Modelling the response of Mediterranean maize yields to projected climate change

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Modelling Mediterranean maize yields

- We tested the WOFOST model[1] based on partitioning approach, and a modified WOFOST version based on physiological crop conditions around flowering[2,3], against observed data collected during a 2-year field experiment in a Mediterranean environment under fully irrigated conditions.

- We simulated maize yield response under future climate projected conditions till 2060 by using bias-adjusted regional climate model simulations from the EURO-Cordex Initiative.

1 Van Diepen et al., 1989
2 Otegui et al., 1998
3 Gambín et al., 2006

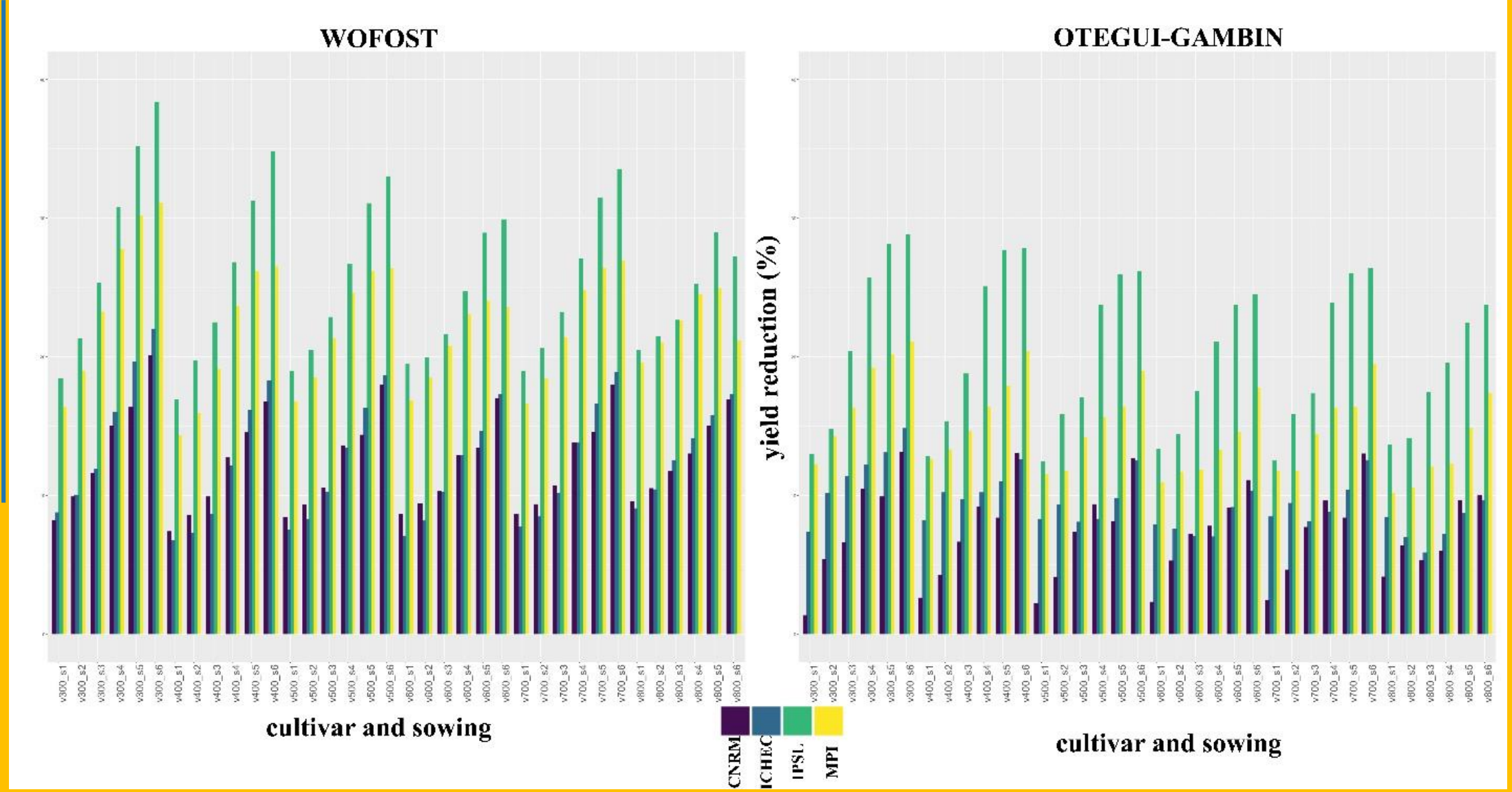
FIELD EXPERIMENTS TO TEST THE 2 APPROACHES

- Location: Sardinia, Italy (39.9°N; 8.5°E; 15m elevation),

- Years: 2015, 2016,

- Cultivars: 300, 400, 500, 600, 700, 800

- Sowing dates: April, May, June.



Mean impact of different sowing dates and cultivar type on crop response under climate change 2041-2060 *vs* 1986-2005 (RCP8.5).

CONCLUSIONS

- Both modelling approaches reveal good performance in simulating average maize yield.
- Crop conditions around flowering well explain maize yield variation associated with different sowing dates and cultivars.
- Both approaches agree on a warmer climate (up to 2060) translating into lower yields (13-18% average reduction with respect to the current climate conditions) than can only be partially offset by changes in phenology and sowing dates.
- Early sowing can optimize yields under current climate.



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