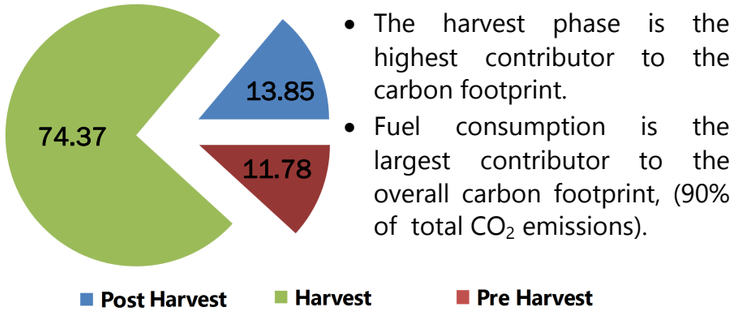
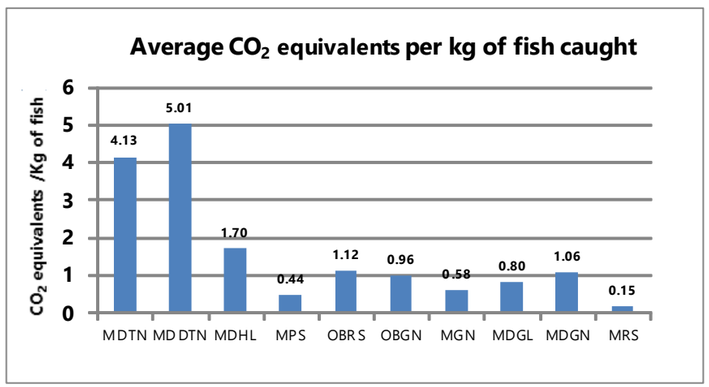
Life Cycle Assessment

- As per the marine fisheries Census 2010, there are about 21,800 crafts operating along the coast of Kerala
- 4,700 are mechanised, 11,200 are motorised and 5,800 are non mechanised.



- The harvest phase is the highest contributor to the carbon footprint.
- Fuel consumption is the largest contributor to the overall carbon footprint, (90% of total CO_2 emissions).



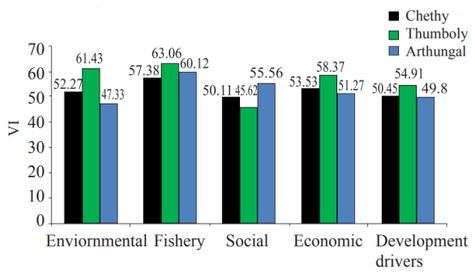
- Emission intensity is marginally higher along Kerala coast compared to southeast coast, with mechanised boats contributing 1.60 kg CO_2 equivalents/kg of fish caught and motorised boats 0.48 kg CO_2 equivalents/kg of fish caught.

Mechanized and motorized crafts deployed along the Kerala coast

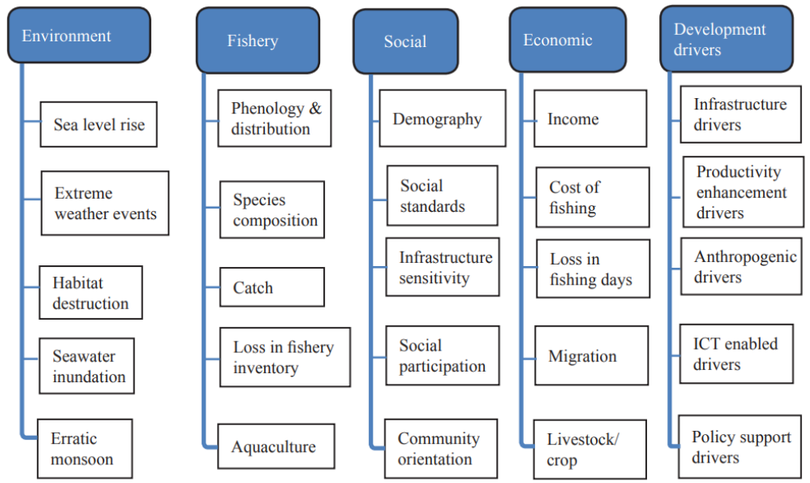
- Active gears (eg. trawlers) consume more fuel resulting in high emission. Fleet size of such gears should be reduced and replaced by passive gears (eg. gill netters).
- Eliminating overcapacity and old fleets are other means for reducing emissions.

Integrated District Level Adaptation and Management (IDLAM)

- IDLAM provides a framework to assess the climate change vulnerability status of resource users and develops adaptation and mitigation plans in order to combat the effects of climate change.
- Of the 9 coastal districts of Kerala Allapuzha has the highest vulnerability, followed by Kozhikode and Trivandrum.



- Vulnerability of 318 fisher households in Allapuzha district was assessed using PARS methodology.
- According to fisher folk, fishery was the most impacted attribute due to climate change.



- Greater awareness of fisher folk on climate change by involvement in disaster preparedness and planning process
- Alternative avocations across different fishing villages need to be improved.

Climate change significantly impacts vulnerable coastal areas.

Prepared by: P.U. Zacharia, T.M. Najmudeen, Shyam S. Salim, Somy Kuriakose V.H. Sajna, Roshen George Ninan, Dawn T. Mathew, Liya V. Benjamin, G. Rojith

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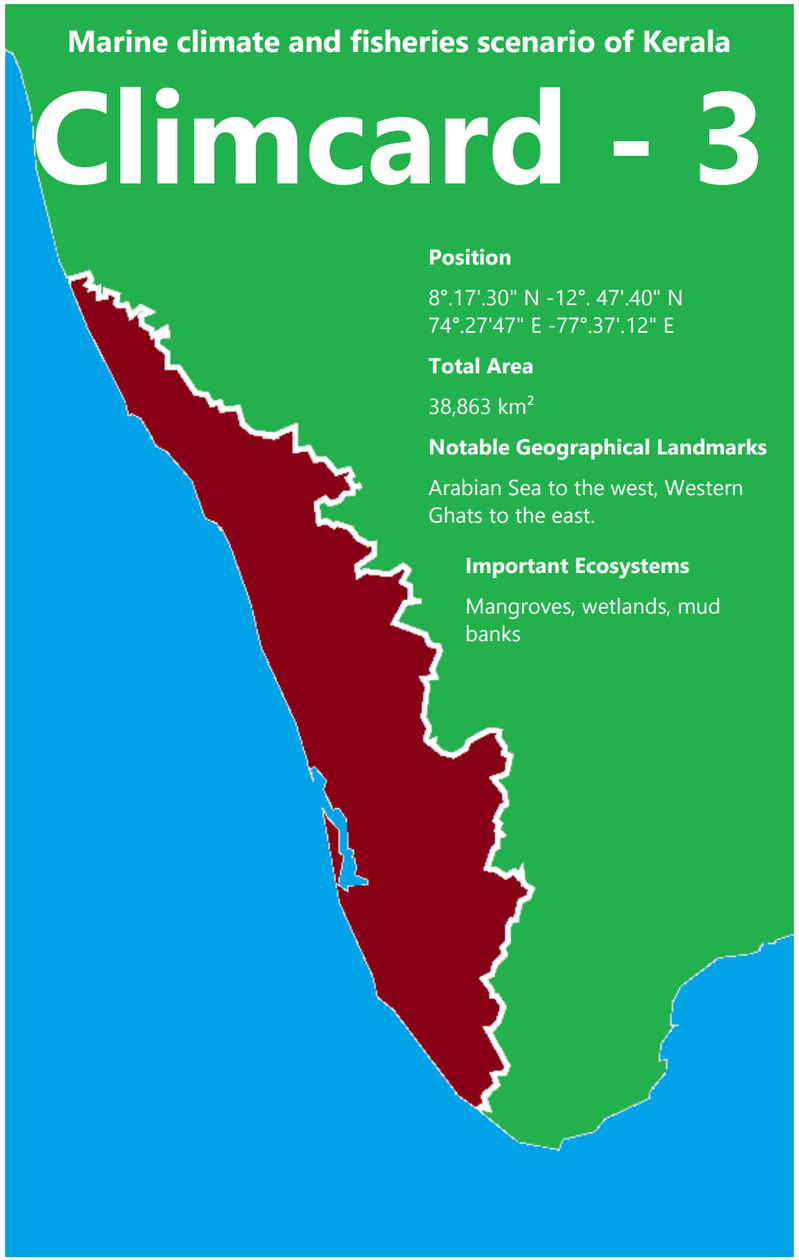
Marine climate and fisheries scenario of Kerala

Climcard - 3



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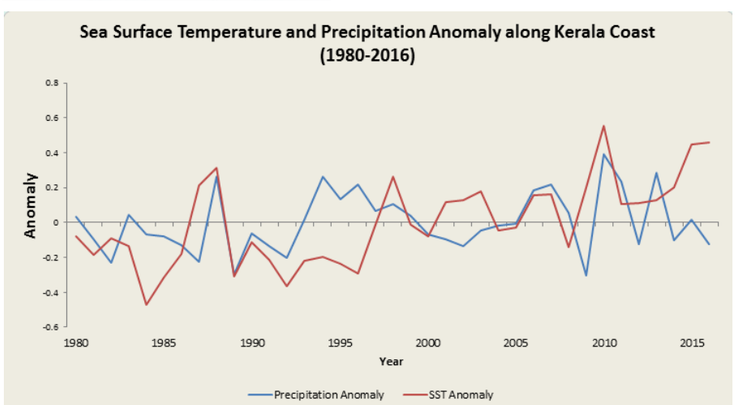
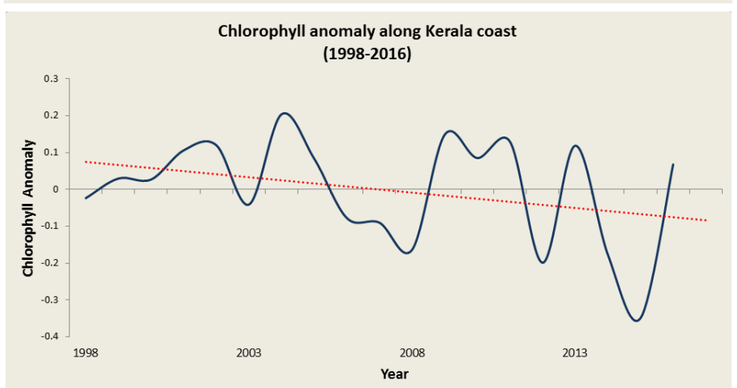
The marine climate

- The coastal regions of Kerala are highly susceptible to gale force winds, storm surges, and torrential downpours.
- Extreme weather events have been increasing in frequency and intensity with the effects of climate change. The Ockhi cyclone in 2017 is an example.
- Annual average rainfall of 3,107 mm, which is highly dependent on the southwest monsoon.
- Over a period of 50 years the annual average SST has shown a definite increasing trend (0.2°C), while chlorophyll has shown a decreasing trend.
- Warming sea temperatures are likely to impact coastal habitats and resources.





The marine ecosystems

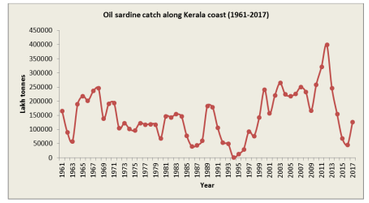
Low Lying Coastal Areas

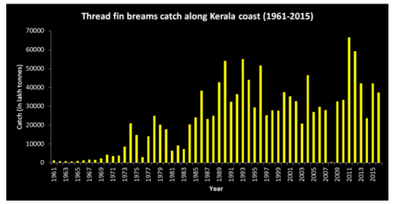
- 590 km long coastline
- 9 of 14 districts in Kerala are coastal.
- The Fifth Assessment Report of the Inter-governmental Panel on Climate Change predicted a sea level rise of 21-71 cm in the year 2070 due to thermal expansion of Oceans.
- Studies of shoreline change rate reveal the 2nd highest rates of coastal erosion occur in Kerala (Mohanty et. al, 2012).
- The average shoreline erosion characteristic of Kerala is 63.02%.

Wetlands

- Rich in biodiversity.
- Anthropological activities: urbanization; land use changes; drainage to agricultural use; infrastructure development and pollution from domestic and industrial effluents are major causes of concern in Kerala
- Mangroves provide protection to coastal areas during times of cyclonic storms. Their continual destruction mitigates their ability to provide this protection.

The marine fishery

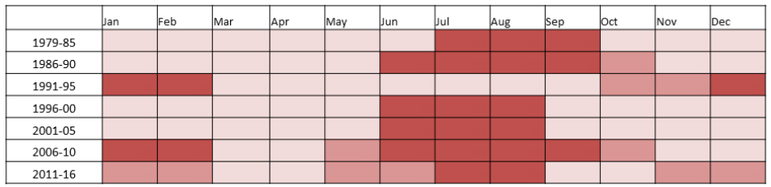




- In 2016, Kerala contributed 5.22 lakh tonnes of total marine fish production in India.
- Decline in last three years was due to reduction in oil sardine catch during 2013-16 from 1.55 lakh tonnes to 43,492 tonnes, whereas in 2017 oil sardine catch increased to 1.27 lakh tonnes.
- After 2012 the oil sardine catch decreased by 90% but in 2017 it increased to 81.9%. After 2011 Thread fin bream catch reduced to 44%.

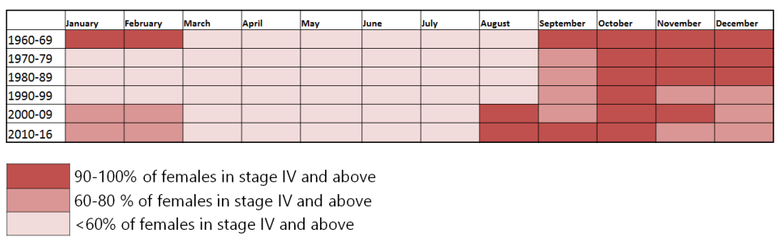
Changes in environmental conditions influence spatial distribution of marine fishes and cause phenological changes and changes in fish production.

Shift in spawning period of *Sardinella longiceps*



- Even a 1°C rise in temperature may significantly affect the distribution and phenology of fish.
- Oil sardine shows an early onset of spawning period from June (1980-'00) to May (2005-'16).

Shift in spawning period of threadfin breams



- Thread fin breams also shows a shift in peak spawning period from September–October (1969-99) to August (2000 onwards).