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Quantifying Impacts of Raising Seawater Levels and Resulting Saline Water Intrusion on Sustainability of Paddy Production: A Vietnamese Case

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Abstract

Increasing soil salinity is an environmental stressor, which causes significant reduction in cultivated land area, crop productivity and increase in risk of farming. Saltwater intrusion in the dry season is a major concern in Vietnam due to geographical and meteorological conditions. In particular, in the north central coastal region of the country, soil salinisation is considered to be one of the most serious problems affecting rice and other crops, limiting crop productivity and affecting food security. To better understand the adverse impacts of soil salinisation in crops from the north central coastal region of Vietnam, this study investigates production risk under salt water intrusion in rice producing areas taking the cases in four communes of Thua Thien hue province using J-P stochastic production function. Electrical Conductivity (EC - a term used to describe a measurement unit of salinity) was measured in order to examine the salinity level in both dry and wet crop seasons of surveyed farms. The model of relationship between EC and rice yield is presented to determine how much rice yield is changing by salinisation impact. The regression result shows salinity is clearly impacting yield levels resulting in an average yield loss of $0.164\,\mathrm{Mg\,ha^{-1}}$ per unit of EC increase. Simultaneously, results from the risk function show that higher EC levels increase the variance of yield. Possible options to offset the impacts of climate changed induced salinity are discussed in the context of rice production and regional food security. This study can be used to help derive site-specific yield goals in context information on EC correlations with rice yield and yield variability is limited.

Keywords: Climate change, impact assessment, rice, salinity, South East Asia

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