

SYMCRAU



INRA  
SCIENCE & IMPACT

SupAgro  
Montpellier

HYDROFIS®

Syndicat mixte  
de gestion de la  
nappe de la Crau

# Groundwater resource management facing global changes: from the European Directive to the local action plan for the Crau aquifer (SE France)

**Baillieux A., Alcazar C., Villesseche D., Monière C., Trolard F., Bourrié G., Brochier C., Olios A., Chanzy A., Ruy S., Charron F., Belaud G., Fénart P.**



DÉPARTEMENT  
**BOUCHES  
DU RHÔNE**



Région  
Provence  
Alpes  
Côte d'Azur

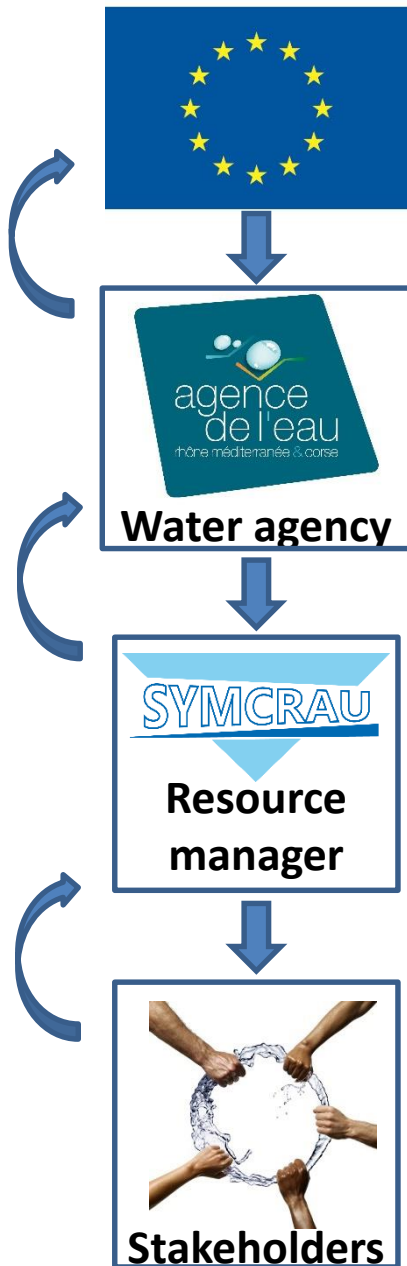


25-29<sup>th</sup>  
September 2016

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## WATER FRAMEWORK DIRECTIVE (2000) GROUDWATER DIRECTIVE (2006)



## RIVER BASIN MANAGEMENT PLAN

- Sets out the environmental objectives
- Determines the orientations
- Updated every six years

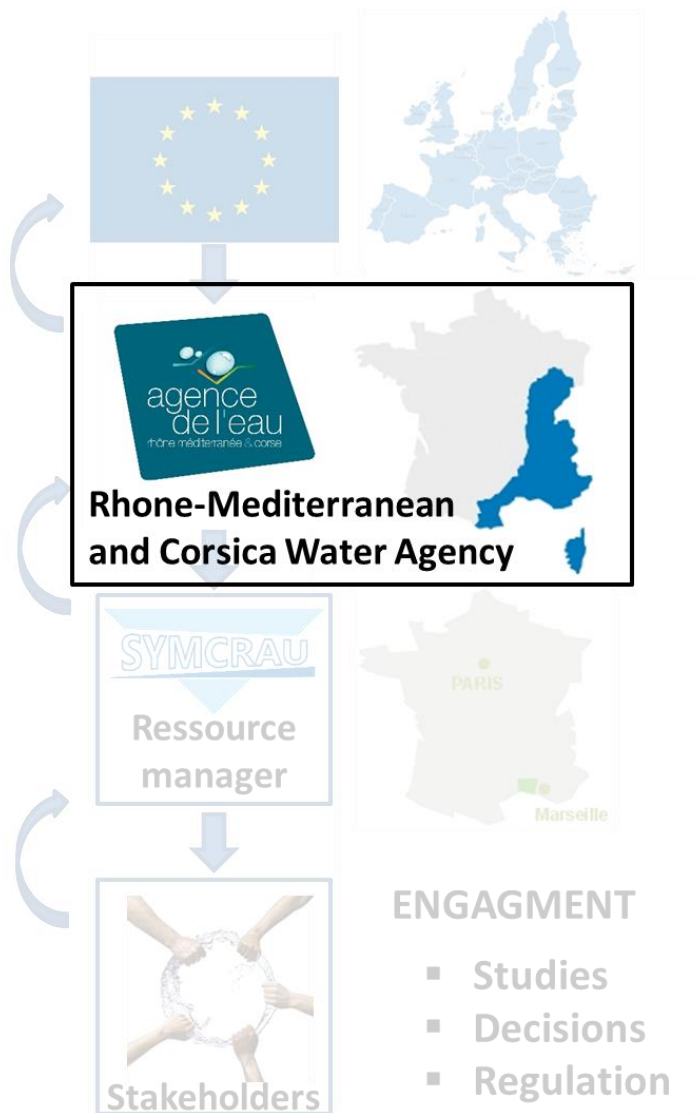


## LOCAL ACTION PLAN

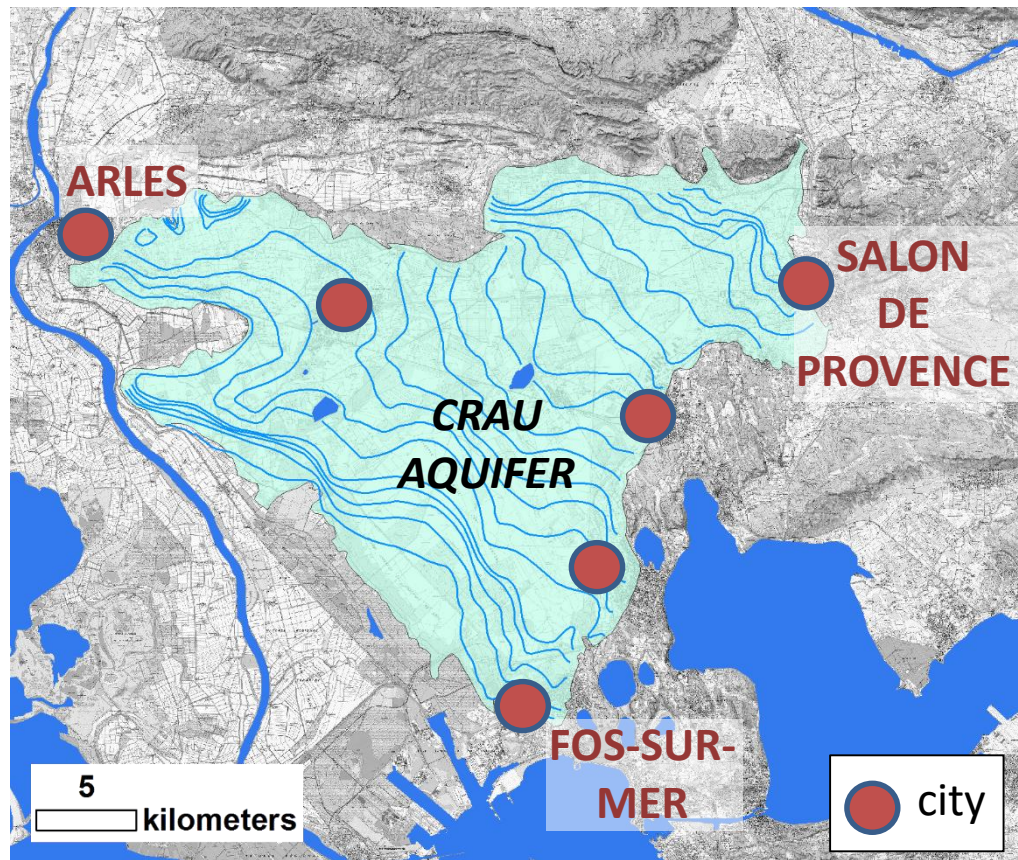
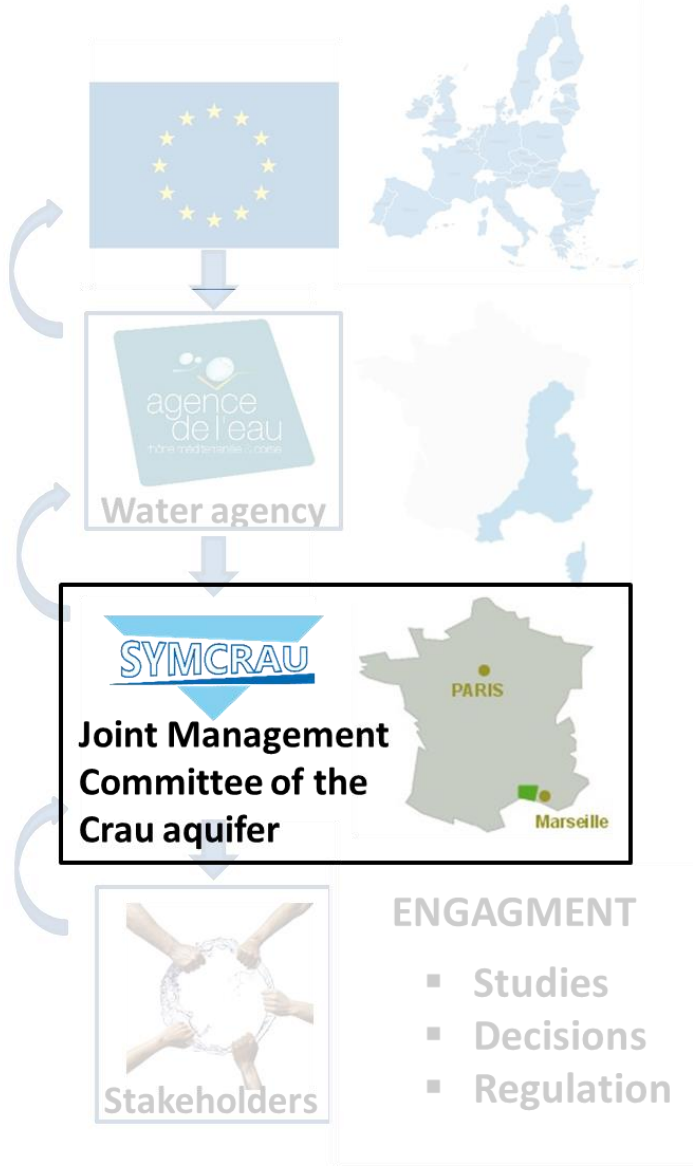
- Assess the local actions
- Identifies the project leaders (contract)
- Defines financial means

## ENGAGEMENT

- Studies
- Decisions
- Regulation



## RIVER BASIN MANAGEMENT PLAN FOR THE RHONE-MEDITERRANEAN AND CORSICA DISTRICT (2016-2021)



## GROUNDWATER RESOURCE OF THE CRAU PLAIN (mediterranean coast)

How **global change issues**  
are taken into account  
in the **action plan** for the **Crau aquifer**?



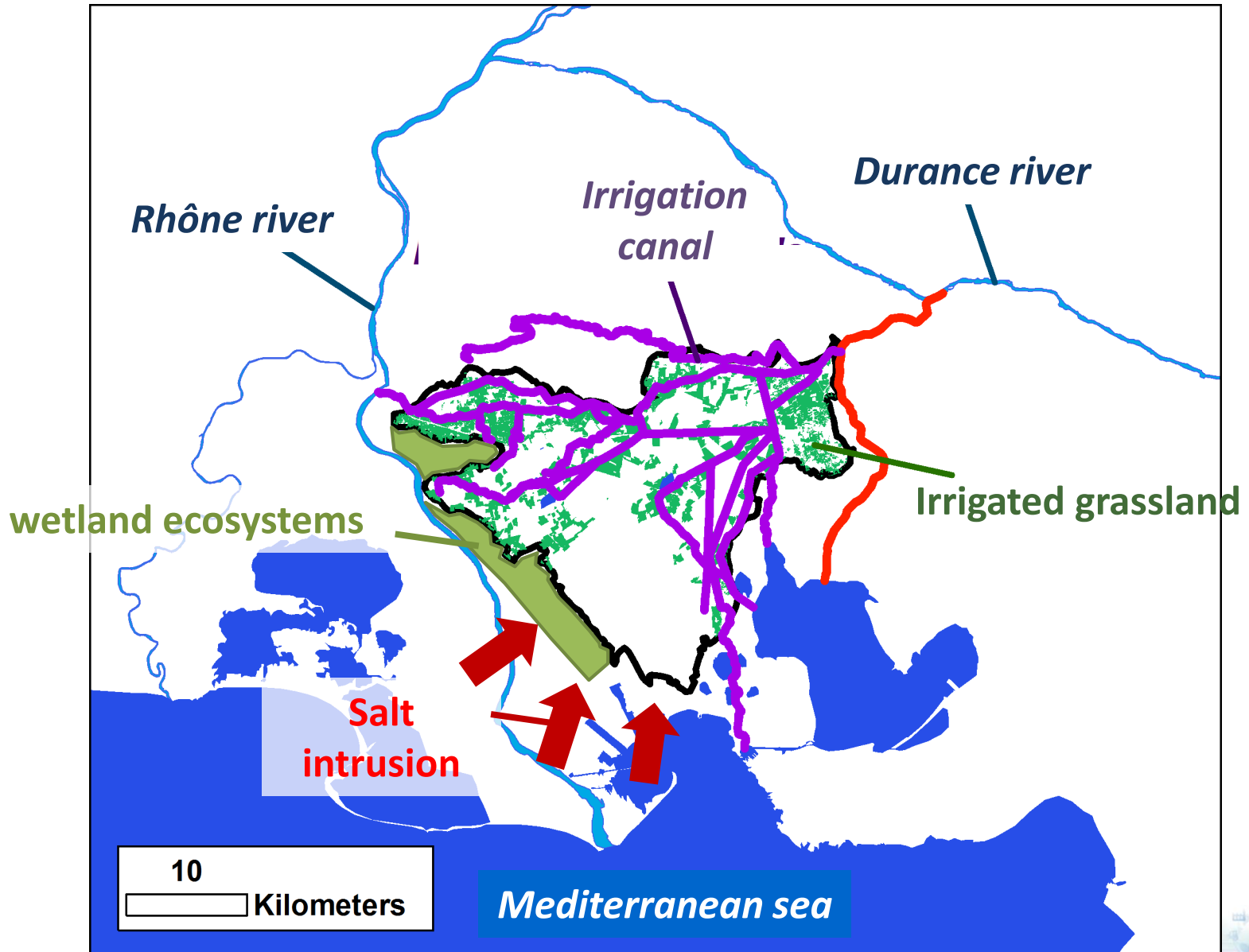
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# SITUATION OF THE CRAU AQUIFER



## What are the issues raised by global changes ?

How ecosystems and salt intrusions are linked to groundwater management?

How much water from the Durance river can be used for irrigation?

What volume of recharge / withdrawals is compatible with a balanced management?

How agricultural practices can face global changes?

Which areas to protect in priority against urban sprawl and pollutions?

**Global changes issues are complex to deal with for local water resource managers and their traditional partners (publics services and consulting offices)**



**Need to collaborate with research institutes to improve knowledge and to develop operational tools**



# CURRENT COLLABORATION

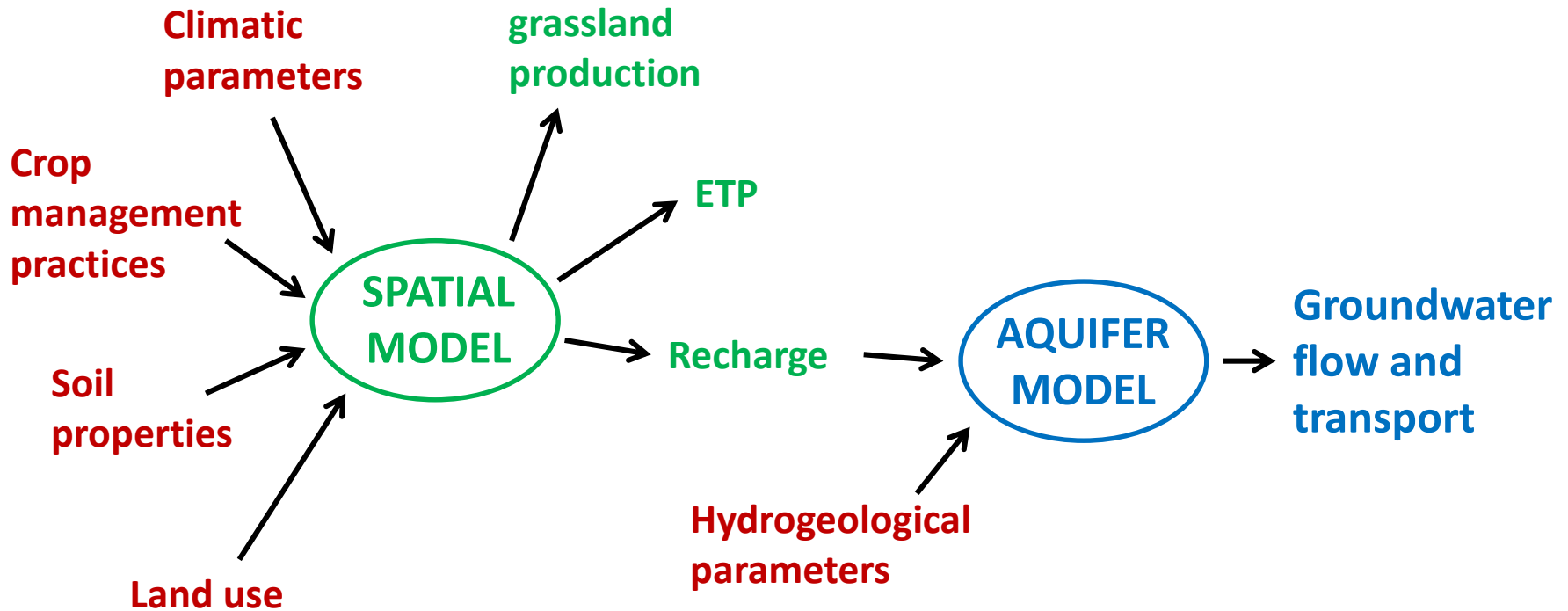
Development of a numerical model to simulate global change impact on the groundwater resource (ASTUCE&TIC / SIRRIMED)



UMR 1114 INRA - UAPV  
Environnement Méditerranéen et  
Modélisation des Agro-Hydrosystèmes

(INRA/Avignon University)

# MODEL DESIGN



## CURRENT COLLABORATION

Development of a numerical model to simulate global change impact on the groundwater resource (ASTUCE&TIC / SIRRIMED)



(INRA/Avignon University)

## GLOBAL CHANGE SCENARIOS

**CLIMATE CHANGE**

A1B 2025-2035

**LAND USE CHANGE**

-12% of irrigated meadow

**WATER AVAILABILITY CHANGE**

-30% of irrigation water



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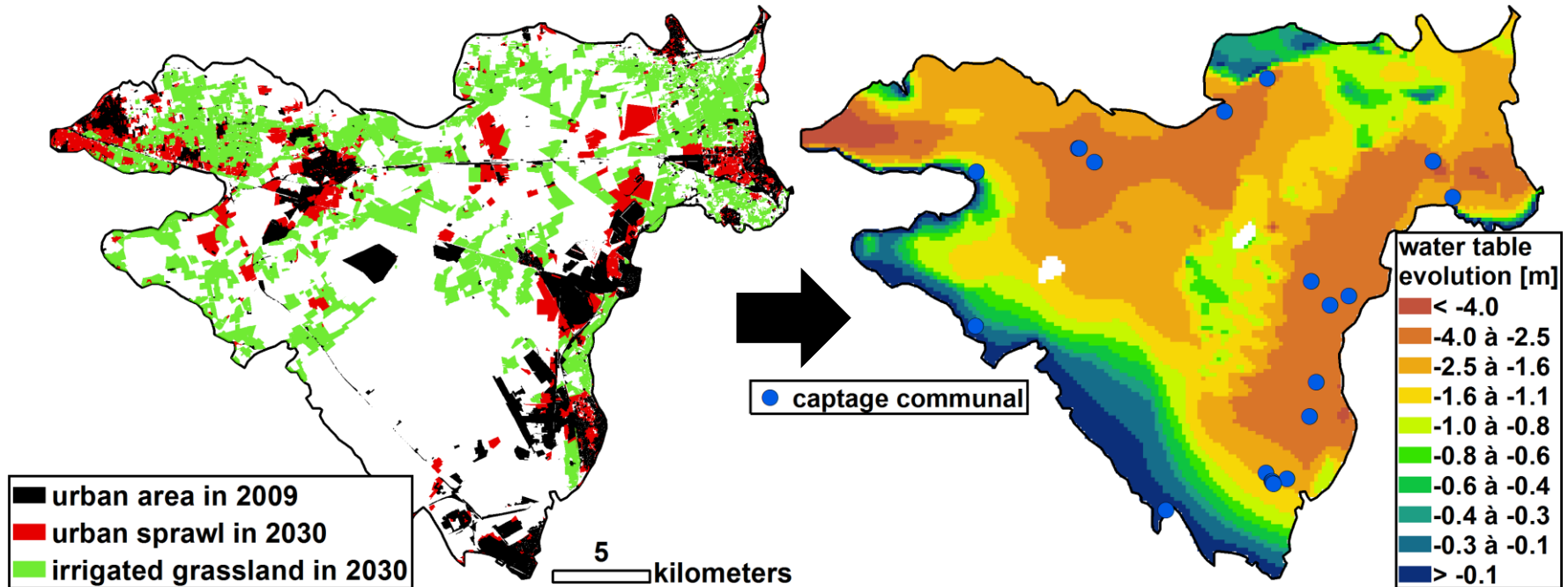
# CURRENT COLLABORATION

Development of a numerical model to simulate global change impact on the groundwater resource (ASTUCE&TIC / SIRRIMED)



INRA/Avignon University

# MAIN RESULTS



Impact of the combination of global changes scenarios on the groundwater resource

## CURRENT COLLABORATION

Development of a numerical model to simulate global change impact on the groundwater resource (ASTUCE&TIC / SIRRIMED)



INRA/Avignon University

## MAIN RESULTS

This study confirms the links between several compartments (water, agriculture, urbanism) that were a priori disconnected

Irrigated grasslands play a major role in the aquifer recharge (70%)

Decrease in drainage, due to global changes, may lead to a significant decrease of the aquifer storage

Results show the interest of the collaboration with research institutes (time of method development, combination of various field of expertise, quality of the results)



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# CURRENT COLLABORATIONS

Development of a numerical model to simulate global change impact on the groundwater resource (ASTUCE&TIC / SIRRIMED)



INRA/Avignon University

Identification of special protection areas to protect future of drinking water supply (project ERS)



# FUTURE COLLABORATIONS

Sensitivity of groundwater to recharge and withdrawals variations & water crisis management (project SINERGI)



Sustainable adaption of irrigation practices to global changes



Monitoring and control of salt water intrusions (SIMBA)

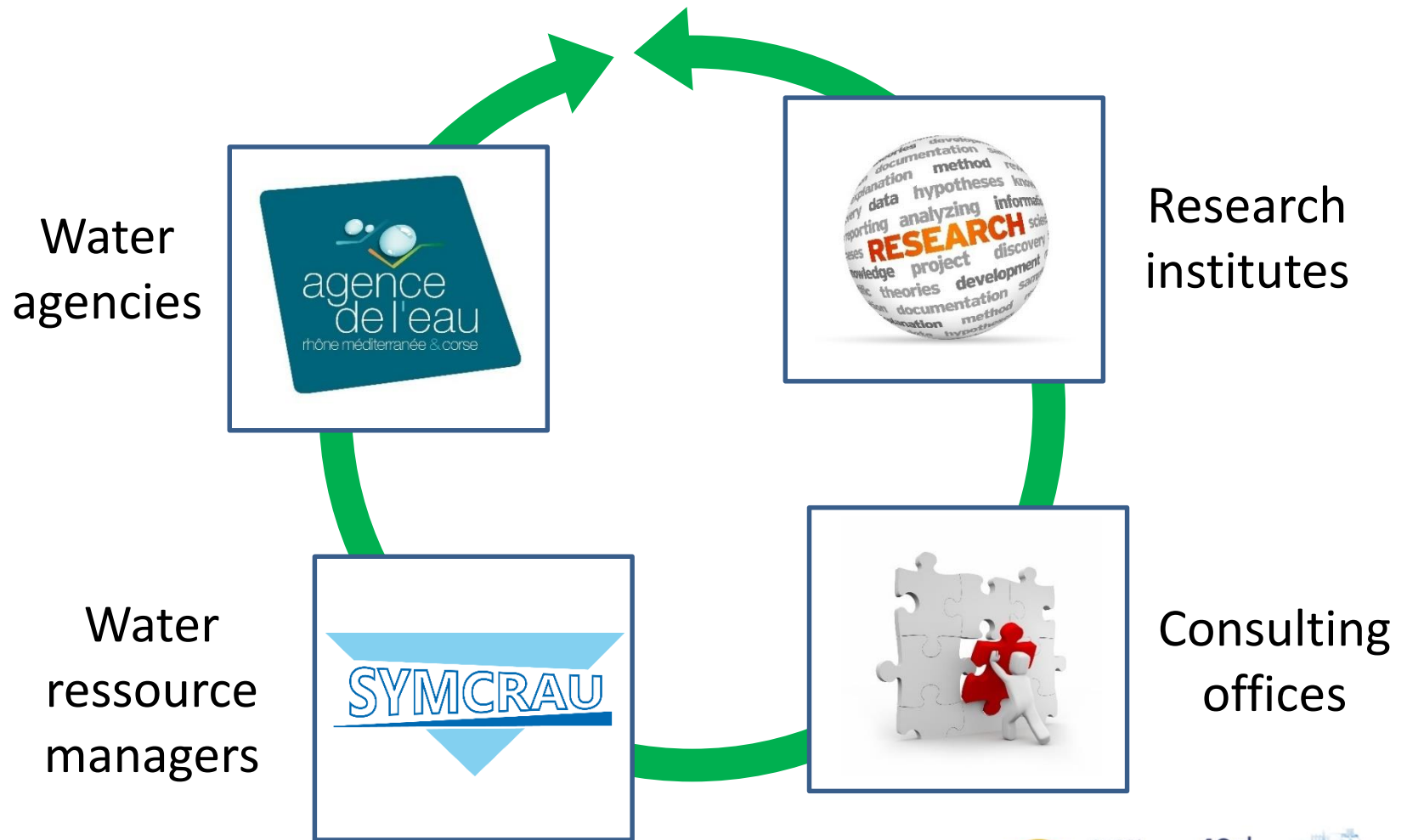


Groundwater management for wetland ecosystems protection



# CONCLUSION

Global changes issues require reinforcing links between **research fields** and **operational programs**



# CONCLUSION

Local water  
resource  
managers

Research  
institutions

## CONTRIBUTIONS

Field knowledge  
Coordination with stakeholders  
“legitimacy” for local actions  
Funding for operational projects

## CONTRIBUTIONS

Multiple skills  
Time for method development  
“Neutrality in results”  
Funding for research projects

## NEEDS

knowledge  
suitable tools  
Transdisciplinary skills  
New fund sources

## NEEDS

Case study  
Field problematic  
Coordination with actors  
New fund sources

