Entry No. IRRC-0266

Category	: International Rice Research Conference
Select Theme	: Climate change and environmental sustainability
Endorsement email	:
Keyword 1	: Integrated risk assessment/management
Keyword 2	: Adaptation to climate change
Keyword 3	: Climate smart agriculture
Title of Entry	: Spatial analysis of agro-climatic indices and simulated crop yield for a better understanding of the impacts of climate variability on irrigated rice in Colombia
Presenting author	: Camilo Barrios Perez
Presenting author email	: camilobarriosperez@gmail.com
Co author 1	: Kensuke Okada
Co author 2	: Steven Prager
Affiliation presenting author	: Graduate School of Agricultural and Life Sciences, The University of Tokyo, Yayoi, Bunkyo-ku, Tokyo 113-8657, Japan.
Affiliation 1	: Graduate School of Agricultural and Life Sciences, The University of Tokyo, Yayoi, Bunkyo-ku, Tokyo 113-8657, Japan.
Affiliation 2	: Decision and Policy Analysis Research Area, International Center for Tropical Agriculture (CIAT), Km 17 Recta Cali-Palmira CP 763537, Colombia
Select only one type of presentation	: 15 minute oral presentation
Abstract	: El Niño Southern Oscillation (ENSO) is recognized as the major driver of extreme climate events such as droughts and floods in many rice-producing regions in Colombia. However, detailed studies about the ENSO-induced risk on the rice productivity are still limited. In this study, we conducted a spatial analysis of the impacts of ENSO phases (El Niño and La Niña) on the agro-climatic patterns across the Central rice-producing region. We then quantified ENSO's impacts on the regional-mean yield anomalies of irrigated-rice, and identified the agro-climatic limiting factors. Sixteen agro-climatic indices were used to assess the temporal and spatial variability of the crop water requirements, dry and wet spells, and heat waves during the growing seasons, under El Niño and La Niña events occurred between 1980-2012. The Oryza-v3 model was used to simulate historical rice yield variability, and the impacts of ENSO's events. Finally, Random Forests (RF) algorithm was implemented to identify factors responsible for yield variation. Results showed that the regional irrigation water requirement of rice under El Niño tended to increase by 7.2%. These increases are associated to the significant rise in the number of total dry days and longer dry spells, together with a higher number of day-and-night heat waves episodes. During La Niña, the irrigation water requirement significantly decreased by 9% while total precipitation and wet spells increased by 35% and 31%, respectively. Analyses of yield anomalies indicated that significant negative impacts of El Niño on the yields are evident in 83-89% of the study region. In contrast, areas where the positive impacts of El Niño were observed is limited (11-17%). The percentages of both positively and negatively affected areas ir

La Niña years varies from 61-63% and 37-39%, respectively. The RF analysis showed that the negative impacts of El Niño on rice yields were related to warmer (higher day-night heatwaves) and dryer (higher dry spells) conditions. Meanwhile, cooler and wetter conditions during La Niña had positive impacts on yields but with variations across the region. Our findings can provide valuable information for both decision-makers and local farmers for agricultural planning and adaptation measures to extreme climate variability.

Read Less»

Uploaded Files »

No files found.