diesel, the main fuel for boats," said Leela Edwin, head, fisheries technology division, CIFT.

## DETECTING A CHANGE

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## Exploitation of commercial species still a concern

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**Kochi:** While the changes in temperature do have a bearing on food availability in marine waters, there is no denying that fishing pressures (over exploitation) have also contributed to the reduction in catch.

The report, 'Relative vulnerability assessment of Indian marine fishes to climate change' showed that fishing pressure and climate change are bound to interact and create multiple, simultaneous alterations within the marine ecosystem, particularly coastal waters. Exploitation rates for different, commercially-important species are a major indicator about the future vulnerability of species amid climate change impacts. Almost all fish species – except tunas, seer fish and barracudas – are exploited by using trawl nets. But, even these fishes are susceptible to capture by trawl nets during their juvenile phase.

"Fisheries management is going to play a very important role in catch sustainability. Most of our policies are activated or get impetus only when we are undergoing a crisis, like now when there's a steady fall in the catch. For example, there was a huge dip in catch of oil sardines in 1994. But there was no discussion or up-roar," said Central Marine Fisheries Research Institute's principal scientist Sunil Mohamed who is leading a study on productivity susceptibility assessment (PSA).

"But, over the last couple of years, look at the level of discussions and awareness. The state could implement minimum legal size for catch, bring in mesh size regulation etc, only because stakeholders realized the need. The country should try to develop strict regulations and proper management of our resources. We took up this work to check the state of tropical fisheries," he said. The report is expected in the middle of this year.

The major issues shadowing Indian marine fish production include over-fishing pressure and reducing yields, poor implementation of regulations, increasing pollution of coastal waters, marine debris/litter accumulation in coastal waters, ghost fishing, inland water bodies being severely affected by effluent discharge and eutrophication.