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Modeling the climate change impact of rice yield towards climate resilient future in Sri Lanka

Sarath Premalal Nissanka[1], A S Karunaratn[2], W M W Weerakoon[3], B V R Punyawardena[4], D Wallach[5], Sonali McDermid[6] and Alex Ruane[6]
[1]University of Peradeniya, Sri Lanka
[2]Sabaragamuwa University, Sri Lanka
[3]Field Crops Research and Development Institute, Sri Lanka
[4]Natural Resources Managements Centre, Sri Lanka
[5]INRA, France
[6]NASA GISS, USA

Statement of the Problem: The climate projections for Sri Lanka indicate a further warming trend and rainfall variability to become more pronounced in the future. Implications of climate change will be more severe on the rice farming since it requires more water and cultivating areas already exposed to upper limit of maximum temperature. Therefore, this study was initiated to quantitatively assess the impact of climate change on productivity of rice varieties by means of crop-climate modeling and to identify adaptation measures.

Methodology & Theoretical Orientation: A leading representative rice farming district (Kurunegala) was used. Yield performances of commonly growing rice cultivars (Bg-300, Bg-357, Bg-358, At-308) were assessed using systematically calibrated DSSAT version 4.5 model for baseline (1980-2010), downscaled 20 Global Climate Models (GCMs, CMIP5-RCP8.5) for mid-century (2040-2069) and for climate sensitivities (AgMIP-C3MP) across three locations of Rajangane, Nikawaratiya and Btalagoda in the district. Randomly selected 104 farmer survey data collected for the two growing seasons (major [October-February] and minor [April-September]) was used for the simulation.

Findings: Cultivation seasons of minor and major showed diverse yield performances with diverse sensitivities to climate. Overall, major cultivation season reported that comparatively lower reduction in rice yields compared to minor season for the actually observed climate over baseline period. According to 20 GCMs of CIMP5- RCP 8.5 climate predictions for the study sites showed the yield drop of up to 16% in major season and it was up to 30% during minor season. Out of three sites Rjangane reported the lowest reduction (10%) in major season compared to Nikaweratriya (19%) and Batalagoda (18%). In Contrast, Batalagoda showed the lowest drop (24%) relatively to Rajnagane (30%) and Nikaweratiya (33%) in minor season.

Conclusion: According to C3MP results two rice cultivar (Bg 300 and Bg 357) reported diverse yield performances with diverse sensitivities to climate for Batalagoda.

Biography

Sarath Premalal Nissanka is a Professor in Crop Science at the Department of Crop Science, Faculty of Agriculture, University of Peradeniya. He has graduated with a PhD in Agronomy from the University of Guelph, Canada. He has his expertise on agronomy, crop physiology and climate change and its impacts on agriculture and forest ecosystems.

spnissanka@gmail.com

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