



# ADAPTATION TO CLIMATE CHANGE OF THE MEDITERRANEAN AGRICULTURAL SYSTEMS (ACLIMAS)

**Yahya Shakhatreh, PhD**

National Center for Agricultural Research and  
Extension (NCARE)

**Amman 16/5/2012**



**Adaptation to Climate Change of the Mediterranean Agricultural Systems**



**•Full title of the Project& Acronym of the project:  
Adaptation to Climate Change of Mediterranean  
Agricultural Systems (ACLIMAS)**

**Amount of funds received by the EC: 2.839.650,75 EURO**

**The overall objective is to bring a durable improvement of the agricultural water management and a broader socio-economic development of target areas in the context of adaptation to climate change, increasing water scarcity, and desertification risks.**

**location (name of the location, region, country)**

<i>Country</i>	<i>Region</i>	<i>Name of the target areas</i>
<b>Morocco</b>	<b>Chaouia Ourdigha</b>	<b>Oulad Said, Sidi El Aidi, Tamadrout, Jmaa Riah, Berrechid, Sidi Ain Nzagh, Sidi Ain Nzagh Ben Rahal, Sidi Mohamed Ben Rahal</b>
<b>Tunisia</b>	<b>Nort-Eastern</b>	<b>Capbon, Manouba, Saida, Mhamedia, Grombalia</b>
<b>Egypt</b>	<b>Western Nubaria</b>	<b>Entlak, Tiba</b>
<b>Jordan</b>	<b>Irbid Governorate</b>	<b>Bani Kananeh, Bani Obaid, Quasbat Irbid, Al-Ramtha</b>
<b>Lebanon</b>	<b>Bekaa Valley</b>	
<b>Syria</b>	<b>Aleppo Plateau</b>	<b>Tel Hadya, Breda, El Bab</b>

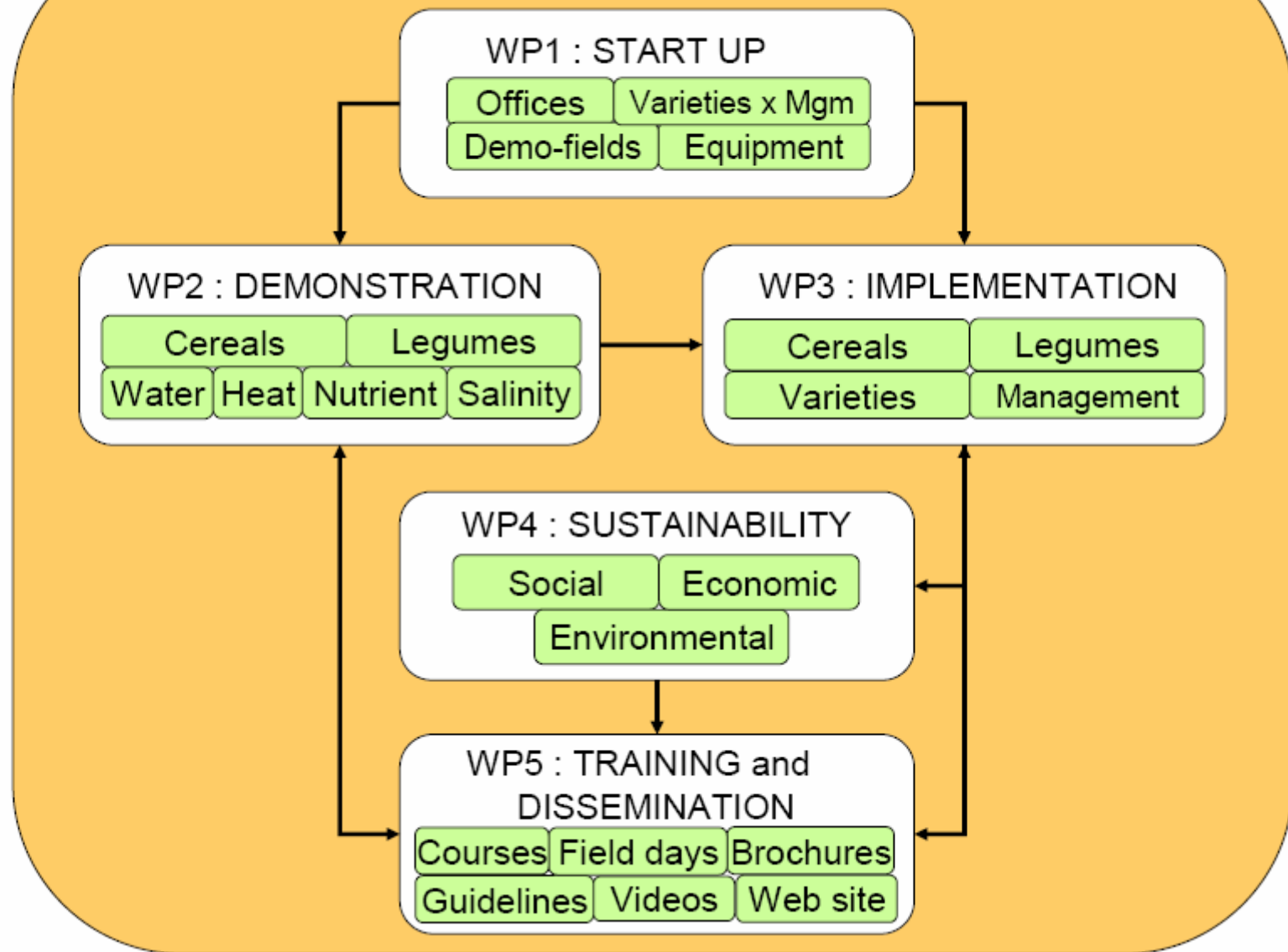
## Expected outcomes

- 6 demonstration fields with agro-meteorological stations, other equipment and Excel-based irrigation scheduling tool;
- 2 years of testing (at least 48 combinations of genotypes and water management practices);
- 24 training courses and 600 farmers, technicians and water managers trained;
- 60 field days with the participation of 1200 local stakeholders;
- 2 years on-ground implementation of the best performing varieties and water harvesting and management practices in a surface area of at least 240 ha with the involvement of at least 120 farmers;
- 2 guidelines, 24 brochures, 6 seminars, 180 minutes of video material, etc.
- Social and economic impact:
  - support of the local communities to market a quality durum wheat (in Lebanon and Morocco) and chick pea (in Morocco) products and
  - promotion of the women cooperatives for durum wheat transformation to several types of couscous on downstream value chain (in Morocco)

## **Partner organizations/institutions**

1. International Center for Agricultural Research in the Dry Areas (ICARDA), International
2. Institut National de la Recherche Agronomique (INRA), Morocco
3. Institut National Agronomique de Tunisie (INAT), Tunisia
4. West Nubaria Rural Development Project (WNRDP), Egypt
5. National Center for Agricultural Research and Extension (NCARE), Jordan
6. Lebanese Agricultural Research Institute (LARI), Lebanon
7. Centro Euro-Mediterraneo per i Cambiamenti Climatici (CMCC), Italy
8. Consiglio Nazionale delle Ricerche - Istituto per i Sistemi Agricoli e Forestali del Mediterraneo (CNR-ISAFOM)
9. Universitat de Barcelona (UdB), Spain
10. University of Lleida (UdL), Spain
11. University of Nottingham (UNOTT), UK
12. Agriculture Environnement et Developpement, pour l'Avenir (AGENDA), Morocco
13. Association of the Friends of Ibrahim AbdEl Al (AFIAL), Lebanon

# PROJECT MANAGEMENT



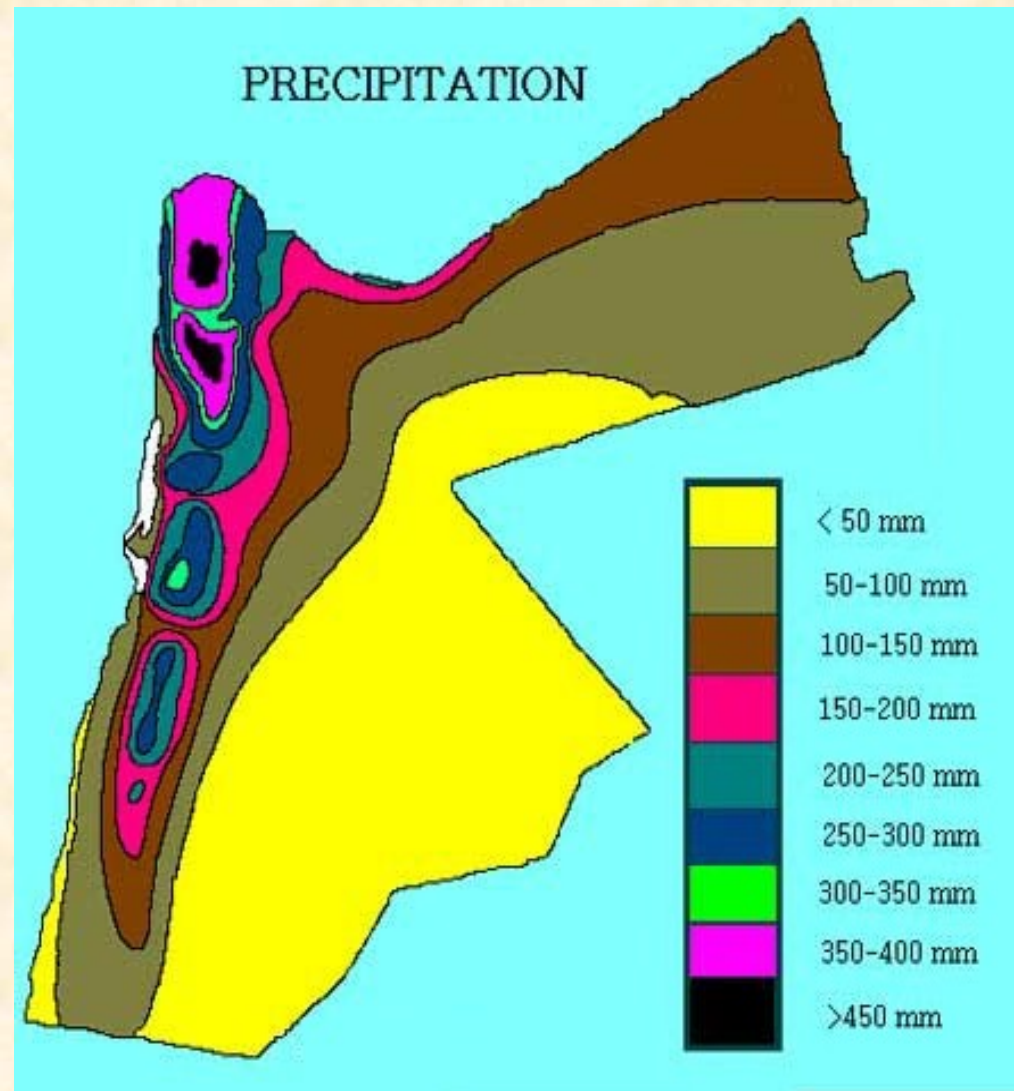
# ■ **Introduction**



- \*Area of Jordan:
  - 8.7 million ha
  - Arable land: is less than **five percent** (0.4 million ha).

\* Of this about **84%** is rainfed

\*Around **80%** of the land receives less than **100mm** rainfall per year.

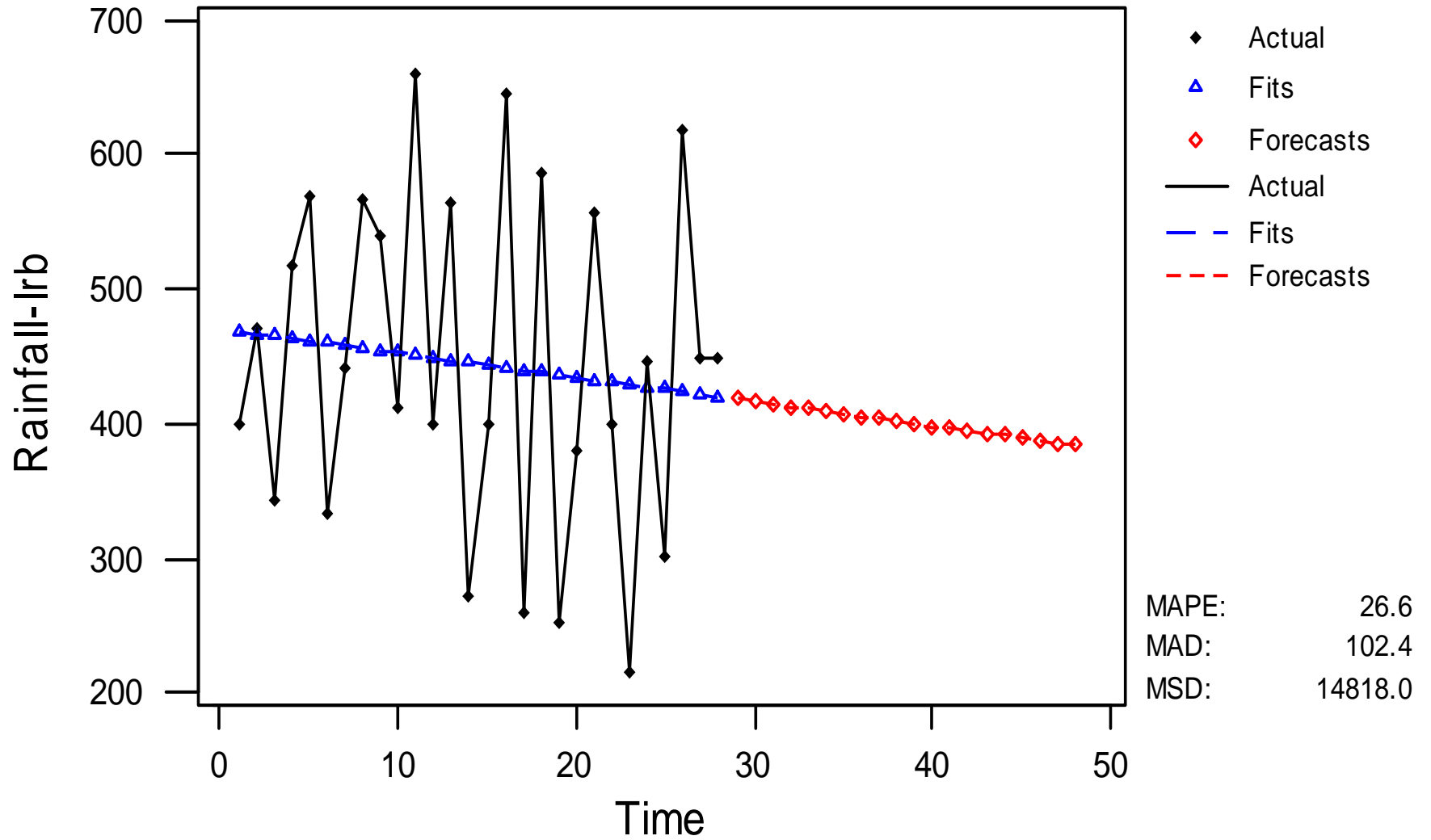




# Trend Analysis for Rainfall-Irb

Linear Trend Model

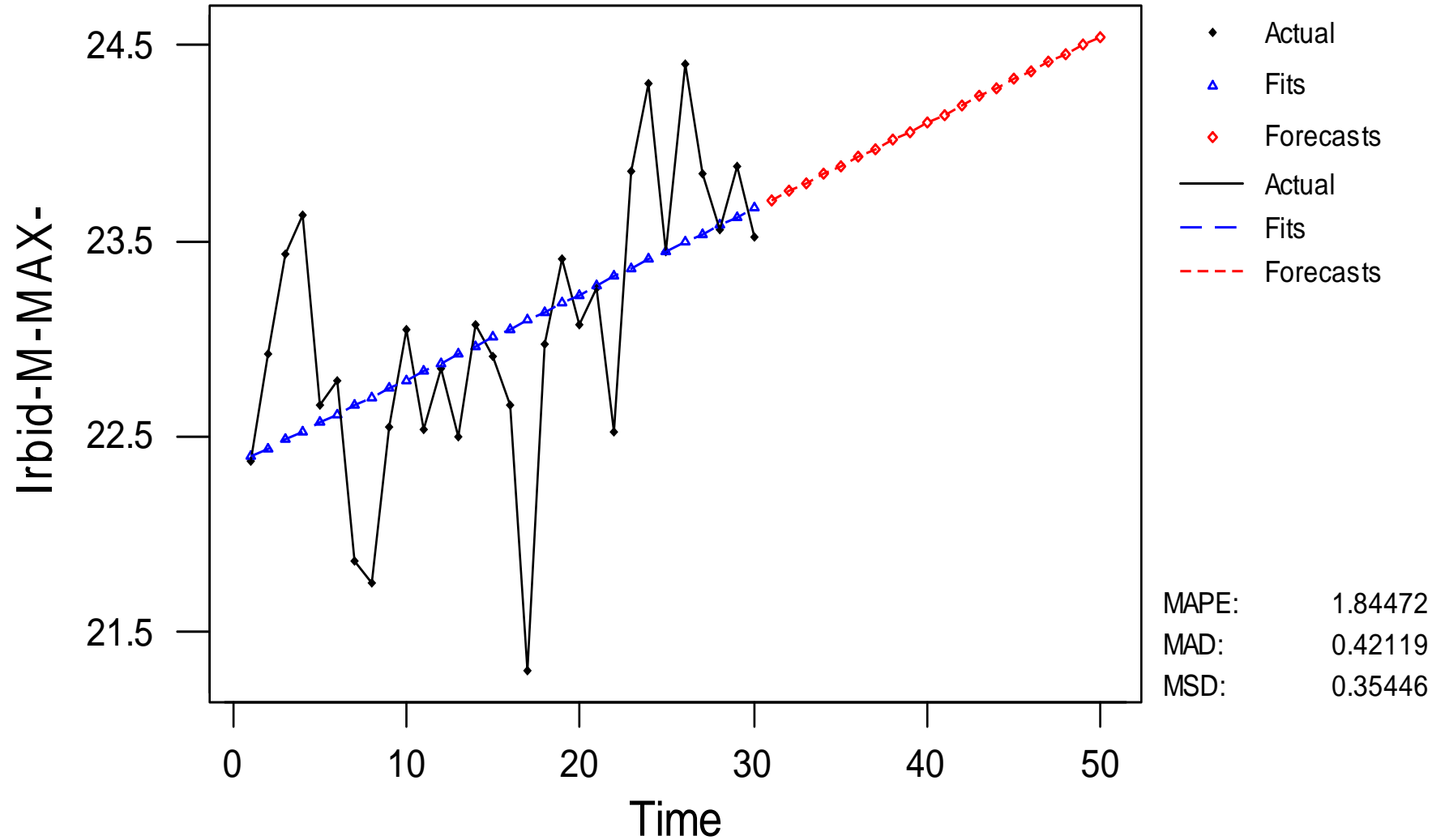
$$Y_t = 470.782 - 1.81352 \cdot t$$



# Trend Analysis for Irbid-M-MAX-

Linear Trend Model

$$Y_t = 22.3461 + 4.41E-02*t$$



## Description of the target area

**Irbid governorate**

**Total area : 157200 ha, (1.8% of the total area).**

**Poulation : around one millione, ( 18%).**

**Number of farmers : 26119**

**Main cultivated crops: Olives, Wheat, and Barley**



## Description of the target area

### **Irbid governorate**

The area is characterized as a typical semi-arid Mediterranean climate with annual rainfall ranging from 250 to 500 mm.

The rainy season starts around November and ends in April. The summer period is completely dry and it is characterized by daily maximum temperatures that reach 35°C.

The cropping systems in the area are wheat based system and barley based system in the drier part.

- Wheat and barley harvested areas, production and productivity at Jordan and Irbid level during the period (2001 - 2011)

Level / crop	Harvested area (1000ha)	Production (ton)	Yield (kg/ha)
Jordan/ Wheat	21	24000	1100
Irbid/ Wheat	4.8	6400	1300
Jordan/ Barley	31	22300	700
Irbid/ Barley	4.7	6100	1200

- The region is part of the famous **Houran** area known in history as the food basket of the Roman Empire.

## Main constrains

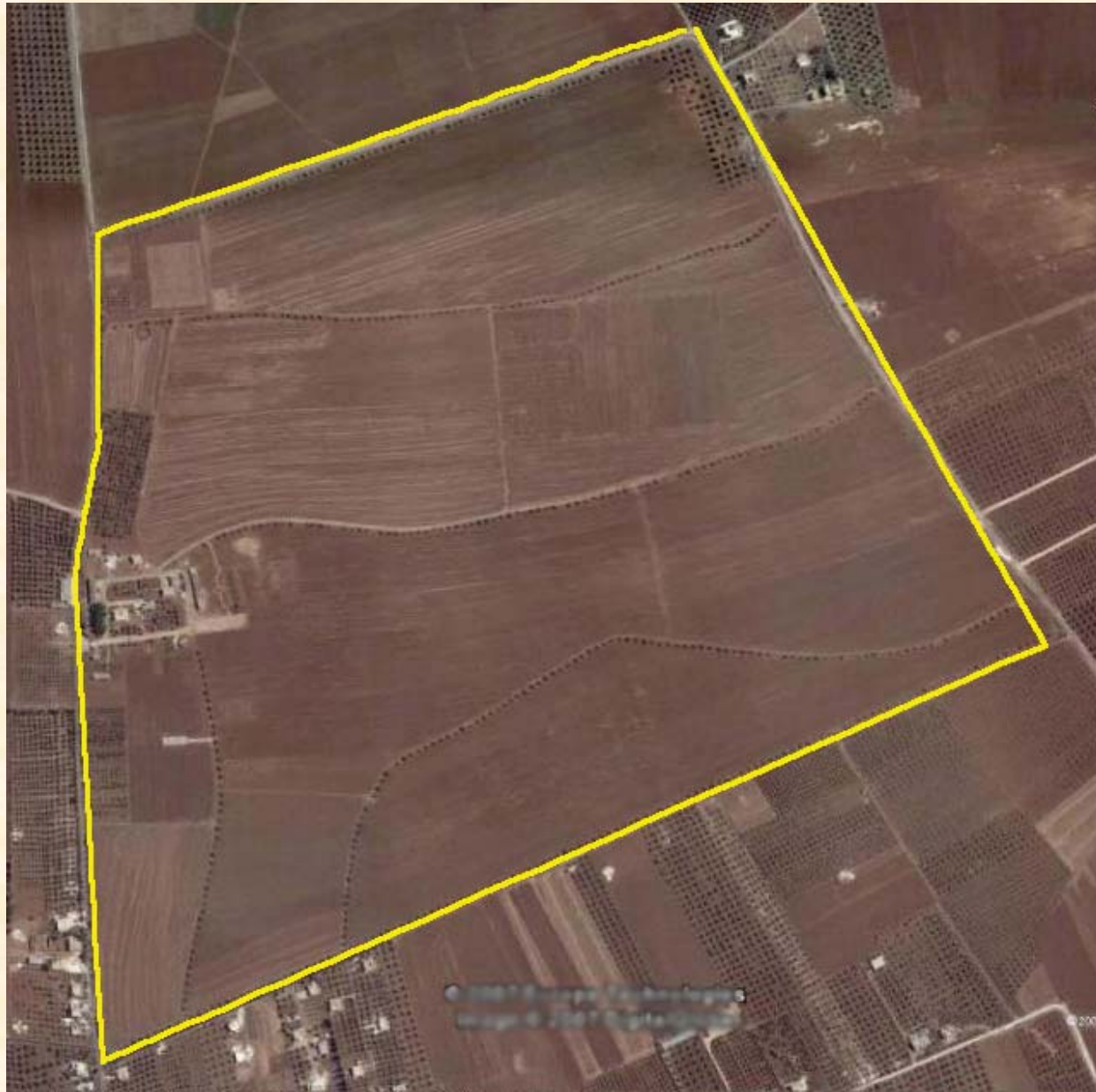
- \* Drought occurrence and water scarcity.
- \* Land degradation.
- \* Urban expansion.
- \* Fragmentation of land holdings.
- \* Invasion of fruit crops into field crops land.
- \* Fluctuation of precipitation and other climatic constraints.



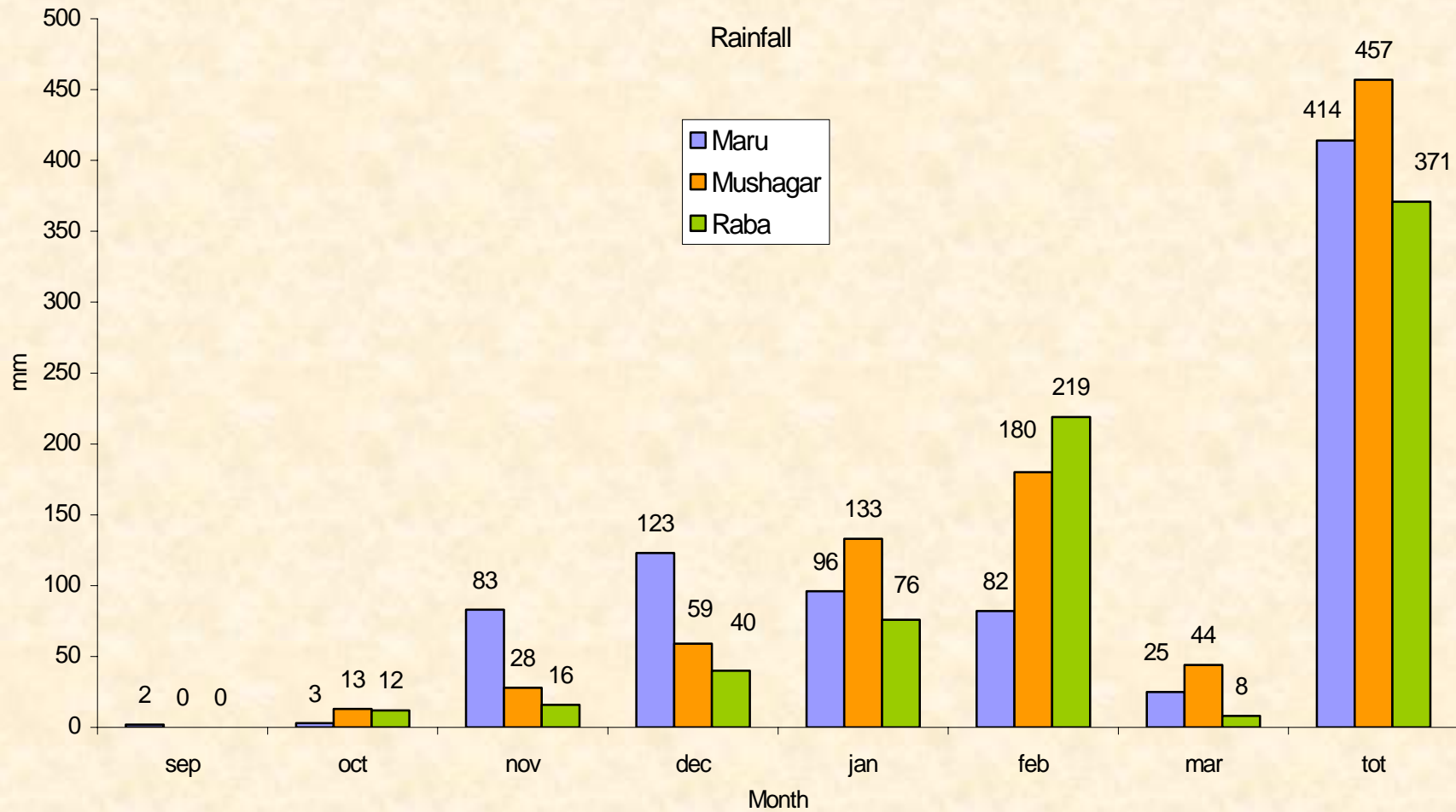
## Demonstration site

### Maru Agricultural Research Station

- \* The station is located about 20 km North of Irbid city in north Jordan at 32-36`N and 35-40` E.
- \* The elevation of the station is 620 m above sea level.
- \* The climatic conditions are characterized by cold winter and hot summer.
  - \* The long term average annual rainfall (20 years) is 414 mm.
- \* The total area is about 100 ha.

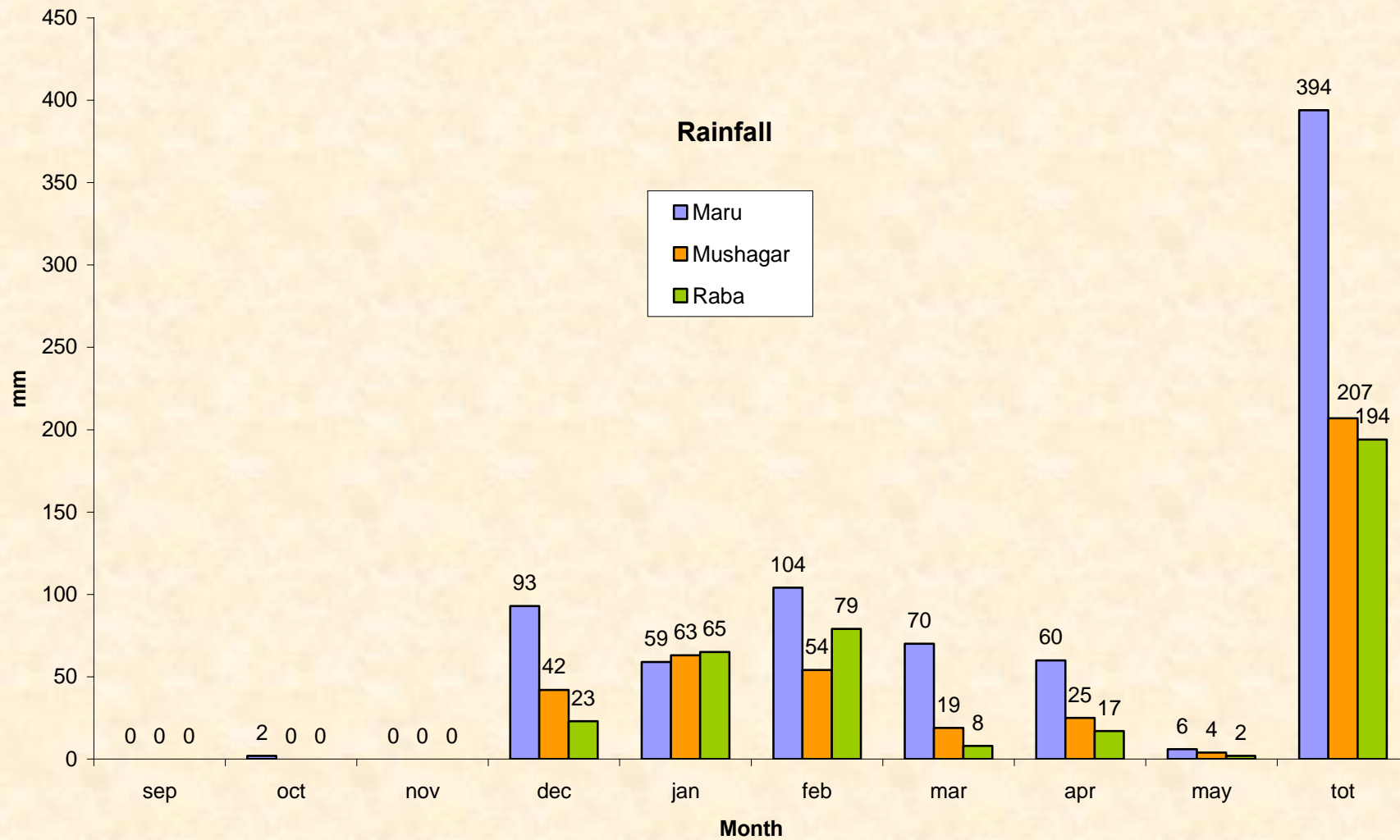


Map for Maru Agricultural Research Station



2010/2011 growing season





2010/2011 growing season

- Efforts in Jordan through wheat and barley production improvement program was focusing on **increasing the productivity** under shortage water conditions.
- Several national breeding strategies and activities have been adopted to increase yield and stability of the crop.

Farmer productivity  
-local variety.  
-Traditional cultivation practices.

1300kg/ ha



Demonstrations  
Productivity  
-Improved Variety.  
- Full package of improved practices

3500 kg/ha

This project is a good opportunity to **expand, develop** and **introduce** efficient measures of applied research and **technology transfer**: □

- Increase field crops yields at farmer's fields.
- Improve production at the national levels.
- Improve crop management under climate change.
- Capacity development.

## Main activities

### Demonstration

- Varieties evaluation for drought tolerance
  - Wheat (5 genotypes).
  - Barley (3 genotypes).
- Tillage practices
  - Conventional.
  - Conservation.
- Sowing date and seeding rate Experiments
  - Conventional.
  - Conservation.
- Water harvesting (still under selection)
  - Strip catchment tillage.
  - Pitting systems.

## Main activities

### On – ground implementation

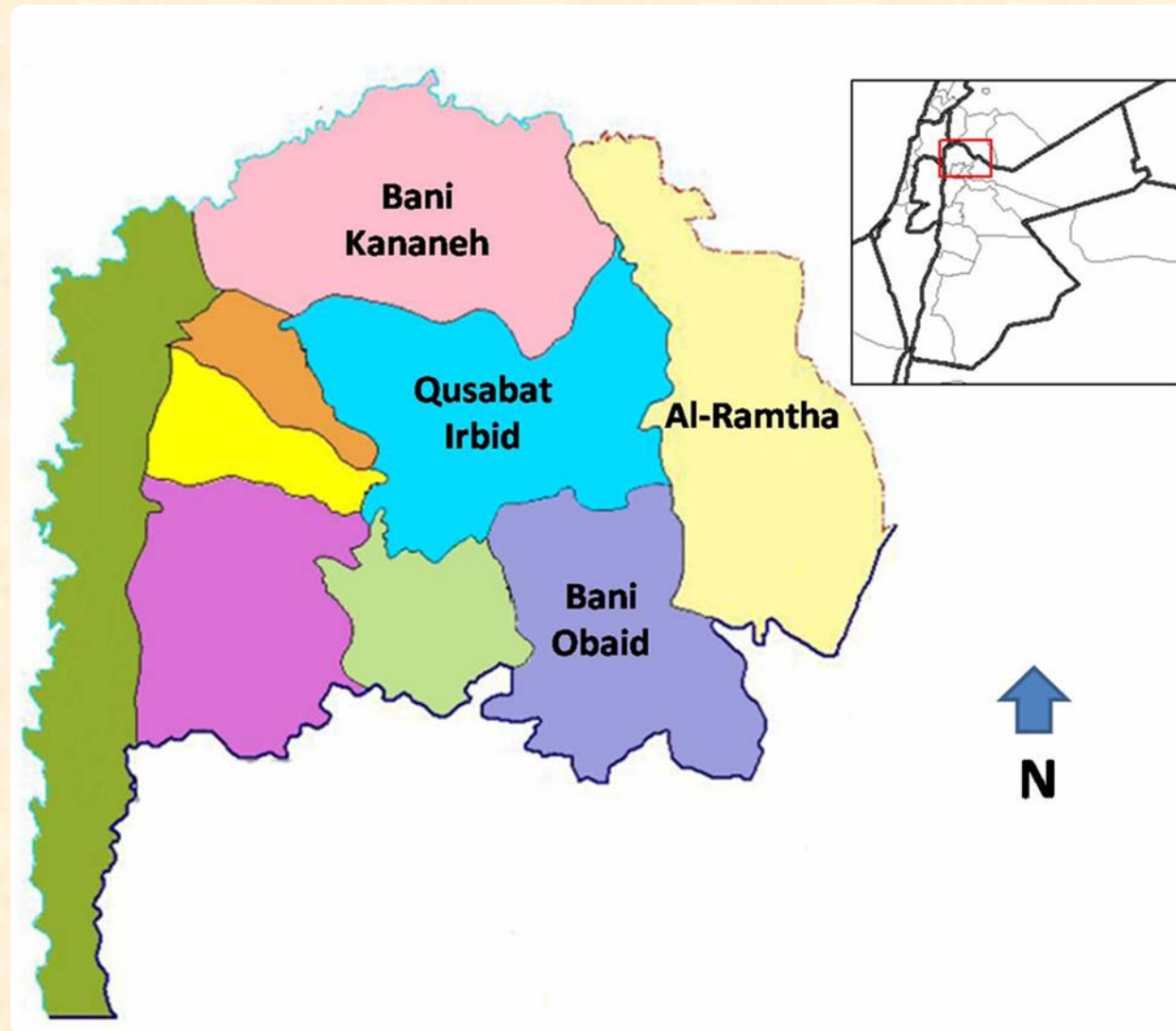
- Improved varieties and conservation agriculture.
  - Wheat (2 genotypes).
  - Barley (2 genotypes).
  - Vetch.
- Full package of integrated cropping practices with improved varieties (seeder, seeding rate, sowing date and fertilizers).
  - Wheat.
  - Barley.
  - Vetches



## On – ground implementation

- Number of demonstrations at farmer fields: 11
- Area of each demonstration: 1.5-2 ha.
- Durum wheat: 4 demonstrations.
- Barley: 4 demonstrations.
- Vetches: 3 demonstrations .

Farmer fields on- ground implimentation will be conducting in four districts :  
**Bani kananeh, Bani Obaid, Quasbat Irbid and Al-Ramtha .**



Map of Jordan shows the four selected districts.

## Methodology for on-ground implementation

### CO

concern **two times tilling** using the chisel and moldboard and planting as usual by **conventional seeder**.

### CA

use of zero-till seeders **without plowing** and **residue retaining** as much as possible

Seeding rate of 120kg per ha will be used and fertilizer amount will be added depending on soil analysis.

Farmer Field

## Methodology for on-ground implementation

### CO

planting as usual by  
**conventional method.**

### Full package of cropping practices

use of improved varieties, seeders, recommended seeding rate and date.

Fertilizer will be added depending on soil analysis.

Farmer Field

## List of equipment to be purchased during the first year of the project

<b>Items</b>	<b>specification</b>	<b>Estimated cost( in JDs)</b>
Vehicle	Four 4W	25000
Local Office (furniture, PCs and laptops , printers, copying machines ,scanners, Data show , Digital cameras and GPS)	To be specified	15000
Zero-till seeder		15000
Weather station		10000













Thank You