



# WATERPROTECT

## THE CATCHMENT

- **Urban** zone (metropolitan area of the city of Barcelona, densely populated)
- **Alluvial and deltaic plain** of the Llobregat River (120 Km<sup>2</sup> )
- **Mediterranean** climate: drought periods and flow peak events
- **High infiltration** capacity of the river but huge urban areas not permeable
- **Two main aquifer** systems:
  - Llobregat valley and deep deltaic aquifer
  - Surface deltaic aquifer
- More than **700 wells** for drinking, agricultural, and industrial uses (50 Hm<sup>3</sup>/year)
- **Llobregat River** for drinking water (100 Hm<sup>3</sup>/year)
- **Diverted** Ter River water and **desalinated** water also used for drinking water production
- **Reclaimed** water (RCW) for uses like irrigation, cleaning, or aquifer recharge
- High pollution from **urban** and **industrial** sources (4 WWTPs)
- **Salinity** problems:
  - Seawater intrusion in aquifer
  - Salt mining activities in river

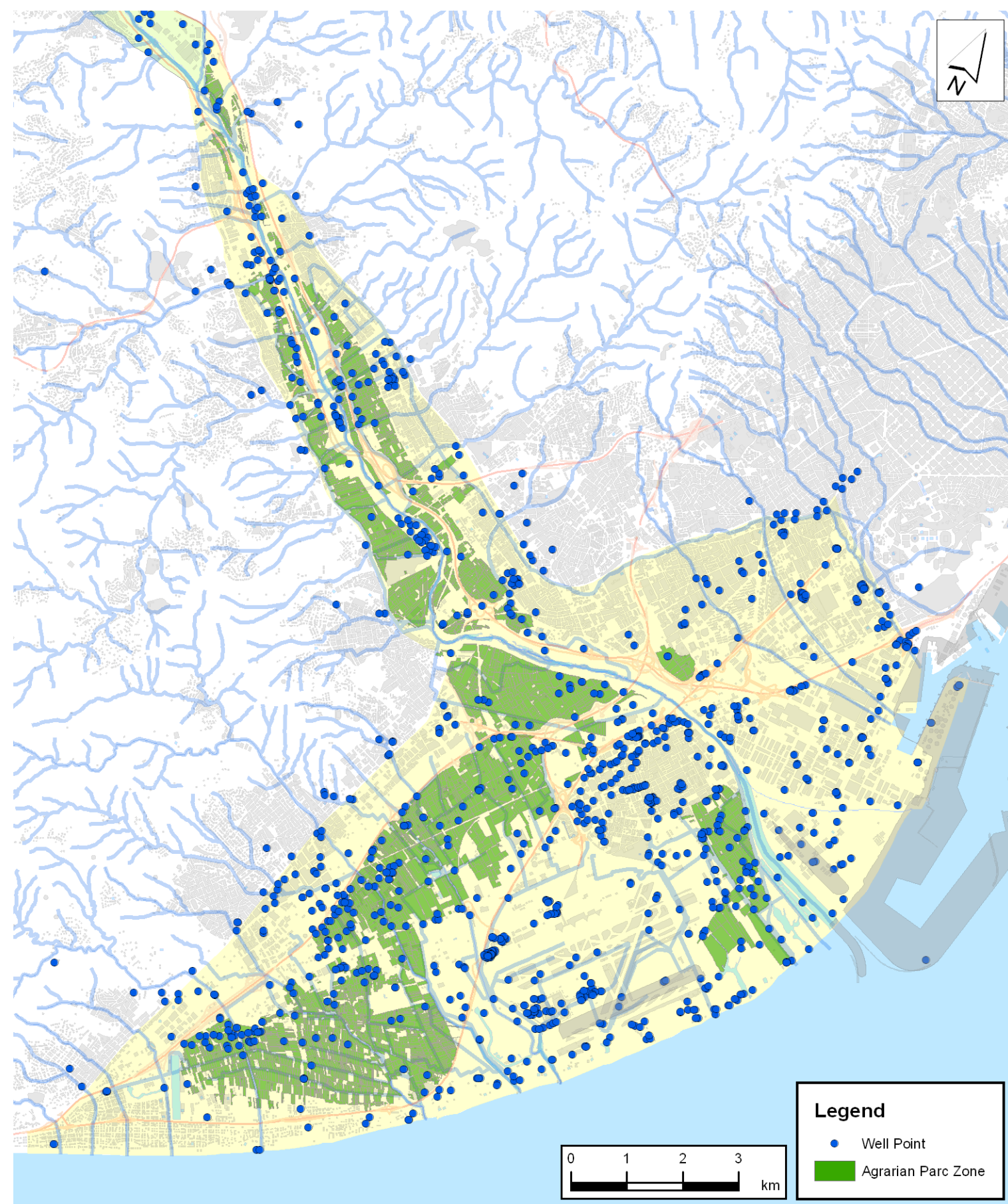


Figure 1. Location of groundwater quality monitoring wells at the Spanish Action lab

## LOCAL CHALLENGES

**Measures to reduce chemical impact** of agricultural, industrial and urban activities. The impact of agricultural activity is relatively **low** in the area, and this activity contributes to GW recharge and preserves land from urbanization. In terms of agriculture, it is required:

- Improving agrarian practices in terms of plant protection products (PPPs) application and introduction of water efficient measures (BMPs)
- Improving irrigation infrastructure
- Monitoring and controlling agrarian enterprises (of any size)

**Ensure drinking water quality and quantity during water scarcity scenarios**

## MITIGATION MEASURES & BMPs

Successful mitigation measures taken up **in the past** include:

- Construction of a channel to divert water from two contaminated streams to a point of the river downstream of the waterworks
- Enhancing soil-aquifer treatment through recharge ponds
- Injection of river water in the Low Valley aquifer to increase GW quantity and quality
- Construction of a brine collector to discharge mining waste into the sea

**Following mitigation measures:**

- Evaluation of *in situ* bioremediation techniques (fungi, algae)
- BMPs aimed at reducing the application of PPPs: training workshops, provision of tools for easy calibration of sprayers, provision of common areas to clean sprayers, promoting the use of alternative measurements to fight pests and correct management of containers with banned PPPs, supporting farmers advisory entities

## GOVERNANCE

- To increase water resources (transfer of Ter River water will be minimized, water scarcity scenarios will likely increase in frequency/severity under climate change and take place during irrigation season) through increasing use of reclaimed water
- To improve organoleptic properties of drinking water
- To control urban and industrial pollution

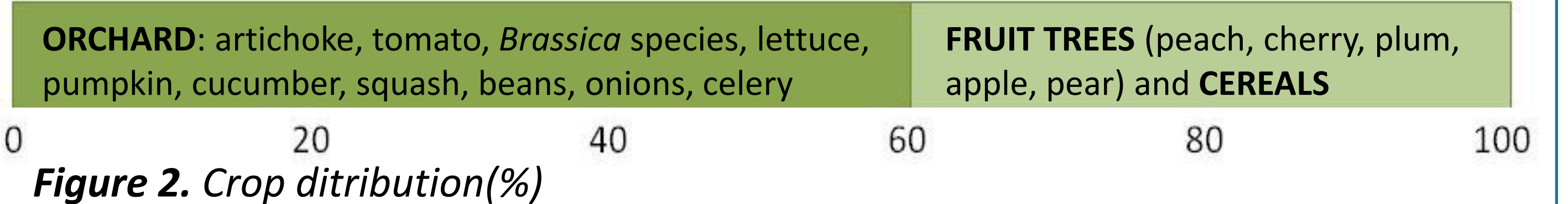
**Limitations:** **Lack of economical resources** - upgrading wastewater/drinking water treatment plants, constructing a distribution supply system for reclaimed water, improving irrigation infrastructure.

# Action Lab Lower Llobregat River basin

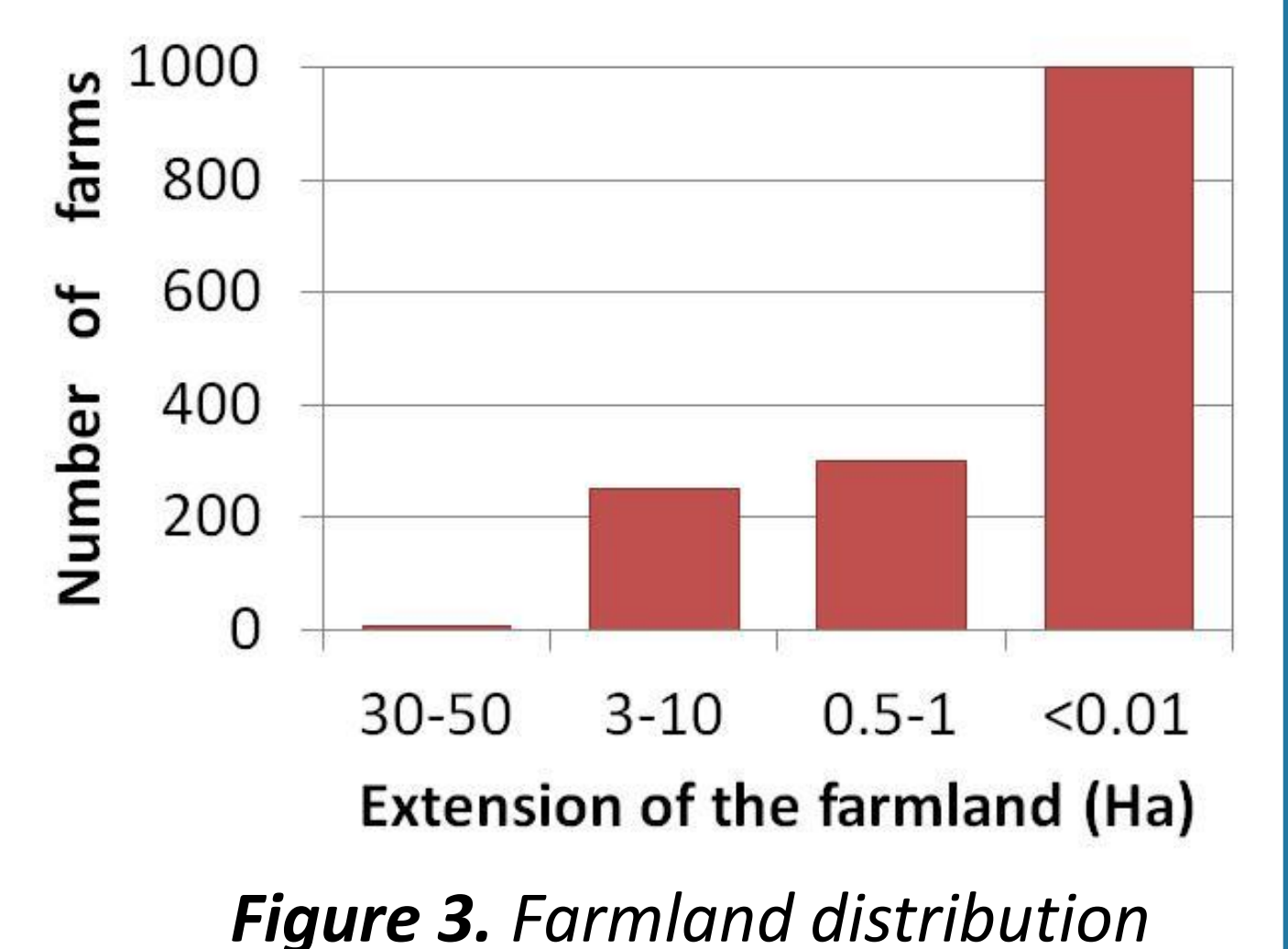


## AGRICULTURAL ACTIVITIES

Most of the agricultural activity in the area is carried out in the Agrarian Park (34 Km<sup>2</sup> of agrarian soil, 14 municipalities, annual production: 35,371 tonnes)



- Water sources for crop irrigation:**
- Llobregat River water
  - Anoia River (tributary) + RCW
  - Groundwater (GW)+Reclaimed water (RCW)
  - Groundwater
  - RCW + GW+ field, urban & forest areas run-off.



## PROJECT IMPACT



Monitoring of water salinity and chemical pollution in general are good indicators of the evolution of water quality



One farmer training event on *BMPs regarding application of fitosanitary products (practical /theoretical workshop)*  
One informative workshop on the *use of biological resources to reduce the application of fitosanitary products*



Open access to ground- and surface water quality information through the **GISEL** Webtool / App



Evaluation of surface water bioremediation techniques  
Promote BMPs related to minimize PPPs application



Compilation of historical data on ground- and surface water quality and generation of additional required data



24 stake-holders (including farmers' union) involved (see Fig. 4)

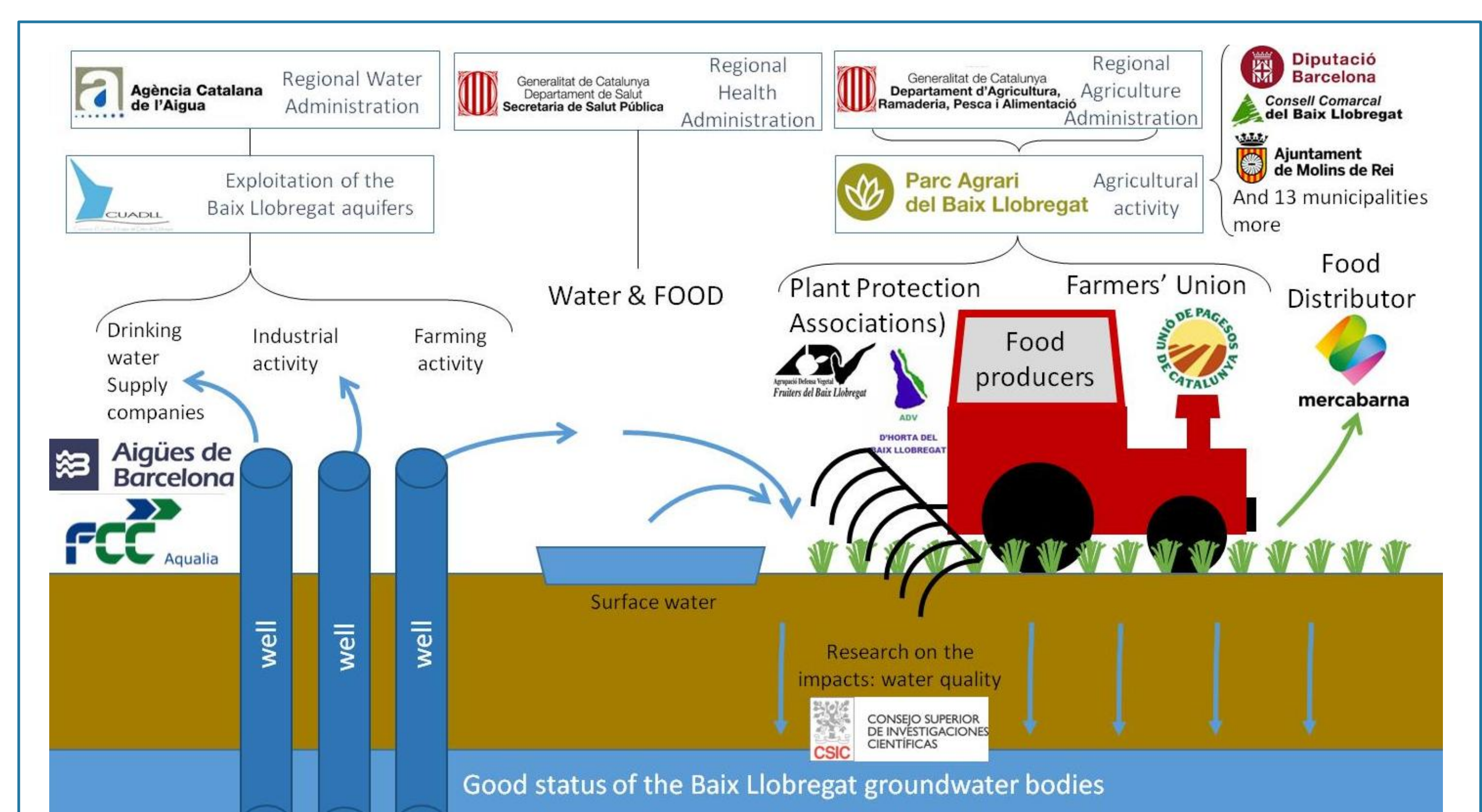


Figure 4. Main actors involved in water governance

**Policy recommendations:**

- To fully integrate reclaimed water resources into the water cycle
- To promote the use of rainfall water as an additional water resource (and support the necessary infrastructure)
- To perform public campaigns on water protection for a deeper involvement of society and motivate its participation in water governance.



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