

# PROJECTING THE CHANGE IN NICHE WIDTH OF AN OLIGO AND MESOHALINE MANGROVE SPECIES FROM INDIAN SUNDARBAN UNDER CLIMATE CHANGE AND DIFFERENT SALINITY REGIME

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## **Abstract**

Species distribution models (SDM) have been used to estimate potential geographic distributions of hundreds of species and plant communities. Nonetheless, very few studies have been conducted which attempted to model the distributions of mangrove species in future under climate change scenarios and under different sea surface salinity at a local level. The present study used a machine learning based Maximum Entropy (MaxEnt) Modelling Approach to model the future distribution of two mangrove species with different salinity tolerance and predicted the change width of the ecological niche of the species. The present occurrence data of the mangrove species *Phoenix paludosa* and *Brugeira sp.* was collected from the Indian Sundarban region, and the environmental parameters such as water surface salinity was collected in-situ. The salinity tolerance of *Phoenix paludosa* and *Brugeira sp.* are low and high respectively thereby making them oligo and mesohaline species. The in-situ data and stationbased data were used to statistically downscale climatological parameters for the present condition. A total of 8 climate variables were used to model the ecological niche of the two species under present conditions. The future change in niche width was modelled using the climatological variables from the Global Circulation Model (GCM) CMIP6. The future climatological parameters chosen were sea level rise and sea surface salinity under Shared Socio-economic Pathway (SSP) 1.2.6 and SSP 585 i.e., baseline scenario and extreme climate change scenario for the years 2050 and 2100. The result of the future niche modelling revealed that *Phoenix paludosa* holds the potential for niche width expansion and shows a westward migration towards a low salinity regime from its current habitat, while the *Brugeira sp.* Shows a huge habitat loss due to extreme sea level rise. The baseline scenario also revealed that the habitat loss for *Brugeira sp.* is around 12% of its present habitat and thereby needs urgent conservation attention. The habitat of *Brugeira sp.* can be maintained by planting the species in other suitable mangrove habitats in India where the species diversity is low.

**Keywords:** Climate Change, Ecological Niche, Global Circulation Model, MaxEnt, Sundarban