Crop Module 6: Hands-on exercise

Context

Moldova is one of the lowest contributors to greenhouses gases emissions in Europe, yet key development sectors, including agriculture, have already experienced widespread losses and damages. Southern and central regions are the most exposed and vulnerable to climate change impacts, mainly due to changes in temperature and precipitation patterns.

The impact of climate change on agricultural production can manifest in different ways. For example, shifts in rainfall distribution[1], intensification and more extreme weather events[2], and changes in crop pests and diseases[3]. Understanding how climate change could affect agricultural production can inform local governments and allow the development of appropriate long-term policies, with the aim of reducing the adverse impacts of climate change on agriculture.

Background for the hands-on exercise

The Ministry of Agriculture (MoA) of the Republic of Moldova is interested in understanding the impact of climate change on maize yields. In particular, the MoA wants to assess whether projected changes in climate would require shifting (anticipating or delaying) the maize growing season. In this exercise, you will use AquaCrop and AquaCropPlotter to draw insights about the potential impact of projected climate change on maize yields in Cahul (southern Moldavia) and inform the ministry about your findings.

Task on AquaCrop

You will receive the projected climate data for the location of Cahul, for one RCP and one climate model. The default sowing date considered for this assignment is the 7th of May. You will simulate crop yields under different sowing dates (7th of May

and 15th of April)and provide evidence of why changing sowing dates may be approppiate in the future.

Bonus:

If you have time left, you can simulate maize yields according to two different climate models and understand whether your findings are robust enough (consitency of results across different climate models). Additionally, you could also try to include an irrigation scheme to your simulations.

Materials provided by the FAO team

- All necessary files to create the project files for both the base and bonus exercise

References

1. Mamalakis, A. *et al.* Zonally contrasting shifts of the tropical rain belt in response to climate change. *Nat. Clim. Change* **11**, 143–151 (2021).
2. Teixeira, E. I., Fischer, G., van Velthuizen, H., Walter, C. & Ewert, F. Global hot-spots of heat stress on agricultural crops due to climate change. *Agric. For. Meteorol.* **170**, 206–215 (2013).
3. Wang, C. *et al.* Occurrence of crop pests and diseases has largely increased in China since 1970. *Nat. Food* **3**, 57–65 (2022).