



# **SICMED**

## **Continental Surfaces and Interfaces in the Mediterranean area**

**A collaborative research project  
on Mediterranean anthropo-ecosystems**



# Scientific objectives

**Studying changes in Mediterranean continental systems (functions and dynamics) under climatic and human constraints**

*Hydrological and biogeochemical fluxes*

**biotechnic mechanisms**

**biophysical mechanisms**

**socio-economic mechanisms**

Seeking innovative management strategies for Mediterranean anthropo-ecosystems

Developping tools and methodologies for managing natural resources and landscapes

## Co-operative objectives

### **Co-construction of a multilateral project between Mediterranean countries**

*first international meeting in Amman, May 2009*

*thematic workshops*

*farming systems in Montpellier, March 2010*

*water resources in Tunis, December 2010*

*mining environments in Rabat, December 2010*

### **Solving common problems with a necessary scientific solidarity**

### **Providing pilot results for sustainable management**

# General Context

- Political situation
- Demography, poverty, gender, small farms
- Natural resources (water, soil, biodiversity)
- Agricultural Production

# Objectives

- Develop integrated and interdisciplinary approaches and comparative analysis in order to:
  - model the socio-environmental processes at local and regional scales
  - and better define public policies for sustainable development

# TRANSVERSAL ISSUE:

(from FI4IAR-SICMED-ICARDA Seminar, Montpellier 2010)

- ***How to improve the production systems in order to produce more and better, to take care of the environment and to reduce rural poverty?***

Taking into account global drivers, challenges and environmental context at different levels (FS, territories)

(Climate Change, Policies Trade and Markets, Gender, Small farms, Poverty..)

- **Four Diversified Agro-Ecosystems**

- Rain fed Agro-Eco system
- Peri Urban Agro-Ecosystem
- Irrigated Agro-Ecosystem
- Rangeland pastoralism Agro-Ecosystem

Rain Fed	Irrigated
Peri-urban	Pastoral

# Rainfed Agro-Ecosystem

## Specific challenges

### Main land use in the region,

Large diversity in Climatic areas, Farm size and intensification, Crops...

- Yields are below world average in SEM countries
- No possibility to increase area.
- Necessity to increase yield with better drought and risk management and less environmental effects



# Rainfed Agro-Ecosystem

## Main research issues

### Adaptation to climate change and Mitigation of its effects

- Increase WUE and increase productivity through agronomic practices and breeding
- Increase sustainability
- Risk management to allow resilience
- Water management systems :water harvesting, soil and water conservation



# Peri Urban Agro-Ecosystem

## Specific challenges

Related to the location

- **Scarcity of arable land**, competition for land and water
- **Economic sustainability**
- **Adapt to the proximity of the city and Develop synergy with it:**
  - Supply markets with fresh product
  - Source of pollution and a way to recycle urban waste



# Peri Urban Agro-Ecosystem

## Main issues and research priorities

- Improve urban environment and increase synergy better manage natural resources in metropolitan areas.
- Multifunctionality of agriculture: what production systems best meet the locally expected combination of functions?
- Policies: strengthen the resilience of PU agriculture



# Irrigated Agro-Ecosystem

## Specific challenges

*Vital to secure food production in some areas*

*Water resources limited, consequences on environment*

- ***Institutions and policies/management of WR***
- ***Which performances?*** *concept of water productivity in a context of growing competition between water uses*
- *Use of other inputs, in order to **allow an efficient use of water***

# Irrigated Agro-Ecosystem

## RESEARCH PRIORITIES

- *How to preserve water resources, water quality ?*
- *How to face water scarcity in a context of changing climate?*
- *How to cope with a growing pressure on water resources?*
- *How water policies are designed and how specific options are selected?*
- *How does market access affect irrigated agriculture financial sustainability?*

# Rangeland Agro Ecosystems

## Specific challenges

- Large areas
- Environment degradation to Environmental functions
- Specific public policies of the rangeland/hinterland
- Land and its status (land tenure status)



# Rangeland Agro Ecosystems

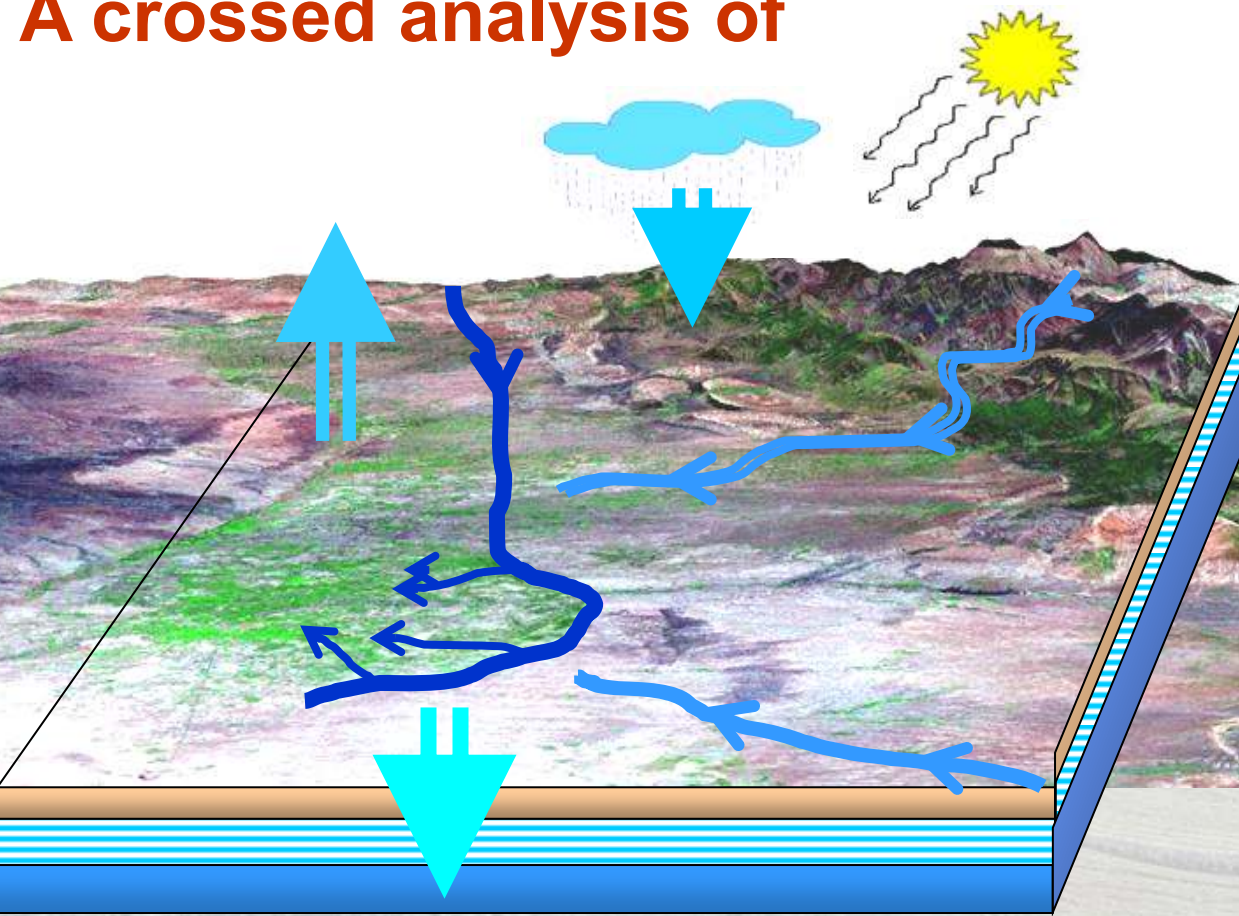
## RESEARCH PRIORITIES

- Farming systems, Promote environment friendly products, integrate into local agricultural chains,
- Environmental services
- Better management of natural resources (biodiversity, soil, water)

# Prospects

- Increase food production with less water, land, biodiversity
- Through different AES, research questions related to
  - Water: increase efficiency and productivity,
  - Water harvesting and conservation techniques
  - Soils: preserve soils, reduce erosion
- Public Policies: efficiencies and implementation
- Holistic approaches

# A crossed analysis of



**Scientific domains**

- Functioning and management of plant canopies
- Hydrological cycle and water resources management
- Biogeochemical cycles + soil and water quality
- Resources evaluation at regional scale
- Farming systems
- Social and territorial dynamics
- Integrated modelling of ecosystems

**Representative anthropo-ecosystems**

Forests and natural ecosystems	
Rainfed agriculture	Irrigated agriculture
Grazing land	Peri-urban areas
Desert transition areas	Coastal areas
Mining Areas	



# Elements of a scientific strategy

## Developing systemic approaches

Linking biophysical, biotechnical and social approaches

Studying interactions between ecosystemic functions

→ *For new management strategies*

## A multi-dimensional approach

*(no isolated case studies)*

networks of sites for thematic approaches

integrated research in a few "major" reference test sites

larger integration along nested spatial scales

(local, catchment, region) or gradients



Steps \ Scale	Field	Landscape Catchment	Small region Basin	Large region
<b>Observation</b> • Field surveys & measurements • Remote sensing				
<b>Modelling</b> • Processes • Integration • Participative				
<b>Data bases &amp; spatial modelling</b>				
<b>Capacity building</b>				

Major Mediterranean anthropo-ecosystems						
Rainfed agriculture	Irrigated agriculture	Forests & shrublands	Grazing lands	Desert transition	Coastal areas	Peri-urban areas



<b>Thematic groups</b>	Hydrology and water resources management	Montpellier Dec 2009, Tunis Dec 2010
	Social and territorial dynamics	Montpellier Dec 2009, Montpellier Feb 2011
	Biogeochemical cycles and soil/water quality management	Montpellier Jan 2011
	Vegetation, canopy functioning	Montpellier Jan 2011
	Regional assessment of resources	still to come
	Farming systems	still to come
<b>Anthropo-ecosystems groups</b>	Irrigated agriculture	Montpellier March 2010
	Peri-urban agriculture	Montpellier March 2010
	Rangelands and pastoralism	Montpellier March 2010
	Mining environments	Rabat Dec 2010, Montpellier Feb 2011
	Oasis	still to come

**40 labs belonging to 15 research institutes and 24 Universities**



For any information, please visit <http://www.sicmed.net>  
 or send an email to [info@sicmed.net](mailto:info@sicmed.net)



SICMED  
 Surfaces et Interfaces Continentales en Méditerranée

- Bienvenue / Welcome
- Contexte / Context
- Objectifs / Goals
- Organisation
- Meetings
- Agenda
- Documents
- Liens / Links
- Contacts

Bienvenue sur le site du programme SICMED - Welcome on the SICMED website

Ce site Internet est dédié au programme SICMED, projet visant à une meilleure connaissance des éco-anthroposystèmes méditerranéens et de leurs évolutions.

This website is dedicated to the SICMED program, initiative aiming at a better understanding of the Mediterranean eco-anthroposystems and their evolutions.

Actualités / News

- [Deuxième réunion du groupe de travail " Cycle hydrologique et gestion de la ressource Eau", Tunis, 13 décembre 2010 / Second meeting of the water resources working group, Tunis, Dec 13, 2010](#)
- [Le premier colloque international MISTRALS se tiendra à Malte du 30 mars au 1er avril 2011 / First MISTRALS International conference will be held in in Malta, 30 March - 1st April, 2011.](#)

