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A review of the impact of climate change on Paddy production in Sri Lanka

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Background: Rice is the primary staple crop for almost 50% of the world population. In 2050, its demand will be increased by 28%. It is the primary cultivated crop in Sri Lanka occupying 34% of the total cultivated area.

Objectives: The agricultural sector in Sri Lanka is vulnerable to climate change. Therefore, understanding the impact of climate change on paddy production is crucial to mitigate future difficulties by adopting additional efforts.

Methods: The Scopus database was used to obtain thirty relevant publications on the impact of climate change on paddy production published between 2010 and 2020. The articles focused on Sri Lankan territories are selected and conference proceedings are excluded.

Results: Climate change alters the precipitation regime, sea-level rise and temperature, which are highlighted in 23, 16, and 40% of the articles, respectively, with 20% highlighting all three. As for sea-level rise, the effects of salinity can permeate throughout whole deltas and change hydrological systems. Uncontrolled flooding hinders rice production because rice cannot survive if submerged under water for long periods. Higher temperatures can decrease rice yields as they can make rice flowers sterile and the quality of rice grain will be decreased. A 1% increase in temperature and rainfall leads to 3.44% and 0.12% decrease in current paddy yield, respectively. Furthermore, CO_2 levels, humidity changes and water scarcity affect the yield. Rainless days for a week in upland and for two weeks in shallow lowland rice-growing areas can significantly reduce rice yields. Rice diseases and pests are strongly influenced by climate change. Furthermore, water shortages, irregular rainfall patterns, and related water stresses increase the intensity of some diseases.

Conclusion: Climate change causes crop damage, low productivity and high production cost leading to income losses for farmers and increasing their poverty level. Therefore, adaptation practices are important to reduce these vulnerabilities.

Keywords: *Climate change, Paddy, Sri Lanka*