



**Food and Agriculture
Organization of the
United Nations**



Module 6

Hands-on exercise

Jorge Alvar-Beltrán
Riccardo Soldan
(2023)



- Simulate different irrigation schemes for wheat in Multan under 2 RCPs scenarios (RCP 4.5 and 8.5) for the 2010-2099 period.



Project files
(.PRMs or .PROs)



Output files (daily
or seasonal)

AQUACROP PLOTTER

[LINK](#)



Project file scheme

Crop_Location_SowingDate_Irrigation_RCP

Wheat_Multan_1Nov_7d13mm_45

Wheat_Multan_1Nov_7d13mm_85

Wheat_Multan_1Nov_8d15mm_45

Wheat_Multan_1Nov_8d15mm_85

Irrigation schemes

13 mm each 7 days

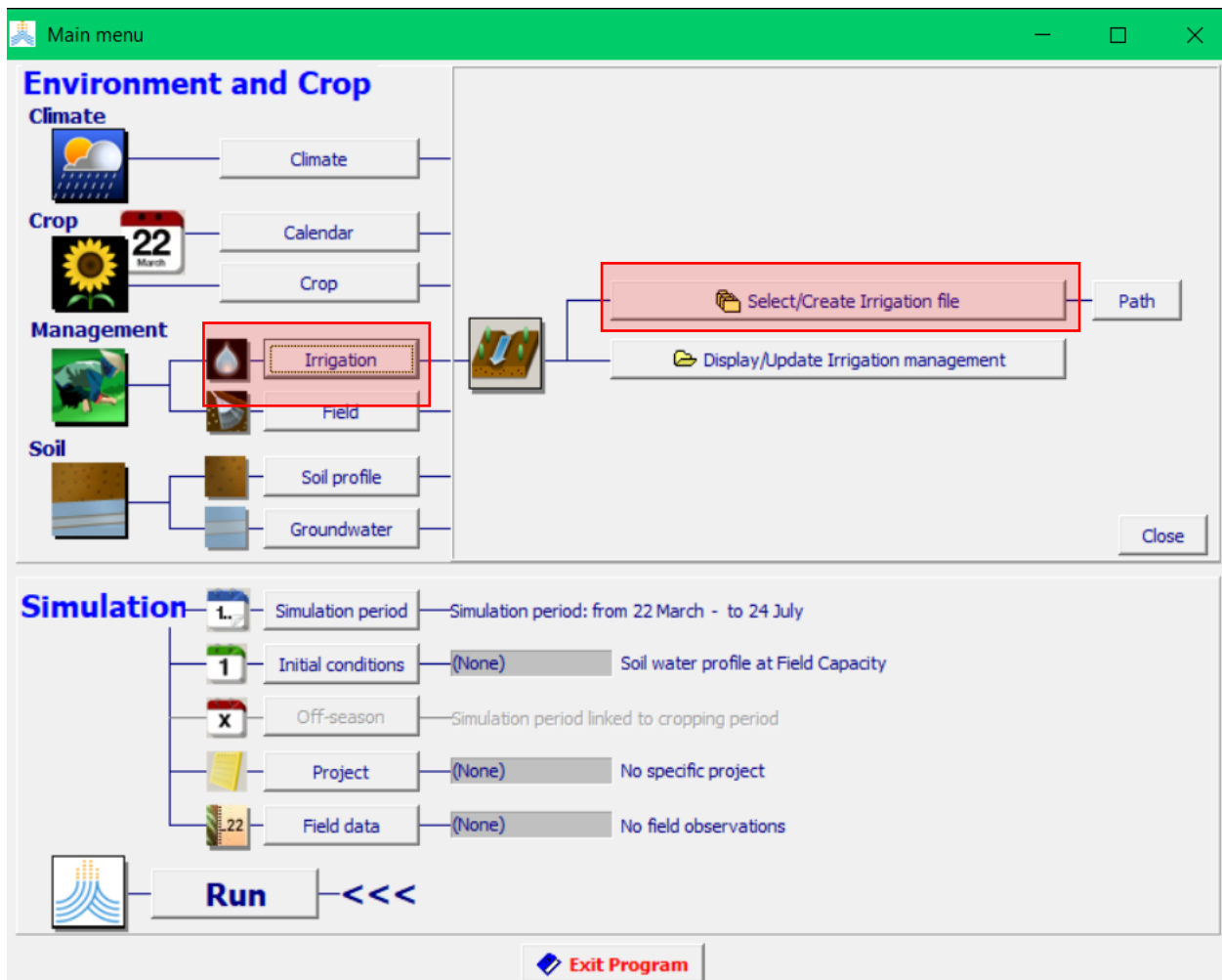
VS

15mm each 8 days

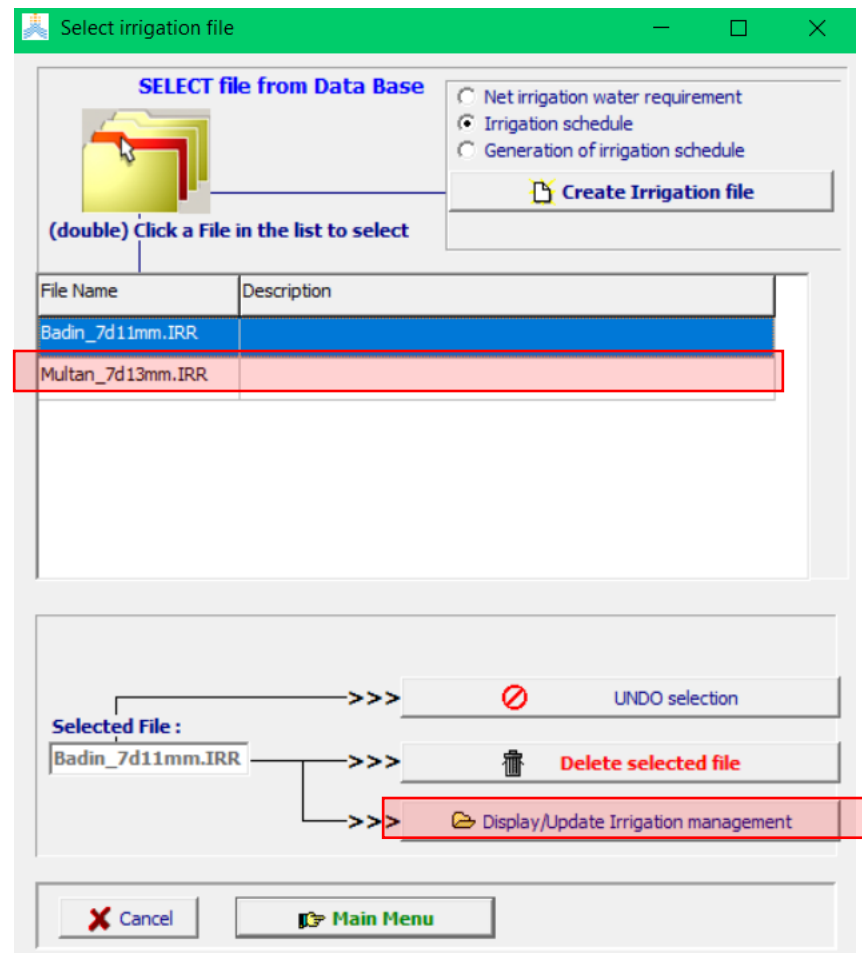


Create the new irrigation file: Fixed intervals 15mm each 8 days

- 1) Open AquaCrop
- 2) Select "Irrigation"
- 3) Click on "Select/create project file"



- 3) Select the "Multan_7d13mm" file and "Display/Update Irrigation management"



Create the new irrigation file: Fixed intervals 15mm each 8 days

- 1) Select "Time and Depth criteria"
- 2) Select "8" (days) under **Intervals** and "15" (mm) under Depth
- 3) Select "Save as"

Generation of irrigation schedule

Mode | Irrigation method | **Time and Depth criteria**

Time and depth criteria

soil bunds

Day No. 1 - day 1 after sowing: 22 March

Time Criteria

- ☒ Fixed interval
- ☐ Allowable depletion (mm water)
- ☐ Allowable depletion (% of RAW)
- ☐ Water layer between bunds

Depth Criteria

- ☐ Back to Field Capacity
- ☒ Fixed net application

Irrigation water quality

excellent

EC_w 0.0 dS/m

assign

Date	Day No.	Interval (days)	Depth (mm)	Quality
22 March	1	8	15	0.0

valid From When? Depth? Quality

Growing period

Canopy Cover

Thresholds

Day No. 125 - maturity: 24 July

Clear All Events

Cancel Main Menu Save as

3) Name the file as "Multan_8d15mm"

Save as

Existing File name

Multan_8d15mm.IRR

File name

Save as >> Multan_8d15mm

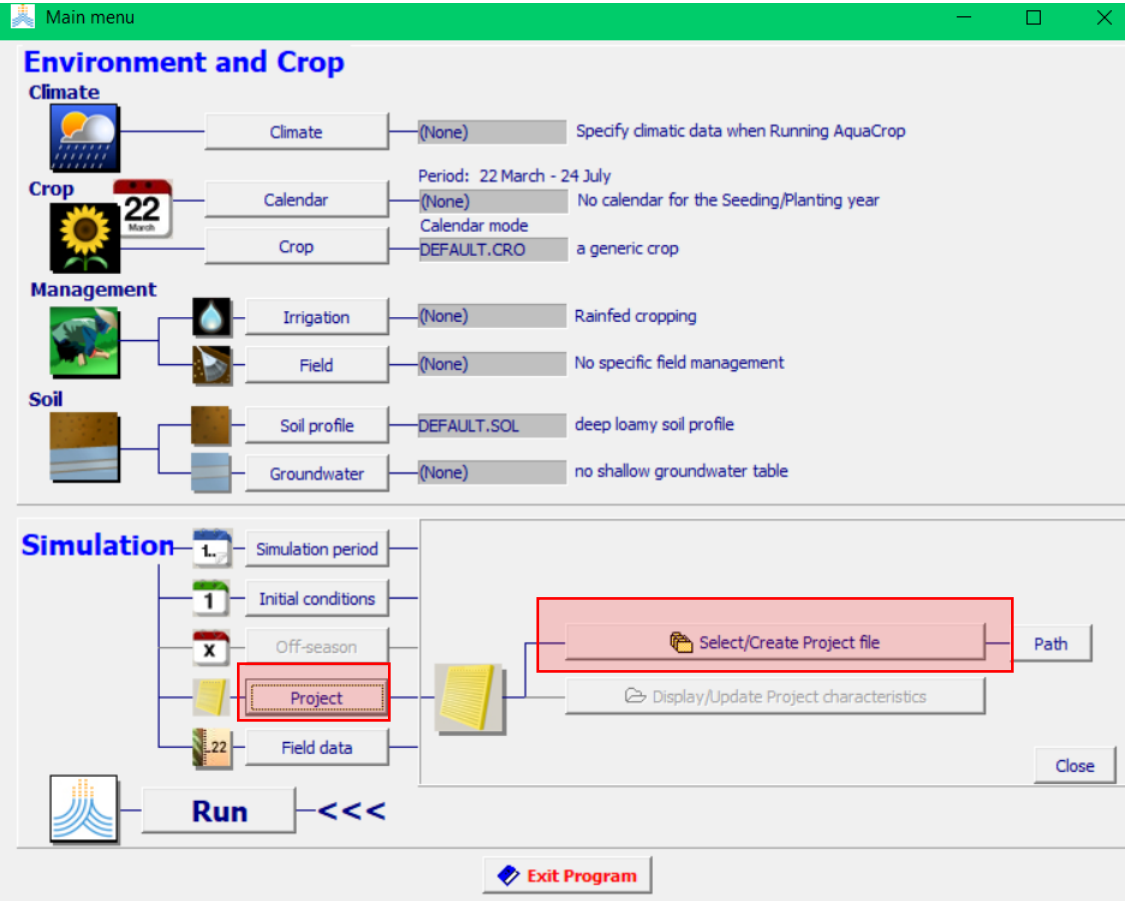
IRR

Description

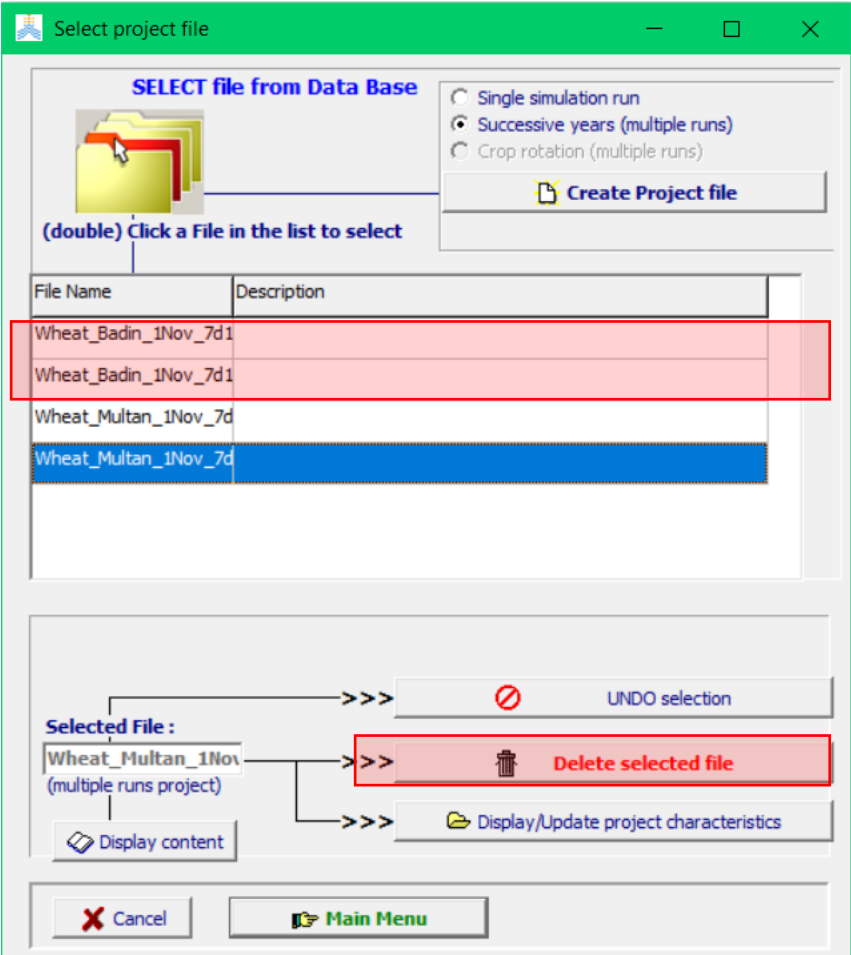
Cancel Save



- 1) Select “Project”
- 2) Click on “Select/Create Project file”



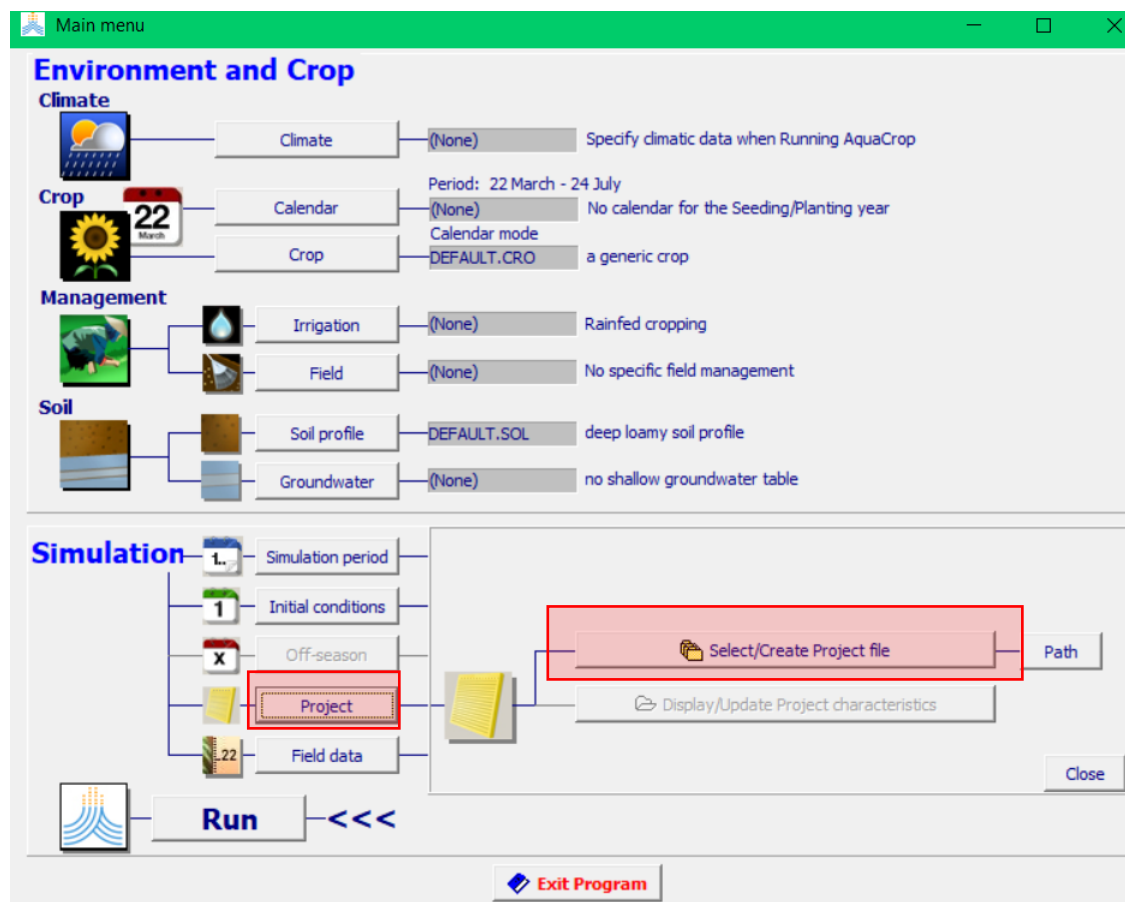
- 3) Delete the two PRMs files for Badin



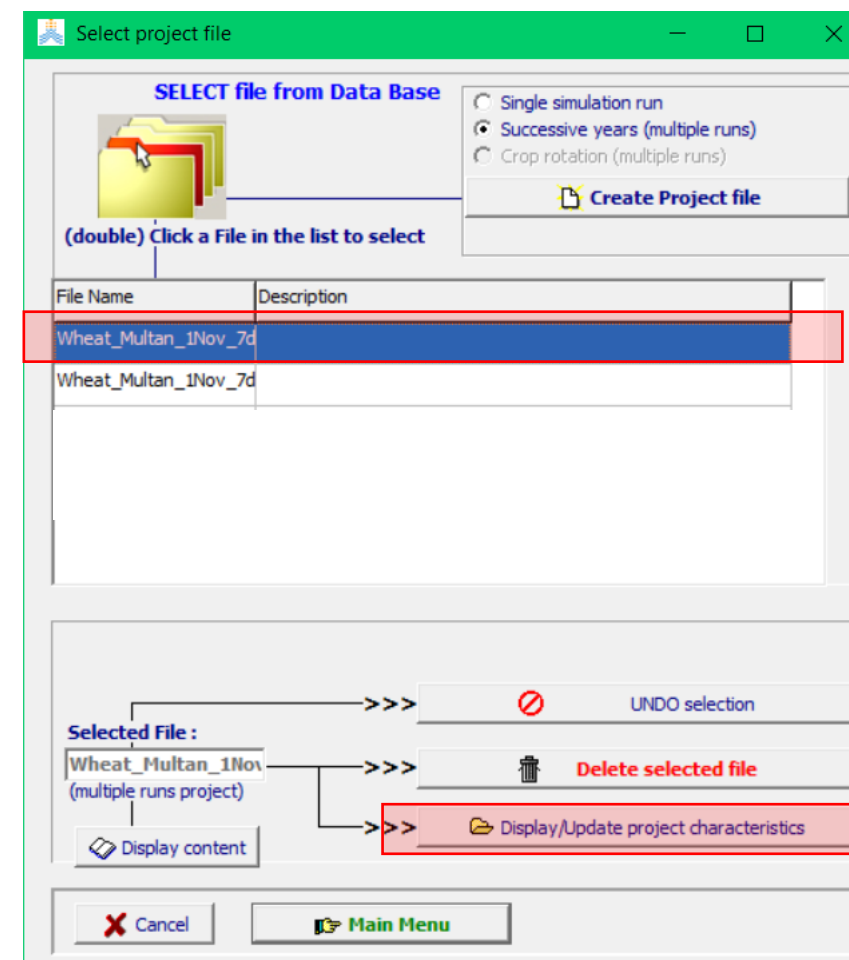


Create PRMs with the new Irrigation files

- 1) Go back to the main menu
- 2) Click on “Select/Create Project file”



- 3) Select the first file (Multan_RCP4.5)
- 4) Click on “Display/Update project characteristic



- 1) Select “Environment, Crop and Simulation files
- 2) Click on “Irrigation”
- 3) Click on “Select Irrigation file”

Project characteristics

Description | **Environment, Crop and Simulation files** | Calendar | Program settings

Multiple project: – Simulation run 1 out of 89

Environment and Crop

Climate/Calendar/Crop

Multan_RCP45.CLI

1stNov.CAL Onset: 1 November

Growing cycle: From 1 November 2010 - to 14 April 2011

wheatpakistan.CRI wheatpakistancalibration

Annual crop

Management

Irrigation ☒ Multan_7d13mm.IRR

Field ☒ (None) No specific field management

Soil

Soil profile ☒ ClayLoam_Multan ClayLoam

Groundwater ☒ (None) no shallow groundwater table

Simulation

Simulation period: From 1 November 2010 - to 14 April 2011

Conditions

1 Initial ☒ Pakistan.SW0

x Off season ☒ (None) No specific off-season conditions

Field data

22 Field data ☒ (None) No field observations

Check if apply to all 89 runs

Cancel Main Menu Save as

- 4) Select the new irrigation file “Multan_8d15mm.IRR”
- 5) Click on Update Menu

Select irrigation file

SELECT file from Data Base

(double) Click a File in the list to select

File Name	Description
Badin_7d11mm.IRR	
Badin_8d14mm.IRR	
Multan_7d13mm.IRR	
Multan_8d15mm.IRR	

Selected File :

Multan_8d15mm.IRR >>> UNDO selection

Cancel Update Menu

- 1) Check the highlighted box to include the irrigation file into the PRM
- 2) Save as

Project characteristics

Description Environment, Crop and Simulation files Calendar Program settings

Multiple project: – Simulation run 1 out of 89

Environment and Crop

Climate/Calendar/Crop

Multan_RCP45.CLI

1stNov.CAL Onset: 1 November

Growing cycle: From 1 November 2010 - to 14 April 2011

wheatpakistan.CRI wheatpakistancalibration

Annual crop

Management

Irrigation ☒ Multan_8d15mm.IF Fraction of soil surface wetted by irrigation: 80 % - Furrow Irrigation -

Field ☒ (None) No specific field management

Soil

Soil profile ☒ ClayLoam_Multan.: ClayLoam

Groundwater ☒ (None) no shallow groundwater table

Simulation

Simulation period: From 1 November 2010 - to 14 April 2011

Conditions

Initial ☒ Pakistan.SW0

Off season ☒ (None) No specific off-season conditions

Field data

Field data ☒ (None) No field observations

Check if apply to all 89 runs

Cancel Main Menu Save as

- 3) Name the file as: **Wheat_Multan_1Nov_8d15mm_45**

Save as

Existing File name

Wheat_Multan_1Nov_7d13mm_45 Save as >> Wheat_Multan_1Nov_8d15mm_45 PRM

Description

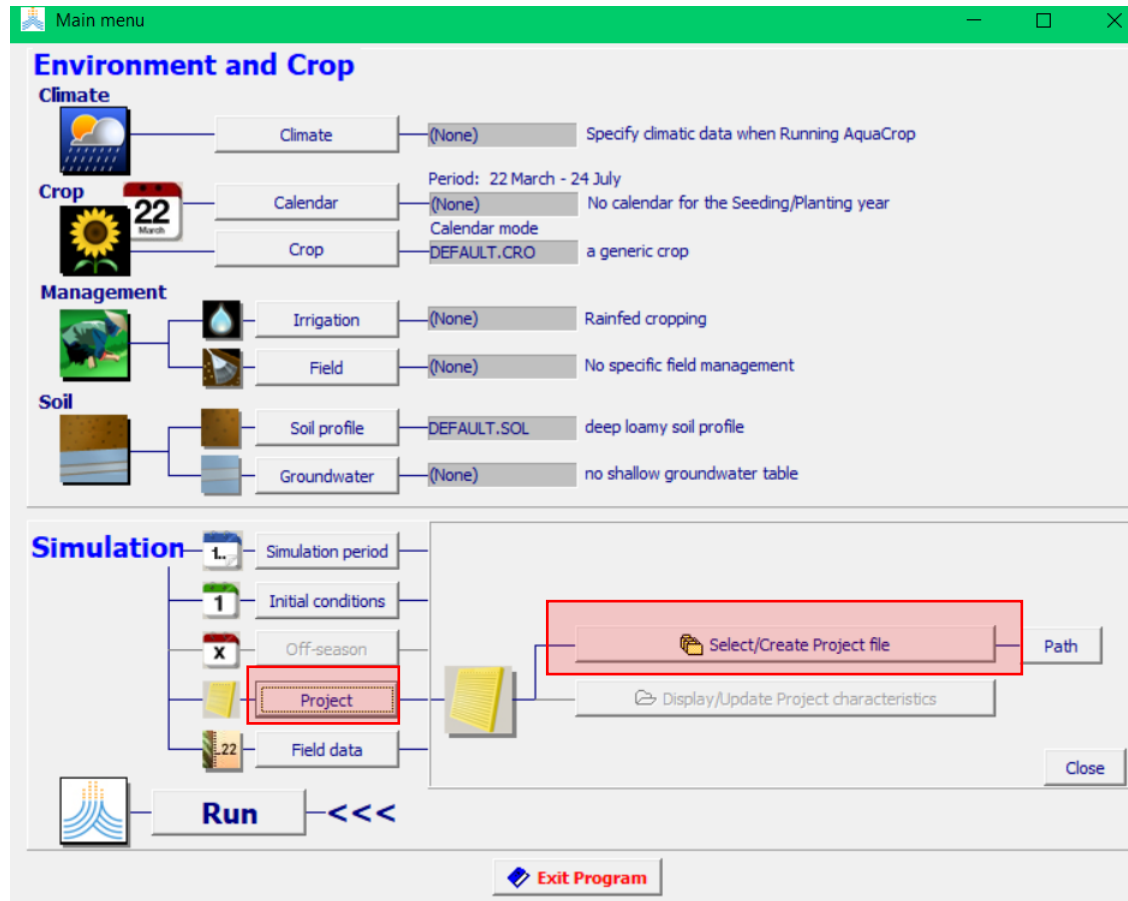
Cancel Save

Irrigation ☐ Multan_8d15mm.IF

Irrigation ☒ Multan_8d15mm.IF

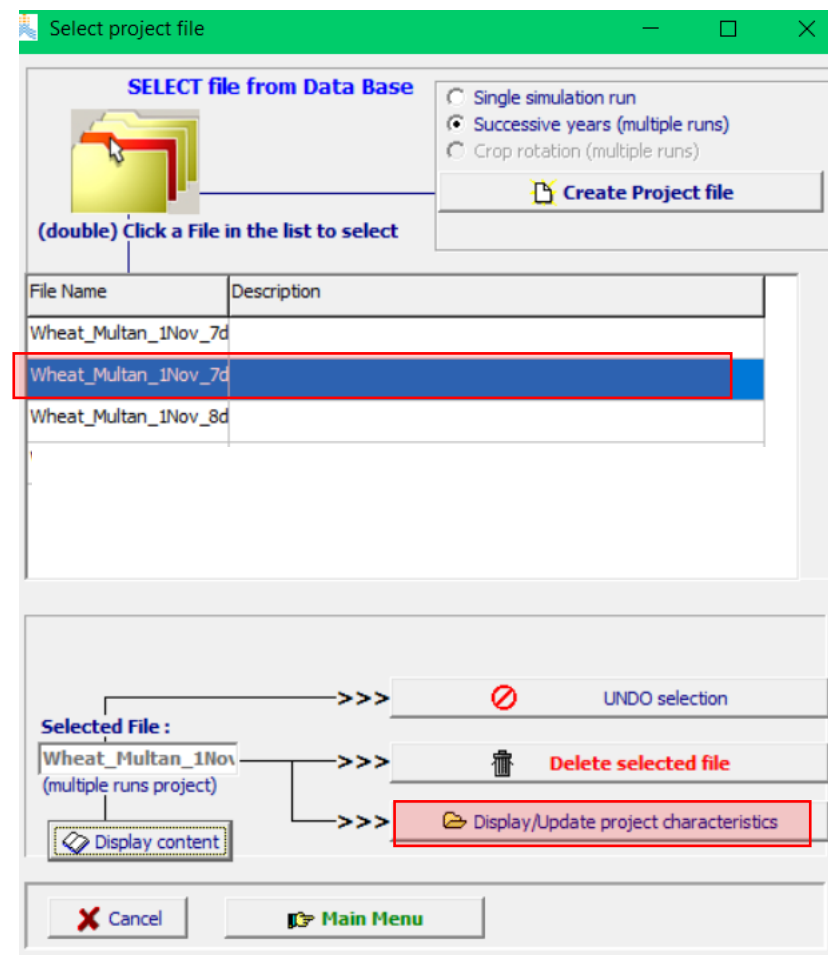
Repeat the process with the second file named
“Wheat_Multan_1Nov_7d13mm_85” and after changing the
irrigation file, name it “Wheat_Multan_1Nov_8d15mm_85”

1) Click on Project – Select /Create Project file



3) Select the second file (Multan_RCP8.5)

4) Click on “Display/Update project characteristic
And follow the same process to select the new irrig
file and to save the new PRM





Project file scheme

All the project files are created, you can find them in the DATA folder of AquaCrop

Crop_Location_SowingDate_Irrigation_RCP

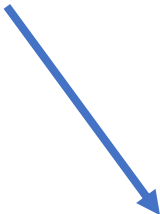
- Wheat_Multan_1Nov_7d13mm_45

Wheat_Multan_1Nov_7d13mm_85
- Wheat_Multan_1Nov_8d15mm_45

Wheat_Multan_1Nov_8d15mm_85
- ☒

☒
- ☒

☒

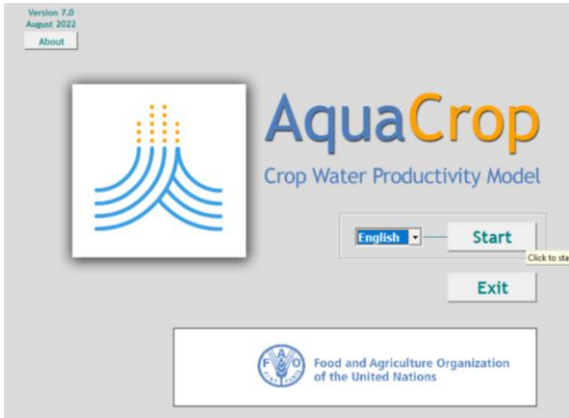


FS (C:) > FAO > Pakistan > GUI_AC71 > AquaCropV71No13102023 > DATA

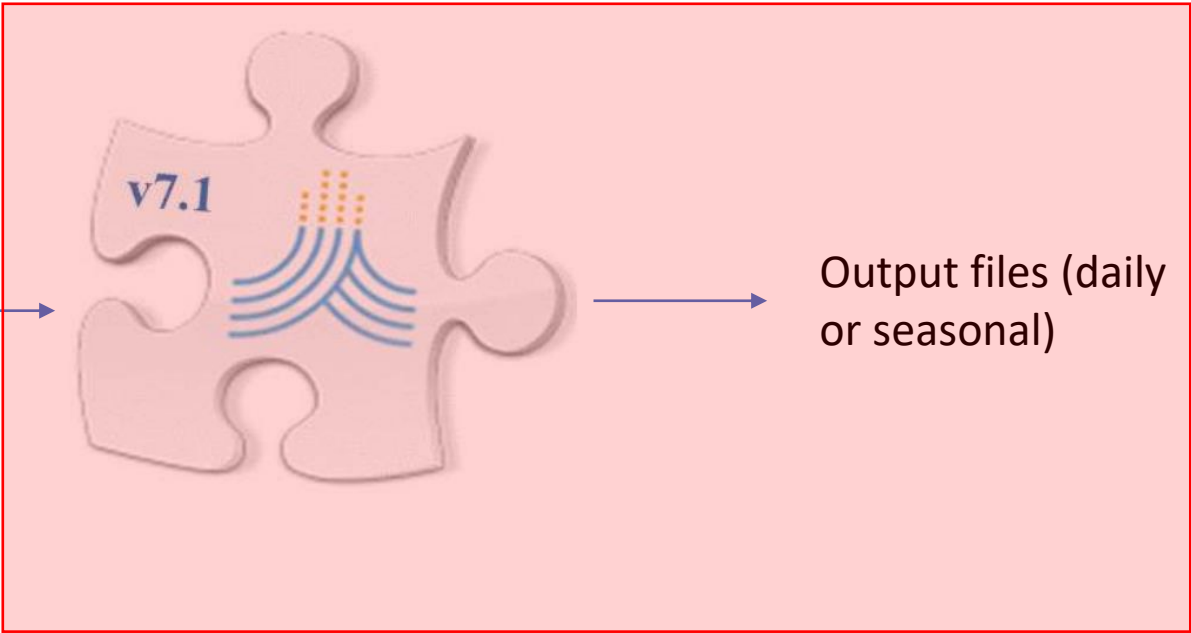
Nome	Ultima modifica	Tipo	Dimensione
wheatpakistan.CRO	24/11/2023 15:17	File CRO	/ KB
Badin_7d11mm.IRR	01/12/2023 17:55	File IRR	1 KB
Badin_8d14mm.IRR	04/12/2023 18:36	File IRR	1 KB
Multan_7d13mm.IRR	01/12/2023 17:58	File IRR	1 KB
Multan_8d15mm.IRR	05/12/2023 09:32	File IRR	1 KB
Bad85.PLU	08/11/2023 12:41	File PLU	386 KB
Badin_RCP45.PLU	20/11/2023 18:14	File PLU	386 KB
Multan_RCP45.PLU	21/11/2023 17:26	File PLU	386 KB
Multan_RCP85.PLU	21/11/2023 17:28	File PLU	386 KB
Wheat_Multan_1Nov_7d13mm_45.PPn	05/12/2023 09:31	File PPN	3 KB
Wheat_Multan_1Nov_7d13mm_85.PPn	05/12/2023 09:31	File PPN	3 KB
Wheat_Multan_1Nov_8d15mm_45.PPn	05/12/2023 09:33	File PPN	3 KB
Wheat_Multan_1Nov_8d15mm_85.PPn	05/12/2023 09:34	File PPN	3 KB
Wheat_Multan_1Nov_7d13mm_45.PRM	05/12/2023 09:31	File PRM	146 KB
Wheat_Multan_1Nov_7d13mm_85.PRM	05/12/2023 09:31	File PRM	146 KB
Wheat_Multan_1Nov_8d15mm_45.PRM	05/12/2023 09:33	File PRM	146 KB
Wheat_Multan_1Nov_8d15mm_85.PRM	05/12/2023 09:34	File PRM	146 KB



Use of the Plug-in



Project files
(.PRMs or .PROs)



Output files (daily
or seasonal)



Use of the Plugin

Copy and paste the PRM files from the DATA folder of GUI_AC71 to the LIST folder of the PLUGIN

IS (C:) > FAO > Pakistan > GUI_AC71 > AquaCropV71No13102023 > DATA

Nome	Ultima modifica	Tipo	Dimensione
wheatpakistan.CRO	24/11/2023 15:17	File CRO	7 KB
Badin_7d11mm.IRR	01/12/2023 17:55	File IRR	1 KB
Badin_8d14mm.IRR	04/12/2023 18:36	File IRR	1 KB
Multan_7d13mm.IRR	01/12/2023 17:58	File IRR	1 KB
Multan_8d15mm.IRR	05/12/2023 09:32	File IRR	1 KB
Bad85.PLU	08/11/2023 12:41	File PLU	386 KB
Badin_RCP45.PLU	20/11/2023 18:14	File PLU	386 KB
Multan_RCP45.PLU	21/11/2023 17:26	File PLU	386 KB
Multan_RCP85.PLU	21/11/2023 17:28	File PLU	386 KB
Wheat_Multan_1Nov_7d13mm_45.PPn	05/12/2023 09:31	File PPn	3 KB
Wheat_Multan_1Nov_7d13mm_85.PPn	05/12/2023 09:31	File PPn	3 KB
Wheat_Multan_1Nov_8d15mm_45.PPn	05/12/2023 09:33	File PPn	3 KB
Wheat_Multan_1Nov_8d15mm_85.PPn	05/12/2023 09:34	File PPn	3 KB
Wheat_Multan_1Nov_7d13mm_45.PRM	05/12/2023 09:31	File PRM	146 KB
Wheat_Multan_1Nov_7d13mm_85.PRM	05/12/2023 09:31	File PRM	146 KB
Wheat_Multan_1Nov_8d15mm_45.PRM	05/12/2023 09:33	File PRM	146 KB
Wheat_Multan_1Nov_8d15mm_85.PRM	05/12/2023 09:34	File PRM	146 KB

IS (C:) > FAO > Pakistan > aquacrop-7.1-x86_64-windows >

Nome	Ultima modifica	Tipo	Dimensione
LIST	01/12/2023 18:05	Cartella di file	
OUT+PRMs	01/12/2023 18:07	Cartella di file	
OUTP	01/12/2023 18:06	Cartella di file	
PARAM	17/08/2022 10:22	Cartella di file	
SIMUL	20/11/2023 15:29	Cartella di file	
aquacrop.exe	20/11/2023 15:24	Applicazione	1.741 KB
AUTHORS.md	20/11/2023 15:24	File MD	1 KB
LICENSE	20/11/2023 15:24	File	2 KB



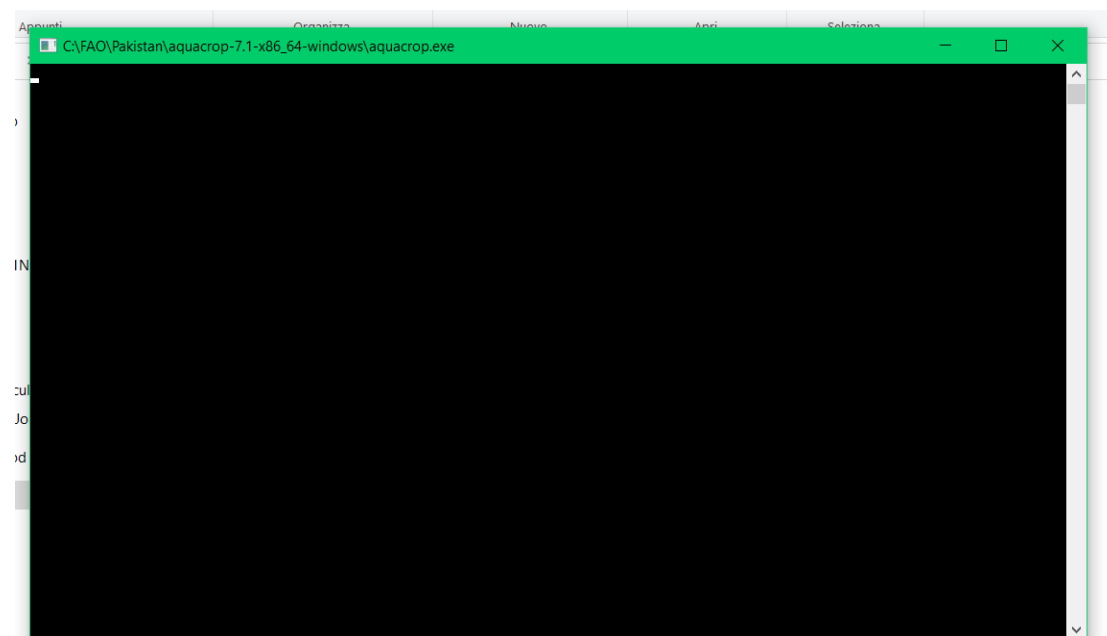
Use of the Plugin

Double click on the .exe file to run the plugin

IS (C:) > FAO > Pakistan > aquacrop-7.1-x86_64-windows >

Nome	Ultima modifica	Tipo	Dimensione
LIST	01/12/2023 18:05	Cartella di file	
OUT+PRMs	01/12/2023 18:07	Cartella di file	
OUTP	01/12/2023 18:06	Cartella di file	
PARAM	17/08/2022 10:22	Cartella di file	
SIMUL	20/11/2023 15:29	Cartella di file	
aquacrop.exe	20/11/2023 15:24	Applicazione	1.741 KB
AUTHORS.md	20/11/2023 15:24	File MD	1 KB
LICENSE	20/11/2023 15:24	File	2 KB

The plugin does not have an interface, wait until this black window closes.





Use of the Plugin

You can find the OUTPUT data in the OUT folder: the plugin produces two OUT files per PRM: daily and seasonal files.

IS (C:) > FAO > Pakistan > aquacrop-7.1-x86_64-windows >

Nome	Ultima modifica	Tipo	Dimensione
LIST	01/12/2023 18:05	Cartella di file	
OUT+PRMs	01/12/2023 18:07	Cartella di file	
OUTP	01/12/2023 18:06	Cartella di file	
PARAM	17/08/2022 10:22	Cartella di file	
SIMUL	20/11/2023 15:29	Cartella di file	
aquacrop.exe	20/11/2023 15:24	Applicazione	1.741 KB
AUTHORS.md	20/11/2023 15:24	File MD	1 KB
LICENSE	20/11/2023 15:24	File	2 KB

Together with the PRMs, the OUTs files can be uploaded on AquaCrop plotter to start the interpretation

OUTs + PRMs



AQUACROP PLOTTER

Thank you!

Contact details:

jorge.alvarbeltran@fao.org

riccardo.soldan@fao.org