



Predicting Climate Change Impacts on Agricultural Cash-crops Species in the Western Ghats, India Towards Conservation Planning

Malay Kumar Pramanik

Jawaharlal Nehru University, School of International studies, India (malaygeo@gmail.com)

Abstract:

Climate change is continuously affecting the agriculture, ecosystem, species distribution as well as global biodiversity. The assessment of the species potential distribution, land suitability, and the spatial changes under various climate change scenarios is a significant step towards the conservation planning and policy applications. Therefore, to understand the climate change impacts, the present study considers *Garcinia gummi-gutta* cash crop species as a case study, which are even exported, adding the nation's foreign reserve. India maintains a global monopoly in this agricultural production. Also, the study aimed to predict the influence of current and future climate on an ecologically vulnerable medicinal cash crops species, *Garcinia gummi-gutta*, of the Western Ghats using Maximum Entropy (MaxEnt) modeling. The future projections were made for the period of 2050 and 2070 with RCP (Representative Concentration Pathways) scenario of 4.5 and 8.5 using 84 species occurrence data, and climatic variables from three different models (HadGEM2-CC, NorESM1-M, and GFDL-CM3) of Intergovernmental Panel for Climate Change (IPCC) 5th assessment. Climatic variables contributions were assessed using jackknife test and AOC value 0.888 indicates the model perform with high accuracy. The major influencing variables will be annual precipitation (Bio12), precipitation of coldest quarter (Bio19), precipitation seasonality (Bio15), and Precipitation of driest quarter (Bio17). The model result shows that the current high potential distribution of the species is around 1.90% of the study area, 7.78% is good potential, about 90.32% is moderate to very low potential for species suitability. Finally, the results of all model represented that there will be a drastic decline in the suitable habitat distribution by 2050 and 2070 for all the RCP scenarios. HadGEM2-CC climate model results provides more accuracy than NorESM1-M, and GFDL-CM3 climate model as Western Ghats lying in the monsoonal region. more accurate The study also signifies that MaxEnt model might be an efficient tool for agricultural development, ecosystem management, biodiversity protection, and species re-habitation planning under climate change.