Projected impacts of climate change on the crop yield of Thiruvallur and Kancheepuram districts

The projected impacts of climate change on crop yield in Thiruvallur and Kancheepuram (Chengalpattu district) of Tamil Nadu was assessed by using crop simulation model the Decision Support System for Agro technology Transfer (DSSAT). Regional Climate Model RegCM 4.4 was dynamic downscaling under IPCC RCP 4.5 scenario for 128 years (1971- 2098). The major crops cultivated in these area are rice, groundnut, and sugarcane. Rice, Groundnut and Sugarcane yield were simulated by using DSSAT, CERES-RICE under the cereal modules and CROP-GRO under the legume modules, and CANE-GRO under the sugar/energy modules.

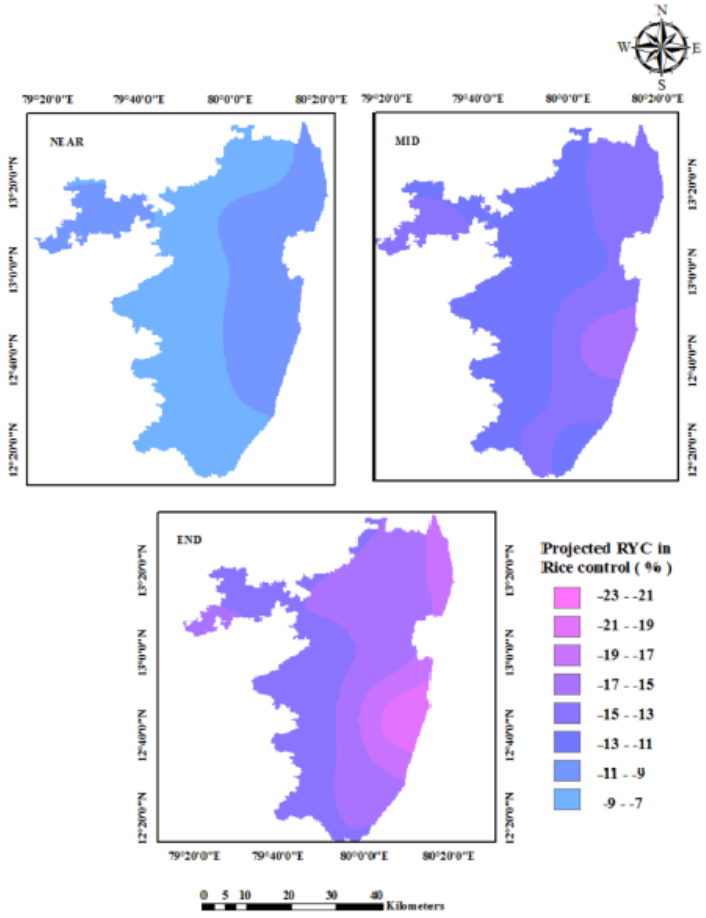

Fig. Projected crop yield change of Rice under RCP 4.5

Under the control simulations the projected yield of Rice would be decline by about 8.8%, 13.1%, and 18.73% for Near, Mid, and End Century respectively. In the case of the CO_2 enriched scenario, the decline in the yield of rice would be 6.4%, 4.7%, and 4.4% respectively. The crop yield of Tirukalikundram, Lathur, Tiruporur, Minjur, Sholavaram, R.K. Pet, Ellapuram, etc. blocks of Thiruvallur and Kancheepuram significantly affected under future climate scenario.

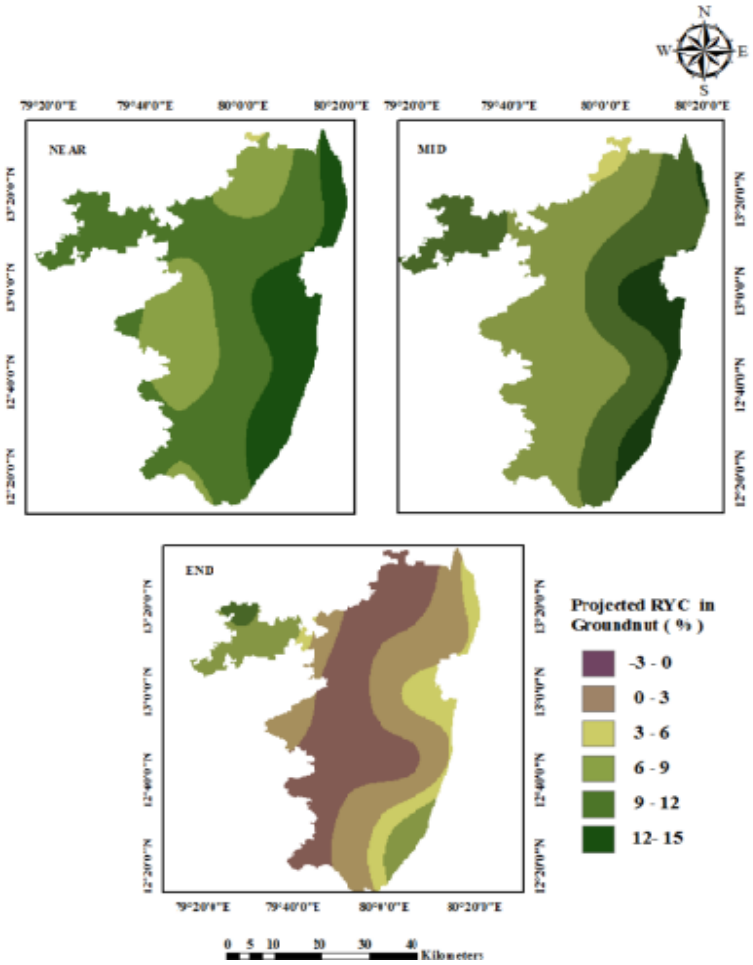

Fig. Projected crop yield change of Groundnut under RCP 4.5

The projected crop yield changes in the groundnut showed a positive change for Near and Mid Century. During the End Century period, due to large change in the temperature in the daytime as well as in the night time, the groundnut yield might tend to decline or fall by -3%. Acharapakkam, Uttiramerur, Wallajabad, Kadambattur, Poondi, Gummidipoondi, etc., are likely to be affected badly. Groundnut yield would slightly increasing in other area of Thiruvallur and Kancheepuram under the changing scenarios of climate change. The projected yield of sugarcane during the End Century may be reduced by 3 to 1% to be a slight yield increase near the northeastern coastal areas. Under the RCP 4.5 scenario mean temperature rise of 2.4°C, there is not much decrease in the sugarcane yield during the End Century. The Sugarcane productivity in the areas of Thirukalikundram, Lathur, Uthiramerur, Wallajabad, Thiruvalangadu, Tiruttani, Thiruvallur, and Poondi blocks would likely to be affected more by Mid and End Century.

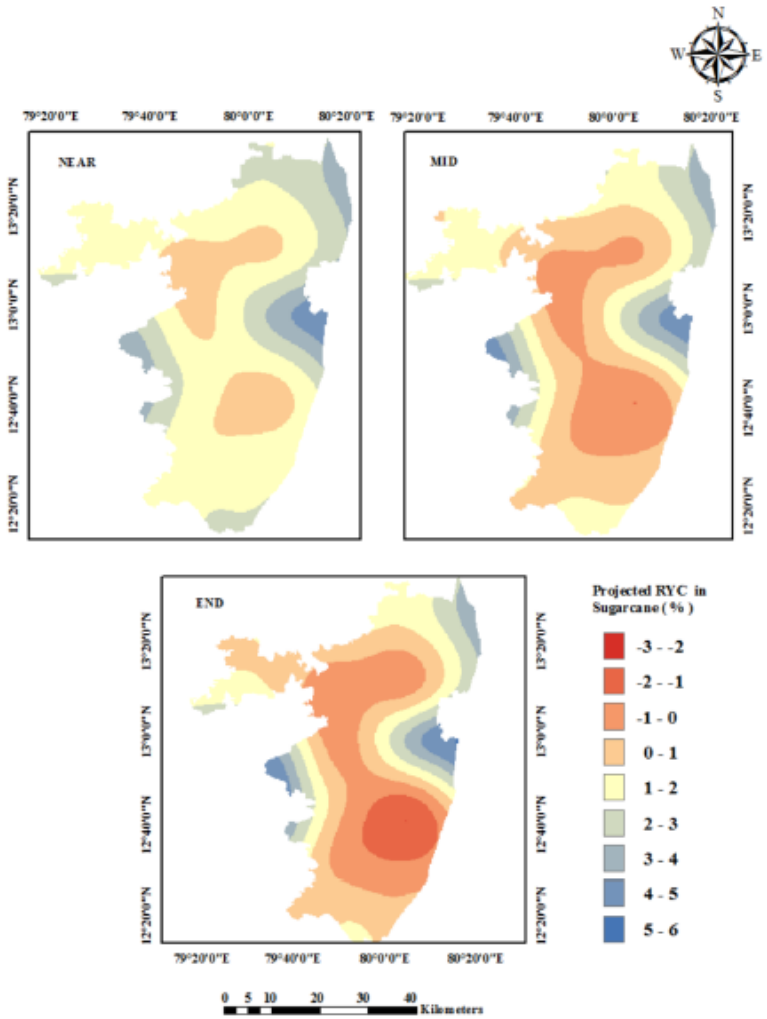

Fig. Projected crop yield change of Sugarcane under RCP 4.5

It is necessary to have a synergistic adaptation assessment and implementation plan that combines field level and scientific inputs (community based adaptations), but that also enhances the inherent capacity of the crops (ecosystem based adaptations) to withstand any future changes in climate.

Source: Ramachandran A., Dhanya Praveen, Jaganathan R., Rajalakshmi D. and Palanivelu K, 2017, **Spatiotemporal analysis of projected impacts of climate change on the major C3 and C4 crop yield under representative concentration pathway 4.5: Insight from the coasts of Tamil Nadu, South India**, *Plos One*, pp.1-19.