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UNDERSTANDING SPATIAL VARIABILITY OF CROPPING SYSTEM RESPONSE TO CLIMATE CHANGE IN PUNJAB STATE OF INDIA USING REMOTE SENSING DATA AND SIMULATION MODEL

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Abstract. The present study investigated the impact of climate change, as projected by the Global Climate Model, HadCM3 for two different storyline (A2, B2), on the total crop production of Punjab state of India and its spatial variability for three future periods (2020, 2050 and 2080). Gridded weather data (1*1 degree) from India Meteorological Department was used as baseline weather. Daily future weather data were generated from baseline and projected change for each weather parameter (maximum and minimum temperature, rain fall). Both baseline and future weather data were then interpolated to 25*25 km grid level. The cropping system model, CropSyst was used for simulating the climate change impact on crop productivity. Cropping system map generated from remote sensing data for Punjab was used for finding the major cropping systems in each of the 25 km grid. Using this information cropping system productivity in each grid was estimated for baseline weather as well as for projected weather. Spatial pattern was generated for the difference in grid yield for each scenario. Results showed yield decline in all cropping systems except for few grids during 2020 in B2 scenario. Aggregated district yield indicated that for A2 scenario, in the near future (2020) Roopnagar (in eastern Punjab) will be the most affected district with around 35 % reduction in cropping system yield where as Hoshiarpur (in north-eastern part) will be most affected during 2050 and 2080. For B2 scenario, Hoshiarpur was found to be the most vulnerable region for all the three periods.

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