

Agronomy in Uruguay

- 1) We present an analysis of rice productivity in 15 crop seasons (1995/96- 20010/12) in Uruguay, by exploring the impact of main climatic and technological factors on paddy yield. Farmers incorporate new, modern high-yielding Indica varieties and adopt new technologies increasing yield productivity about 51% respects to the previous 15-years (1980/81-1994/95). However, yield variability ($cv=12.1\%$) was large and we need to understand main factors that would explain it. A regression of yield and crop season was adjusted with a rate of $0,128T \text{ Ha}^{-1}\text{year}^{-1}$ ($P=0,0027$). Farmers' productivity average was $6,78T \text{ ha}^{-1}$, while larger yields (8 t ha^{-1}) were obtained in 3 of the last 5 years. Crop productivity was related by multiple regression analysis with climatic parameters. A model explains large proportion of yield variability ($R^2=0,890^{***}$, $P=0,001$). Model's independent variables were: November maximum temperature (T_{max}), number of days with minimum temperature lower than 15°C by February ($N^\circ\text{days}<15^\circ\text{C}$), and percentage of environmental humidity ($\%Hum$) by the months of February and April. According to path coefficients, the most important parameters were those of February ($p = \text{path coefficient}; \%Hum - p = -0,613^{**}; N^\circ\text{días}<15^\circ\text{C} - p = -0,604^{**}$). Years of larger yields were those with less thermal and radiation stress at relevant crop stages of pre-heading (microsporogenesis) and grain filling. Results support hypotheses applied to the local rice breeding program, with emphasis on incorporation of cold tolerance at vegetative and reproductive stages, as well remarks the needs for breaking the yield plateau based on more productive cultivars and improved cultural practices.
- 2) We are working in a big-data analysis approach relating experimental yield and environmental (climatic) factors (at different phenological stages) at Uruguayan conditions in the last 20 years
- 3) Yield Gap estimate in the same period