2nd LENSES E-DIALOGUE WEBINAR:
SUSTAINABLE WATER MANAGEMENT IN SEMID-ARID AREAS

20 June 2023
h. 10:00 CET

This project is part of the PRIMA programme supported by the European Union.
GA n° [2041] [LENSES] [Call 2020 Section 1 Nexus IA]

EFFICIENT USE OF WATER RESOURCES IN SPAIN: Challenges & Opportunities.

Esteban Henao
esteban.henao@agrisat.es

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Content and Structure

1. Introduction
2. Overview of Water Resources in Spain
3. Agricultural sector: Strengths and Weaknesses
4. Policy and Legal Framework
5. Opportunities for Efficient Water Management in the agricultural sector
6. Collaboration and Stakeholder Engagement
7. Conclusion

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1. Introduction

- By 2030, there will be a 40% shortfall between water demand and supply.
- Water scarcity, hydrological uncertainty, and extreme weather events
- Feeding 10 billion people by 2050 requires a 50% increase in agricultural production and a 15% increase in water withdrawals.
- Over 40% of the world's population lives in water-scarce areas.
- Climate change intensifies the situation.
- Transboundary basins and aquifer systems.

The World Bank, 2022.

Improved water resource management, institutional strengthening, and infrastructure development are necessary to enhance water security!!!

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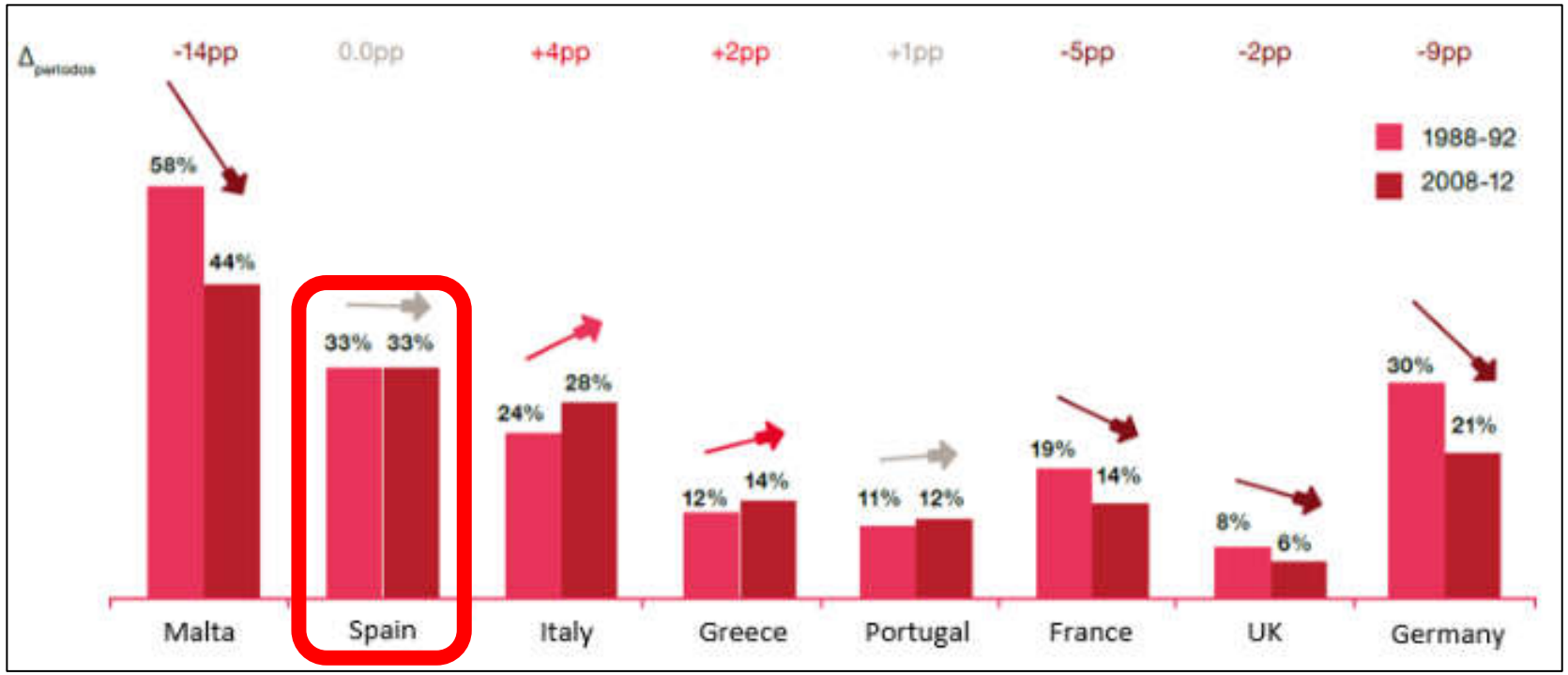
2. Overview of Water Resources in Spain

High levels of water stress due to its:

- Low level of available renewable water resources
- High level of high-water consumption per inhabitant



Water Stress Index. Source: PwC, 2018. EUROSTAT.

Spain has the highest ***Water Stress Index*** of the large European countries (33%). In addition, this situation has not changed in the last 30 years.

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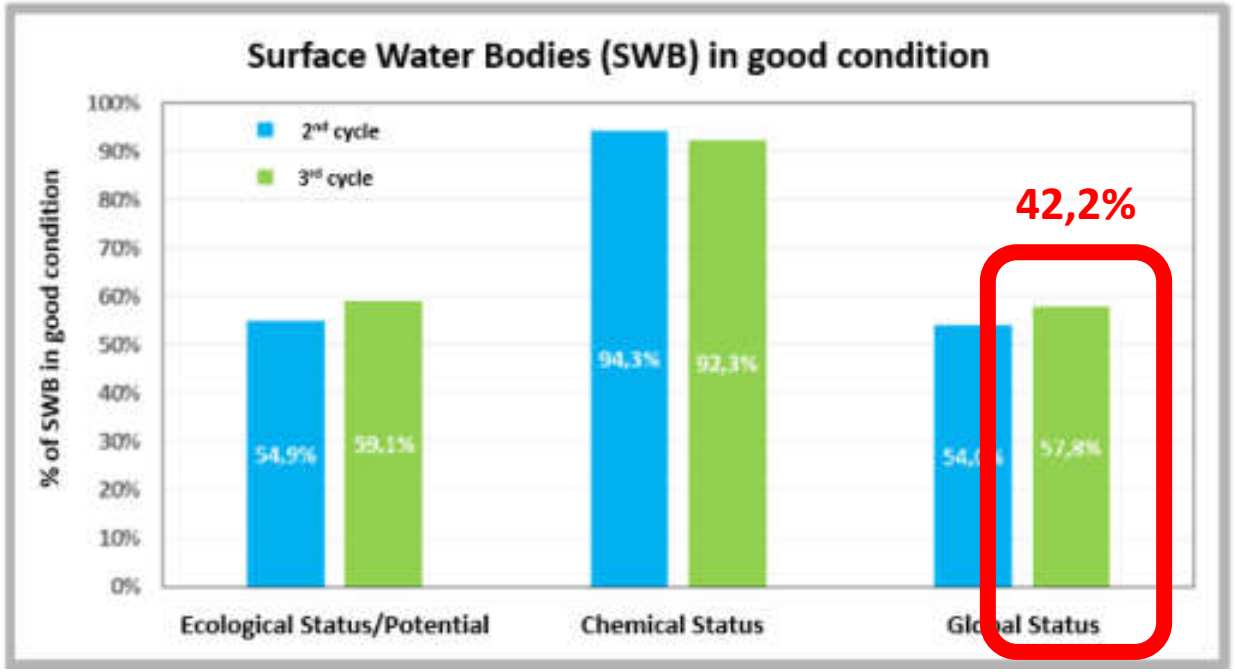
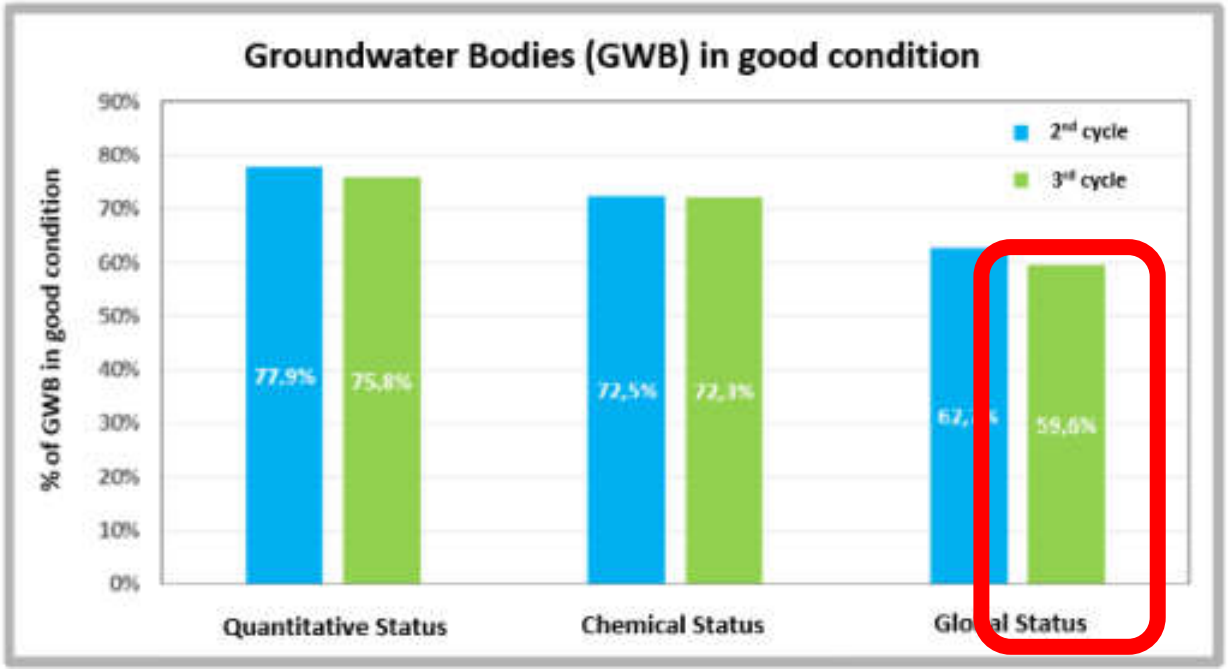
2. Overview of Water Resources in Spain





Status of Surface (left) & Groundwater (right) in Spain. Source: MITECO, 2022.

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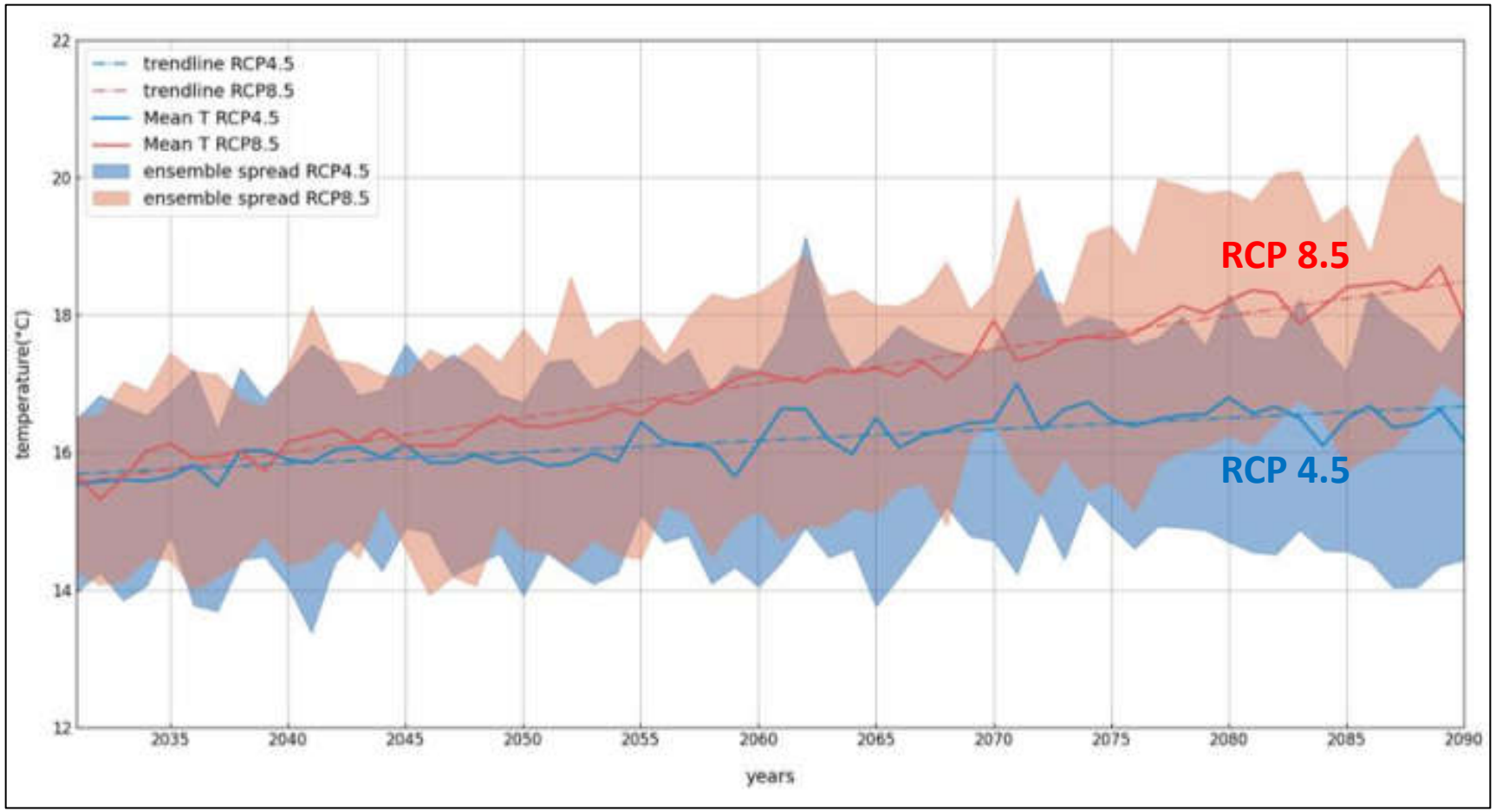
2. Overview of Water Resources in Spain: Future Scenarios



Mean Temperature RCP4.5 & RCP8.5. Source: results presented within the framework of the REXUS project by DRAXIS SL, 2022.

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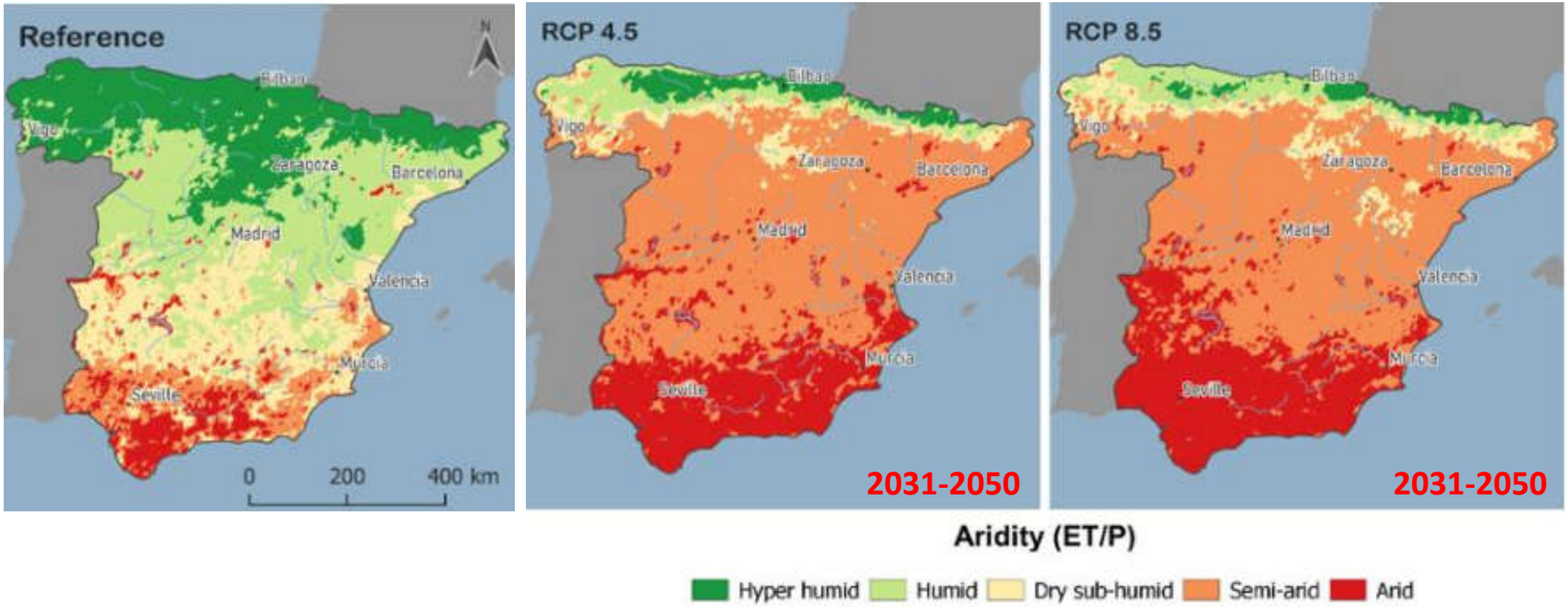
2. Overview of Water Resources in Spain: Future Scenarios



Risk indicators with RCP4.5 & RCP8.5: Aridity. Rf period: 1986-2005. Source: Results presented within the framework of the REXUS project by DRAXIS SL, 2022.

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2. Overview of Water Resources in Spain

Delta del Ebro

Albufera de Valencia

Mar Menor

Tablas de Daimiel

Doñana

GOBIERNO DE ESPAÑA
MINISTERIO PARA LA TRANSICIÓN ECOLÓGICA Y EL RETO DEMOGRÁFICO

Spain's unique biodiversity to be protected. Source: GDW, 2022.

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3. Agricultural sector: Strengths & Weaknesses

Typology	Strengths	Weaknesses
Economical	Relevance sector in the economy and the society Diversified agricultural production Export capacity	Dependence on the CAP and limited access to sources of financing Low R&D effort High production costs (e.g., energy)
Social	Experienced farmers Potential to generate employment Population with high levels of education	Low social appreciation of the agricultural profession Low level of income Lack of generational turnover
Environmental	Increased consumer appreciation of environ. friendly production	Agriculture abstractions: 65%. Sometimes Non authorized Water pollution Flooding & Droughts / High levels of aridity Temperature increase Generation and spread of resistance to plant health products

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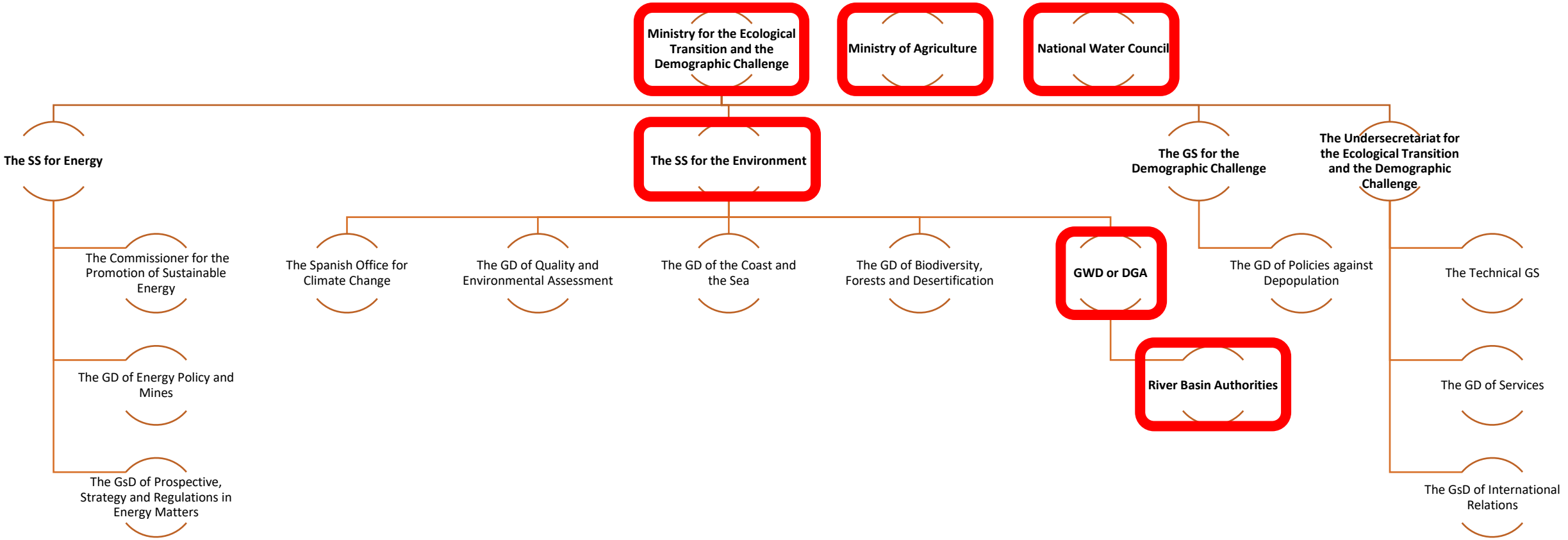
4. Policy and Legal Framework



SS: *Secretary of State*
GD: *General Directorate*
GDW: *General Water Directorate*
GS: *General Secretariat*
GsD: *General Sub-Directorate*

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4. Policy and Legal Framework

Ministry for the Ecological Transition and the Demographic Challenge

Ministry of Agriculture

National Water Council

The Secretary of State for the Environment

General Water Directorate

River Basin Authorities

Implementation of national water policies and regulations at the basin level, including water quality monitoring, water infrastructure development, and issuing permits for water use.

Regional government

SS: *Secretary of State*
GD: *General Directorate*
GDW: *General Directorate of Water*
GS: *General Secretariat*
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4. Policy and Legal Framework

Main policies and regulations for water and agriculture. Source: MITECO, 2021.

Water	Agriculture
Water Law (Ley de Aguas)	Common Agricultural Policy (CAP)
River Basin Management Plans (Planificación Hidrológica)	Water Use and Allocation Regulations
Water Pricing and Tariffs	Environmental Regulations and Cross-Compliance
Environmental Protection and Conservation	Good Agricultural Practices (GAP)
Drought and Water Scarcity Management	Agri-Environmental Schemes
Water Allocation and Permits	Irrigation Modernization Programs
Water Infrastructure Development	Organic Farming Regulations

- There is no single model for effective water governance! → Governance systems must be tailored to the social, economic and cultural particularities of each country.

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5. Opportunities for Efficient Water Management

IRRIGATION: Main water use in the EU (agriculture)

Water scarcity and drought are becoming increasingly frequent phenomena.

Need for better water management and monitoring of water resources

Awareness and best practices: from the farmer to the authorities

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5. Opportunities for Efficient Water Management

How can we improve water management?

We offer solutions through services based on remote sensing and precision agriculture!

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5. Opportunities for Efficient Water Management

"Connecting sky…

….and Land"

CROP WATER MANAGEMENT

- *Water Requirements*
- *Irrigation*
- *Water Allocation*
- *Hydrological Planning*

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5. Opportunities for Efficient Water Management

SERVICES & COLLABORATIONS

www.teledeteccionysig.es

https://hidrogestor.es/

https://irrimaps.com/

http://fertimaps.es/

www.agrisatwebgis.com

https://agrisat.es/productos/productos-equipos/

PROJECTS

http://fatima-h2020.eu/?lang=es

https://diana-h2020.eu/es/

https://apollo-h2020.eu/es/

https://www.coalaproject.eu/

https://nbsoil.eu/

https://www.lenses-prima.eu

https://fastplatform.eu/

https://www.sieusoil.eu/

https://www.rexusproject.eu/

https://bferst.eu/

https://tudi-project.org/

https://www.stargate-h2020.eu/

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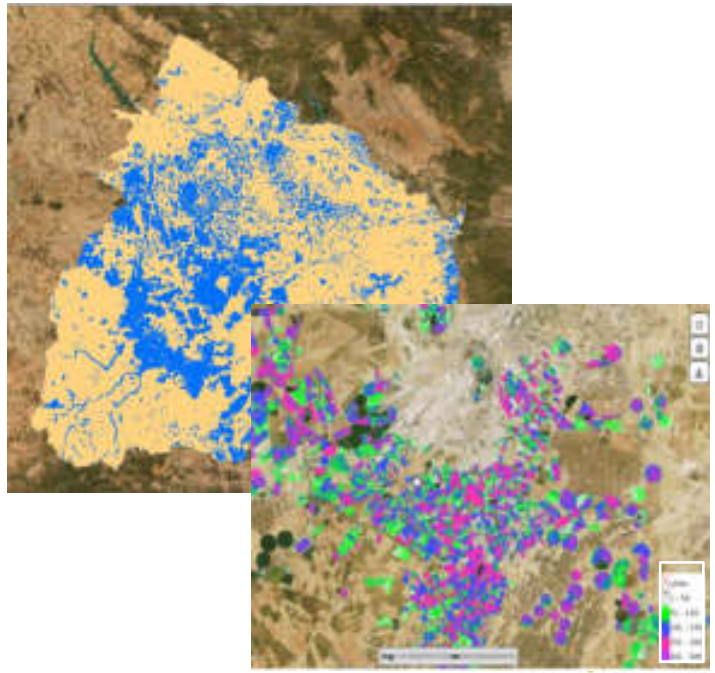
5. Opportunities for Efficient Water Management

Agro-meteorological Parameters

irrimaps® Riego eficiente

Hidrogestor Administración inteligente



Farmers → Water managers

agriSat Iberia, S.L.

PRIMA IN THE MEDITERRANEAN AREA

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5. Opportunities for Efficient Water Management

EVOLUCIÓN DE LAS SUPERFICIES EN REGADÍO, EN EL ÁMBITO DEL ACUÍFERO DE LA MANCHA ORIENTAL, MEDIANTE TÉCNICAS DE TELEDETECCIÓN

ERMOT

1998- actual

EVOLUTION OF IRRIGATED AREAS IN THE AREA OF THE EASTERN MANCHA AQUIFER USING REMOTE SENSING TECHNIQUES

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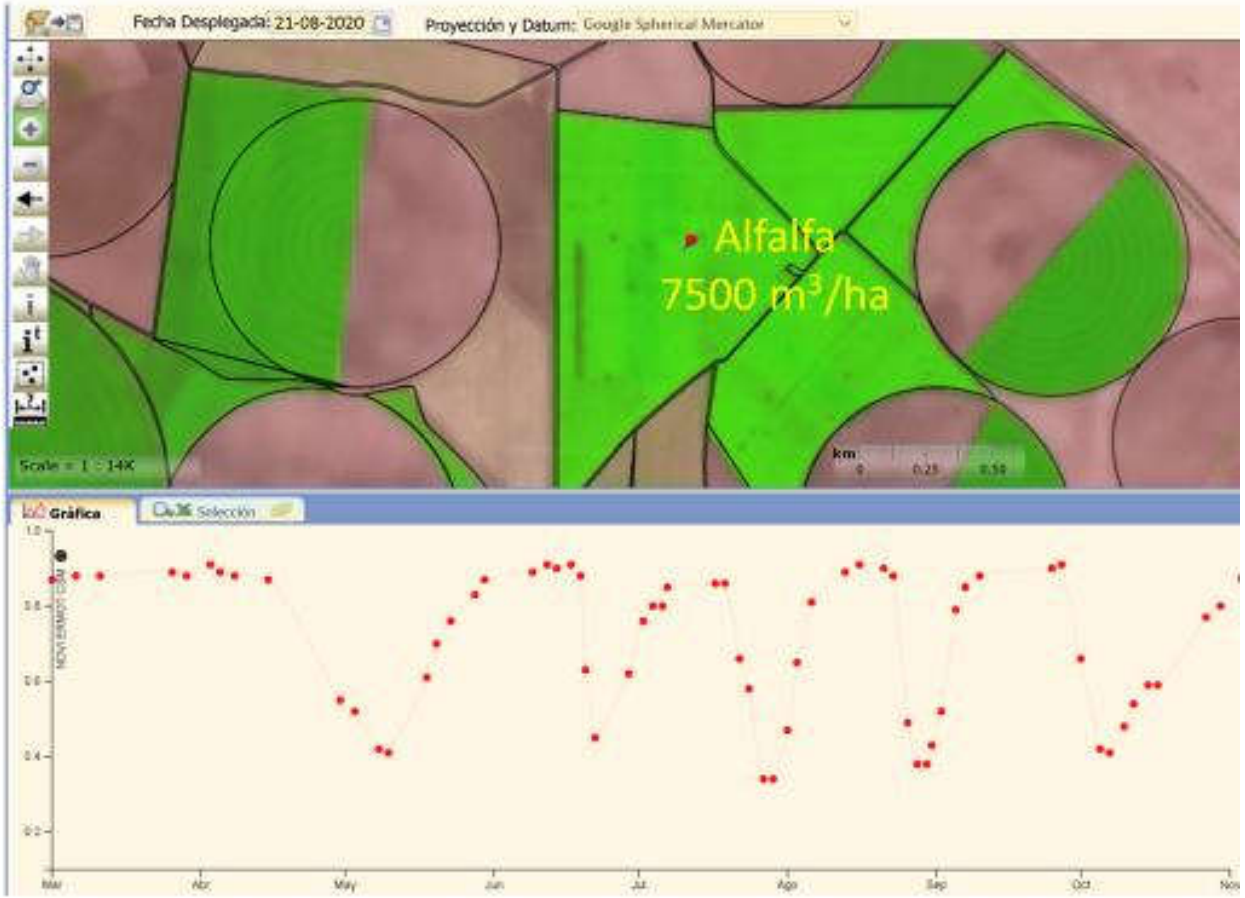
5. Opportunities for Efficient Water Management

ERMOT Project; 1998-current

Earth Observation for (ground)Water Management

Time series of images for monitoring crops, supporting field inspection and mapping irrigated areas

Key Success Factors:
Participatory community tool;
Technology available // mature for operations;
Commitment of users;



Free images of a constellation of satellites are currently being used: Sentinel2a; Sentinel2b (10 m pixel sixe), a Copernicus program of the European Commission,

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5. Opportunities for Efficient Water Management

For more than 25 years, the Júcar River Basin Authority, the Central Irrigation Board of Eastern La Mancha, the University of Castilla La Mancha, and AgriSat, have worked together within the framework of the ERMOT project, to assign water rights and for the monitoring of irrigated areas using remote sensing techniques.

GOBIERNO DE ESPAÑA
MINISTERIO PARA LA TRANSICIÓN ECOLÓGICA Y EL RETO DEMOGRÁFICO

Confederación Hidrográfica del Júcar, O.A.

JUNTA CENTRAL DE REGANTES DE LA MANCHA ORIENTAL

Teledetección y SIG
Instituto de Desarrollo Regional
Universidad Castilla-La Mancha

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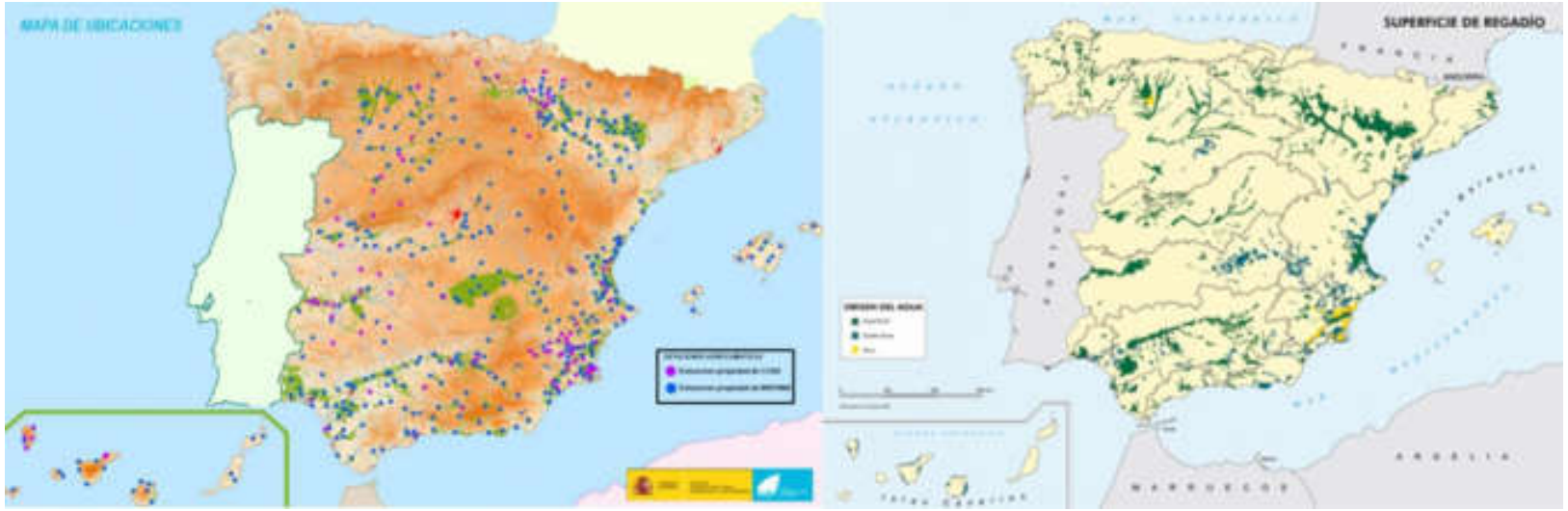
5. Opportunities for Efficient Water Management



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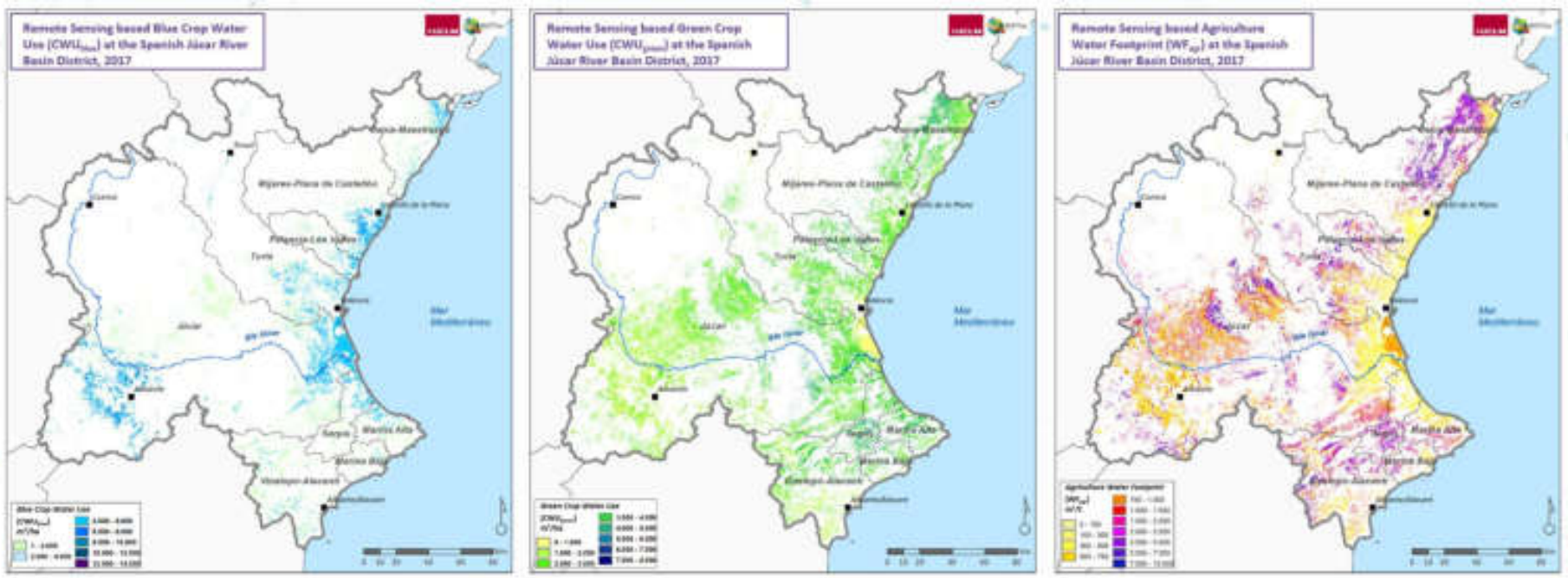
5. Opportunities for Efficient Water Management

Water Accounting & Footprints



Remote Sensing based Water Accounting and Footprint:

- Spatial Extent: Júcar River Basin (42,735 km²)
- Time period: years 2017 (dry) & 2020 (humid)
- Satellite: Sentinel – 2 A&B (spatial resolution 10x10m)
- Water Accounting products: CWU_{blue} & CWU_{green}
- Water Footprint products: WF_{green}, WF_{blue} & WF_{agr}

https://www.chj.es/es-es/medioambiente/planificacionhidrologica/Documents/Plan-Hidrologico-cuenca-2021-2027/PHC/Documentos/PHJ2227_Anejo03_UsosDemandas_20220329.pdf

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6. Collaboration and Stakeholder Engagement

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7. Conclusions

- Governance systems must be tailored to the social, economic and cultural particularities of each country.
- Incorporate scientific criteria and involve farmers, foster transparency focusing on building capacity, adaptability, and resilience.
- Develop models to assess masses at risk and Decision-making processed based on the integration of remote sensing data on models.
- Explore economic instruments to incentivize responsible resource management and conservation.

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13 PROJECT PARTNERS

Centre for Agricultural Research and Economics (Italy)

University of Padua - Department of Land, Environment, Agriculture and Forestry (Italy)

Water Research Institute of the National Research Council (Italy)

ETIFOR S.R.L. (Italy)

AgriSat Iberia, S.L. (Spain)

EcoAdapta (Spain)

Soil and Water Resources Institute of the Hellenic Agricultural Organization "DEMETER" (Greece)

Technical University of Crete (Greece)

Galilee Research Institute Ltd. (Israel)

National Agricultural Research Center (Jordan)

Draxis Environmental S.A. (Greece)

International Agricultural Research and Training Centre (Turkey)

Uluslararasi Arastirma Gelistirme Muhendislik Yazilim Ve Danismanlik Limited Sirketi (Turkey)

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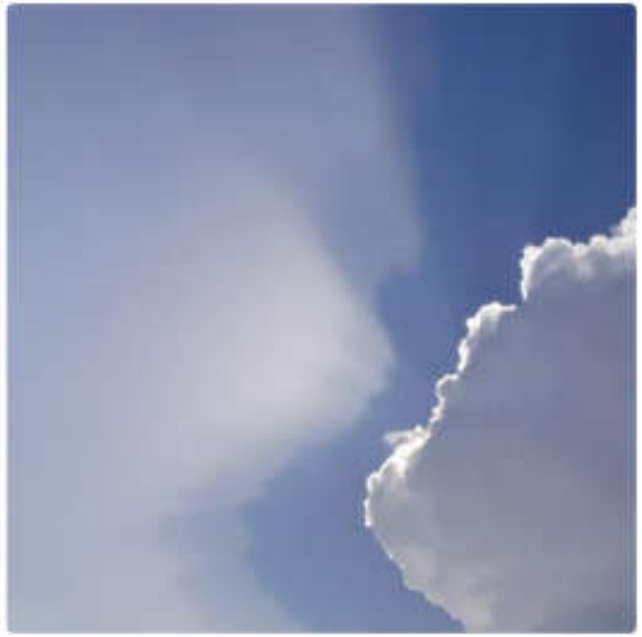
THANKS FOR YOUR ATTENTION!



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