Food and Agriculture Organization of the United Nations

Follow-up training session

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Food and Agriculture Organization of the United Nations

Agenda follow-up online training

Time	Content
12:00-12:15	Workshop agenda
12:15-12:45	Online survey + discussion
12:45-13:15	Where to access training material and how to find relevant information?
13:15-13:45	Addressing specific requests from technical officers
13:45-14:00	Coffee break
14:00-15:00	Hands-on exercise
15:15-15:45	Presentations from participants
15:45-16:00	Closing remarks

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Online survey: CAVA related questions

Survey: https://ee-eu.kobotoolbox.org/x/j5vOUjsm

Question	Possible answers
1. Which is the greenhouse gas trajectory pathway used by the CAVA platform?	a) Special Report on Emission Scenarios (SRES) b) Representative Concentration Pathways (RCP) c) Shared Socioeconomic Pathways (SSP)
2. Which is the spatial resolution of the future climatic data provided by the CAVA platform?	a) 100 km b) 50 km c) 25 km d) 10 km
3. Which is the temporal resolution of the future climatic data downloaded from the CAVA platform?	a) Daily b) Monthly c) Yearly d) Daily, monthly, and yearly
4. Which are the climatic variables that can be downloaded (as of now) from the CAVA platform?	a) Tmax and Tmin b) Tmax, Tmin and precipitation c) Tmax, Tmin, precipitation, and relative humidity d) Tmax, Tmin, precipitation, and wind speed e) Tmax, Tmin, precipitation, wind speed, and solar radiation

Online survey: AquaCrop related questions

Question	Possible answers
5. Which are the abiotic stresses that can be assessed on AquaCrop?	a) Water, salinity, heat, and fertility stresses b) Water and salinity stresses c) Heat and water stresses d) Pest and disease stress
6. Which is the temporal resolution of the climatic data accepted by AquaCrop?	a) Daily b) Daily, 10-day, monthly c) 10-day and monthly d) Yearly
7. Which are the maximum number of climatic variables accepted by AquaCrop when creating the climatic files?	a) 1 b) 2 c) 4 d) 6
8. Which is the additional information that AquaCrop requires when creating the climatic files?	a) Latitude and longitude b) Latitude, longitude, and altitude c) Latitude and altitude d) Longitude

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Objectives follow-up training session

Objectives

- To support the access of relevant documents and information.
- To address specific requests from technical officers (Q&A).
- To consolidate, through hands-on exercises, what we have learned during the Sindh and Punjab workshops in December 2023.

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How to find relevant information?

- Workshop training materials (GIT-HUB): link
- AquaCrop training handbook: link
- Reference manual version 7:
  - Reference manual chapter 1: crop water productivity model → link
  - Reference manual chapter 2: users guide → link
  - Reference manual chapter 3: calculation procedures → link
  - Reference manual chapter 4: calibration guidance → link
  - Reference manual chapter 5: training videos → link
  - Reference manual Annexes: crop parameters → link
- 43 YouTube tutorials on how to use the model: link
- The AquaCrop model – 10 years of enhancing crop water productivity: link

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How to find relevant information: crop parametrization?

Suggested steps for the parametrization of the **CROP/MANAGEMENT/SOIL** modules

1. Check if a specific crop has already been parametrized on AquaCrop
    - Available default crop files (17 crops) in AquaCrop: cotton, maize, potato, quinoa, rice, soybean, sugar beet, sunflower, tomato, wheat, barley, sugarcane, sorghum, dry beans, teff, casava, and alfalfa.

2. Access technical reports produced from National Agricultural Research Institutions/Ministry of Agriculture.

3. Engage technical national experts on the field/crop of interest

4. Perform a literature review (e.g., google scholar or other academic search engines)

5. Start the parametrization process

Useful templates

1. Crop parametrization values and statistical performance of AquaCrop (word doc.)

Table 1. Crop parametrization values

Inputs	Units	Default	Literature	Calibrated
Development				
Planting date	dd/mm			
Plant density	plants/ha			
Type of planting method	-			
Initial canopy cover	-			
Canopy size seedling	cm^2/plant			
Canopy expansion	%/day			
Canopy decline	%/day			
Time to emergence	days			
Time to maximum canopy cover	days			
Time to senescence	days			
Time to maturity	days			
Maximum canopy cover	%			
Time to flowering	days			
Duration of the flowering	days			
Length building up harvest index	days			
Max. effective rooting depth	cm			
Time for maximum root depth	days			
Production				
Water productivity	g/m^2			
Harvest index	%			
Response to stresses				
Base temperature	°C			
Upper temperature	°C			
Canopy expansion	-			
Stomatal closure	-			
Early canopy senescence	-			
Aeration stress	vol %			
Air Tmax stress: pollination	°C			
Air Tmin stress: pollination	°C			

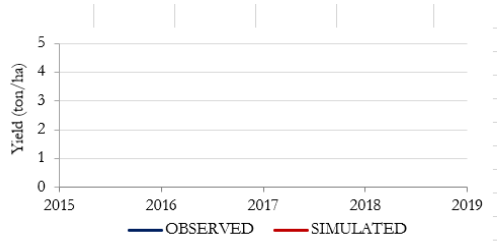
Table 2. Statistical performance of AquaCrop – comparison between observed and simulated yields

		Crop name		
	Units	Location 1	Location 2	Location 3
Number of observations	Years	xxx	xxx	xxx
MAPE	%	xxx	xxx	xxx
NRMSE	%	xxx	xxx	xxx
d	-	xxx	xxx	xxx

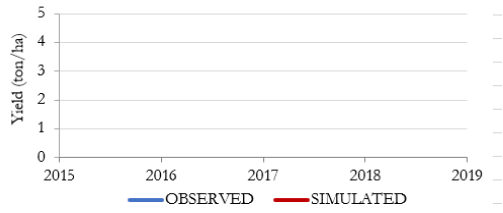
Useful templates

2. Crop calibration and validation (excel doc.)

Variety NAME:										
Location NAME:										
	OBSERVED	SIMULATED	RMSE	MAE	EF	| *Pi-Oave* |	| *Oi-Oave* |	d	MAPE	Difference
2015			0.000	0.00	#¡DIV/0!	#¡REF!	#¡REF!		#¡DIV/0!	0.00
2016			0.000	0.00	#¡DIV/0!	#¡REF!	#¡REF!		#¡DIV/0!	0.00
2017			0.000	0.00	#¡DIV/0!	#¡REF!	#¡REF!		#¡DIV/0!	0.00
2018			0.000	0.00	#¡DIV/0!	#¡REF!	#¡REF!		#¡DIV/0!	0.00
2019			0.000	0.00	#¡DIV/0!	#¡REF!	#¡REF!		#¡DIV/0!	0.00
	#¡DIV/0!		0.000	0.00	#¡DIV/0!	#¡REF!	#¡REF!	#¡REF!	#¡DIV/0!	0.00
										0.00
									NRMSE (as %)	#¡DIV/0!



Variety NAME:										
Location NAME:										
	OBSERVED	SIMULATED	RMSE	MAE	EF	| *Pi-Oave* |	| *Oi-Oave* |	d	MAPE	Difference
2015			0.000	0.00	#¡DIV/0!	#¡REF!	#¡REF!		#¡DIV/0!	0.00
2016			0.000	0.00	#¡DIV/0!	#¡REF!	#¡REF!		#¡DIV/0!	0.00
2017			0.000	0.00	#¡DIV/0!	#¡REF!	#¡REF!		#¡DIV/0!	0.00
2018			0.000	0.00	#¡DIV/0!	#¡REF!	#¡REF!		#¡DIV/0!	0.00
2019			0.000	0.00	#¡DIV/0!	#¡REF!	#¡REF!		#¡DIV/0!	0.00
	#¡DIV/0!		0.000	0.00	#¡DIV/0!	#¡REF!	#¡REF!	#¡REF!	#¡DIV/0!	0.00
										0.00
									NRMSE (as %)	#¡DIV/0!



For the nRMSE, AquaCrop simulations are considered highly performant if the differences between observed and simulated values are **below 5%**, and good when ranging between **6 and 15%**

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Questions and Answers

Instructions

- Type the questions on the chat and we will address the most relevant ones based on the available time.

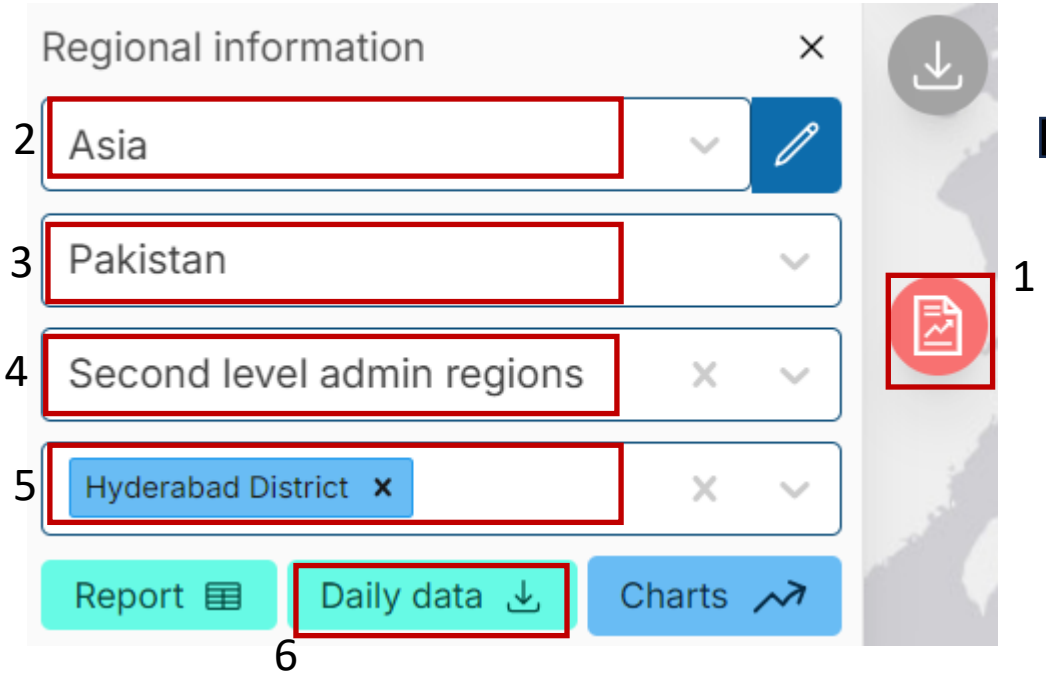
Questions raised

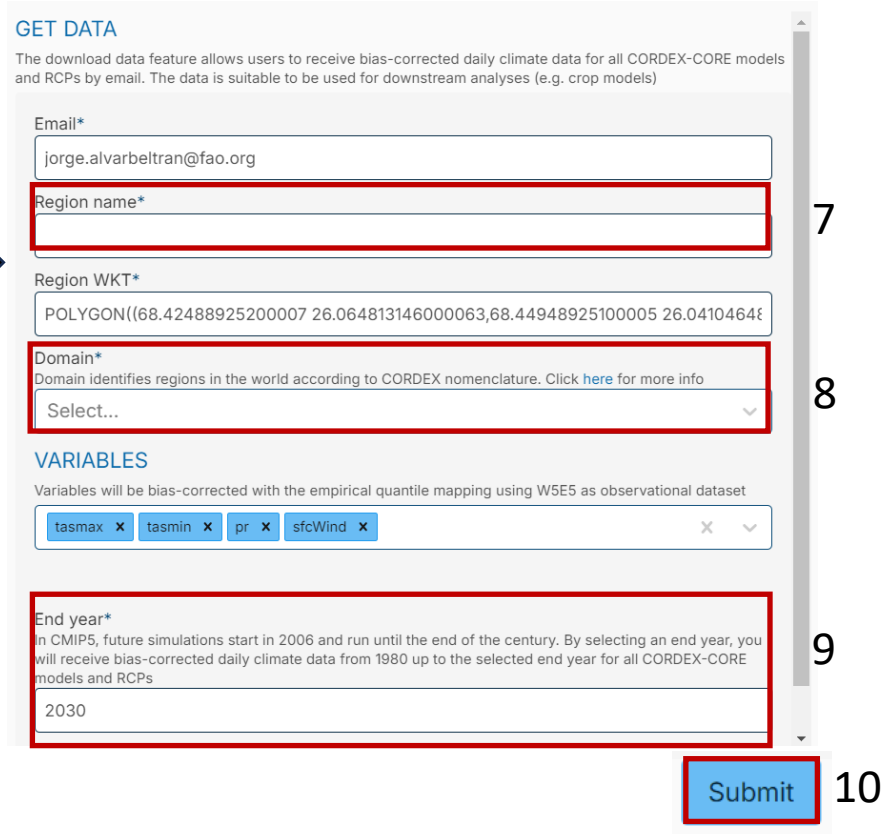
Hands-on Exercise

Instructions

- Log-in to the CAVA platform: https://fao-cava.predictia.es/

- **Step 1:** Click on the "Automatic Reports and More", **Step 2**: Select the continent "Asia", **Step 3**: Select the country: "Pakistan"; **Step 4**: Select "Second level admin regions"; **Step 5**: Select the district of interest from the map; **Step 6**: Click on "Daily Data"; **Step 7**: Provide a "Region Name"; **Step 8**: Select the Domain "EAS-22"; **Step 9**: End Year "2100"; **Step 10**: Click on "Submit"





COFFEE BREAK

Hands-on Exercise

-Jorge: 15 mins to show the entire process (CAVA → AQUACROP GUI → AQUACROP PLUGIN)

-Participants: 15 mins to create the climatic file on AquaCrop

-Participants: 45 mins to prepare two project files, run the AquaCrop plugin and visualize data on AquaCrop plotter:

a) *Basic users:* Test two sowing dates.
b) *Basic users:* Test two different soil types.
c) *Basic users:* Test two irrigation management practices.

Fixed files: **crop: wheat-badin; sowing date: 1st Nov; irrigation: Inet; field: Moderate SF; soil: sandy-loam**

d) *Advanced users*: freedom to select the simulation scheme that you are interested on and the number of project files.

-2 Participants: 30 mins to present plots on their simulations on AQUACROP PLOTTER

Thank you!

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