PERFORMANCE OF SELECTED RICE VARIETIES IN INTERMEDIATE ZONE OF SRI LANKA: A MODELLING APPROACH TO ACCESS IMPACT OF CLIMATE CHANGE

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Future food security is at risk due to the high vulnerability of crop growth to climate change. As rice is the staple food of Sri Lanka, it is essential to identify the impacts of climate change on rice production in the country. This study aimed to identify the changes of rice yield of three popular rice varieties (Bg300, Bg357, Bg379-2) grown in the intermediate zone of Sri Lanka in possible future climates. Weather, soil, and crop management data were collected from Rice Research & Development Institute, *Bathalagoda*. APSIM-*Oryza* model was calibrated and validated using National Coordinated Rice Variety Trials (NCRVT) data. Expected yields of studied varieties for the 2020 – 2099 period were predicted using 20 Global Climate Models (GCMs) and two representative concentration pathways (RCP), RCP 4.5 and RCP 8.5. Simulation results of RCP 4.5 revealed that the yield of Bg300 decrease approximately by 3.5%, 10.5%, and 11.5% during the near-term (2020 – 2039), mid-term (2040 – 2069) and end-term (2070 – 2099), respectively compared to the baseline period (1980 – 2009). The average simulated yield of Bg357 increase by approximately 0.5%, 2%, and 1.5% during near, mid, and end terms, respectively. Whereas, the average simulated yield of Bg379-2 decreases approximately by 9%, 12.5%, and 12.3% during near, mid, and end terms, respectively. Further RCP 8.5 results show that the average simulated rice yield of Bg300 decreases approximately by 4.3%, 11.7%, and 17.2% during near, mid, and end terms, respectively. The average simulated yield of Bg357 increases approximately by 2.3% and 1.5% during the near-term and mid-term, respectively, but yield decreases by 4.5% during the end-term. Similarly, the average simulated yield of Bg379-2 decreases approximately by 11%, 18.3%, and 14.5% during near, mid, and end terms, respectively, compared to the baseline period. Only Bg357 showed an increasing trend in both RCPs.

Keywords: APSIM, Climate change, Intermediate Zone, Rice