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Abstract: In a World Bank-GEF project, InfoCrop models were used to quantify the past, current and future climatic risk related loss to productivity of wheat, mustard, maize and soybean in climatically vulnerable villages ie., 11 in Mewat district of Haryana and 13 in Dhar district of Madhya Pradesh. To capture the variability in the potential impacts of climatic risks and adaptation gains in different farms in 24 villages, different management combinations along with varietal variations were input into the model. Simulation analysis indicated that continuation of current management and verities will lead to significant yield loss. For example, wheat experiences early and terminal heat stress during winter season (rabi; Nov.-April) leading to yield loss, while soybean yield performance is strongly correlated to the optimal rainfall and distribution during monsoon season (kharif; June-Oct.). Changing variety and sowing time were found easy to adapt and low-cost technologies to minimize climatic risks. Simulation analysis based short-listed varieties were sown in 24 villages covering about 3500 farms. Yields from different varieties of four crops were compared by taking the samples at 1m2 area. Such introduction of improved varieties enhanced the yield levels in the range of 8-40% under all conditions of management. Percentage of farms falling in the high-yield level group increased. This clearly demonstrated that the outputs from decision support systems such as InfoCrop can be successfully used for implementing adaptation to climatic risks.

***Title*: Climate change impact on the yields of cereals in smallholder settings in West Africa: The case of Nioro, Senegal and Navrongo, GhanaClimate change impact on the yields of cereals in smallholder settings in West Africa: The case of Nioro, Senegal and Navrongo, Ghana**

Presenter: Dilys S. MacCarthy

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Abstract: The production of cereals in West Africa is constraint by several yield limiting factors such as poor soil fertility and erratic rainfall distributions and is largely dominated by smallholder farmers. Projected changes in climate thus poses a threat since crop production is mainly rainfed. In this study, two crop models; Decision Support System for Agro-technological Transfer (DSSAT) and Agricultural Production Systems sIMulator (APSIM) were calibrated, evaluated and used to quantify climate change impact on the yield of maize, sorghum and millet under future production systems in Nioro, Senegal and Navrongo, Ghana. Data on management practices (sowing dates, time

and amount of fertilizer) obtained from household surveys, soil data, weather data (historical; 1980-2009 and 5 Global Circulation Models (GCMs); Mid Century time slice 2040 – 2069 for two representative concentration Pathway (RCP); 4.5 and 8.5) were used for the impact assessment. Temperatures were projected to increase in both study areas with higher temperatures for Nioro. Change in total rainfall amounts varied in Nioro with rains in Navrongo to remain same or increase slightly. Ensembled maize yield changes under RAP 4 were between -22 to -1% in Nioro, and -19 to 0 in Navrongo for DSSAT and APSIM respectively. The impact of climate change on sorghum and millet were lower than those of maize. Yield reductions under RAP 5 were generally higher than under RAP 4. The extent of yield loss varied among households due to differences in management practices and soils. There is need to explore potential adaptations to reduce yield loses.

***Title*: Evolving climate resilient crop systems through integrated climate and crop modeling: A case study from Tamil Nadu**

Presenter: V. Geethalakshmi

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Abstract: Climate change in recent times put forth a great challenge for research community to quantify its local impact on the of agricultural systems. Assessment of the impacts on agricultural production should take comprehensively into account available adaptation strategies, and account for the uncertainties from many physical, biological, and social-economic processes. For simulation of these impacts, usually a climate model coupled with a mechanism-based crop growth model is employed. The present work on climate change concentrates on the impacts at local scale considering cascaded uncertainties from climate to crop models associated with it. The research work presented here is a part of Agricultural model Inter-comparison and Improvement Project (AgMIP). The maximum (RCP 4.5: 0.2 to 2.9°C, RCP 8.5: 0.2 to 4.6°C) and minimum temperature (RCP 4.5: 0.3 to 3.0°C, RCP 8.5: 0.4 to 5.2°C) over the study location trichy is projected to increase while rainfall is projected to vary widely (RCP 4.5: -13 to 58 %, RCP 8.5: -9 to 65 %) based on the models. The uncertainty in projections of climate models and its cascading effect of crop models were simulated to devise better crop adaptations. Rice and Maize crops were taken for the study to represent the two major photosynthetic pathways. Altered date of sowing and supplemental fertilizer application proved to sustain the yield levels of both the crops.

***Title*: Field warming experiments constrain global crop yield reductions under Paris' global warming targets**

Presenter: Xuhui Wang

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