



# Promoting Food and Water Security through Cooperation and Capacity Development in the Arab Region:

## Strengthening Capacity to Assess Impacts of Changing Water Availability on Agricultural Production

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The Arab Center for the Studies of Arid Zones and Dry Lands (ACSAD)

# Objectives

- **1** - Contribute for enhancing food and water securities in the Arab region
- 2** - Contribute for strengthening the national and regional knowledge base, capacity development and greater intraregional cooperation.
- 3** - Contribute for promoting sustainable development and strengthening capacity to assess impacts of changing water availability (climate change) on agricultural production in the Arab countries.



# Project partners

- This project is implemented in a partnership among , FAO, ACSAD, and ESCWA and funded by SIDA



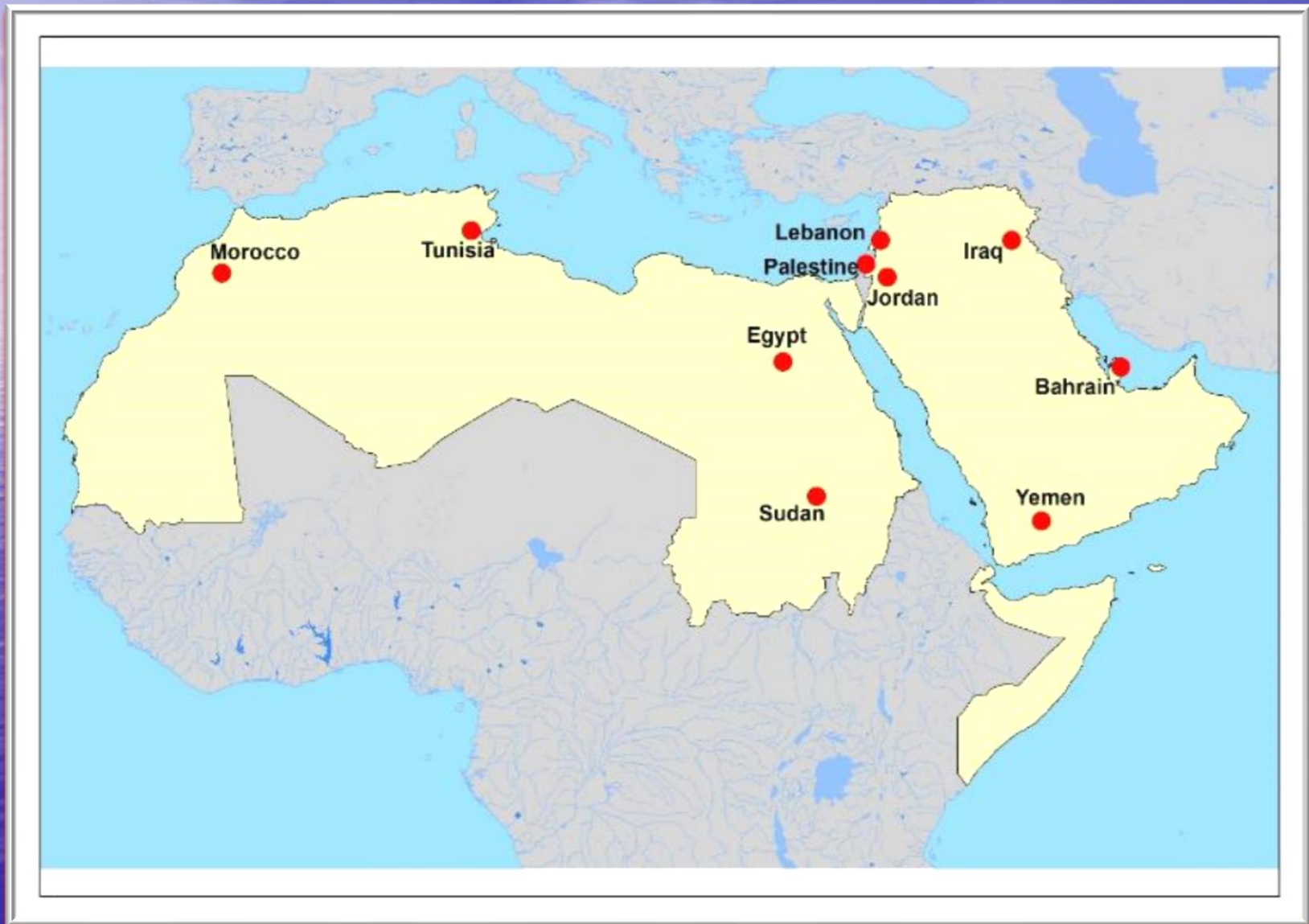
الأمم المتحدة

الإسكوا

ESCWA

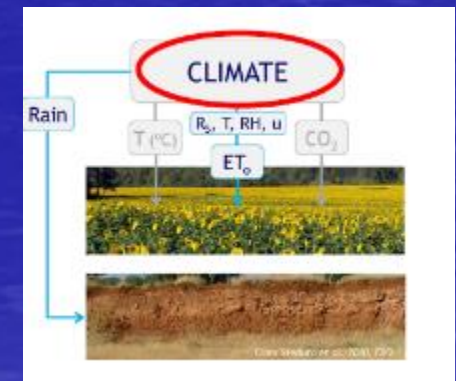


# Target countries



# Introduction

- Climate change may affect agriculture due to changes in **temperature, precipitation, soil moisture, an increase in the probability of extreme events such as droughts, extreme heat waves, heavy rainfall, cyclones, flooding** of the coastal areas, erosion etc





# Training manuals

The Arab Center for the Studies of Arid Zones and Dry Lands (ACSAD)



Food and Agriculture  
Organization of the United  
Nations



Promoting food and water security through cooperation and  
capacity development in the arab region

Training manual

Using AcquaCrop model to evaluate the impact  
Of climate change on crop production

Final edition

Donor



The Arab Center for the Studies of Arid Zones and Dry Lands (ACSAD)



Food and Agriculture  
Organization of the United  
Nations



Promoting food and water security through cooperation and  
capacity development in the arab region

User Guide

AcquaCrop model

Final edition

Donor



# Training activates



6 sub regional and 7 national training sessions for 30 participants from 10 countries





| Country - Area |            | Crop                   |
|----------------|------------|------------------------|
| Jordan         | Mafrak     | Tomato- Irrigated      |
|                | Madaba     | Wheat-Rainfed          |
| Lebanon        | Beqaa      | Wheat-Sup Irrigation   |
| Iraq           | Swereh     | Tomato- Irrigated      |
|                | Swereh     | Wheat-Irrigated        |
| Palestine      | Jenin      | Wheat-Rainfed          |
|                | Jenin      | Potato-Irrigated       |
| Yemen          | Sanaa      | Wheat-Irrigated        |
|                | Sanaa      | sorghum-Sup Irrigation |
|                | Dhamar     | Wheat-Irrigated        |
|                | Dhamar     | sorghum-Rainfed        |
|                | Alkod      | Maize-Irrigated        |
|                | Alkod      | Sesame-Irrigated       |
| Tunis          | Shbeka     | Wheat-Irrigated        |
|                | Koudiat    | Wheat-Rainfed          |
| Morocco        | Marchouch  | Wheat-Rainfed          |
|                | Zamamreh   | Wheat-Irrigated        |
|                | Zamamreh   | Sugar beet-irrigated   |
| Sudan          | Wad Madany | Wheat-Irrigated        |
|                | Gedaref    | sorghum-Rainfed        |
| Egypt          | Sakha      | Wheat-Irrigated        |
|                | Sakha      | Maize-Irrigated        |
|                | Nubareih   | Tomato- Irrigated      |

Ten  
different  
crops

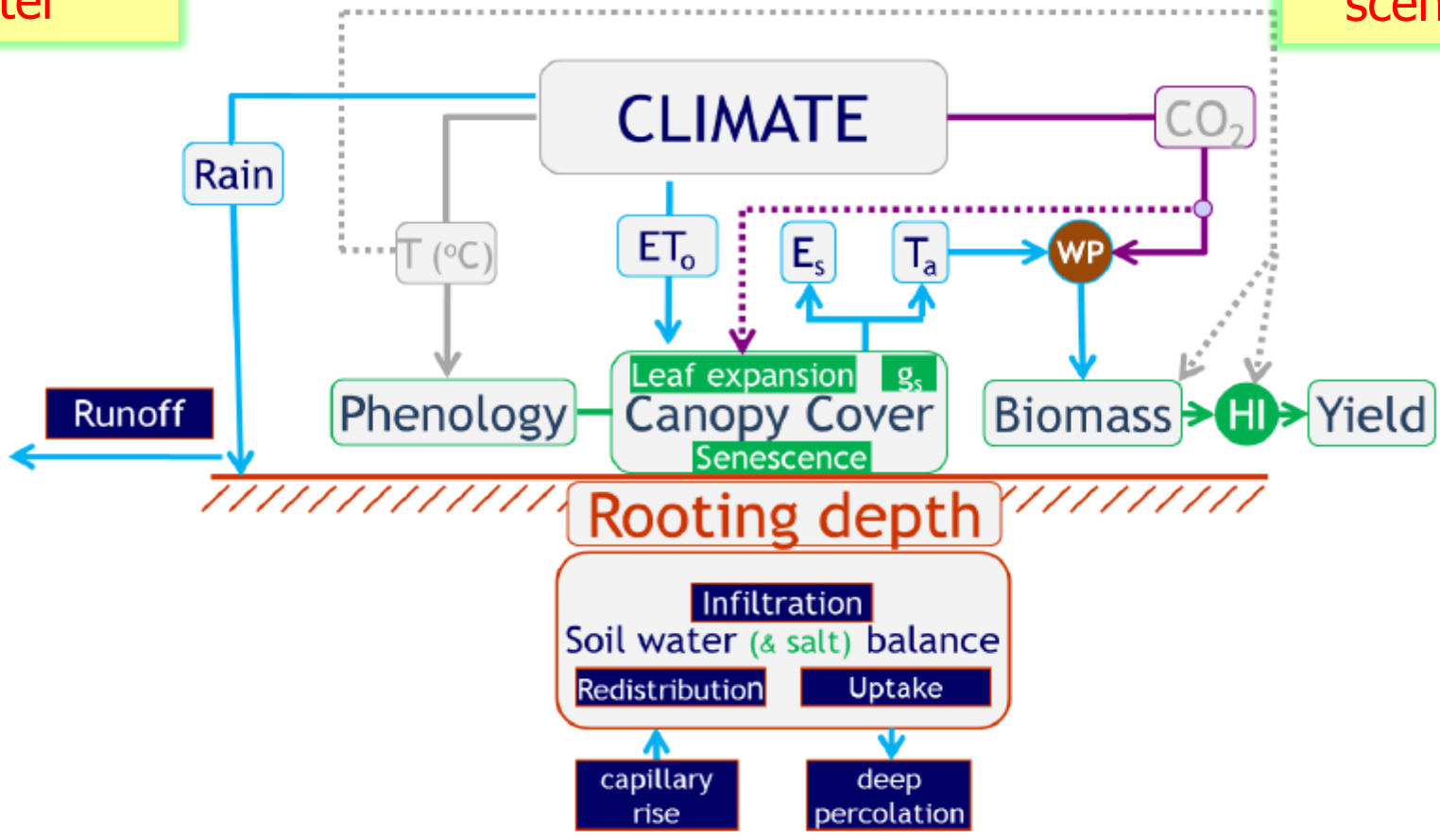




AquaCrop model simulate yield response to water

# AquaCrop model

AquaCrop predict yield under climate change scenarios



Developed by **FAO**

**Dirk RAES, Pasquale STEDUTO, Theodore C. HSIAO, and Elias FERERES**

The background is a smooth blue gradient, transitioning from a lighter blue at the top to a darker blue at the bottom. On the left side, there is a bright sun flare that creates a white and yellow glow, with rays of light extending across the sky. The overall effect is a serene, ocean-like atmosphere.

results



الهيئة الوطنية للتقنية الزراعية العربية

التقويم تأثير التغيرات في المياه المتاحة على إنتاجية المحاصيل الزراعية

تقرير دراسة الحالة في تونس

ESCWA

السويد Sverige

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# Assessment reports



Ranifed wheat yield in Morocco is projected to decrease between 9 and 26 %



Irrigated tomato yield in Iraq is projected to decrease about 7 %



Ranifed Sorghum yield in Sudan is projected to decrease between 7 and 11 %



Irrigated wheat yield in Yemen is projected to decrease between 4 and 7 %



Ranifed Sorghum yield in Yemen is projected to decrease between 8 and 16 %



Irrigated potato in Palestine yield is projected to decrease about 3 %

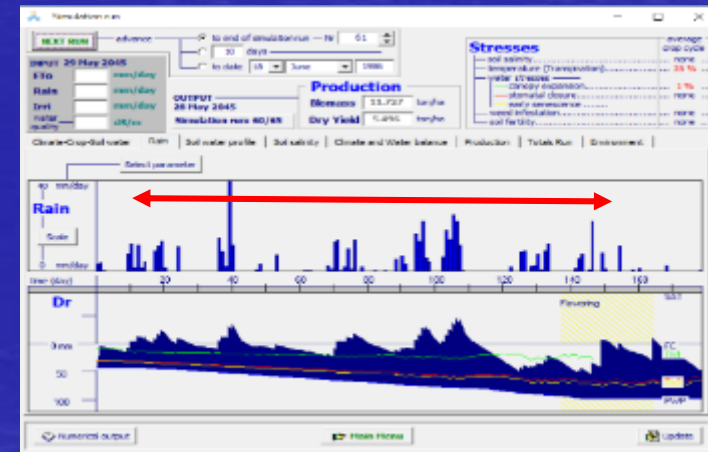
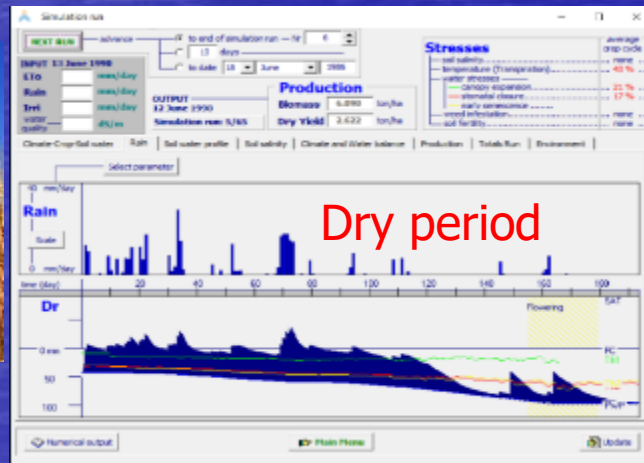




# Supplementary irrigated wheat Lebanon

Supplementary irrigated wheat yield is projected to increase between 4 and 17 %

| متوسط التغير خلال الفترة (2050-2040) | متوسط التغير خلال الفترة (2030-2020) |                                  |
|--------------------------------------|--------------------------------------|----------------------------------|
|                                      | 4.19                                 | الإنتاج في سنة الأساس (طن/هكتار) |
| 17% ↑ 0.73                           | 4% ↑ 0.43                            | التخير المطلق (طن/هكتار)         |
| حلال الفترة 2050-2040                | حلال الفترة 2030-2020                | حلال فترة الأساس 2005-1986       |
| 173 ↓                                | 176 ↓                                | 181                              |
|                                      |                                      | طول موسم النمو                   |



# summary

- The results show that climate change will have several impacts on crops

Crop yields will decline, food production could be affected significantly,

Crop growth cycle will decrease

The shortage of the growing-season length could have a negative impacts on grain yield in terms of quantities and quality.



# summary

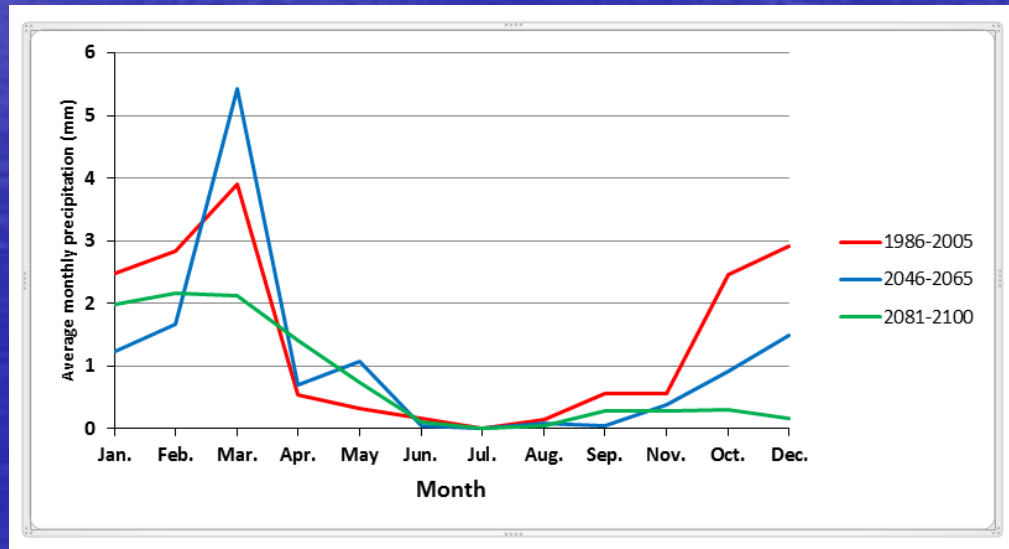
Rainfed crops will be more sensitive to climate change than irrigated crops

A rise in the need for water of irrigated crops by 7-12 per cent

Adaptation measures should be taken to alleviate impact of CC on crops

# Proposed adaptation measures

- adjust **sowing dates** according to temperature and rainfall patterns,





# Proposed adaptation measures

- use **crop varieties** better suited to new climate conditions (e.g. more resilient to heat and drought)



# Proposed adaptation measures

- Apply conservation agriculture:
  - Minimum tillage + land cover + crop rotation
  - CA increase soil moisture and OM content





# Proposed adaptation measures

- Rainwater Harvesting & supplementary irrigation



# Proposed adaptation measures

- Change fertilizer application rate
- apply crop rotation
- Modify irrigation depth and application time
- Enhancing Water Productivity through Efficient Irrigation systems



The background is a smooth blue gradient. On the left side, there is a bright, glowing area that resembles a sun or moon reflecting on a body of water, creating a shimmering effect. The rest of the background is a solid, deep blue color.

Thanks