



Food and Agriculture Organization of the United Nations



FAO AquaCrop exercise

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FAO Climate Risk Team (OCB)



Objective

Objective: run AquaCrop to see the effect of future climate projections on maize yield and the effect of irrigation under two emission scenarios (RCPs), in Cahul.

- GCM: MOHC
- RCPs: 2.6 and 8.5
- Management: Rainfed - Irrigated
- Crop: Maize
- Locations: Cahul

Experimental design

Locations	Cahul
GCM	MOHC
RCPs	2.6 8.5
Management	Rainfed Irrigated
Crop	Maize

4 Project files

Time series: 119 years -> 1/01/1981 – 31/12/2099

Maize_Cahul_10May_Rainfed_26_MOHC
Maize_Cahul_10May_Irrigated_26_MOHC
Maize_Cahul_10May_Rainfed_85_MOHC
Maize_Cahul_10May_Irrigated_85_MOHC

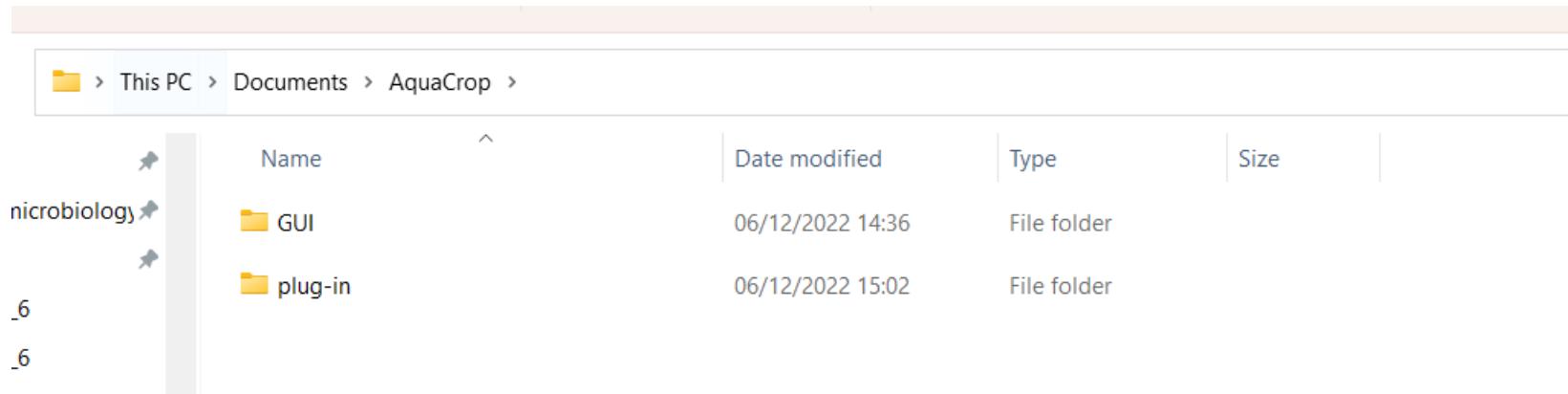


Instruction

- The link to all the **SLIDES** presented in this presentation and the **DATA** can be found at: <https://github.com/Risk-Team/Moldova-workshop>

In case you do not have AquaCrop installed

- Install [AquaCrop software](#) and [AquaCrop Plugin](#) in the documents folder



Folders location

- Where your data folder should be

The screenshot shows a Windows File Explorer window with the following directory path: This PC > Desktop > Moldova-workshop-main > Moldova-workshop-main. The contents of the folder are listed in a table:

Name	Date modified	Type	Size
slides	07/12/2022 16:07	File folder	
.gitignore	07/12/2022 16:07	GITIGNORE File	1 KB
README.md	07/12/2022 16:07	MD File	9 KB

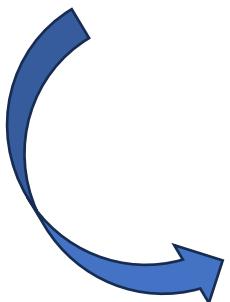
- Where your AquaCrop installations should be

The screenshot shows a Windows File Explorer window with the following directory path: This PC > Documents > AquaCrop. The contents of the folder are listed in a table:

Name	Date modified	Type	Size
GUI	06/12/2022 14:36	File folder	
plug-in	06/12/2022 15:02	File folder	

In case you do not have AquaCrop installed

- *To run the plugin the text file named "DailyResults.SIM" is needed to be in the "SIMUL" folder of the plugin. Download and paste [this file](#).



C:\ > FAO > Moldova > aquacrop-7.0-x86_64-windows >			
Nome	Ultima modifica	Tipo	Dimensione
LIST	17/05/2023 19:08	Cartella di file	
OUTP	16/05/2023 16:11	Cartella di file	
PARAM	17/08/2022 09:22	Cartella di file	
SIMUL	16/05/2023 12:53	Cartella di file	
aquacrop.exe	16/05/2023 12:19	Applicazione	1.740 KB
AUTHORS.md	16/05/2023 12:19	File MD	1 KB
LICENSE	16/05/2023 12:19	File	2 KB

Upload of the files

Go to the GUI downloaded folder and **remove all the content** of your personal “DATA” folder.

Follow the shown path:

Nome	Ultima modifica
1 aquacrop-7.0-x86_64-windows	16/05/2023 12:19
1 GUI_AC7	18/05/2023 11:28

... > FAO > Moldova > GUI_AC7 >

Nome	Ultima modifica
2 AquaCropV70No17082022	17/05/2023 17:37

3	DATA	17/05/2023 17:27
	IMPORT	20/04/2023 11:06
	OBS	20/04/2023 11:06
	OUTP	20/04/2023 11:06
	SIMUL	17/05/2023 17:27
	_DEISREG.ISR	20/04/2023 11:06
	_ISREG32.DLL	20/04/2023 11:06
	AquaCrop.exe	20/04/2023 11:06
	AquaCrop.ico	20/04/2023 11:06
	DelsL1.isu	20/04/2023 11:06

In case you would like to reinitialize the AquaCrop default data you can find it in the “Data with default AquaCrop files” folder.

Upload of the files

Copy and paste the DATA folder content to your personal DATA folder.

Here you can find the DATA folder content

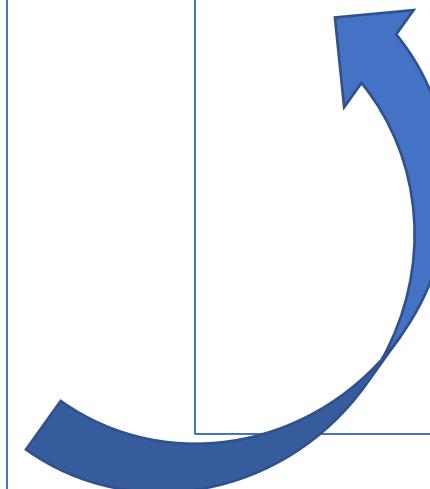
(C:) > FAO > Moldova > GUI_AC7 > AquaCropV70No17082022 > DATA				
Nome	Ultima modifica	Tipo	Dimensione	
10May.CAL	20/04/2023 15:28	File CAL	1 KB	
Cahul_MOHC-HadGEM2-ES_rcp26.CLI	11/11/2022 17:12	File CLI	1 KB	
Cahul_MOHC-HadGEM2-ES_rcp85.CLI	11/11/2022 17:12	File CLI	1 KB	
Soroca_MOHC-HadGEM2-ES_rcp26.CLI	11/11/2022 17:12	File CLI	1 KB	
Soroca_MOHC-HadGEM2-ES_rcp85.CLI	11/11/2022 17:12	File CLI	1 KB	
RCP2-6.CO2	21/10/2022 16:02	File CO2	3 KB	
RCP4-5.CO2	21/10/2022 16:02	File CO2	3 KB	
RCP6-0.CO2	21/10/2022 16:02	File CO2	3 KB	
RCP8-5.CO2	21/10/2022 16:02	File CO2	3 KB	
SSP1_1.9.CO2	21/10/2022 16:02	File CO2	2 KB	
SSP1_2.6.CO2	21/10/2022 16:02	File CO2	2 KB	
SSP2_4.5.CO2	21/10/2022 16:02	File CO2	2 KB	
SSP3_7.0.CO2	21/10/2022 16:02	File CO2	2 KB	
SSP5_8.5.CO2	21/10/2022 16:02	File CO2	2 KB	
Maize-short.CRO	03/05/2023 16:31	File CRO	7 KB	
Optimal.MAN	16/05/2023 14:48	File MAN	2 KB	
Cahul_MOHC-HadGEM2-ES_rcp26.PLU	11/11/2022 17:12	File PLU	510 KB	
Cahul_MOHC-HadGEM2-ES_rcp85.PLU	11/11/2022 17:12	File PLU	510 KB	
Soroca_MOHC-HadGEM2-ES_rcp26.PLU	11/11/2022 17:12	File PLU	510 KB	
Soroca_MOHC-HadGEM2-ES_rcp85.PLU	11/11/2022 17:12	File PLU	510 KB	
North_South.SOL	27/10/2022 15:04	File SOL	1 KB	
Cahul_MOHC-HadGEM2-ES_rcp26.TNX	11/11/2022 17:12	File TNX	935 KB	
Cahul_MOHC-HadGEM2-ES_rcp85.TNX	11/11/2022 17:12	File TNX	935 KB	
Soroca_MOHC-HadGEM2-ES_rcp26.TNX	11/11/2022 17:12	File TNX	935 KB	
Soroca_MOHC-HadGEM2-ES_rcp85.TNX	11/11/2022 17:12	File TNX	935 KB	
Cahul_MOHC-HadGEM2-ES_rcp26.ETO	11/11/2022 17:12	WPS Spreadsheets...	510 KB	
Cahul_MOHC-HadGEM2-ES_rcp85.ETO	11/11/2022 17:12	WPS Spreadsheets...	510 KB	

Personal DATA folder

(C:) > FAO > Moldova > GUI_AC7 > AquaCropV70No17082022 > DATA

Nome Ultima modifica Tipo Dimensione

La cartella è vuota.



CTRL + C - CTRL + V

Open AquaCrop

1. Open AquaCrop software (double click on “AquaCrop.exe”)

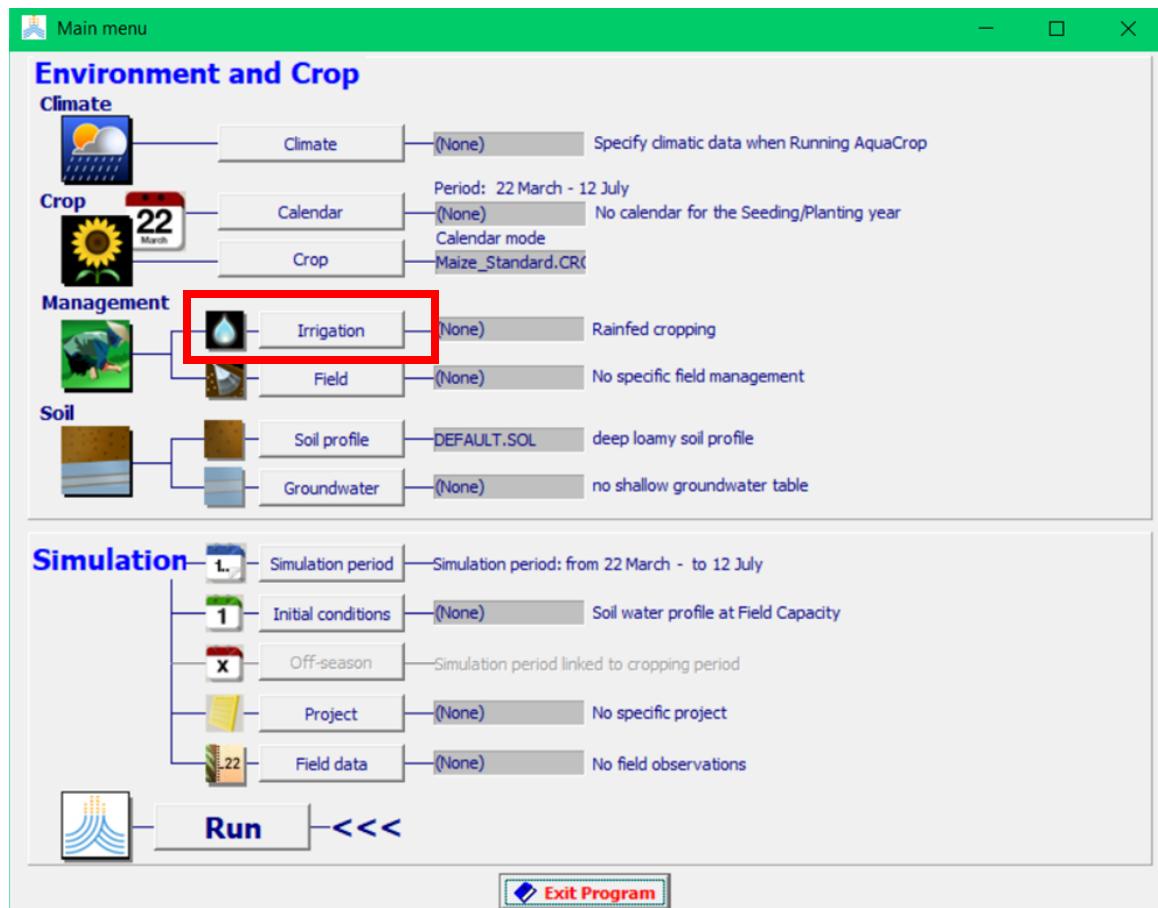
DATA	17/05/2023 17:27
IMPORT	20/04/2023 11:06
OBS	20/04/2023 11:06
OUTP	20/04/2023 11:06
SIMUL	17/05/2023 17:27
_DEISREG.ISR	20/04/2023 11:06
ISREG32.DLL	20/04/2023 11:06
AquaCrop.exe	20/04/2023 11:06
AquaCrop.ico	20/04/2023 11:06
DelsL1.isu	20/04/2023 11:06

2. Select language and press Start

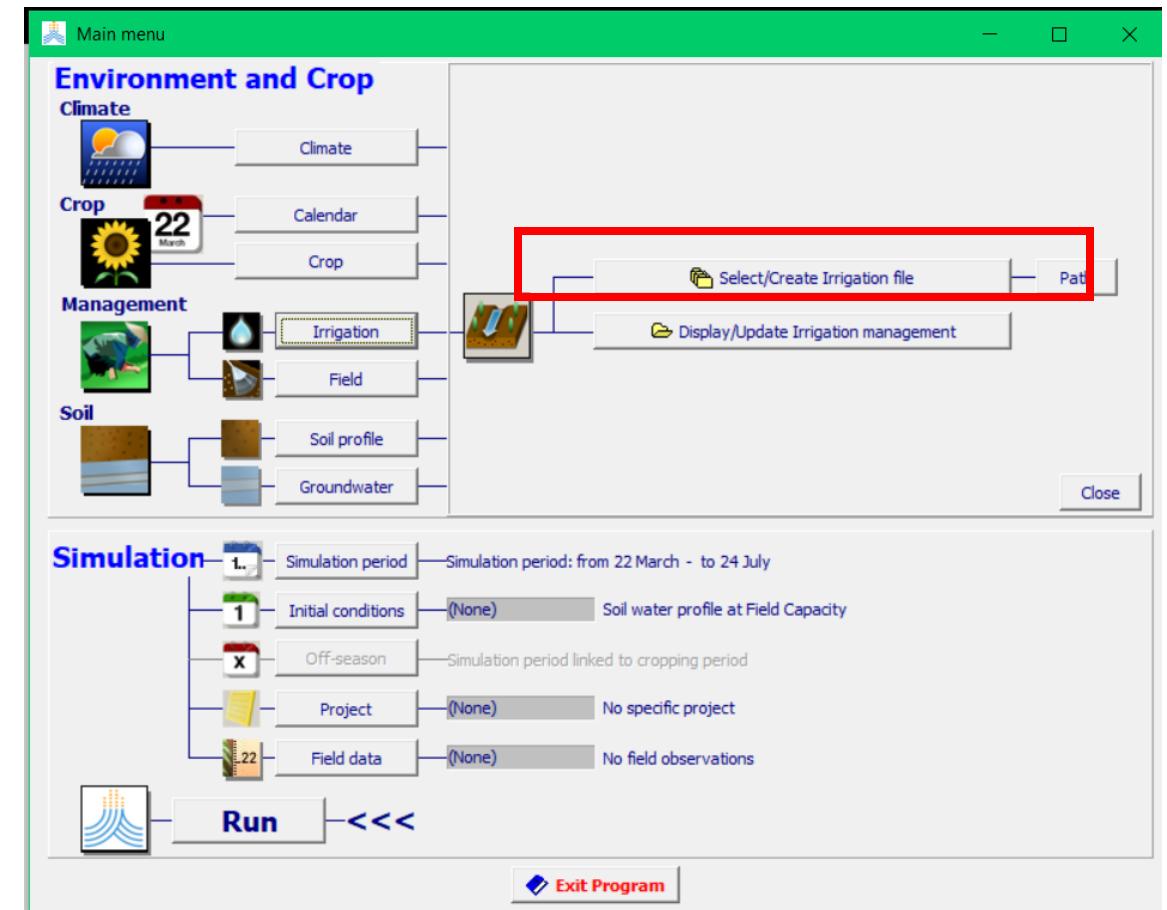


Creation of the irrigation file

Go to Irrigation module

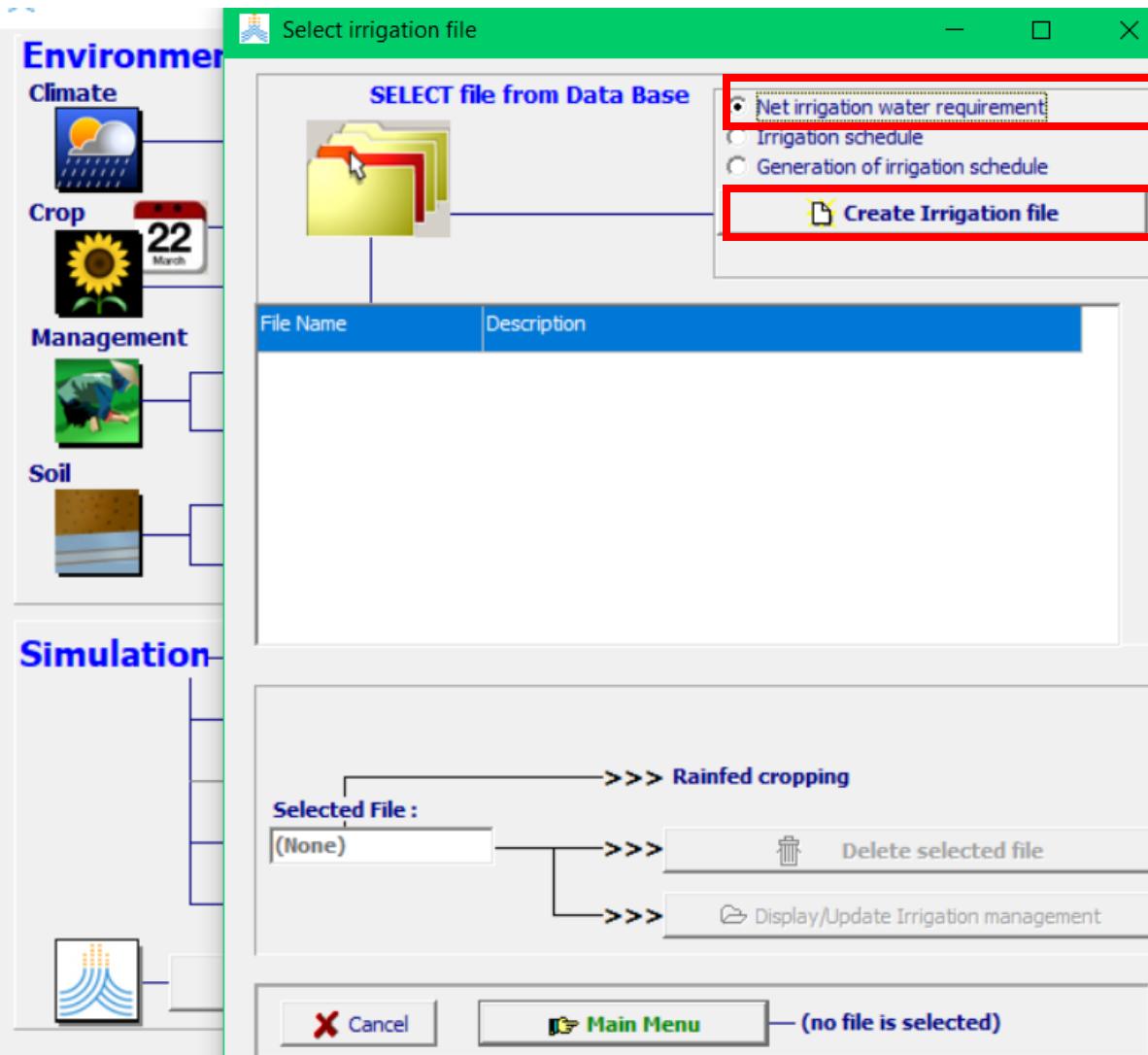


Click on Select/Create Irrigation file

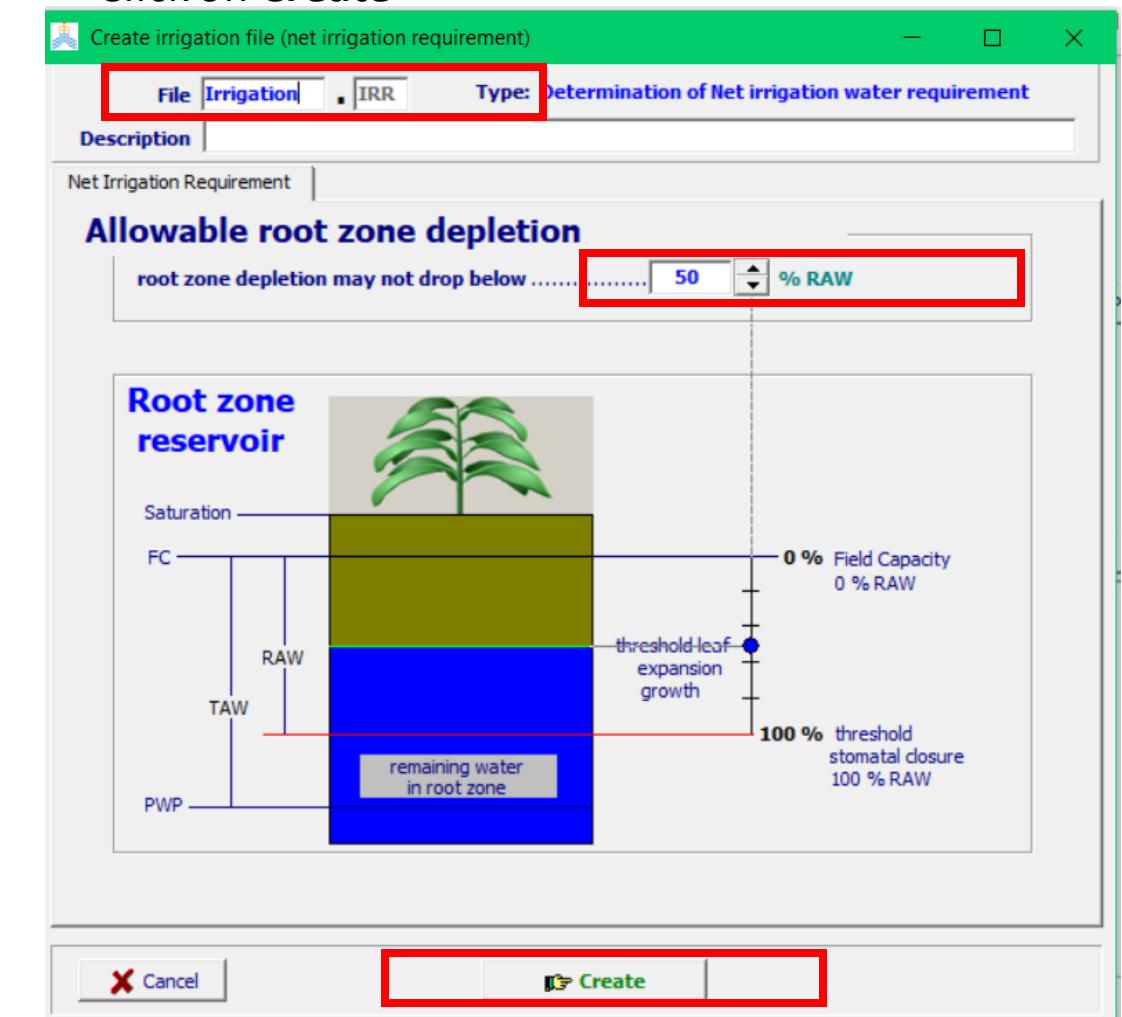


Creation of the irrigation file

- Select Net Irrigation water requirement and Create Irrigation file

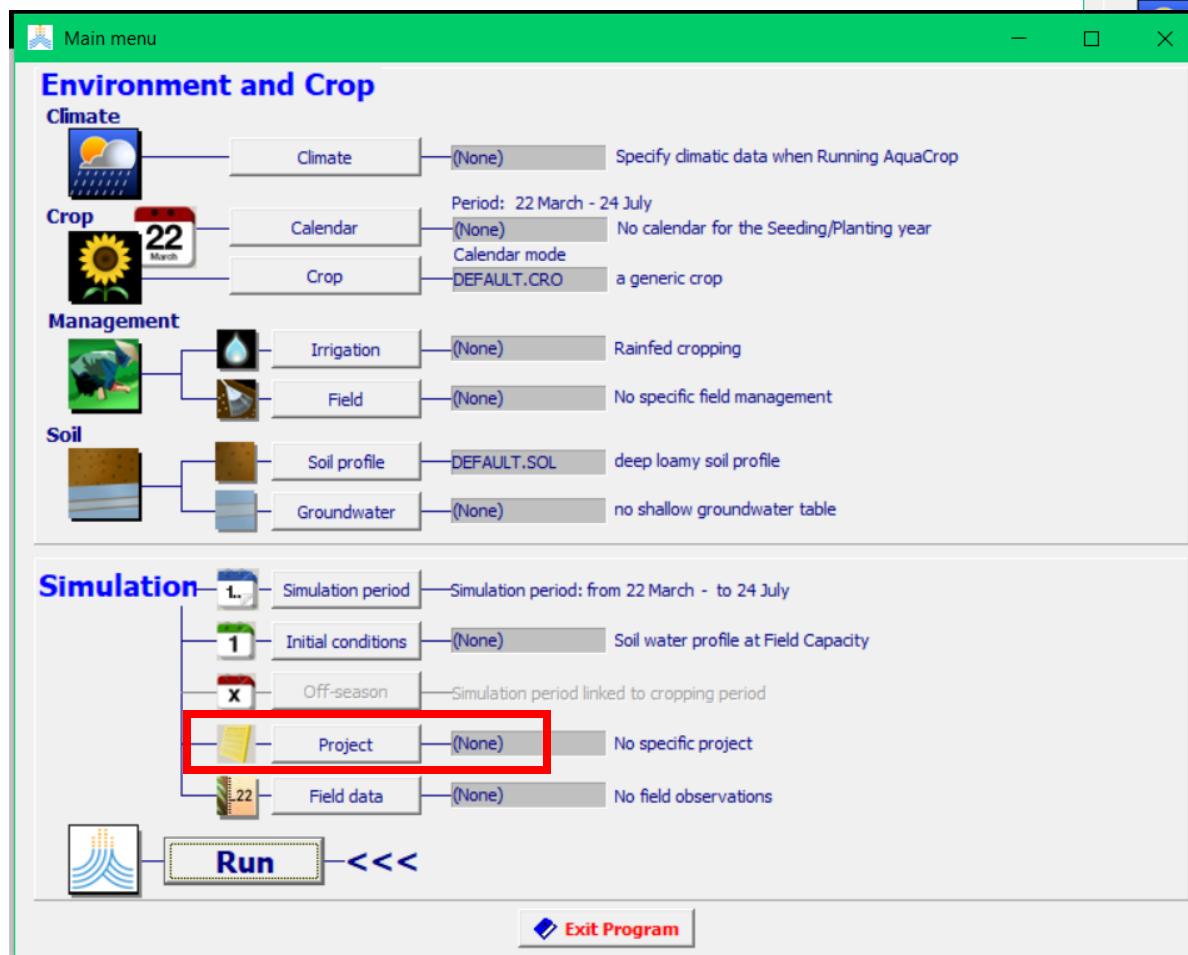


- Select the a rootzone depletion of 50% Ready Available Water (RAW)
- Name the file as "Irrigation"
- Click on Create

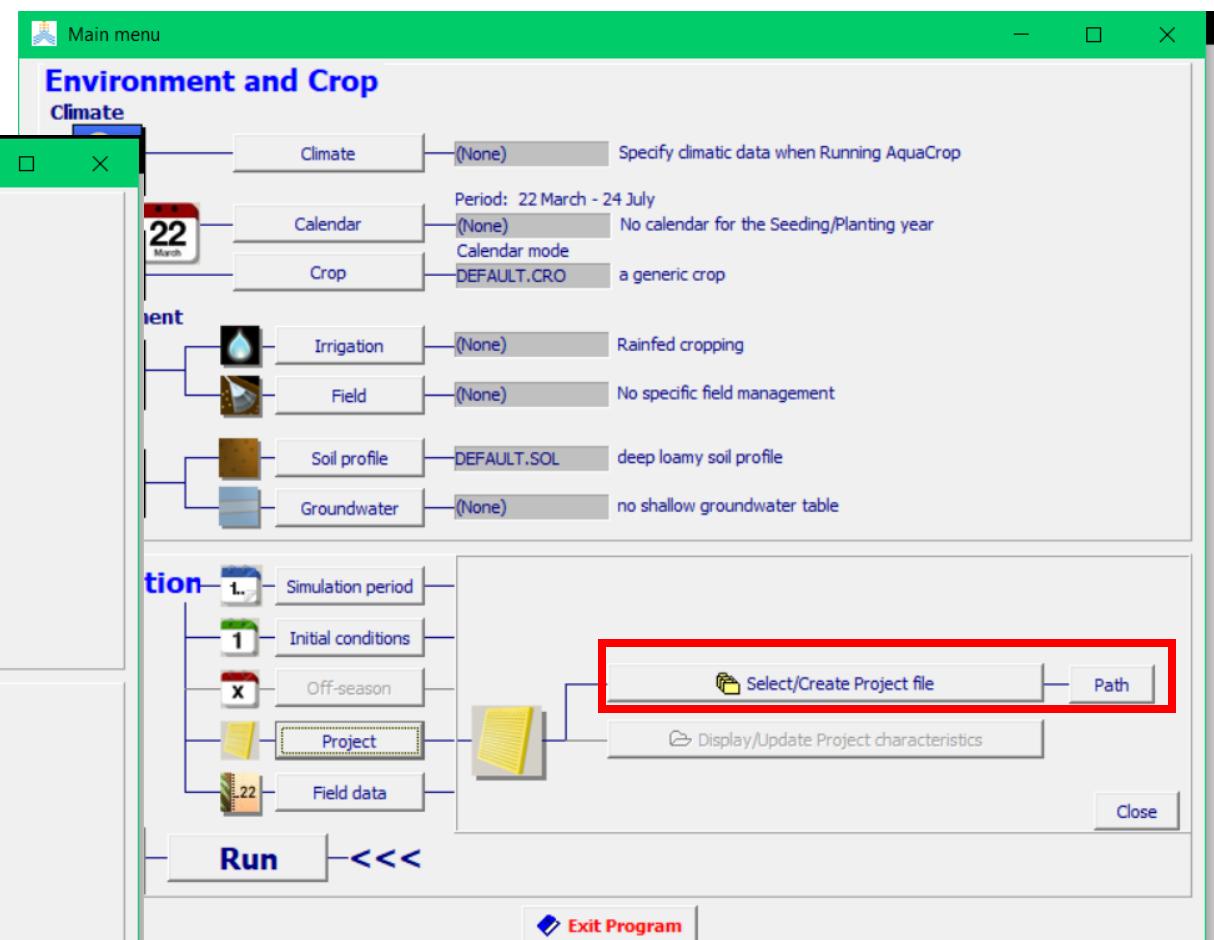


Creation of the project files (.PRM)

Press the “Project” button to create the project file

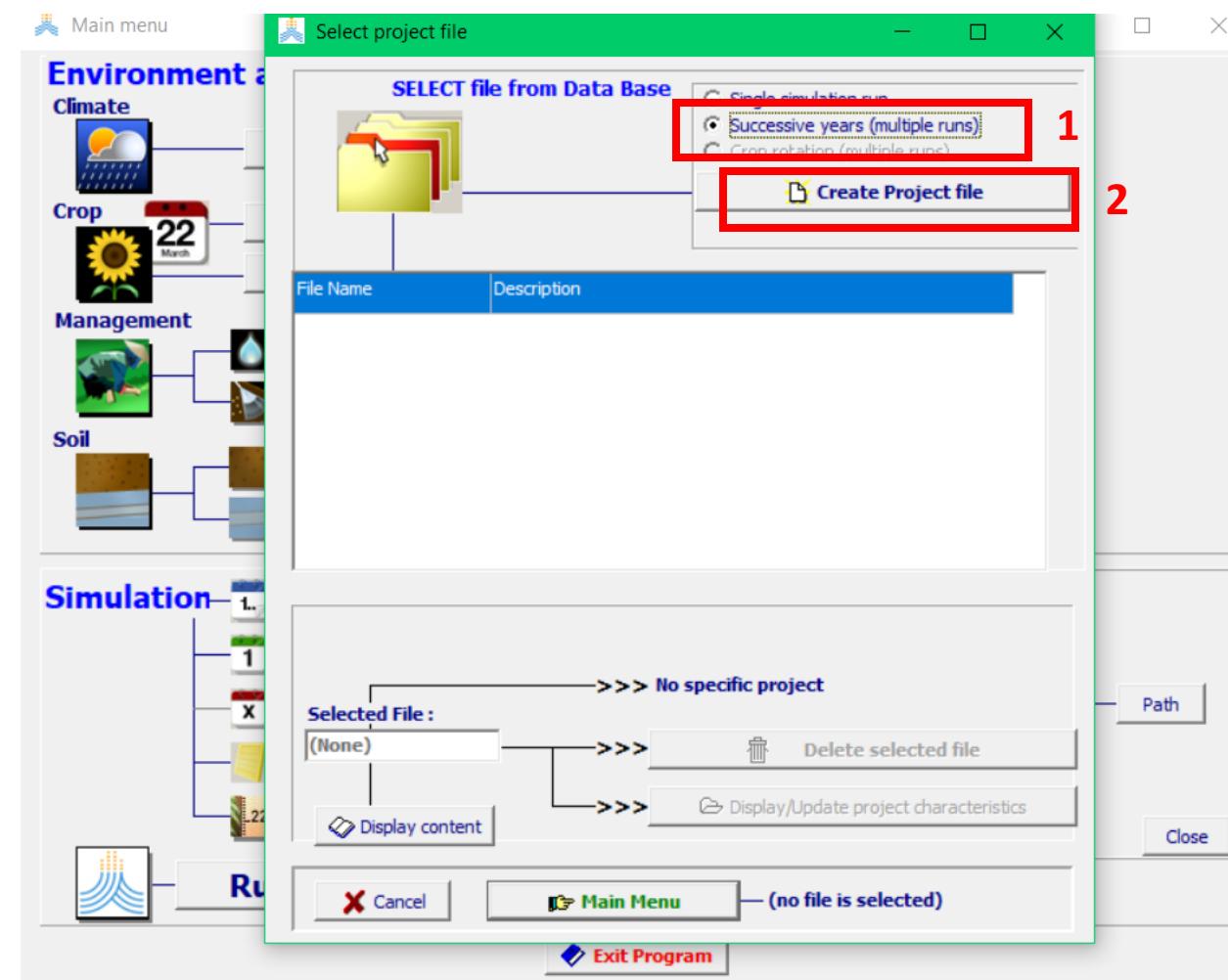


Click on “Select/Create Project file”



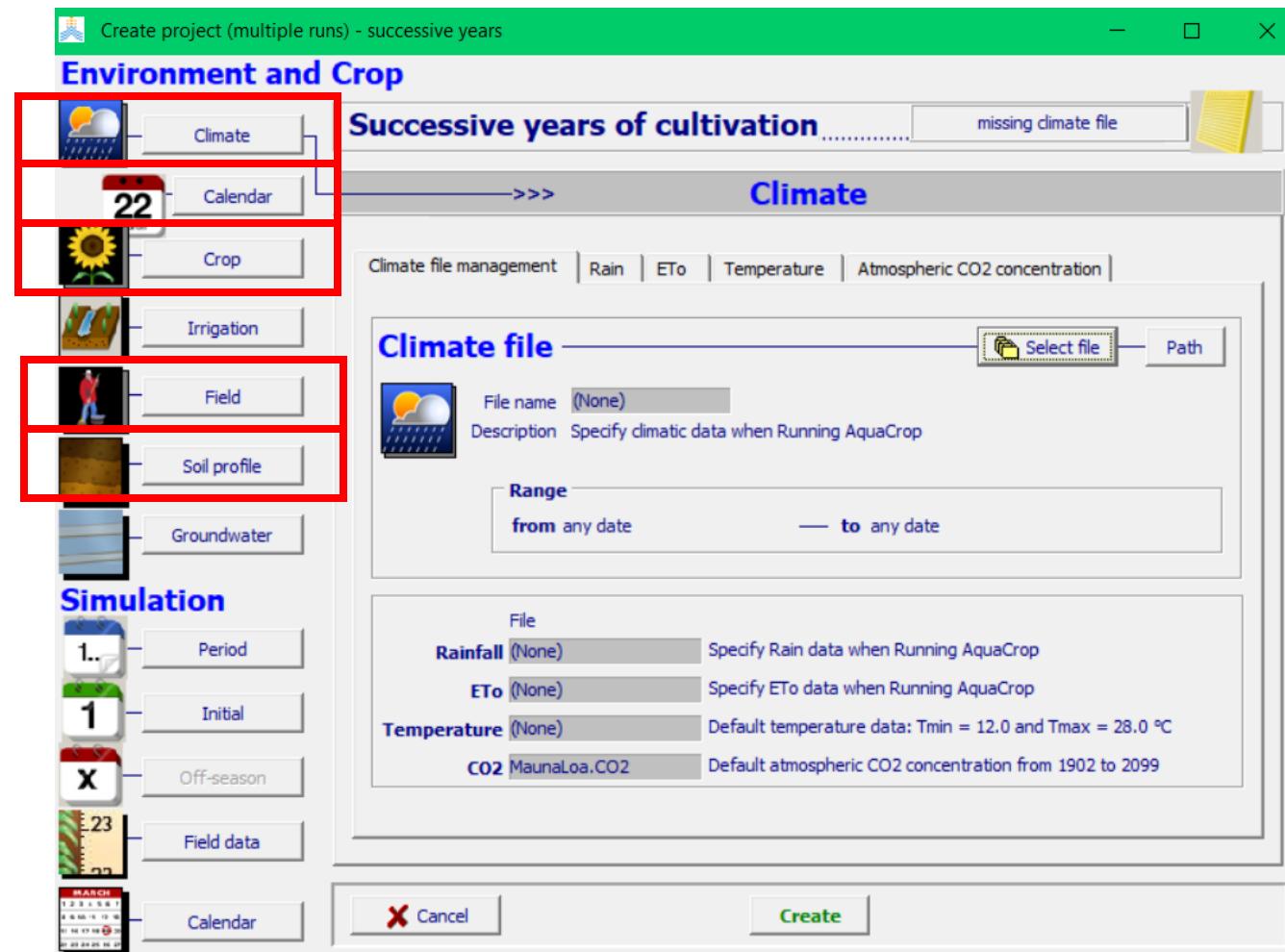
Creation of the project files (.PRM)

1. Press “successive years (multiple runs)” since we are using a climate file with data from 2030 to 2099
2. Click the below “create project file” button



Creation of the project files (.PRM)

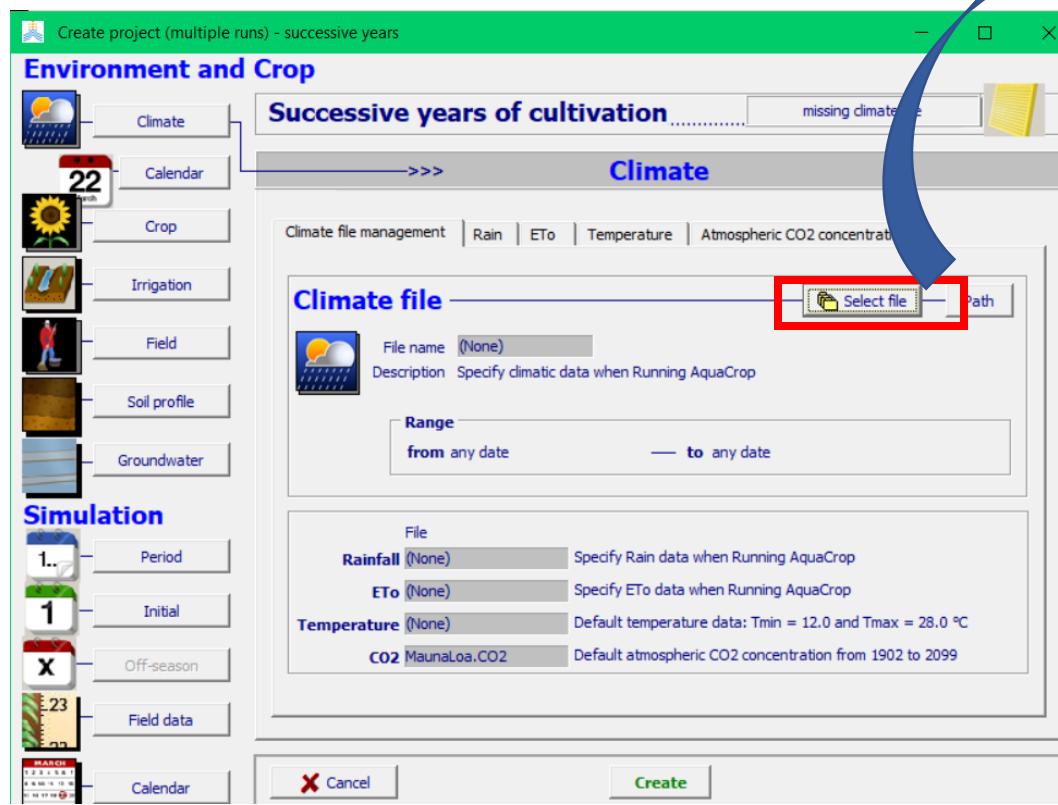
One by one, we will go through each of the highlighted components of the menu and select the correct files to create the PRM file.



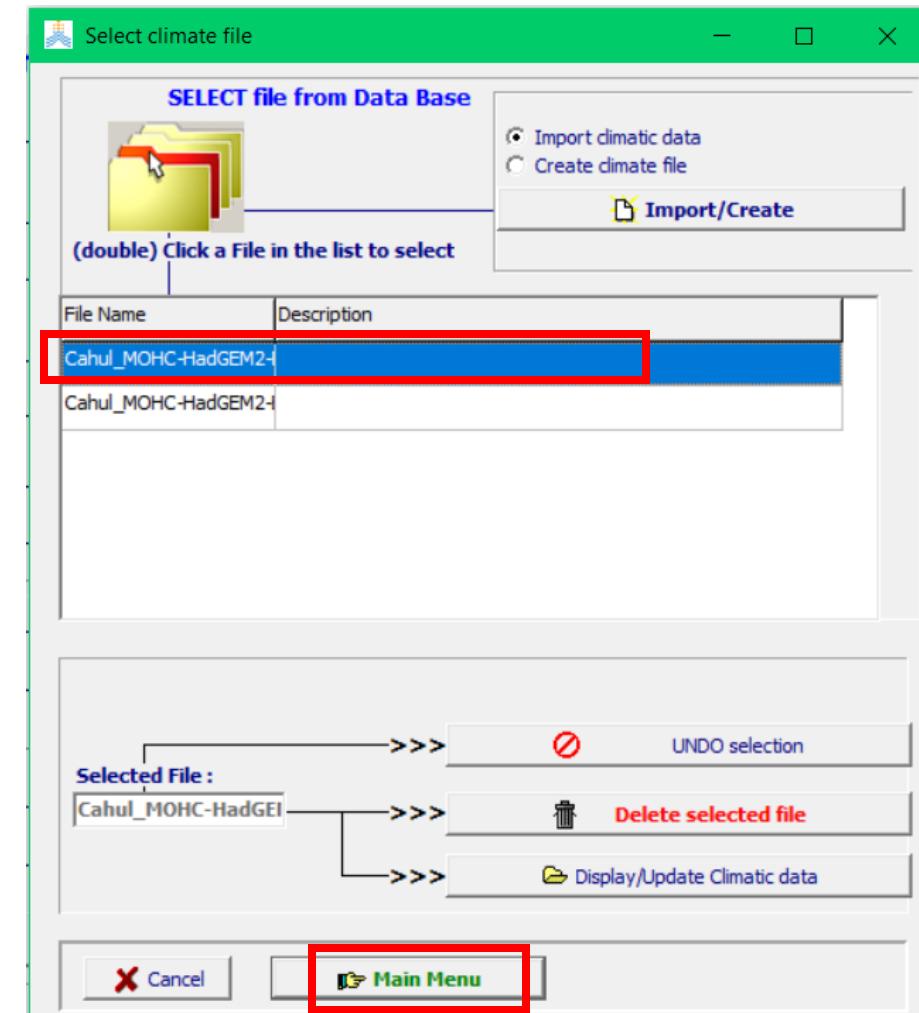
Climate module

1. Climate file

Press “Select file”



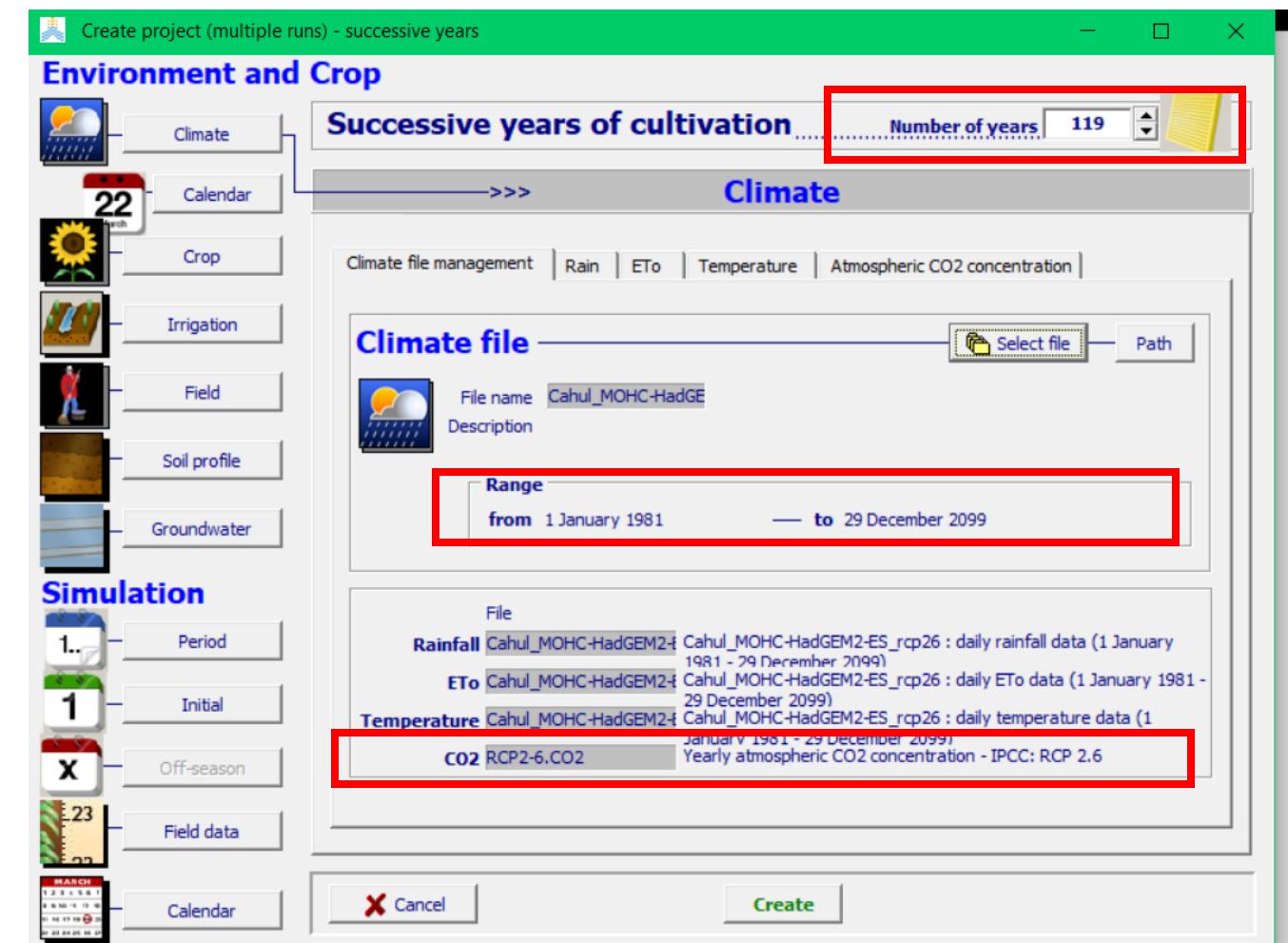
Select the first file “Cahul_MOHC-HadGEM2-”
Press the “Accept” button



Creation of the project files (.PRM)

Here you can check the content of the selected file:

- **119 years:** 1 January 1981 to 29 December 2099
- **MOHC:** Global Climate Model
- **RCP2.6:** representative concentration pathway (2.6 - low emission scenario)

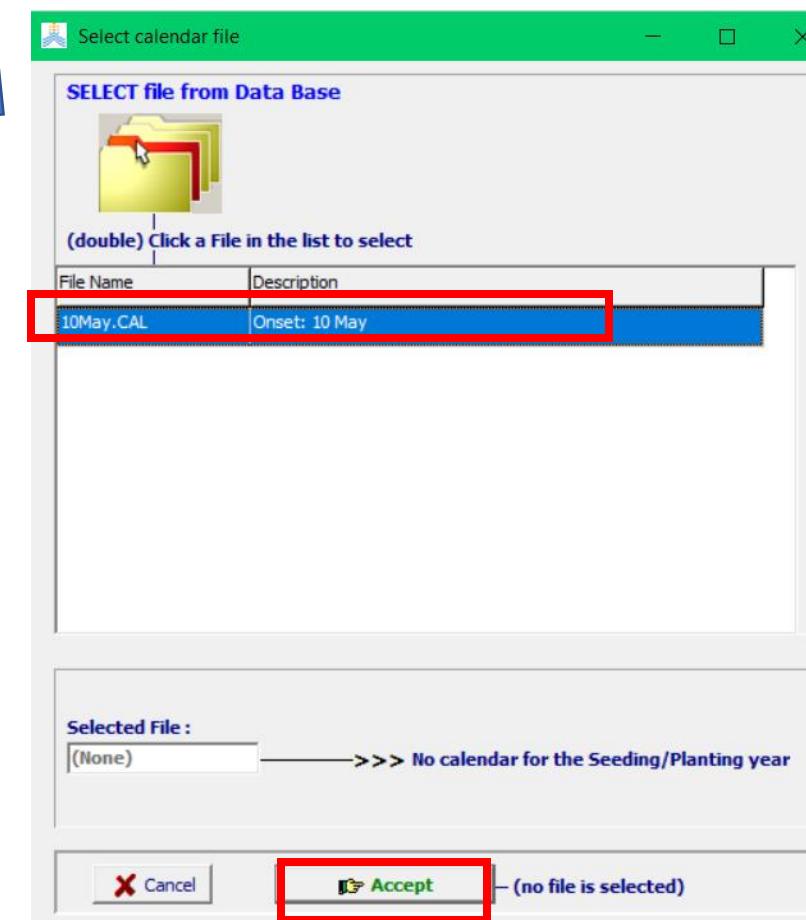
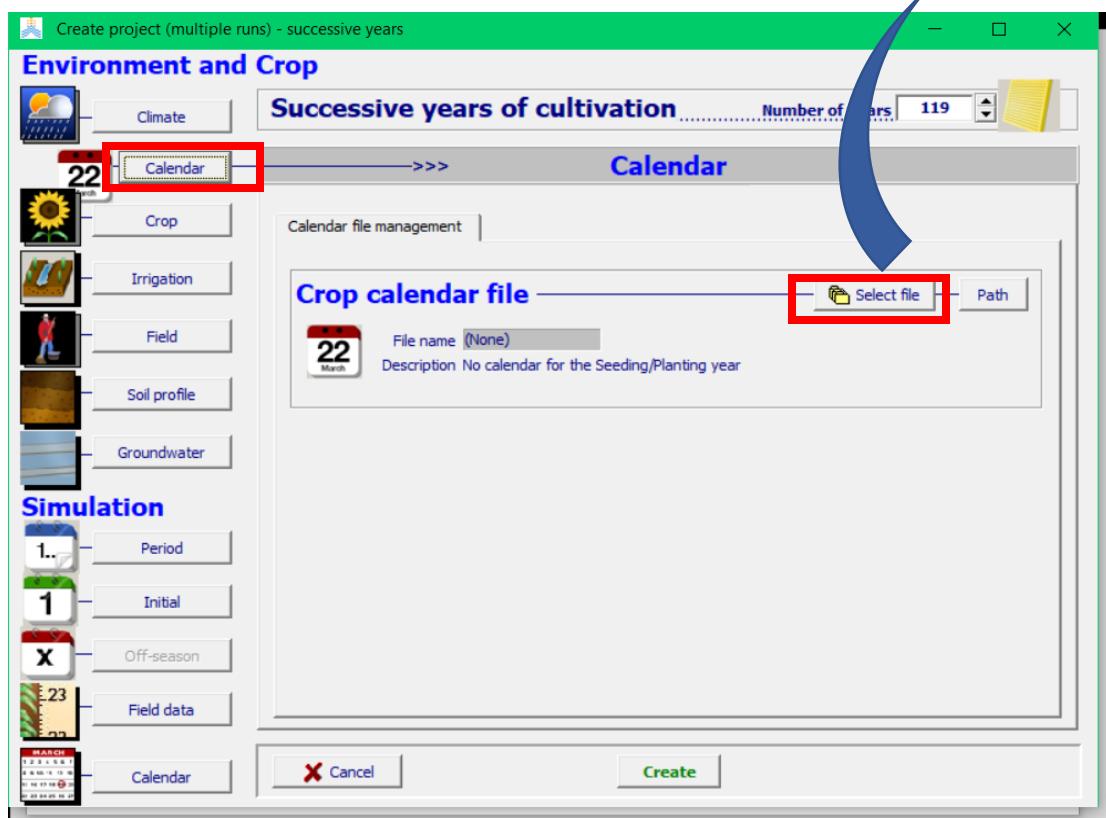


Calendar module

2. Calendar file

Select the file “10May”
Press the “Accept” button

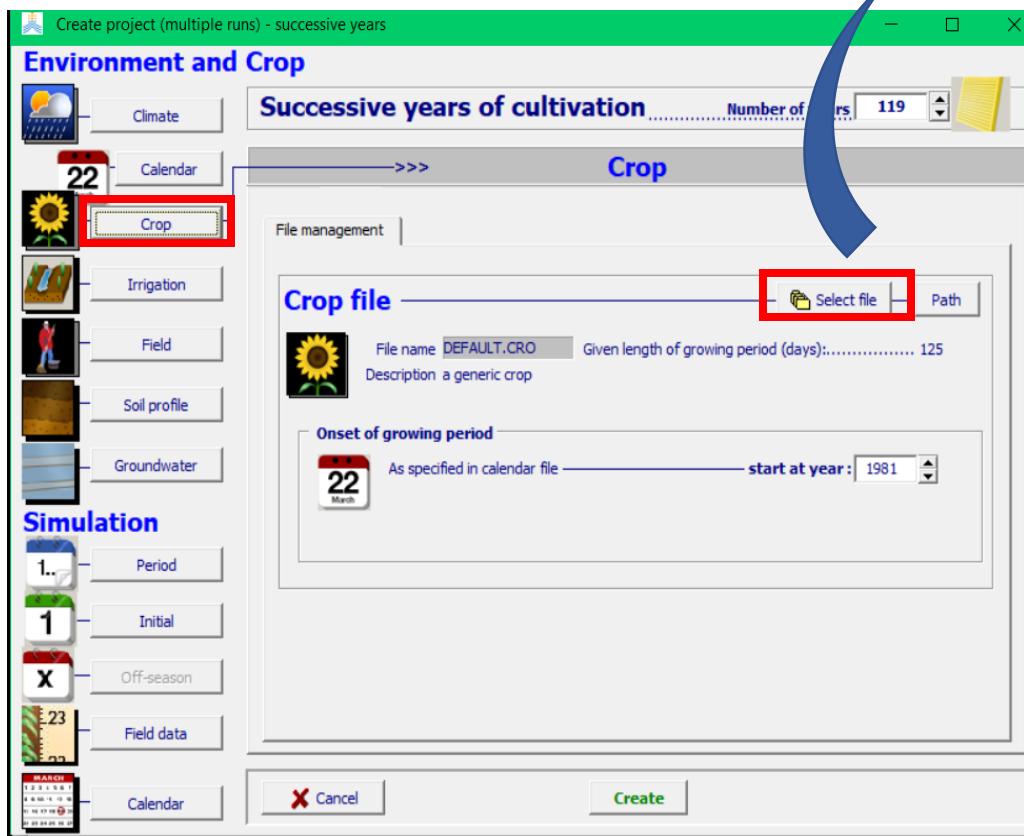
Press “Select file”



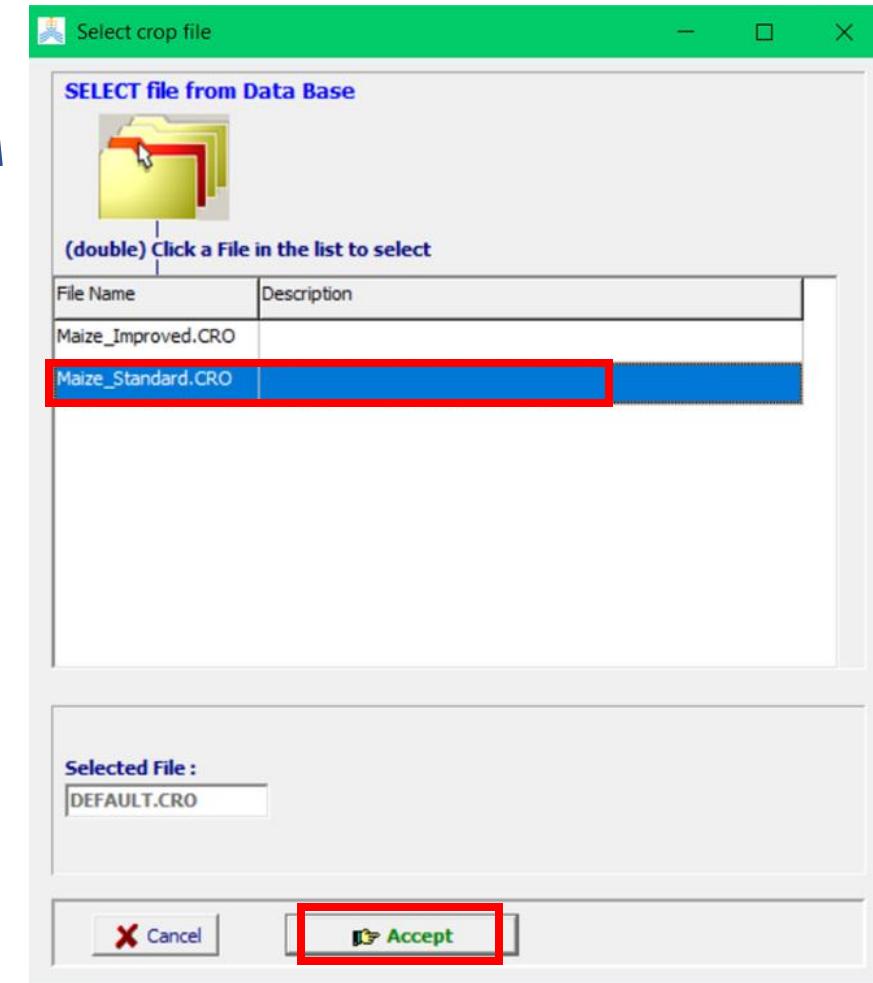
Crop module

3. Crop file

Press “Select file”



Select the file “Maize-Short”
Press the “Accept” button

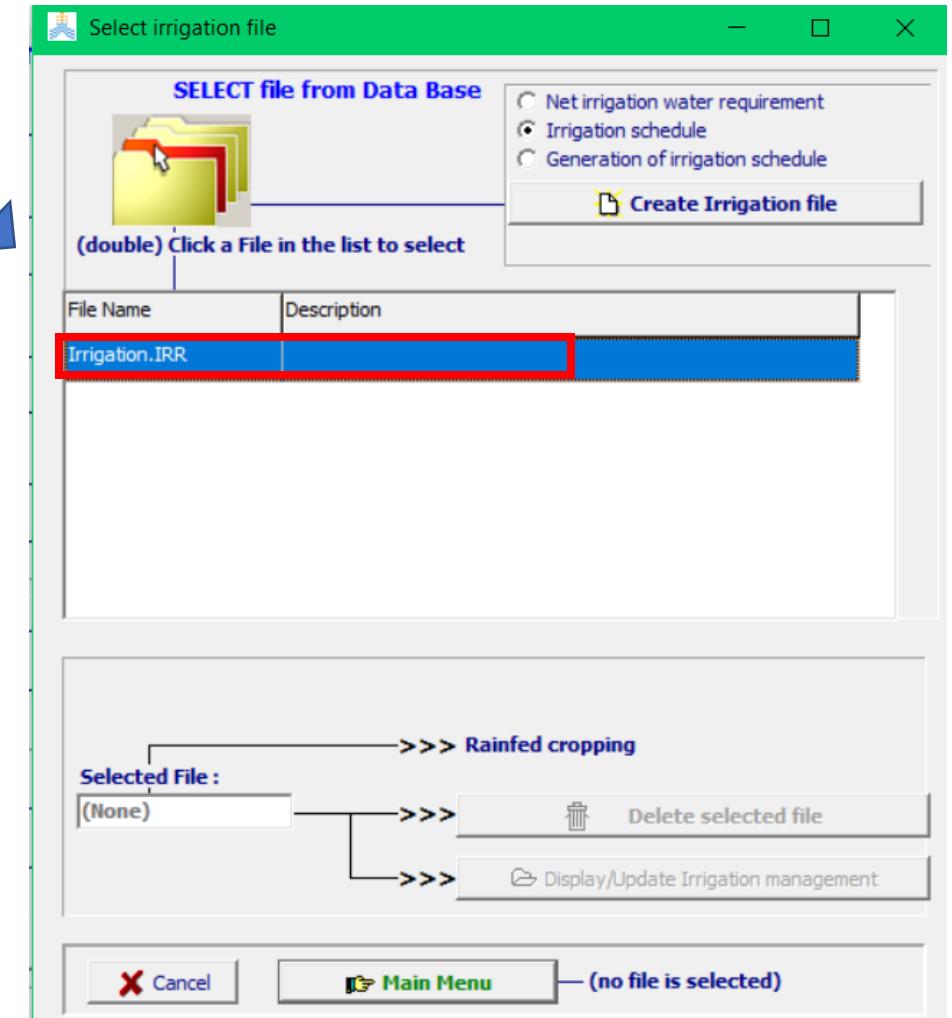
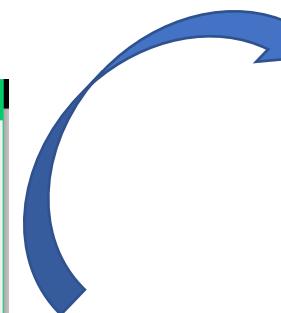
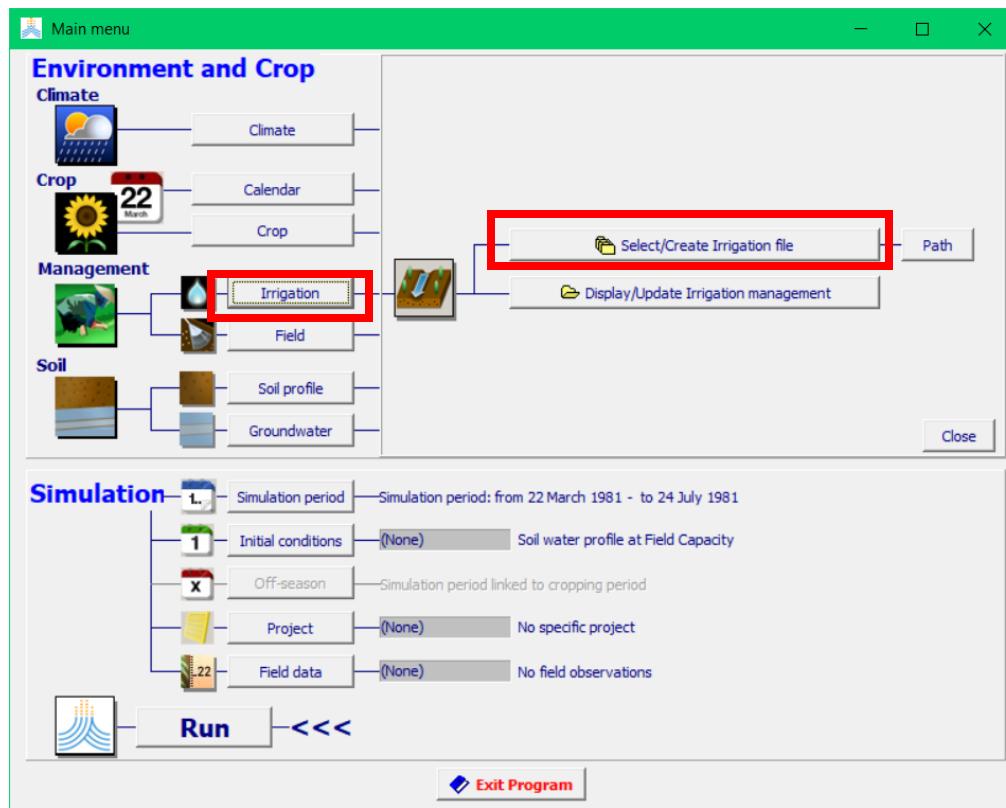


Irrigation module

4. Irrigation file

Double click on Irrigation.IRR file

Press "Select file"

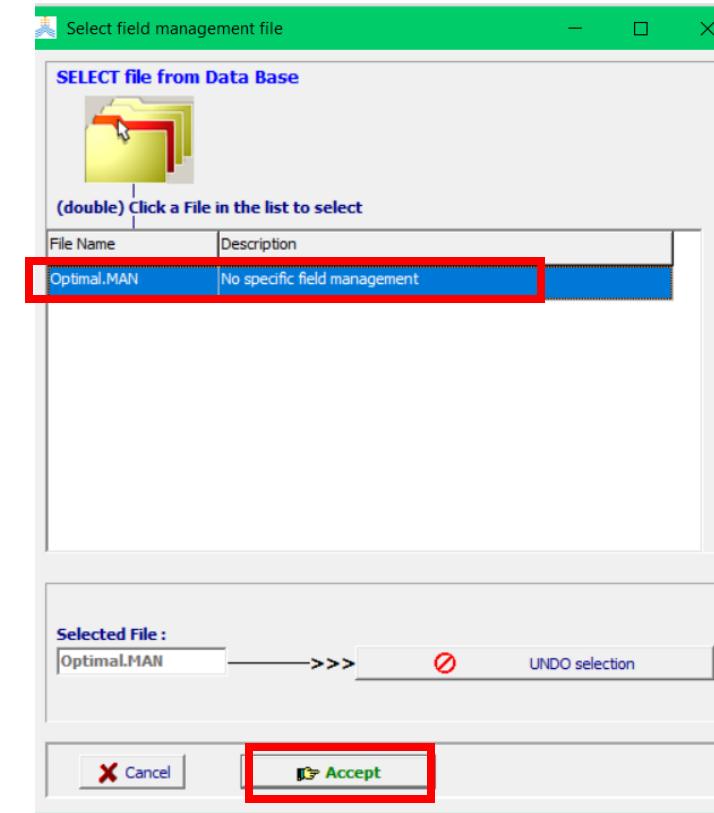
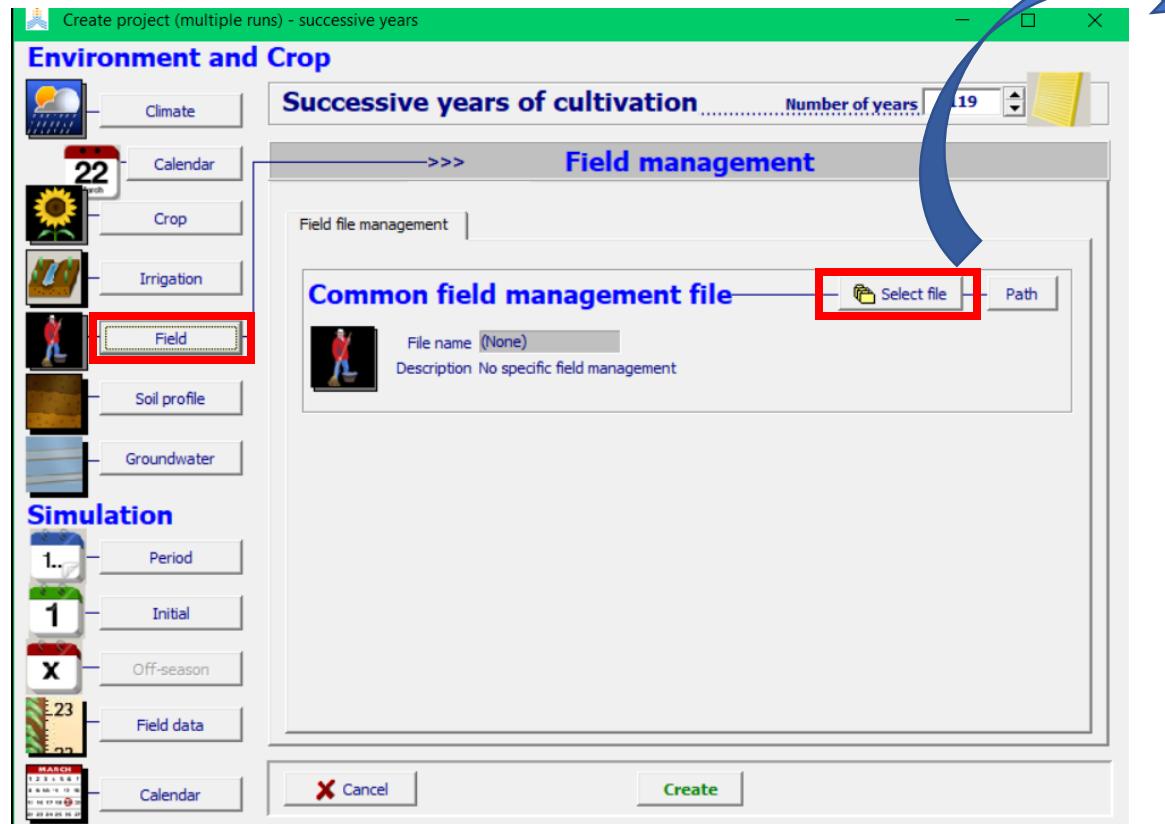


Field module

4. Field management file

Select the file “Optimal”
Press the “Accept” button

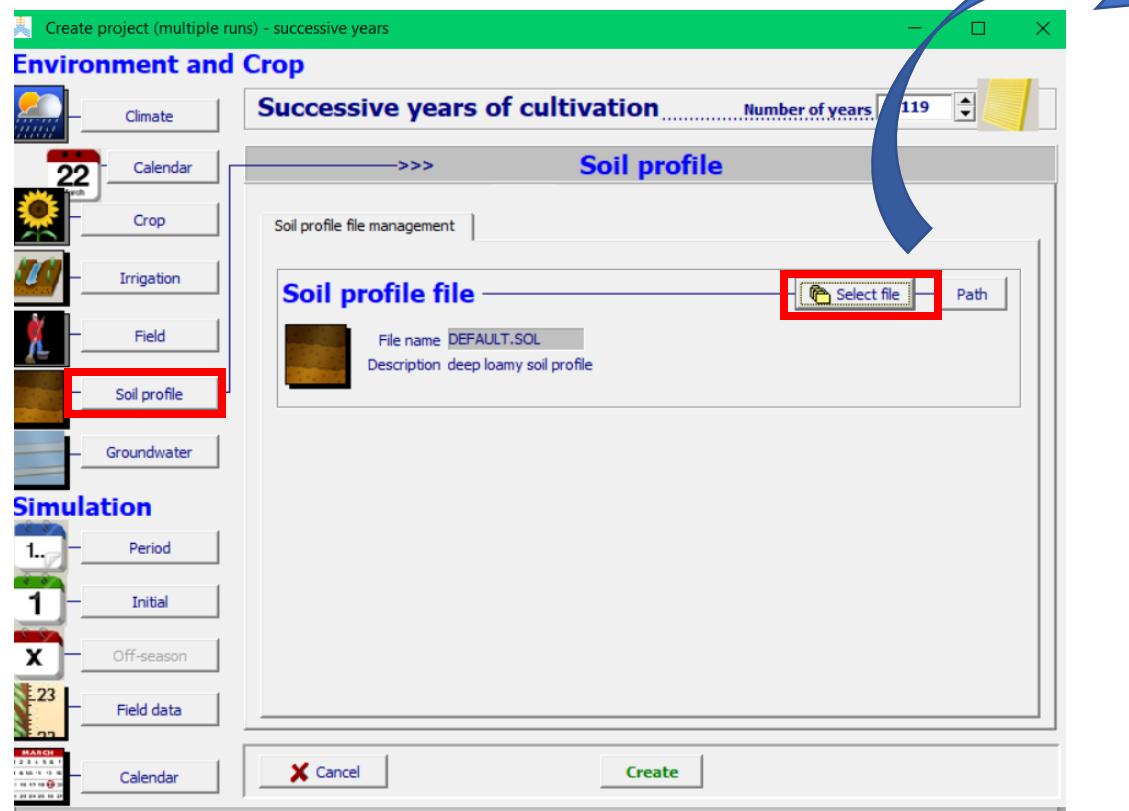
Press “Select file”



Soil module

5. Soil file

Press “Select file”

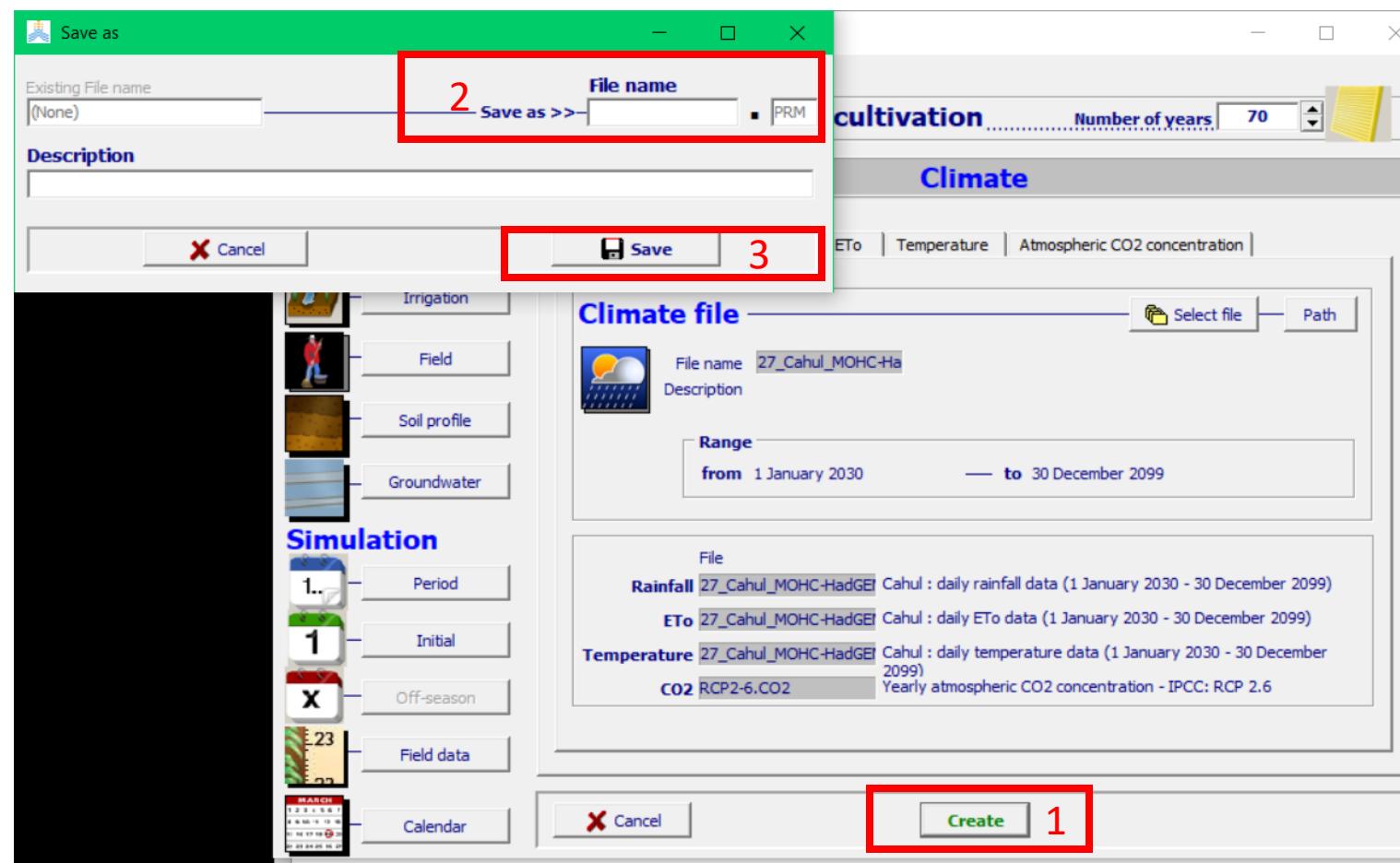


Select the file “North_South”
Press the “Accept” button



Saving project files (.PRM)

1. Press “CREATE”
2. Fill the “File name” with the name: **Maize_Irrigated_Cahul_10May_26_MOHC**
3. Press the “Save” button





Creation of new project files (.PRM)

HOW TO CREATE OTHER PROJECT FILES
WITH DIFFERENT VARIABLES

Variables scheme

Maize_Irrigated_Cahul_10May_26_MOHC



Maize_Irrigated_Cahul_10May_85_MOHC



Step →

Change the Climate file to Cahul RCP 8.5

Maize_Rainfed_Cahul_10May_26_MOHC



Step →

Change the Irrigation file

Maize_Rainfed_Cahul_10May_85_MOHC

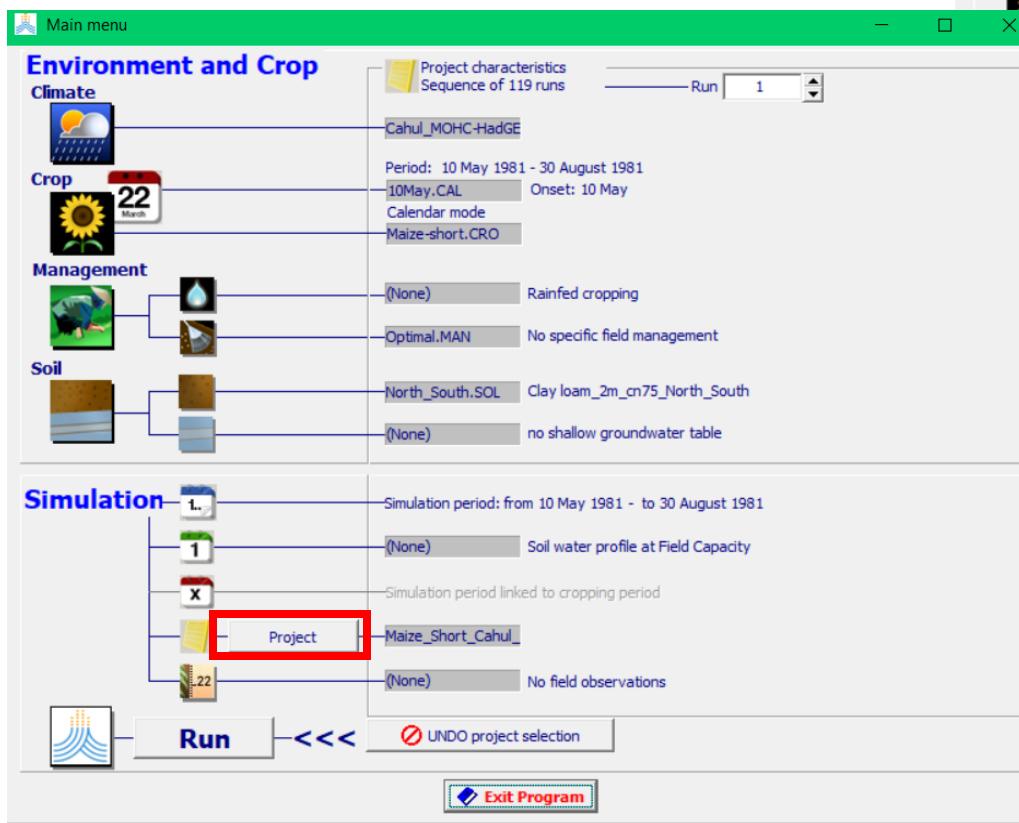


Step →

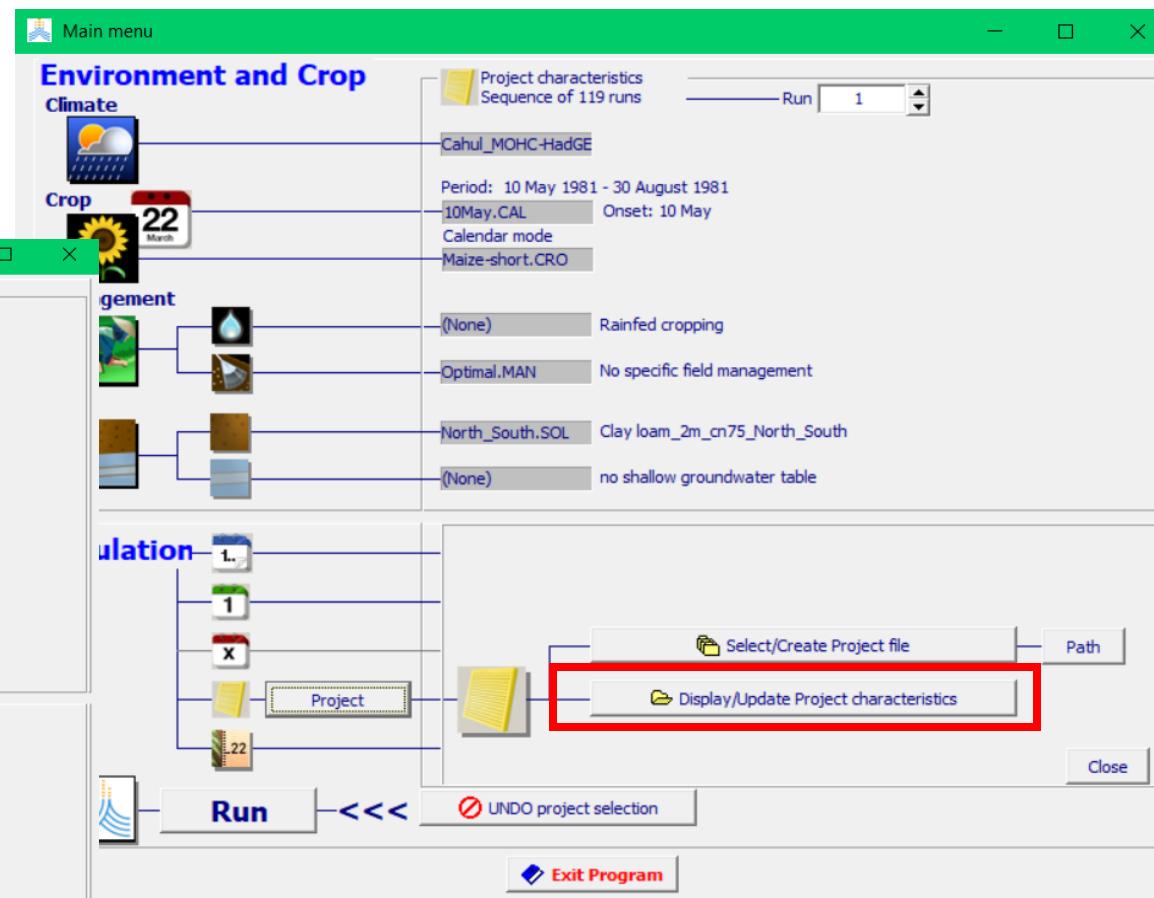
Change the Irrigation file

Creation of new project files (.PRM)

1. Press “Project” button

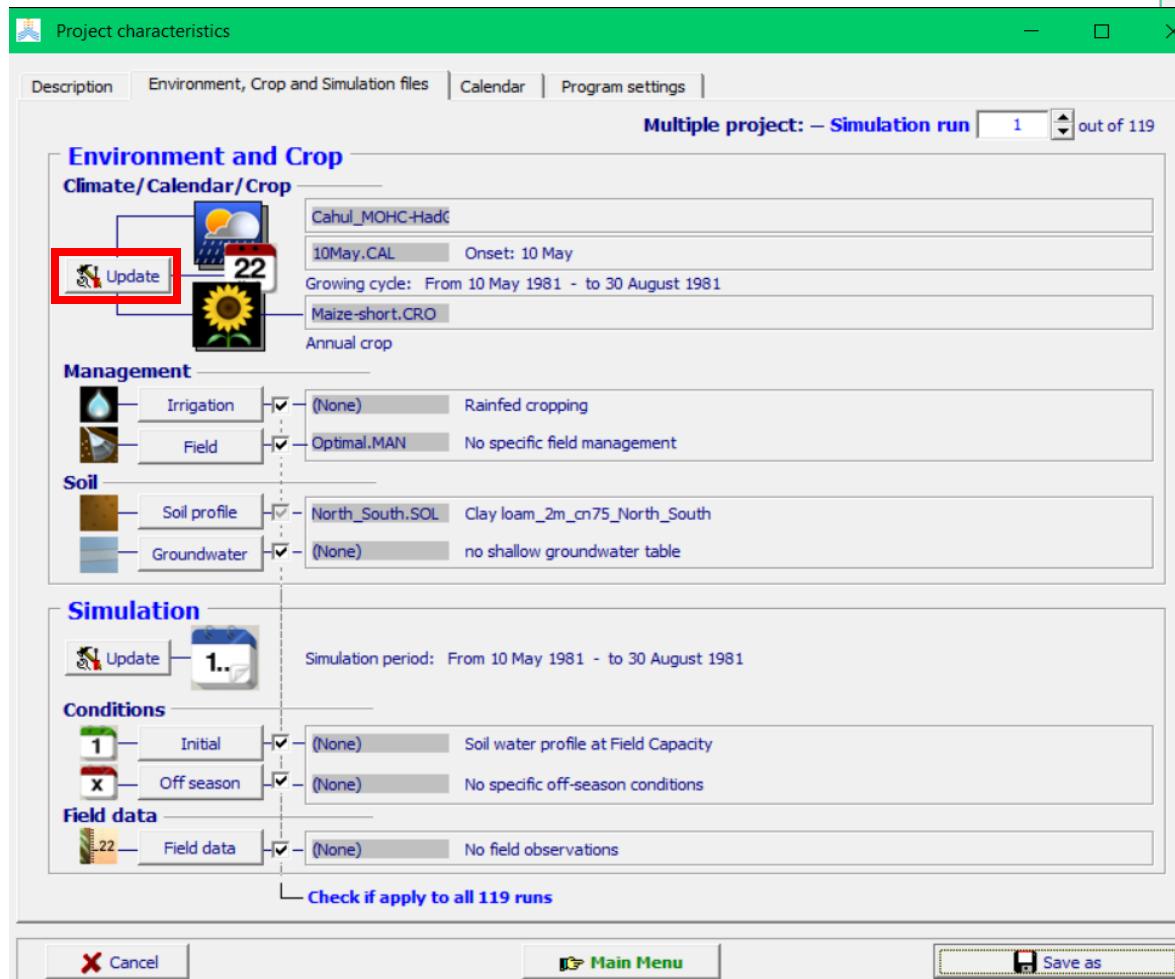


2. Select Display/Update Project characteristics

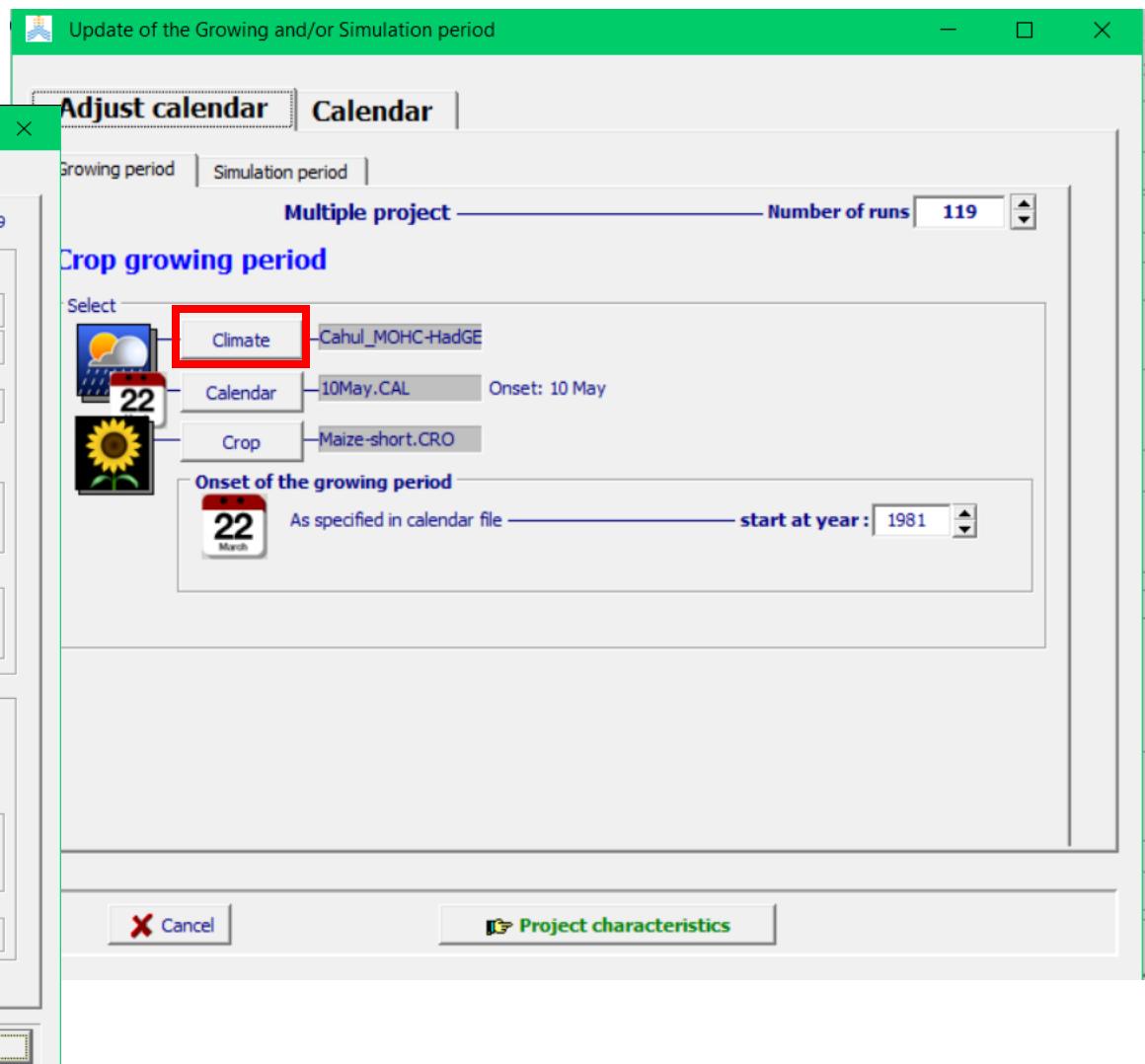


Creation of new project files (.PRM)

3. Press “Update” button

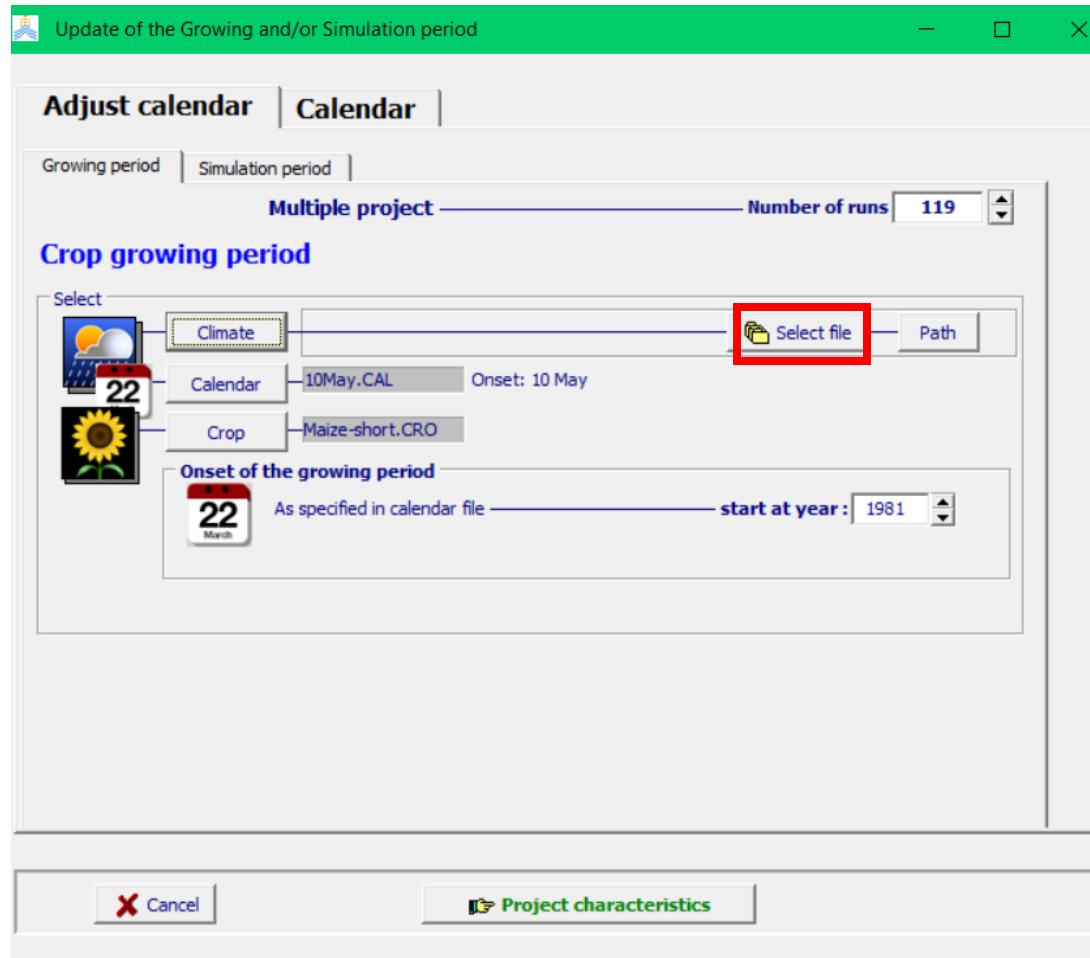


4. Click on Climate

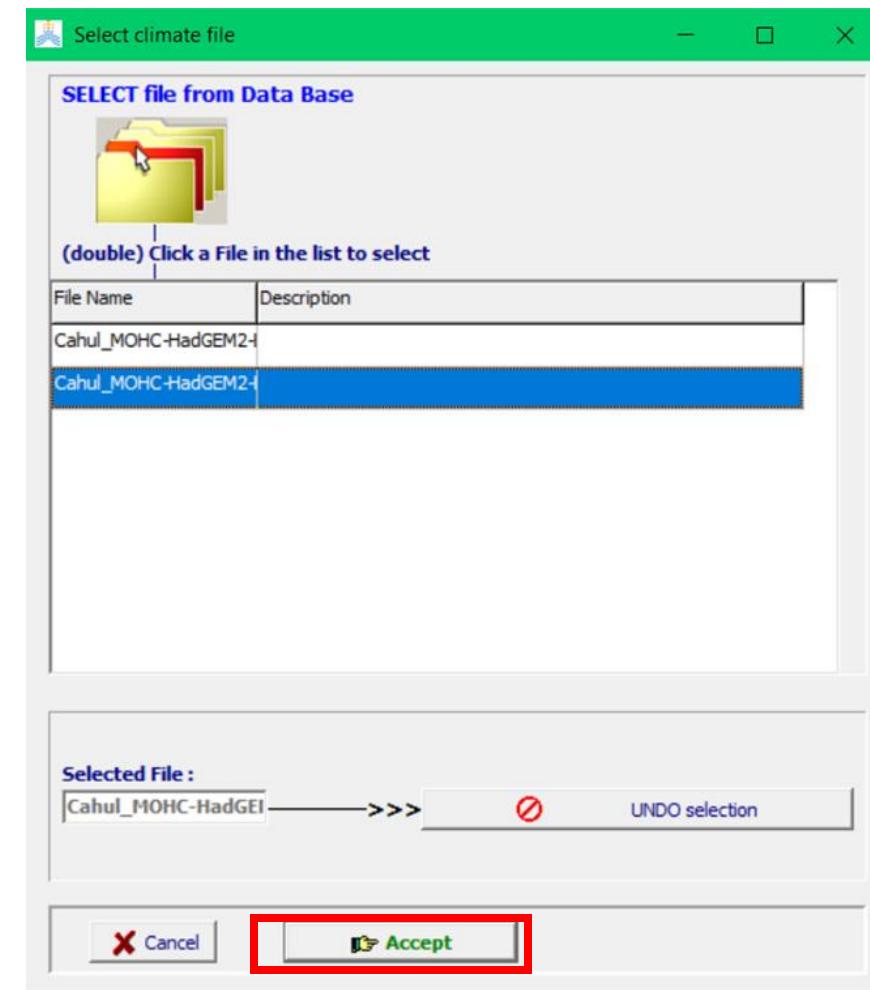


Creation of new project files (.PRM)

5. Click on “Select file”

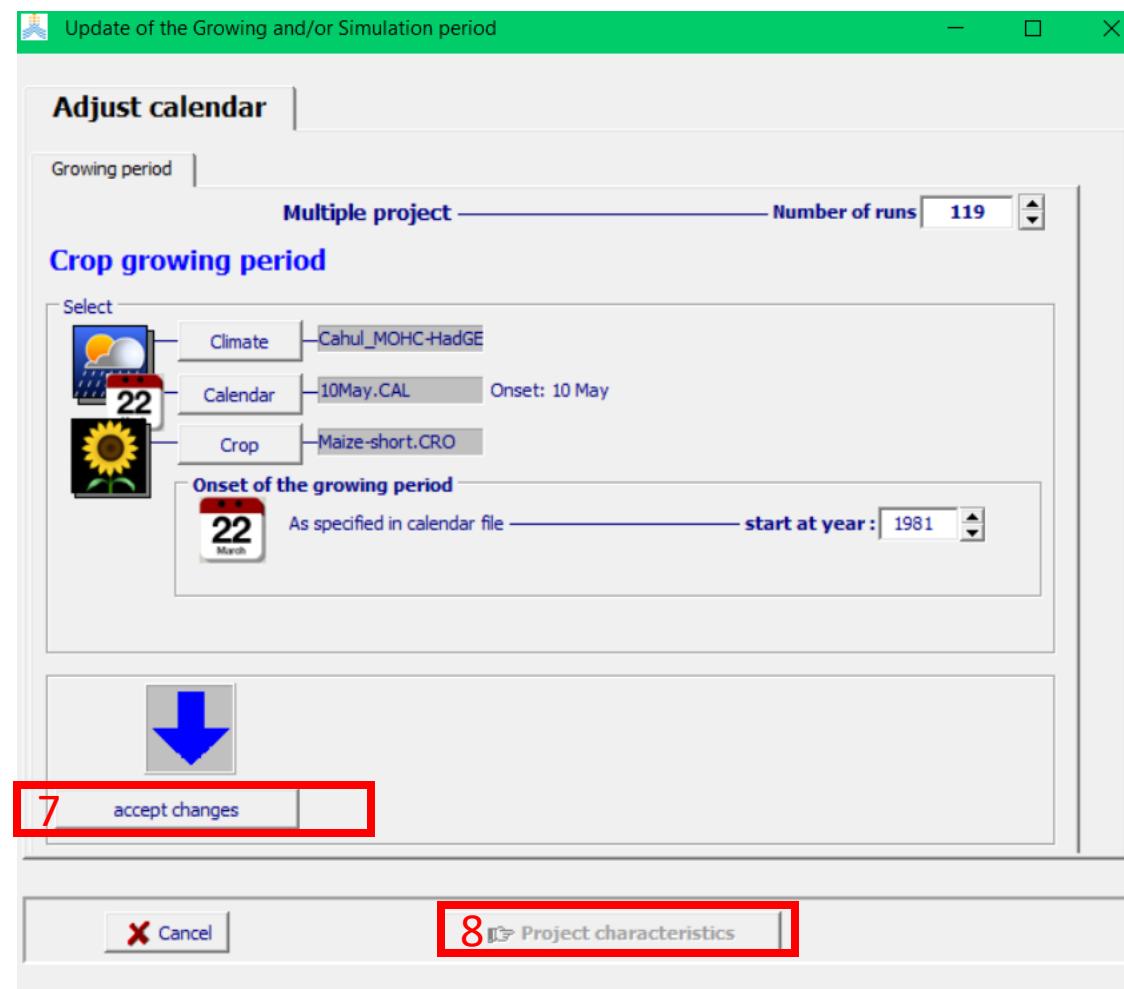


6. Select the second file “Cahul_MOHC-HadGEM2-”



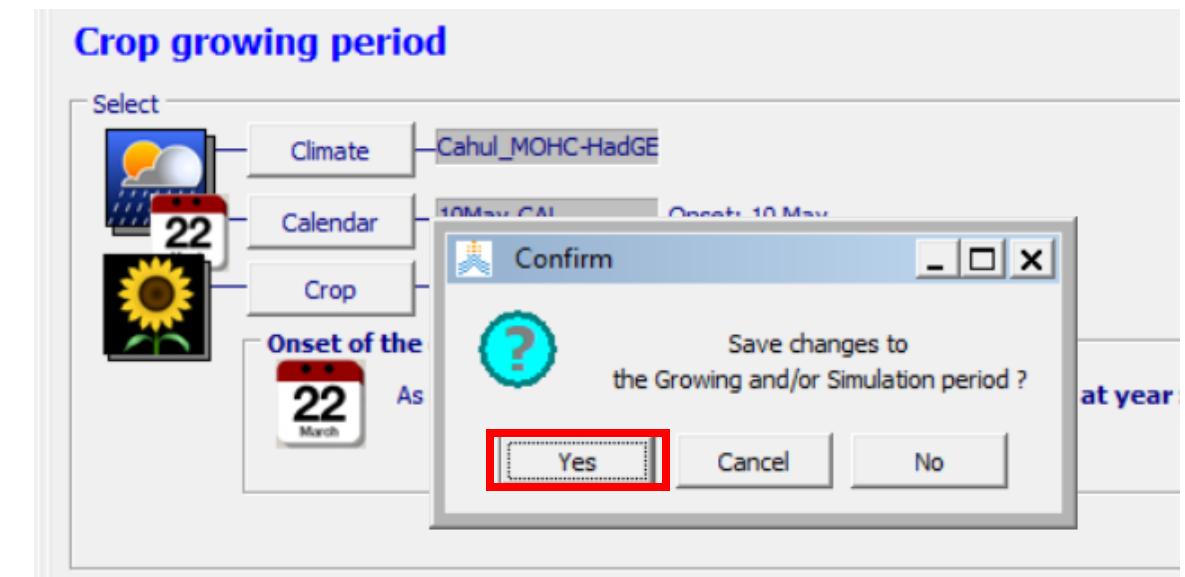
Creation of new project files (.PRM)

7. Press “Accept changes” button



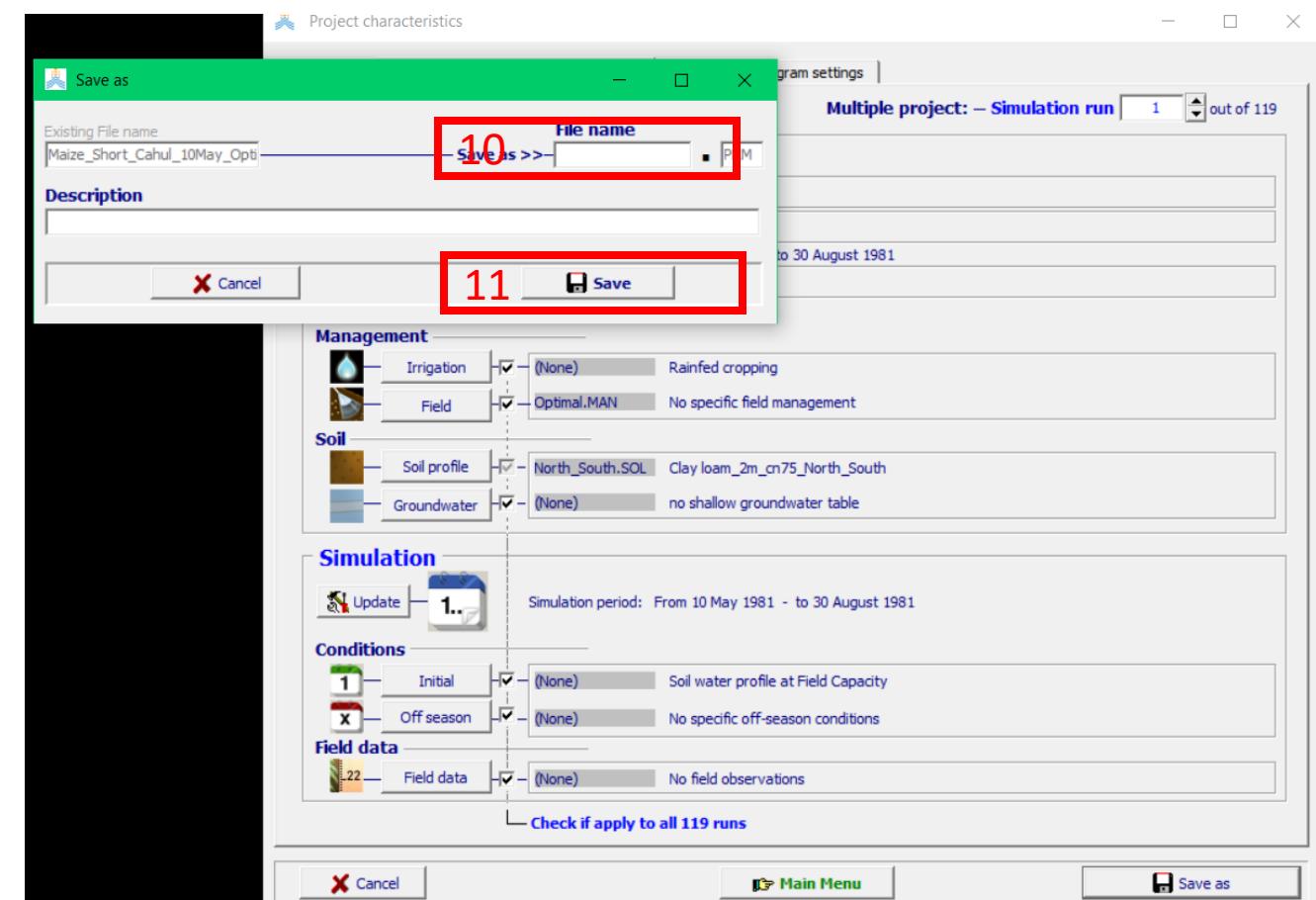
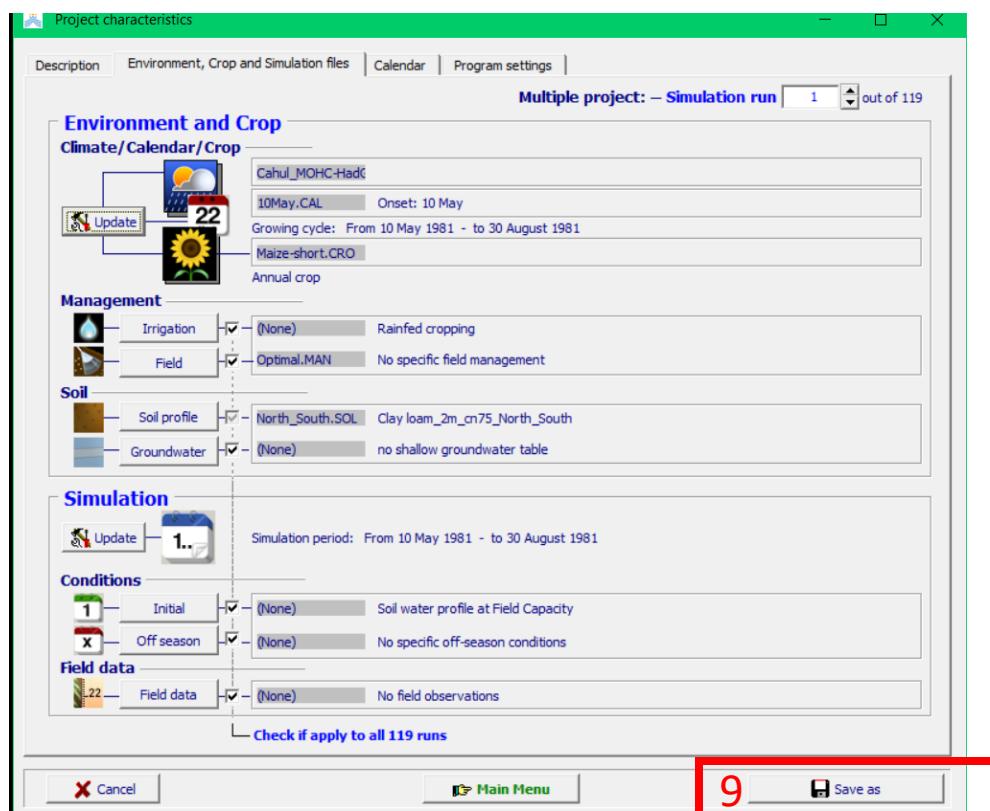
8. Click on “Project Characteristics” to go back on the main project page

9. Select "Yes"



Creation of new project files (.PRM)

9. Press “Save as” button
10. Fill the “File name” with: Maize_Irrigated_Cahul_10May_85_MOHC
11. Press the “Save” button



Variables scheme

Maize_Irrigated_Cahul_10May_26_MOHC



Maize_Irrigated_Cahul_10May_85_MOHC



Maize_Rainfed_Cahul_10May_26_MOHC



Step →

Change the Irrigation file

Maize_Rainfed_Cahul_10May_85_MOHC

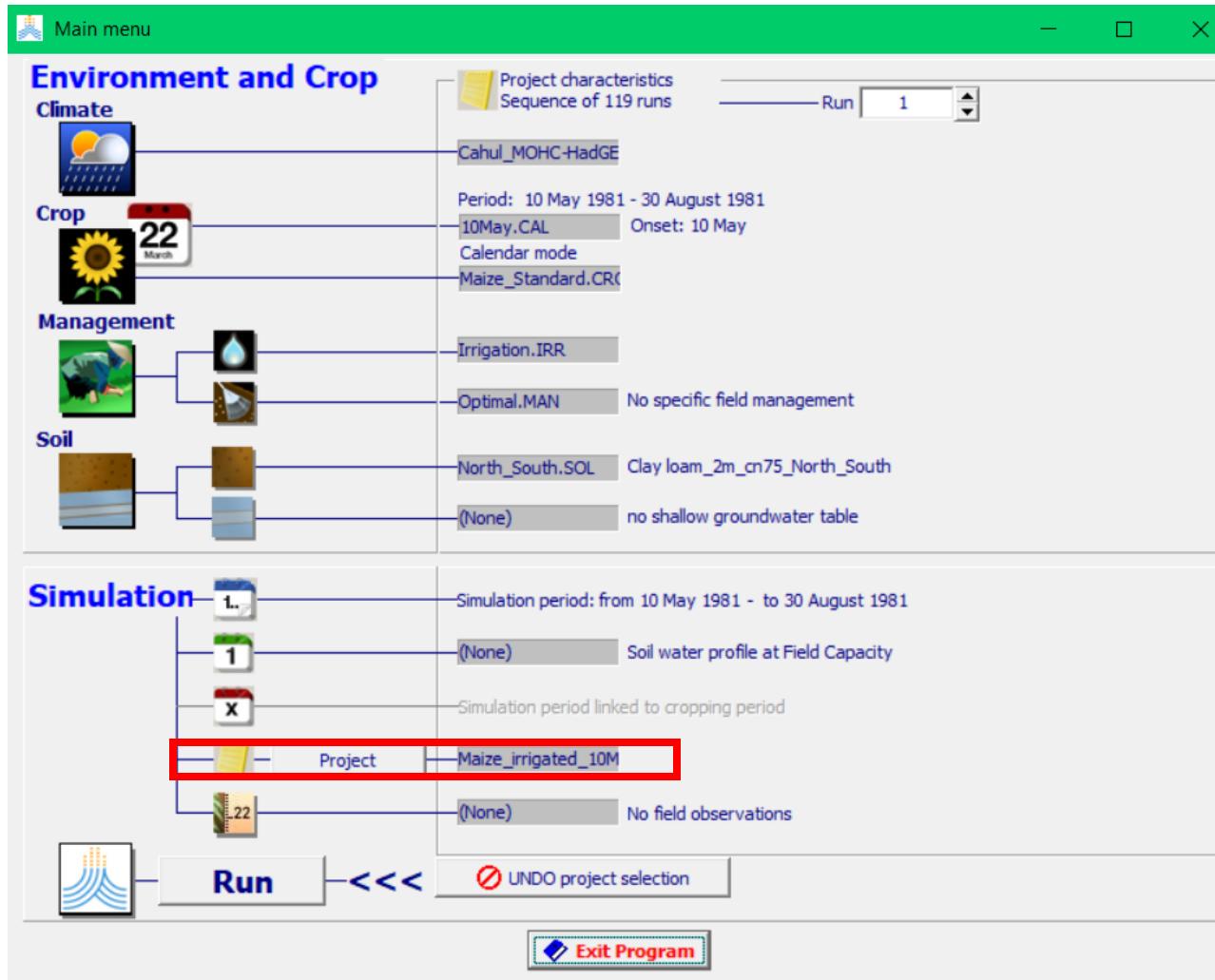


Step →

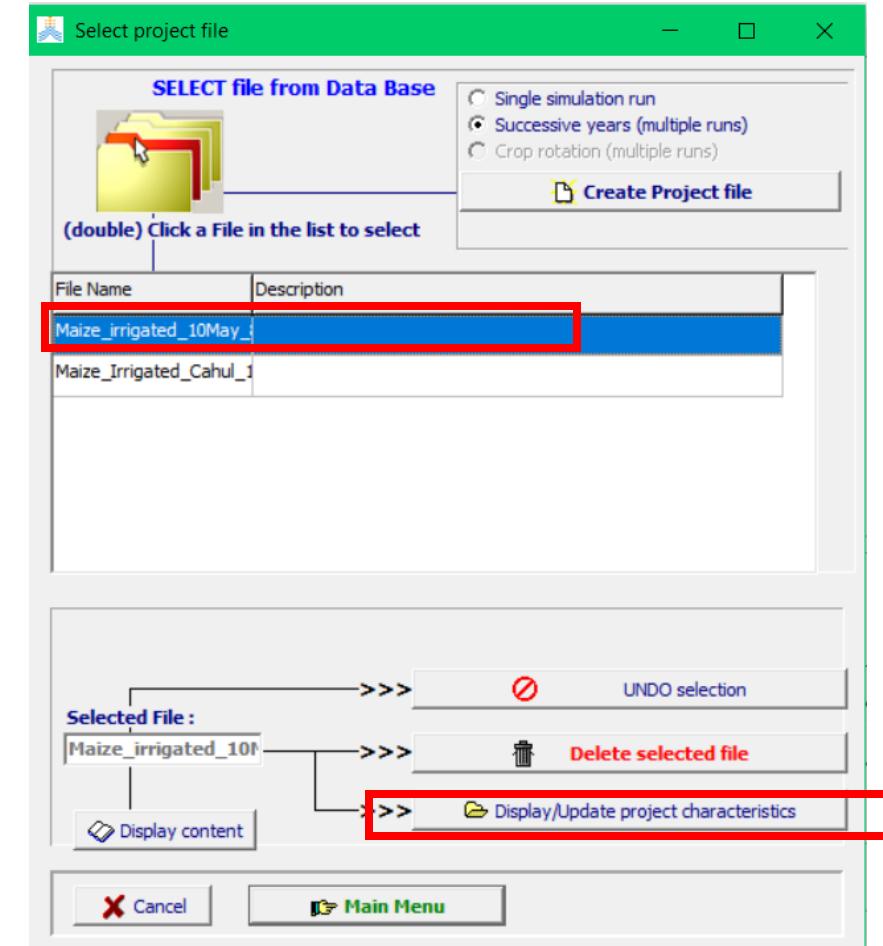
Change the Irrigation file

Creation of rainfed PRM

Press “Project” button



Select the first created file (RCP2.6)
Display/Update project characteristics



Creation of rainfed PRM

Press “Irrigation” button

Project characteristics

Multiple project: – Simulation run 1 out of 119

Environment and Crop

Climate/Calendar/Crop

- Cahul_MOHC-HadG
- 10May.CAL Onset: 10 May
- Growing cycle: From 10 May 1981 - to 30 August 1981
- Maize_Standard.CP Annual crop

Management

- Irrigation: Irrigation.IRR (selected)
- Field: Optimal.MAN No specific field management

Soil

- Soil profile: North_South.SOL Clay loam_2m_cn75_North_South
- Groundwater: (None) no shallow groundwater table

Simulation

Simulation period: From 10 May 1981 - to 30 August 1981

Conditions

- Initial: (None) Soil water profile at Field Capacity
- Off season: (None) No specific off-season conditions

Field data

- Field data: (None) No field observations

Check if apply to all 119 runs

Cancel Main Menu Save as

Click on UNDO selection
Update Menu

Select irrigation file

SELECT file from Data Base

(double) Click a File in the list to select

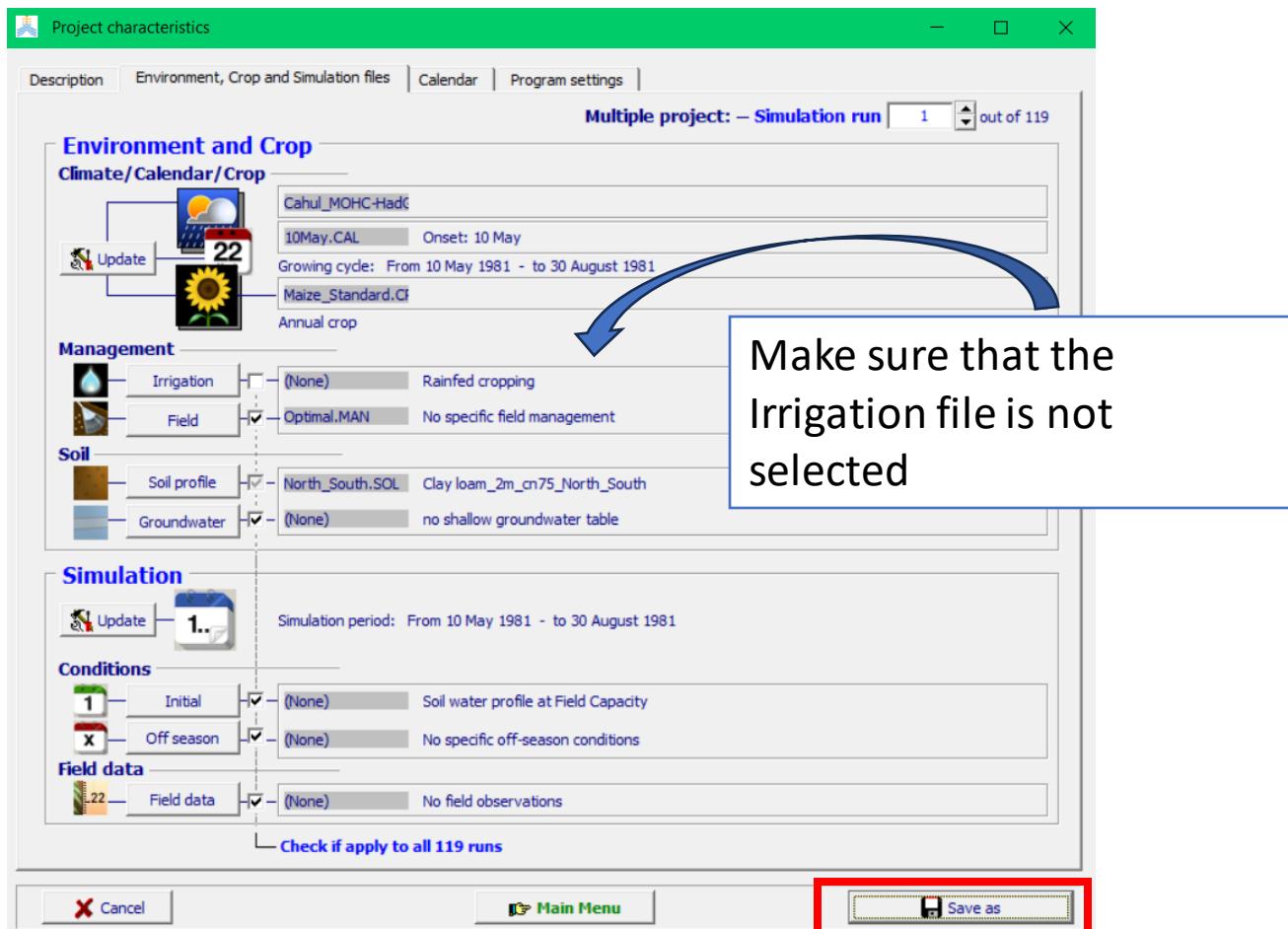
File Name	Description
Irrigation.IRR	

Selected File : Irrigation.IRR >> UNDO selection

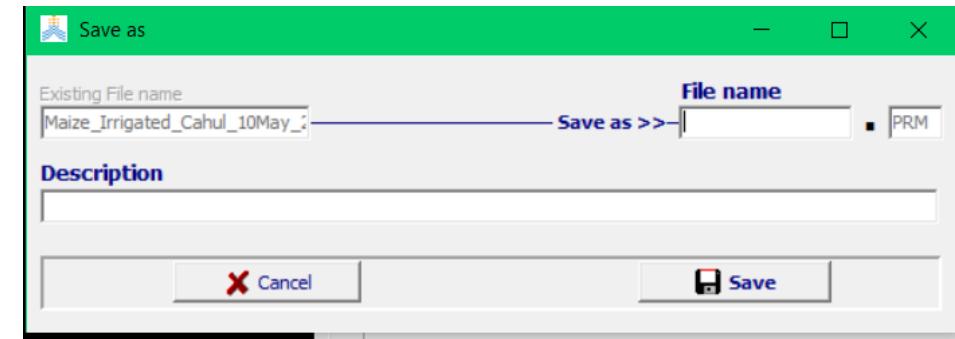
Cancel Update Menu

Creation of rainfed PRM

Press “Save as” button



Rename the file as
Maize_Rainfed_Cahul_10May_26_MOHC



Variables scheme

Repeat the operation with the file RCP8.5

Maize_Irrigated_Cahul_10May_26_MOHC



Maize_Irrigated_Cahul_10May_85_MOHC



Maize_Rainfed_Cahul_10May_26_MOHC



Maize_Rainfed_Cahul_10May_85_MOHC

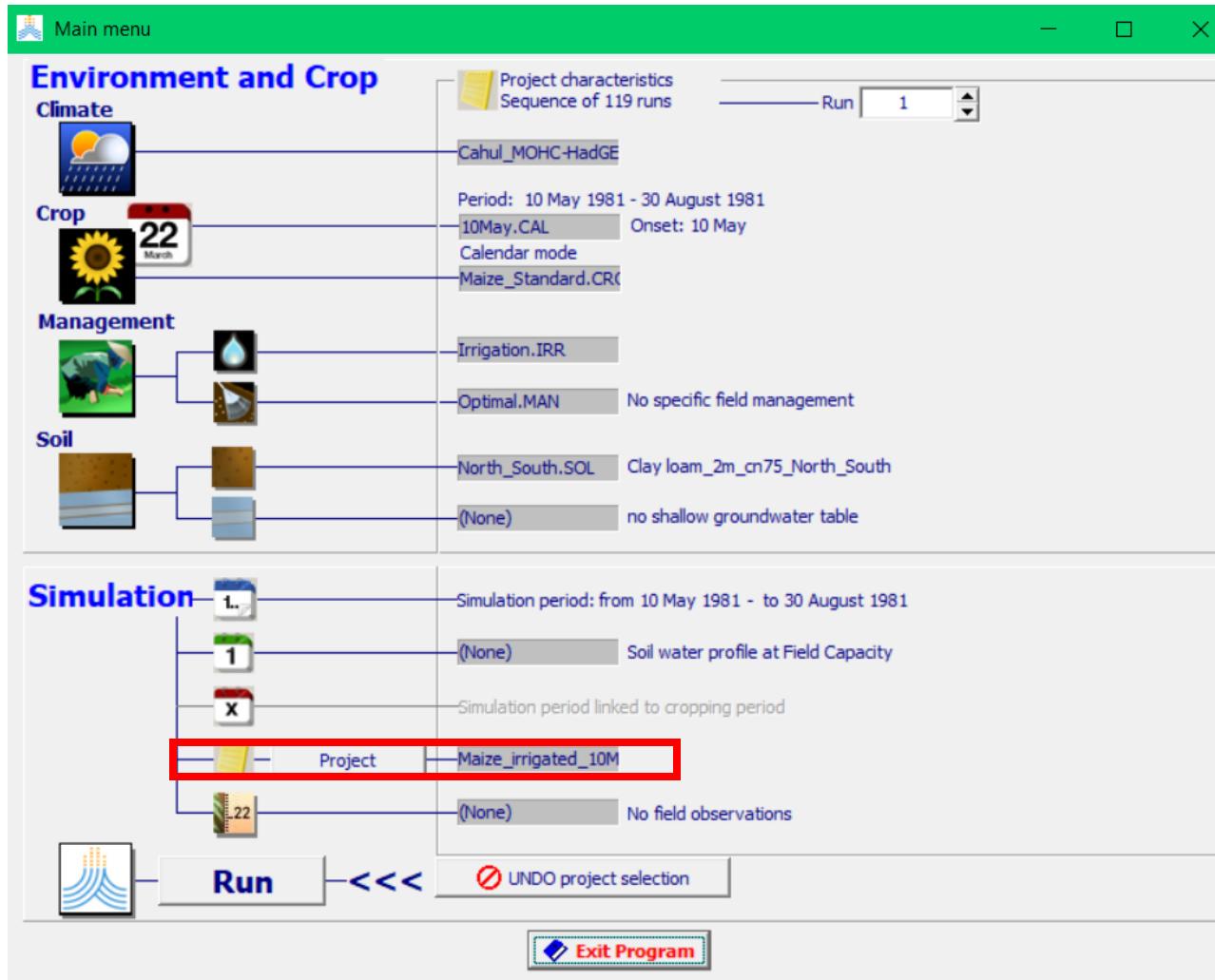


Step →

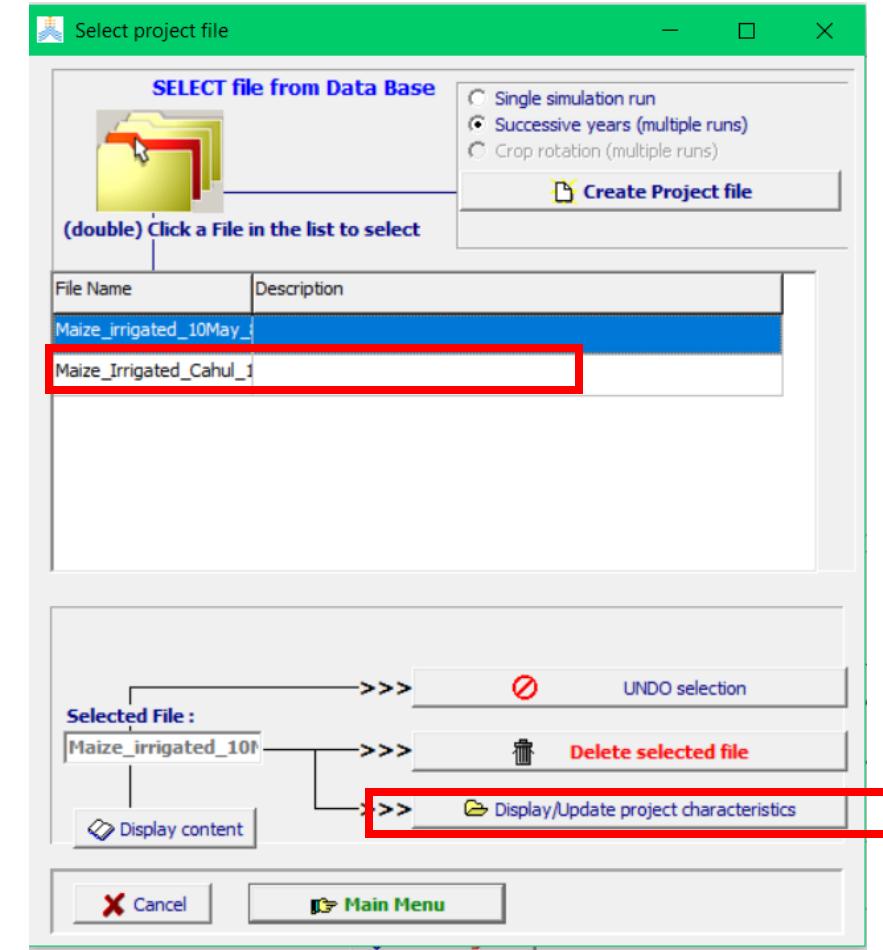
Change the irrigation file

Creation of rainfed PRM

Press “Project” button

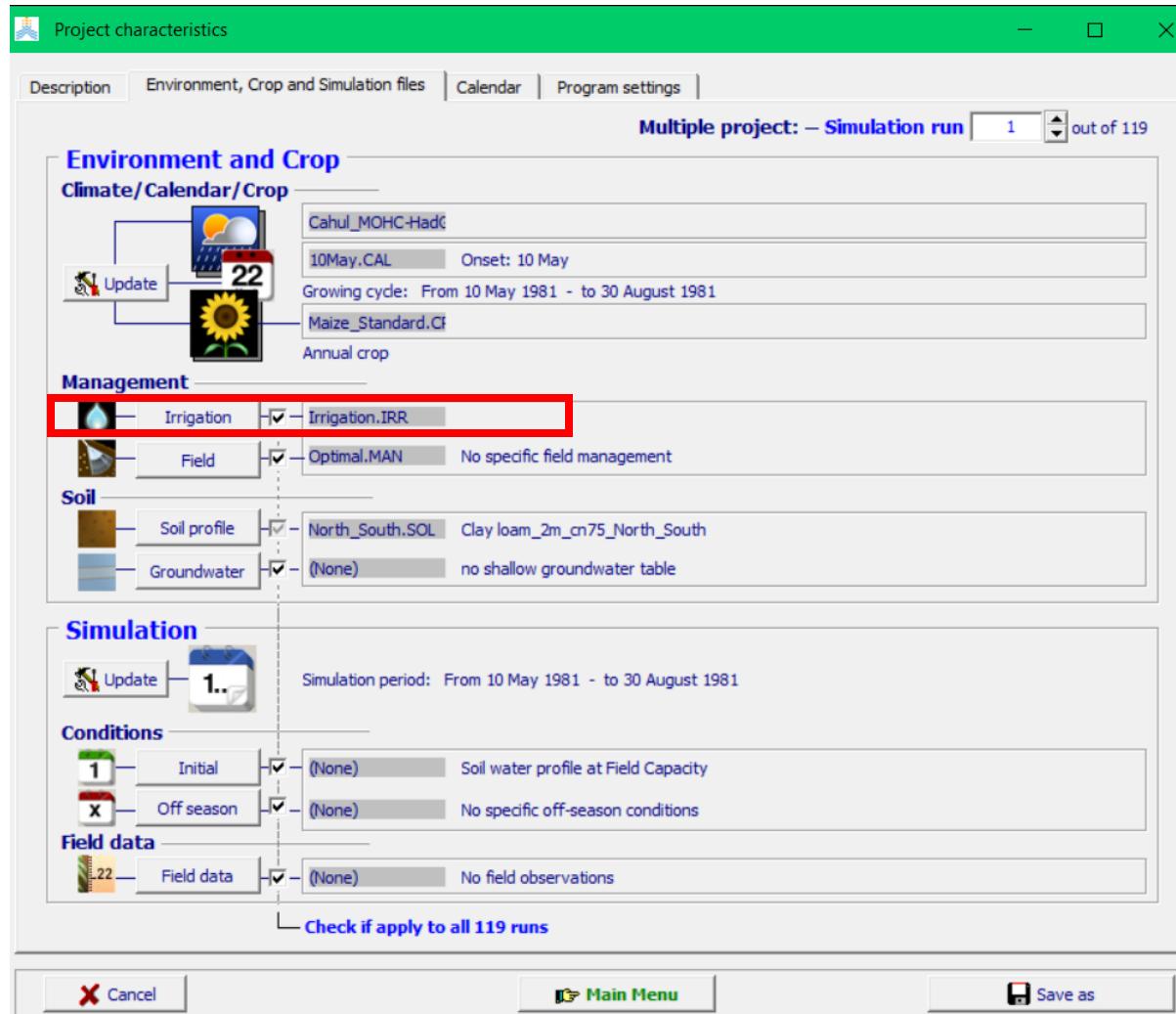


Select the second created file (RCP8.5)
Display/Update project characteristics

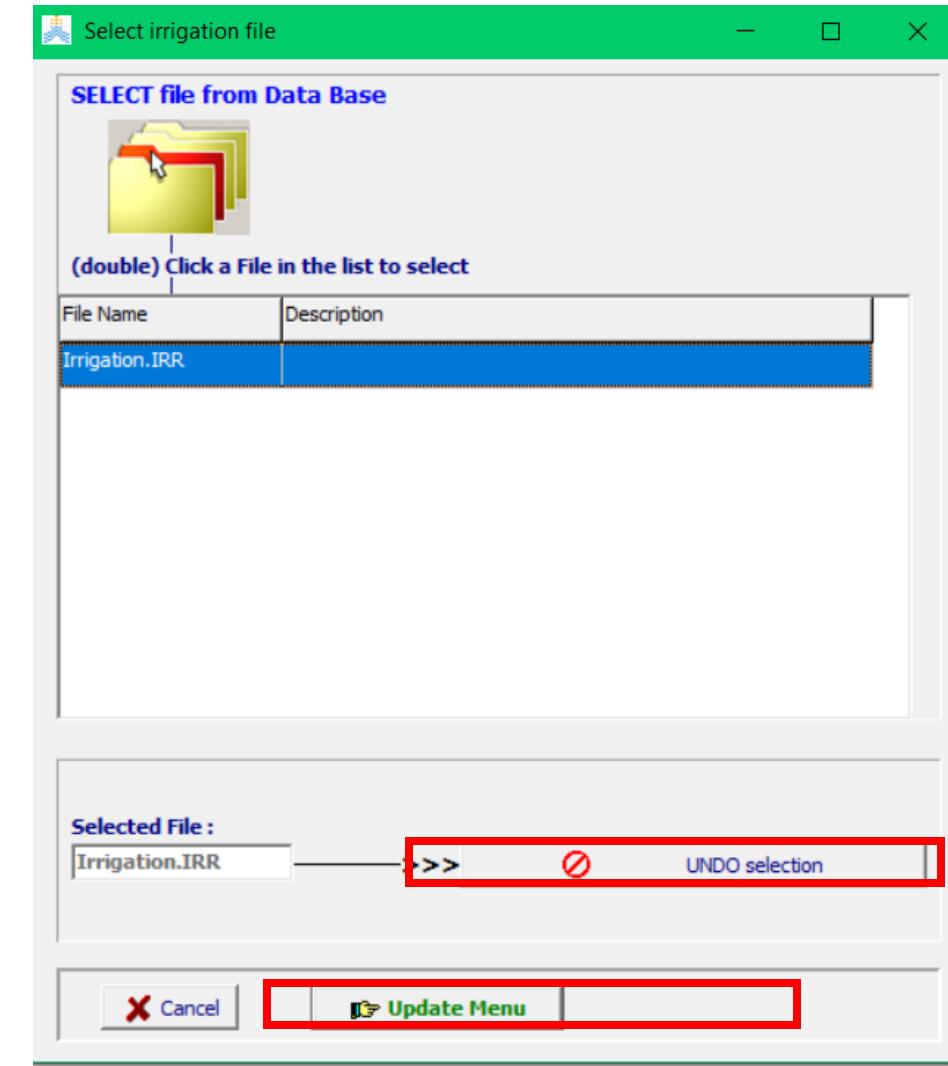


Creation of rainfed PRM

Press “Irrigation” button

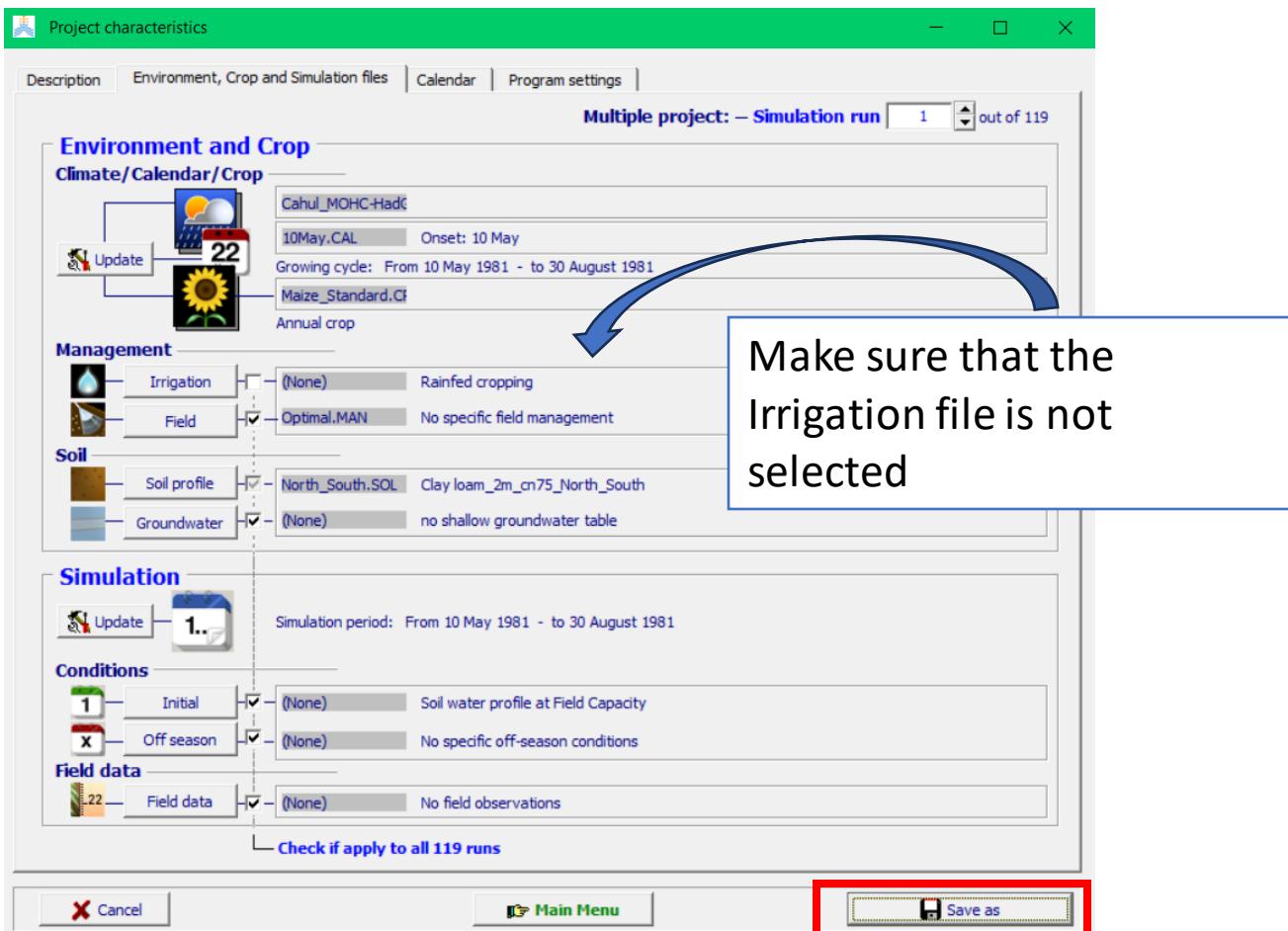


Click on UNDO selection
Update Menu

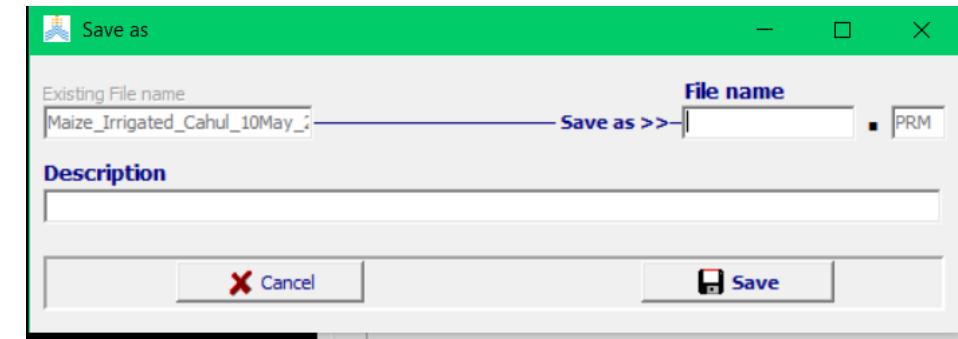


Creation of rainfed PRM

Press “Save as” button



Rename the file as
Maize_Rainfed_Cahul_10May_85_MOHC





Creation of new project files (.PRM)

Variables scheme

Repeat the operation with the file RCP8.5

Maize_Irrigated_Cahul_10May_26_MOHC

 X

Maize_Irrigated_Cahul_10May_85_MOHC

 X

Maize_Rainfed_Cahul_10May_26_MOHC

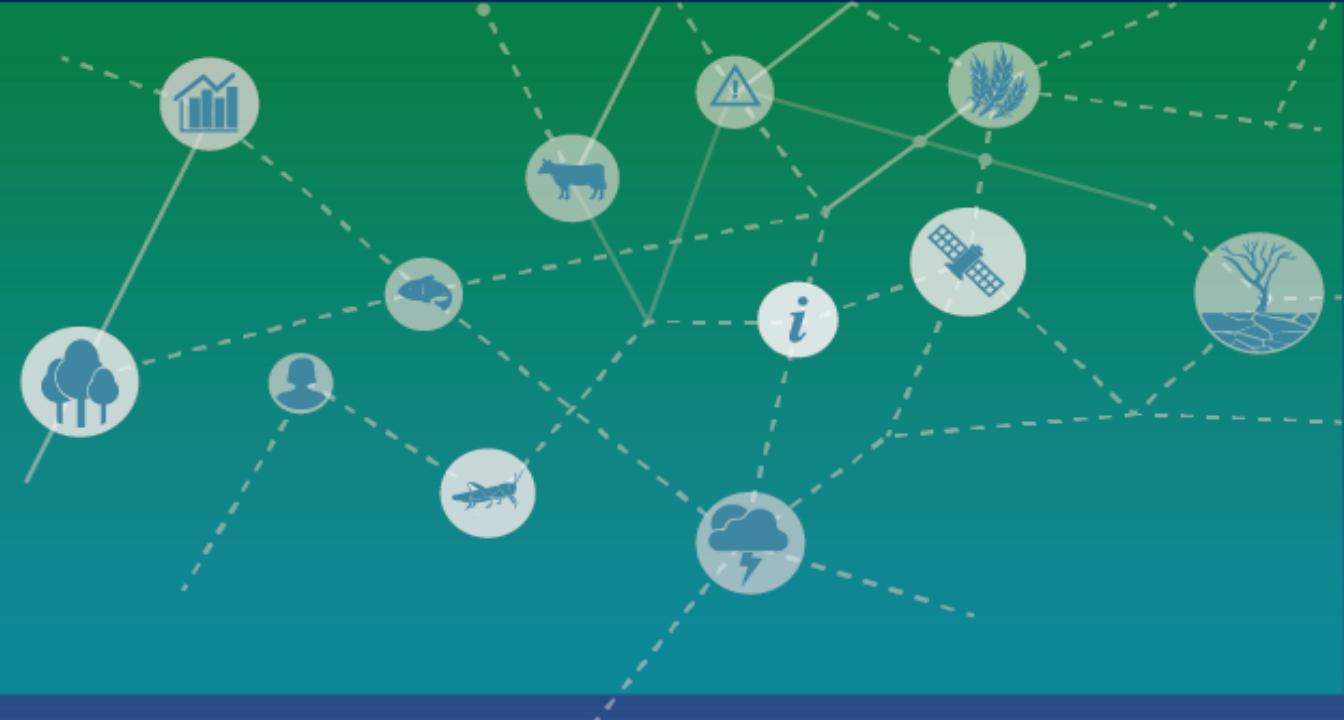
 X

Maize_Rainfed_Cahul_10May_85_MOHC

 X



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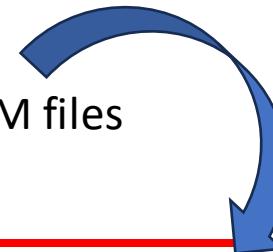
AquaCrop Plugin

June 30, 2023

Plug-in data

- Go to the DATA folder of "AquaCrop standard" - select and copy the .PRM files

(C:) > FAO > Moldova > GUI_AC7 > AquaCropV70No17082022 >	
Nome	Ultima modifica
DATA	25/05/2023 14:59
IMPORT	20/04/2023 11:06
OBS	20/04/2023 11:06
OUTP	20/04/2023 11:06
SIMUL	17/05/2023 19:37
_DEISREG.ISR	20/04/2023 11:06
_ISREG32.DLL	20/04/2023 11:06
AquaCrop.exe	20/04/2023 11:06
AquaCrop.ico	20/04/2023 11:06
DelsL1.isu	20/04/2023 11:06

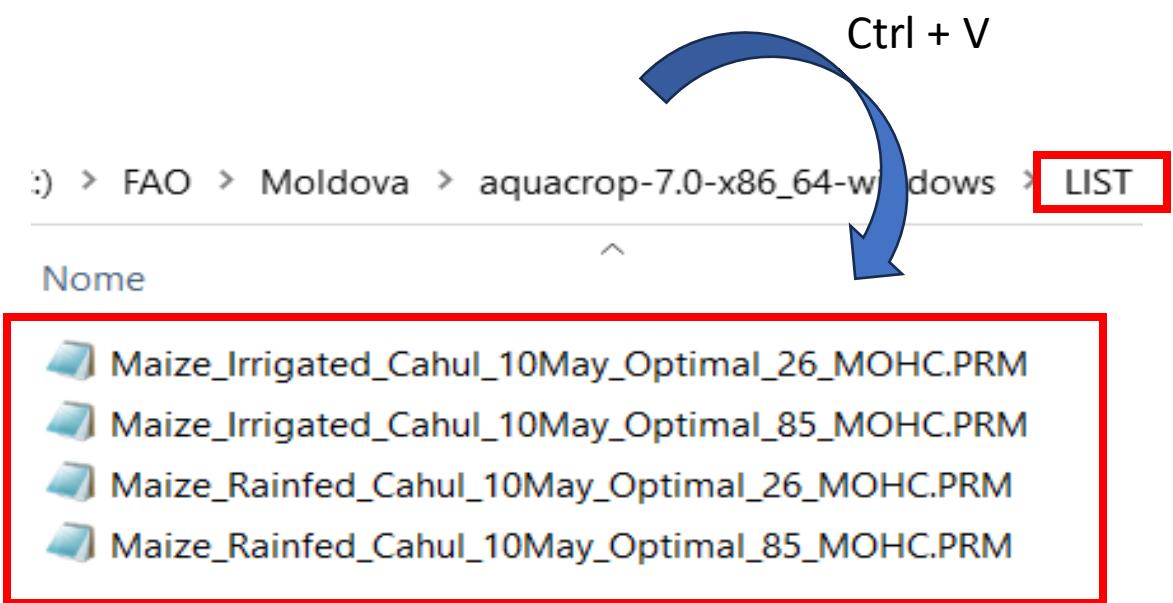


- Maize_Irrigated_Cahul_10May_Optimal_26_MOHC.PRM
 Maize_Irrigated_Cahul_10May_Optimal_85_MOHC.PRM
 Maize_Rainfed_Cahul_10May_Optimal_26_MOHC.PRM
 Maize_Rainfed_Cahul_10May_Optimal_85_MOHC.PRM

Plug-in data

- Paste the .PRM files into the LIST folder of the Plug-in

C:\ > FAO > Moldova > aquacrop-7.0-x86_64-windows >	
Nome	Ultima modifica
LIST	25/05/2023 15:02
OUTP	16/05/2023 16:11
PARAM	17/08/2022 09:22
SIMUL	16/05/2023 12:53
aquacrop.exe	16/05/2023 12:19
AUTHORS.md	16/05/2023 12:19
LICENSE	16/05/2023 12:19



Plug-in

- *To run the plugin the text file DailyResults.SIM is needed to be in the “SIMUL” folder of the plugin. You can find it [Here](#)

C:\ > FAO > Moldova > aquacrop-7.0-x86_64-windows >	
Nome	Ultima modifica
LIST	25/05/2023 15:02
OUTP	16/05/2023 16:11
PARAM	17/08/2022 09:22
SIMUL	16/05/2023 12:53
aquacrop.exe	16/05/2023 12:19
AUTHORS.md	16/05/2023 12:19
LICENSE	16/05/2023 12:19

(C:\ > FAO > Moldova > aquacrop-7.0-x86_64-windows > SIMUL	
Nome	Ultima modifica
AggregationResults.SIM	16/05/2023 12:19
DailyResults.SIM	16/05/2023 12:21
DEFAULT.CRO	17/05/2023 19:08
DEFAULT.SOL	17/05/2023 19:08
EToData.SIM	16/05/2023 17:31
MaunaLoa.CO2	16/05/2023 12:19
RainData.SIM	16/05/2023 17:31
TCrop.SIM	16/05/2023 17:31
TempData.SIM	16/05/2023 17:31

Plug-in

- Run the plug-in by double-clicking on aquacrop.exe (for 4 project files it will take approximately 3 minutes)

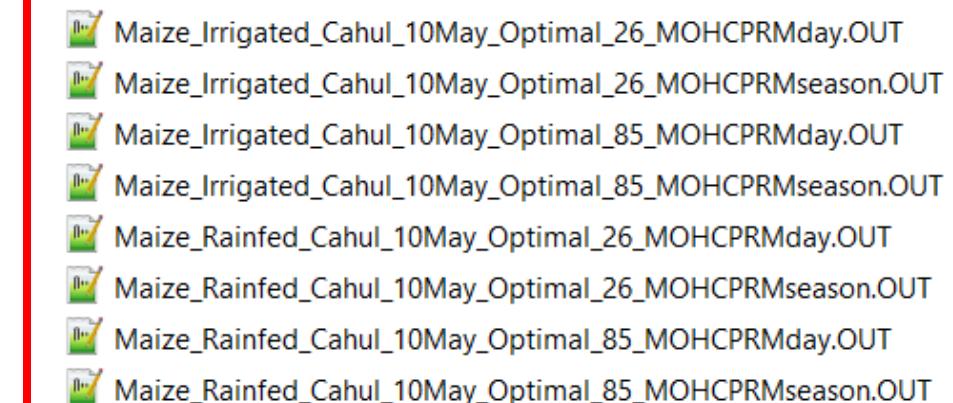
C:\ > FAO > Moldova > aquacrop-7.0-x86_64-windows >	
Nome	Ultima modifica
LIST	25/05/2023 15:02
OUTP	16/05/2023 16:11
PARAM	17/08/2022 09:22
SIMUL	16/05/2023 12:53
aquacrop.exe	16/05/2023 12:19
AUTHORS.md	16/05/2023 12:19
LICENSE	16/05/2023 12:19

Plug-in

- After the plug-in worked, you will find the .OUT files (daily and seasonal) in the OUTP folder

C:\ > FAO > Moldova > aquacrop-7.0-x86_64-windows >

Nome	Ultima modifica
LIST	25/05/2023 15:02
OUTP	16/05/2023 16:11
PARAM	17/08/2022 09:22
SIMUL	16/05/2023 12:53
aquacrop.exe	16/05/2023 12:19
AUTHORS.md	16/05/2023 12:19
LICENSE	16/05/2023 12:19



Plug-in

Create a new folder and copy and paste the PRMs and OUTs data.

 Maize_Irrigated_Cahul_10May_Optimal_2...	07/07/2023 12:39	File PRM
 Maize_Irrigated_Cahul_10May_Optimal_2...	07/07/2023 12:46	File OUT
 Maize_Irrigated_Cahul_10May_Optimal_2...	07/07/2023 12:46	File OUT
 Maize_Irrigated_Cahul_10May_Optimal_8...	07/07/2023 12:44	File PRM
 Maize_Irrigated_Cahul_10May_Optimal_8...	07/07/2023 12:47	File OUT
 Maize_Irrigated_Cahul_10May_Optimal_8...	07/07/2023 12:47	File OUT
 Maize_Rainfed_Cahul_10May_Optimal_26...	07/07/2023 12:39	File PRM
 Maize_Rainfed_Cahul_10May_Optimal_26...	07/07/2023 12:48	File OUT
 Maize_Rainfed_Cahul_10May_Optimal_26...	07/07/2023 12:48	File OUT
 Maize_Rainfed_Cahul_10May_Optimal_85...	07/07/2023 12:44	File PRM
 Maize_Rainfed_Cahul_10May_Optimal_85...	07/07/2023 12:49	File OUT
 Maize_Rainfed_Cahul_10May_Optimal_85...	07/07/2023 12:49	File OUT

[Here](#) you can also find the the PRMs and OUTs files ready to be uploaded on AquaCrop Plotter.

[Here](#) is the link to the AquaCrop plotter platform.

Thank you!

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