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Adaptation assessment for silage maize production in response to climate change in a semi-arid region

Renalda El-Samra¹, Mutasem El-Fadel², Rami Zurayk², Majdi Abou Najm², Ibrahim Alameddine², Elie Bou-Zeid³, Georgiy Stenchikov⁴ and Hamza Kunhu Bangalath⁵

¹Rafik Hariri University, Lebanon

²American University of Beirut, Lebanon

³Princeton University, USA

⁴King Abdullah University of Science and Technology, Saudi Arabia

⁵New York University Abu Dhabi, UAE

The impact of climate change and adaptation strategies on silage maize (*Zea Mays* var. Oropesa) production in a semi-arid region was conducted for the past and the near future (2011-2050) under the conditions of two Representative Concentration Pathways (RCPs) (4.5 and 8.5). For this purpose, outputs from the High Resolution Atmospheric Model (HiRAM), running at 25km around the globe, were dynamically downscaled using the Weather Research and Forecasting (WRF) model at a sequential resolution of 9 and 3km. Downscaling simulations covered a baseline past dry and hot year (2008) and eight future (2011-2050) years (one year per decade per RCP) identified as the worst-case scenarios from a water resources perspective. The resulting climate change scenarios were then used as weather input to CropSyst, a soil-plant growth simulator and experimental data sampled during the 2004 to 2008 growing seasons were used to calibrate and validate the model. The potential decrease in precipitation and predicted warmer air temperatures associated with an increase in CO₂ accelerated plant phenology, reducing crop yields by an average of ~23% under RCP4.5 and ~20% under RCP8.5 in comparison with the baseline yield of 2008. The results indicate that analysis of the implications of variations in the planting date on maize production may be most useful for site-specific analyses of possible mitigation of the impacts of climate change through alteration of crop management practices. The most effective planting date is the one selected based on seasonal forecasting. The selected dates ensure the absence of frost temperatures and the occurrence of the baseline cutoff temperature of 10⁰C necessary for silage maize sowing. Other adaptation measures can be to adopt higher-yielding and heat resistant cultivars or sowing other plants that uses less water such as *Sorghum* and Millet and improve water conservation techniques.

Biography

Renalda El-Samra has completed her PhD in Environmental and Water Resources from the American University of Beirut. She is an Assistant Professor at Rafik Hariri University. She has over two decades of professional experience in the Environmental Sector.

elsamrars@rhu.edu.lb

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