



# Mara-Mediterra



PRIMA programme is supported by Horizon 2020, the European Union's Framework Programme for Research and Innovation

## Safeguarding the livelihood of rural communities and the environment in the Mediterranean through Nature-based Solutions

	<b>The PRIMA funded Mara-Mediterra research and innovation project</b>
14:00 – 14:45	<p><a href="#"><u>Regional actions to combat land degradation, enhance climate change resilience, and food security: the Mara-Mediterra approach</u></a></p> <p><i>Dr. Vasileios Takavakoglou, Mara-Mediterra Project Coordinator</i> <i>Hellenic Agricultural Organization "DIMITRA", Soil and Water Research Institute (SWRI)</i></p>
14:45 – 15:15	<p><a href="#"><u>Guiding the setting up of Living Labs in 5 hotspots of land and water degradation</u></a></p> <p><i>Anna Spiteri, Mara-Mediterra Work Package 3 Leader on Guiding the Living Lab Process, Managing Director, Integrated Resources Management Co Ltd. (IRMCo)</i></p>
15:15 – 15:30	<b>Questions and answers</b>
15:30 – 15:45	<b>Coffee break</b>

	<b>Synergies between Mara-Mediterra and MCST-TUBITAK funded UNIMED project</b>
15:45 – 16:10	<p><a href="#"><u>A UNified framework to cope with droughts under MEDiterranean climate change conditions (UNIMED): scope and expected outcomes</u></a></p> <p><i>Dr. Cem Polat Cetinkaya, UNIMED Scientific Coordinator and Mara-Mediterra Teamleader at Dokuz Eylul University (DEU)</i></p>
16:10 – 16:35	<p><a href="#"><u>Examining the historical evidence of droughts around the Mediterranean</u></a></p> <p><i>Eng. Dirk De Ketelaere, UNIMED Principal Investigator and Mara-Mediterra Communication Manager, Senior Researcher, Integrated Resources Management Co. Ltd. (IRMCo)</i></p>
16:35 – 16:45	<p><a href="#"><u>Exploring further synergies with EU funded projects modernAKIS and MED-WET</u></a></p> <p><i>Dr. Sarah Camilleri, Senior Research Officer and Dr. Francesca Busuttil, Researcher - Applied Research &amp; Innovation Centre (ARIC), Malta College of Arts, Science and Technology (MCAST)</i></p>
16:45 – 17:00	<b>Questions and answers, Closing remarks</b>



Mara-Mediterra project is part of the PRIMA Programme supported by the European Union's Horizon 2020 Research and Innovation Programme (G.A. No 2121).



**Safeguarding the livelihood of rural communities and the environment in the Mediterranean through Nature-based Solutions**

# Regional actions to combat land degradation, enhance climate change resilience, and food security: the Mara-Mediterra approach

**Dr. Takavakoglou Vasileios**  
Mara-Mediterra Coordinator



# Setting the Scene

Mediterranean agri-food systems face today severe and persistent interlinked challenges without frontiers.

- Climate change and environmental challenges
- Geopolitical challenges
- Global health and safety related issues (e.g., COVID-19)
- Consumption patterns and consumers behavior



These challenges point to the urgent need of transforming the food systems and the management practices of our natural resources in order to stay within planetary boundaries, while ensuring the livelihood of Med communities.



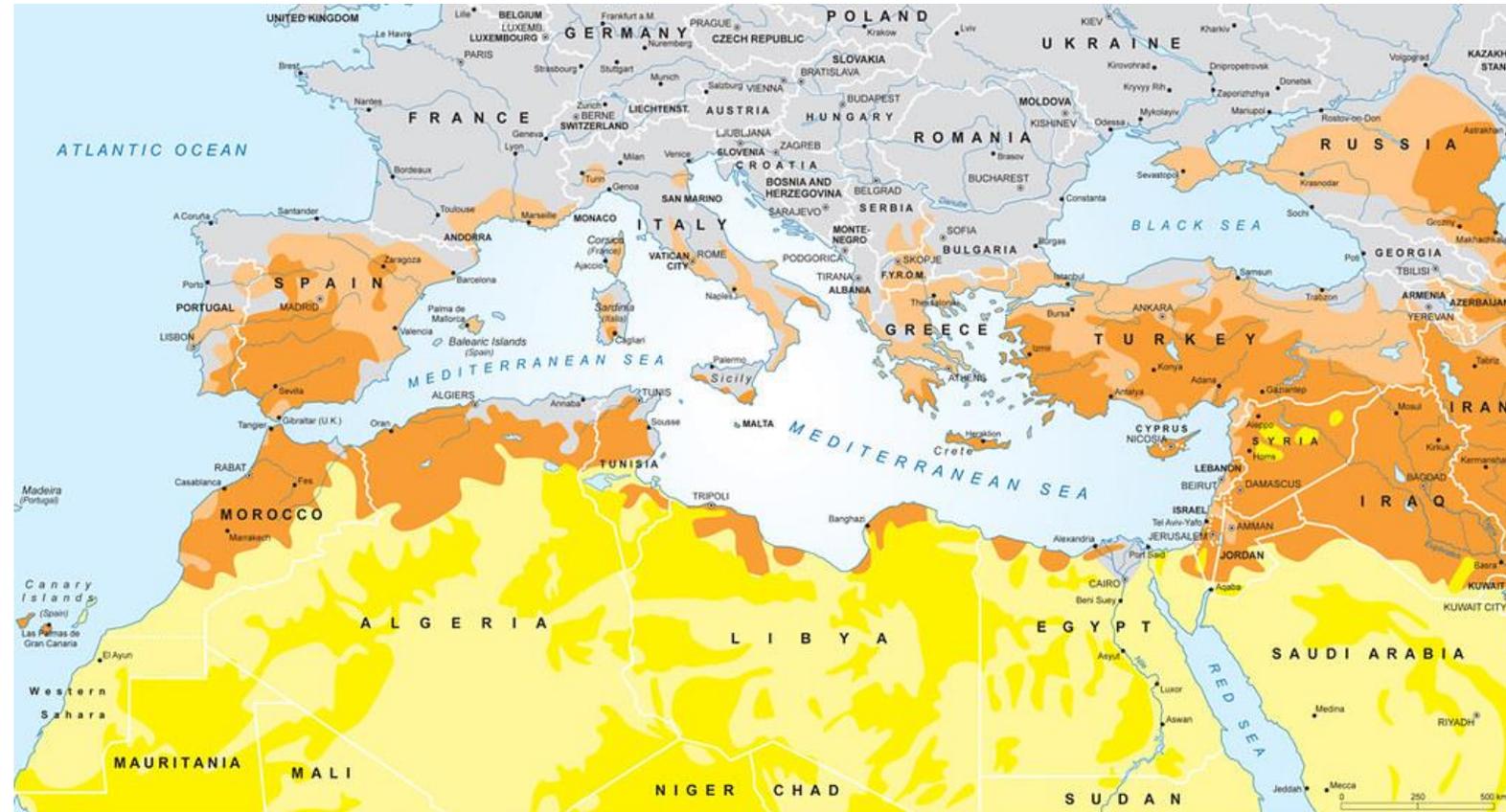
# Challenges without Frontiers

The Mediterranean Basin is experiencing **major changes in environmental conditions**, which introduce new challenges to the **resilience of its natural and human systems**.

 The Mediterranean region is warming 20% faster than the global average.

 2°C global warming will reduce precipitation by ~10 to 15%.

 By 2050, water demand is projected to double or even triple.



Environment and Security in the Mediterranean: **Desertification**

- Desert
- Semi-desert
- Desertification vulnerability, serious
- Desertification vulnerability, moderate

Sources: Natural Resources Conservation Service, Plan Bleu, Times Atlas of the World





# Challenges without Frontiers

## Quiz No 1

How many people will be displaced by 2050 because of climate change impacts (Globally) ?

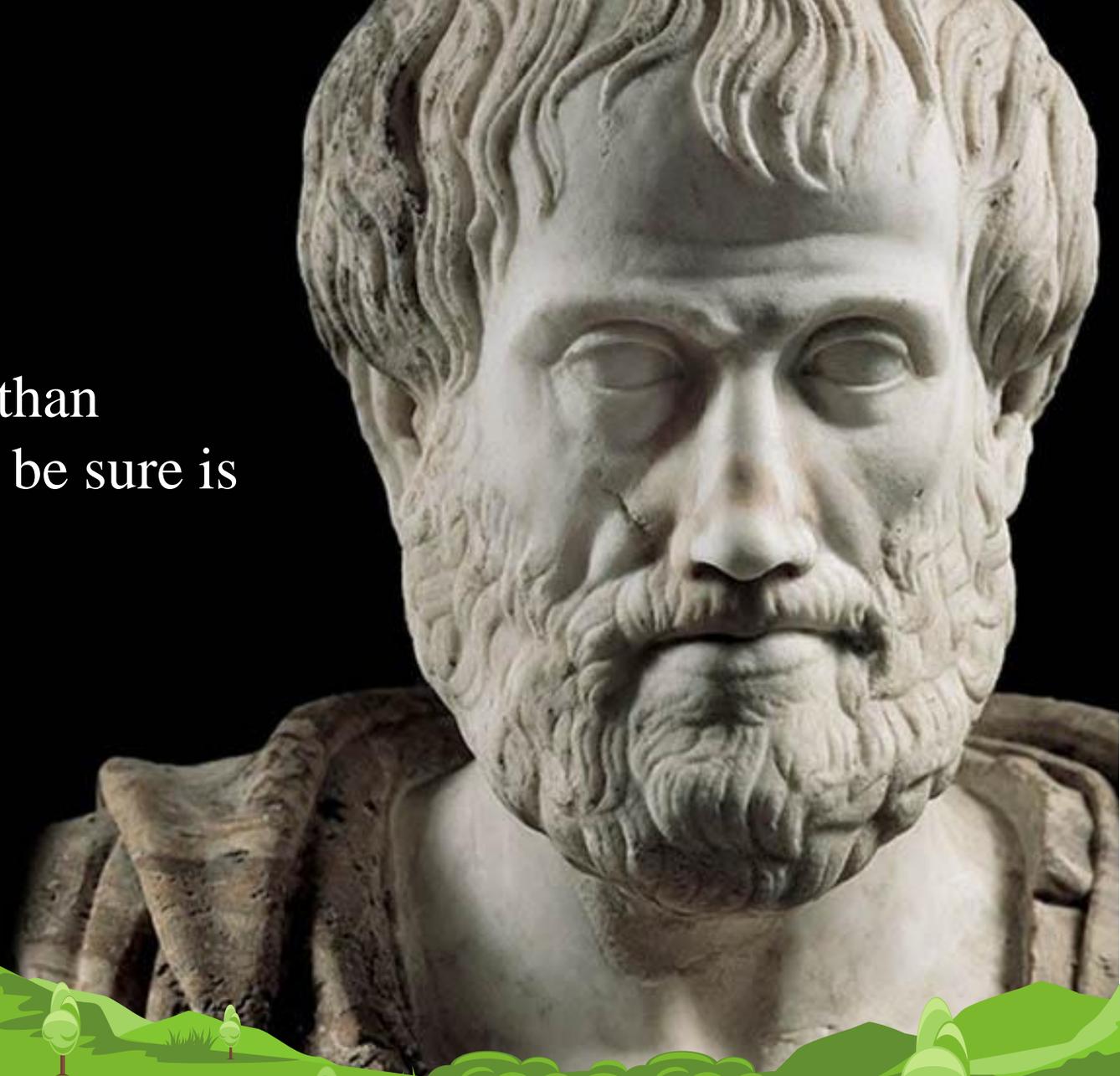
- a) 50 million
- b) 100 million
- c) Over 200 million
- d) Over a 1 billion





"If one way be better than another, that you may be sure is nature's way"

*Aristotle*





# Introducing Nature-based Solutions (NbSs)



**Nature-based Solutions (NbSs)** are defined as ‘actions to protect, conserve, restore, sustainably use and manage natural or modified terrestrial, freshwater, coastal and marine ecosystems, which **address social, economic and environmental challenges** effectively and adaptively, while **simultaneously** providing **human well-being, ecosystem services and resilience and biodiversity benefits.**’ (UNEA Resolution No5, 2022)

These actions have the potential to **offer long-term transformative pathways** towards sustainability of rural Mediterranean landscapes.

However, these efforts are often **slow in catching on** and the uptake of these solutions in rural Mediterranean areas has been limited.



# The Goal of Mara-Mediterra

The ambition of Mara-Mediterra is to **open-up** the Nature-based Solutions' (NbSs) **innovation process** to all active players, so that new ideas can circulate more freely and eventually be transformed into **tools, services** and **practices** that effectively address key environmental and societal challenges of rural Mediterranean areas.

# NbSs under our Microscope (What)



## Agroecological practices

- 1 Green manure & Cover crops
- 2 Organic fertilization
- 3 Mulching
- 4 Conservation tillage
- 5 Agroforestry
- 6 Land settings (terracing)
- 7 Deficit/precision/ smart irrigation
- 8 Recycling of cultivation residues
- 9 Land application of compost / manure / sludge

## Eco-engineering Solutions

- 10 Afforestation (Micro-ecosystem based)
- 11 Hydraulic barrier to halt seawater intrusion
- 12 Natural systems of water quality improvement and biomass production
- 13 Minimum ecological flow for lake / wetland restoration



# The Challenges – Our Case Studies (Where)

Case study	Algeria 	Egypt 	Greece 	Lebanon 	Turkey 
Degradation hotspot	Djelfa gateway to Sahara	Coastal area of Nile Delta	Agri-ecosystems on Lesvos Island	Akkar Al-Atika uplands	Marmara lake habitats
Main problematic	Desertification	Water and soil salinization	Rural landscape desertification	Soil and water degradation	Natural ecosystem degradation
					



# Sustainable Land Management Measures and Practices: Operational NbSs from Mara-Mediterra Practice



Agro-ecological practices minimizing the use of agro-chemicals, while contributing to the strengthening of soil **carbon** sinks and the production of healthy foods.



Sustainable agricultural practices for the control of **erosion** and the reverse of **desertification** especially in hilly areas (e.g., land settings, terraces, cover crops).



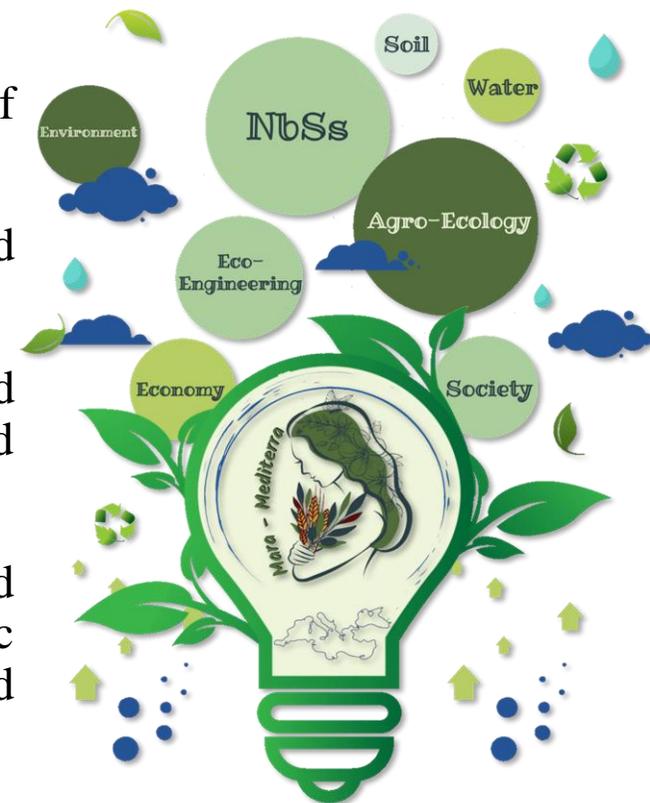
Multifunctional constructed wetlands for **pollution** control, biomass production and **biodiversity** enhancement in rural landscapes.



Promoting **circular economy** by using sewage sludge compost and reclaimed water in land restoration (e.g., microecosystem-based reforestation and afforestation of arid and semi-arid areas).



Tools for sustainable management of **water** resources in areas vulnerable to drought and salinization (e.g., use of Non-Conventional Water Resources for irrigation or as hydraulic barriers to halt saltwater intrusion, ensuring minimum ecological flow for lake/wetland habitats restoration).





# Paving the Way for Sustainability (How)



- (1) **Roundtables** will guide the living labs by bring together all actors involved in each of our hotspots of land and water degradation (estimated at a total of 150 actors).
- (2) **Living Labs** will bring together the prospective end users of our NbSs and actors in the water and agricultural sector with the aim of **co-testing** and **co-validating** our NbSs and **co-create** plans of action.
- (3) Diagnostic assessment and decision support based on **LDN** framework.
- (4) Exploring **investment** opportunities and strengthening of relevant **policies**.

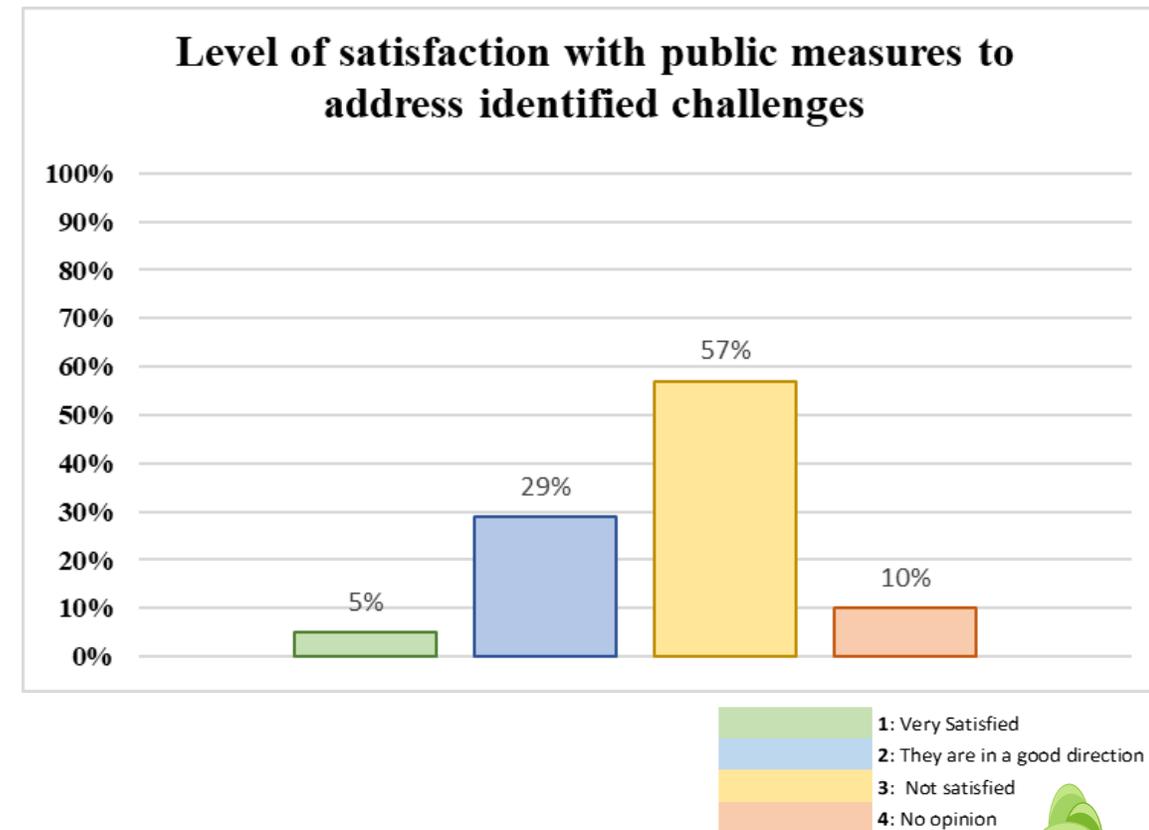
## OUR MIRROR HOTSPOTS

Hotspot Name	Country	Image
Akkar plain	Lebanon	
Mitidja plain, east of Algiers	Algeria	
Manisa-Akselendi plain	Turkey	
El-Hamoul area in Kafr El-Sheikh Governorate	Egypt	
Lake Koroneia	Greece	



# Drawbacks and Bottlenecks that We Need to Overcome

- ☹️ Lack of operational knowledge and effective translation of science into practice.
- ☹️ Lack of effective cooperation (in equal terms) between academia and end-users.
- ☹️ Assessing and evaluating the benefits of SLM practices is still challenging in terms of both their spatial and temporal extend (especially regarding the non-monetary value of ecosystem services and their socioeconomic aspects).
- ☹️ Lack of motivation and support - Urgent need for improved policies and financial support instruments.





# How can Sustainable Land Management (SLM) practices be replicated and scaled up across the Med region?



Strengthening of **AKIS** systems through **lighthouse - demonstration** sites for operational knowhow transfer and awareness raising.



**Innovation brokering and translation** of scientific evidence to the farmers language.



Improvement of policies and introduction of alternative **governance** schemes motivating and promoting participatory development, application, evaluation and exploitation of solutions towards SLM, including:

- Endorsement/support of living-lab initiatives (including legal form and financing).
- Rural entrepreneurship support with clear motives for adopting SLM practices.
- Market creation for products that are produced in areas under SLM and in farm holdings applying NbSs.

Operational **tools** for assessing the benefits SLM practices and supporting decision making in terms of **policy planning** and evaluation.



**Synergies** and cooperation networks to accelerate knowledge and capitalize the results and outcomes of EU funded projects.



# The synergistic effect of Mara-Mediterra and UNIMED



**Common vision** to address the climate change challenges in rural landscapes for the benefit of Med societies.



**Complementarity** of scientific data and disciplines across scales (from farm to country level aligned with WEFE nexus approach).



## Added value

Mara-Mediterra provides and documents a series of NbSs:

- ☼ 9 Agro-ecological,
- ☼ 4 Eco-engineering.

UNIMED brings an evidence-based assessment of the policy aspects required to safeguard the sustainability and applicability of solutions:

- ☼ Perception,
- ☼ Vulnerability,
- ☼ Adaptability, and
- ☼ Recoverability.



**Maximization of Impacts** across borders through linking networks and joint actions.

# thank you!



## Dr. Takavakoglou Vasileios

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Soil and Water Resources Institute (SWRI)

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the European Union



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## Mara-Mediterra

Safeguarding the livelihood of rural communities and the environment  
in the Mediterranean through Nature-based Solutions

### Guiding the setting up of Living Labs

**in 5 hotspots of land and water degradation**

**Anna Spiteri**

*Managing Director, IRMCo, Copernicus Academy Member*

***Mara-Mediterra Info-Session***

***24 April 2023***



# How are Living Labs defined?



**Living Labs:** *real-life* test and experimentation environments that **foster co-creation** and **open innovation** among the main actors of the Quadruple Helix Model, namely Citizens, Government, Industry, and Academia

([ENoLL, European Network of Living Labs](#))

**Soil Health Living Labs:** user-centred, place-based, and transdisciplinary research and innovation ecosystems, which involve land managers, scientists, and other relevant partners in systemic research and codesign, testing, monitoring and evaluation of solutions, *in real-life settings*, to improve their effectiveness for soil health and accelerate adoption

([Soil Mission Implementation Plan](#))

Within the **Soil Deal Mission**, **Living Labs** are collaborative initiatives to co-create knowledge and innovations, while **Lighthouses** are places for demonstration of solutions and exemplary achievements.

# What do we mean by Living Labs in Mara-Mediterra?

**The overall project's aim:** accelerating the uptake of Nature-based Solutions to safeguard the livelihood of rural communities

**How?** testing and validation of the **cost-effectiveness** of agro-ecological practices to address land and water degradation challenges in real-life settings

**Why?** convincing farmers, agricultural advisors, water managers, policy- and decision-makers and local communities about the **benefits**

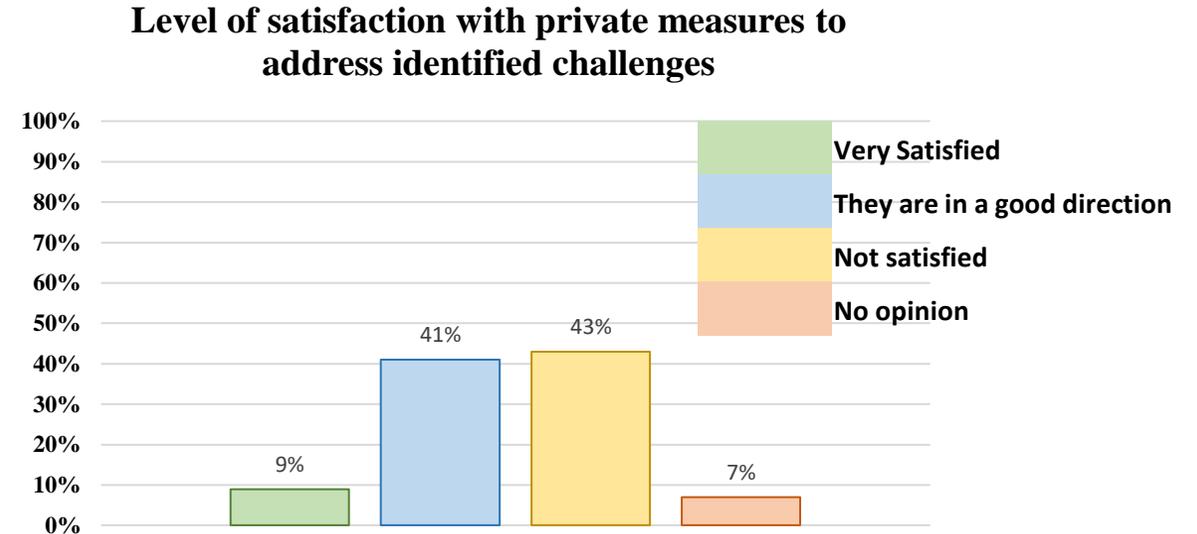
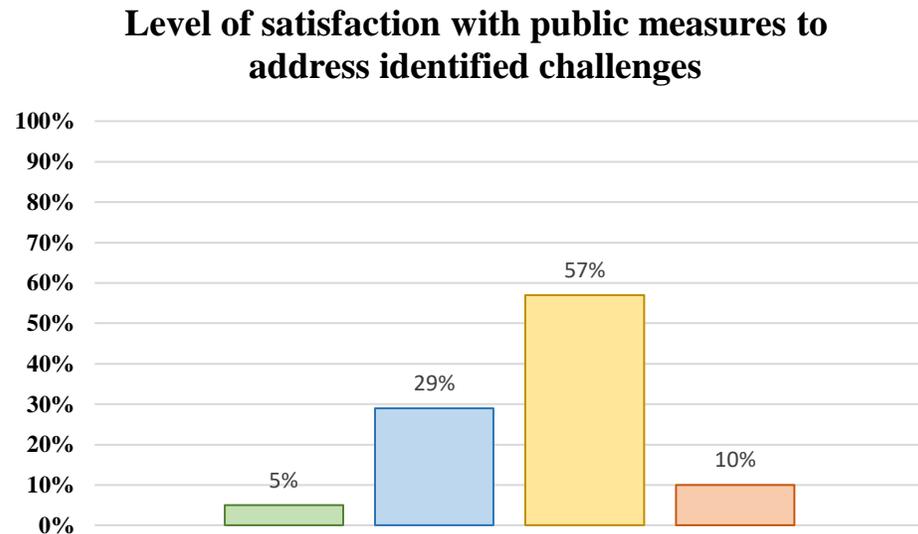
**BUT:** Outcomes of First Series of Roundtables indicate that **farmers** in the majority of the project's 5 hotpots are **unlikely to adopt the practices UNLESS** obstacles (of a policy, regulatory, economic, environmental and/or social nature) **are addressed beforehand**

# Mara-Mediterra's 5 hotspots of land and water degradation



# Clear messages from the First Roundtable

Participants' assessment of level of satisfaction with **public** and **private** measures to address land and water-related degradation challenges

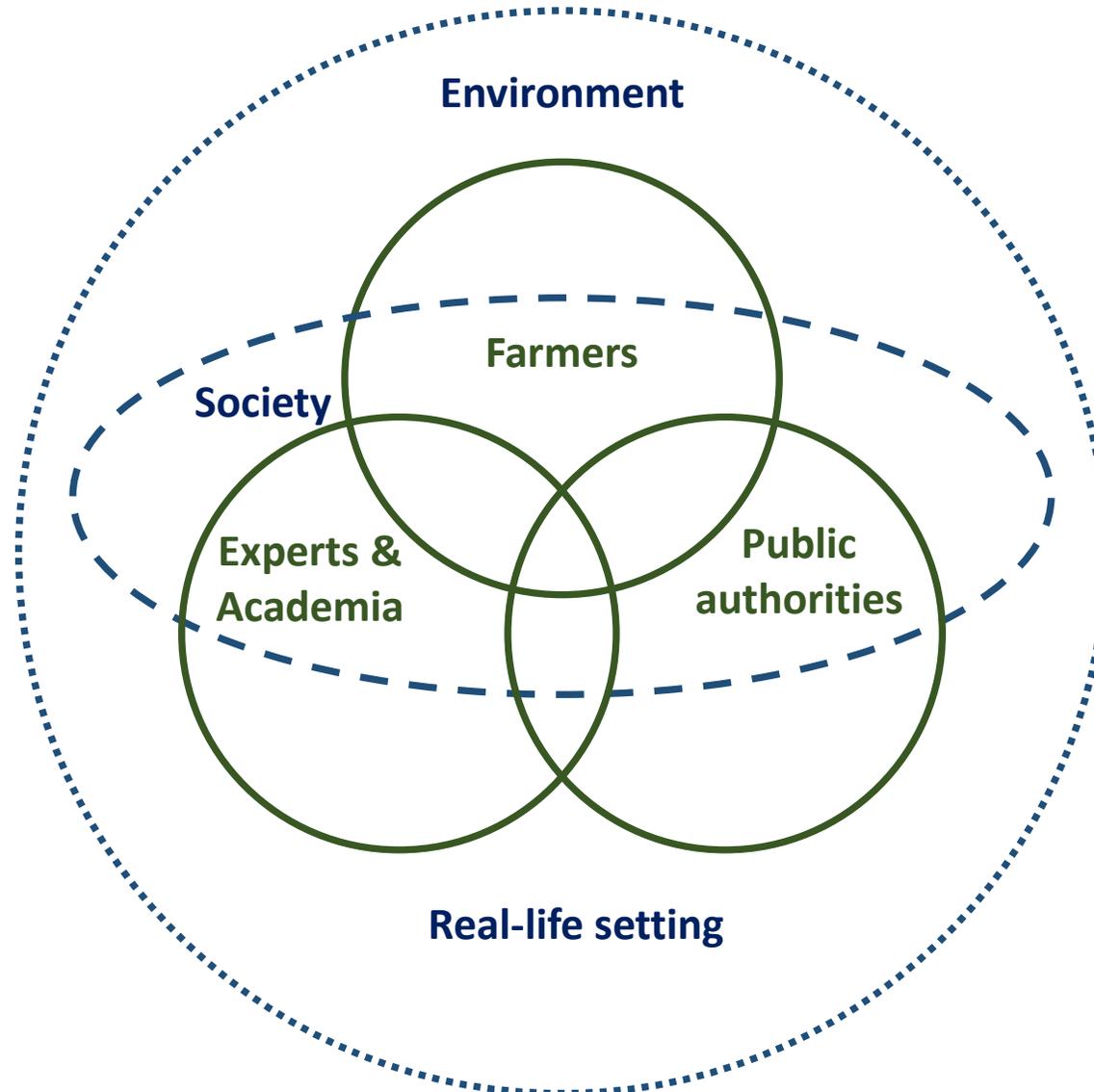


Viewpoints aggregated over 5 hotspots (201 participants in total)

**THEREFORE:** Living Labs must be organized in synergy with research on how to achieve an enabling environment for the uptake of NbSs: **a governance framework** that permits stewardship of the land **AND** the right investment support

# Make-up of Living Labs adopts Quadruple Helix Model

Local community  
representatives,  
NGOs for the well-  
being of society



Environmental NGOs

Agricultural  
advisors and  
experts

National and local  
authorities on water,  
agriculture, land use, land  
planning, human health

# In preparation of Launch of Living Labs -1



Farmers' Testimonials on their use of **agro-ecological practices** with subtitles in English, French, Arabic, Greek and Turkish

# In preparation for Launch of Living Labs -2



Farmers' Testimonials on their use of **agro-ecological practices** with subtitles in English, French, Arabic, Greek and Turkish

# In preparation for Launch of Living Labs -3

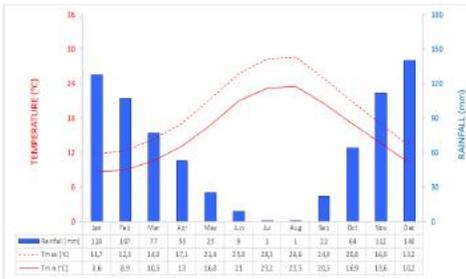


**Testimonial video and associated training material**

## 3. Green manuring and mulching



Antonios Tirpintiris, Kostas Iosifellis and Zenovia Kogia are olive growers in Lesvos, a Greek island in the northeastern Aegean Sea. In their olive orchards, they apply the agro-ecological practices of green manuring and mulching for over 15 years to prevent soil degradation and improve natural soil fertility.



The climate is a temperate hot summer Mediterranean climate. The rain in falls mostly in the winter, with relatively little rain in the summer. The temperature averages 17.6 °C and the annual rainfall is 739 mm. Lesvos has a mountainous terrain that covers a significant portion of the island. On the island of Lesvos, the olive cultivation areas are mostly mountainous soils are poor and there is an acute shortage of water. For these reasons, the cultivation is often made in terraces.

## Green manuring in practice

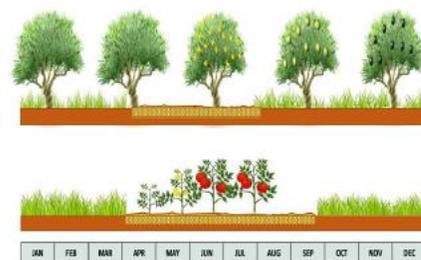
The practice of green manure consists of growing a herbage crop for a short period of time with the aim not of harvesting the product, but of turning into the soil undecomposed green mass.

The main aim of green manure is to increase the organic matter content of the soil and, if the species used is a leguminous one, to make a certain amount of nitrogen available for the next crop.

The most important benefits of a green manure crop on soil fertility are:

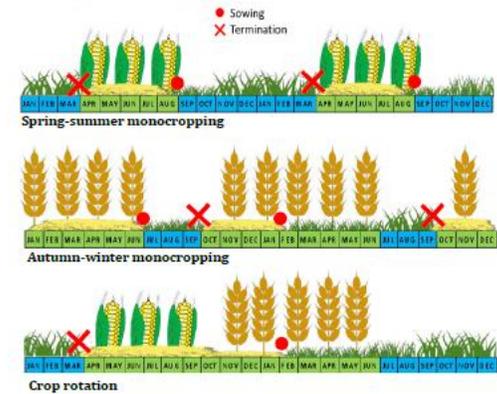
- green manure can be sown when the soil would be kept bare, for example between July (harvesting an autumn-winter crop) and May (sowing a spring-summer crop). This reduces soil erosion, humus mineralization, nitrogen leaching and weed development. Also, the crop uses for its growth any residual nutrients that were not consumed by the previous crop.
- the addition of easily fermentable organic matter into the soil stimulates the growth and activity of microorganisms in the soil; this results in faster decomposition of residues from previous crops and a lower incidence of diseases caused by soil pathogens and diseases.
- green manure can help the fight against pests, an example is the cultivation of cruciferous plants resistant to root nematodes, such as some varieties of horseradish.

Legumes are suitable for soil fertilization, especially to increase nitrogen availability. Grass-legumes mixtures are suitable for soil conditioning, to improve soil structure. Grass-legumes-cruciferous mixture are suitable for soil remedial (soil-borne pathogens, nematodes).



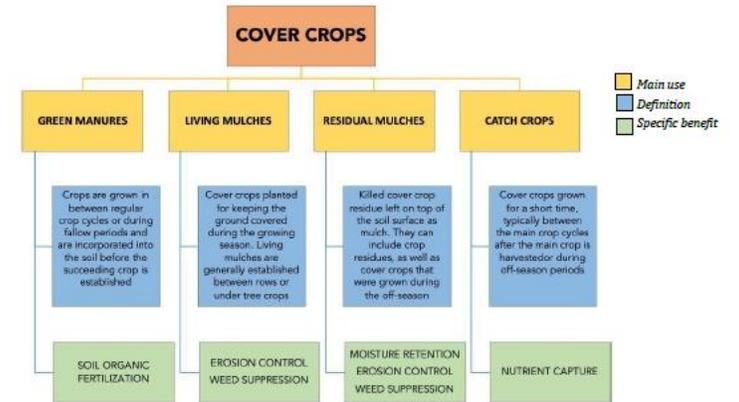
The guiding principle for the choice of green manure is to achieve rapid soil cover and produce maximum biomass in the time available. Both autumn-winter and summer green manure can be done, and it can be sown in the main crop or on stubble. In extensive horticultural farms (e.g. tomatoes), the free intercropping period for green manure crops is from October to April. The same can be said for orchards that are dormant during the autumn-winter period and for maize-based cropping systems, where green manure can already be sown in September, and generally terminated by March.

## Mulching with cover crops



Cover crops deliver the expected results if they produce abundant aerial and root biomass. However, they are often cultivated at times of the year that are unsuitable for cash crops, when the climate is unfavorable and the growing season relatively short. Hence, cover crop management must be aimed at the best utilization of available resources (solar radiation, temperature, water and nutrients). The purpose of sowing is a good establishment and initial rapid growth. The purpose of termination is to prevent cover crops from being an impediment to the creation of suitable conditions for the germination and growth of successive cash crops.

Cover crops have multiple uses, providing several opportunities for inclusion in crop rotation. Cover crops may be used as green manures, living mulches, residue mulches or catch crops which share multiple benefits, but they can be used to best meet certain specific needs.



# In preparation for Launch of Living Labs -4

**Hilly terrain,  
steep slopes**



**Leveling of terrain &  
division of area in 2  
terraces, separated by  
rubble wall**

**No direct  
access to  
water**



**Construction of  
reservoir for rainwater  
harvesting**

**Preparatory on-site activities in Akkar Al-Atika, North Lebanon**

# In preparation for Launch of Living Labs -5



**Agricultural equipment are not just toys for boys**



**Importance of adopting health and safety protocol on site!**

**Lessons learnt by IRMCo from pilot Living Lab in Malta**

# First Milestone in Roadmap of Living Labs achieved!

## Everything in place to launch Living Labs in May 2023:

- **Farmers' testimonials on initial set of agro-ecological practices & associated training material**
- **On site preparatory activities**
- **Safety protocol**



# Upcoming Milestones in Roadmap of Living Labs

## World Soil Day December 2023

**Open-day for local community**  
to witness activities and results  
achieved by the Living Labs in  
each of the 5 hotspots

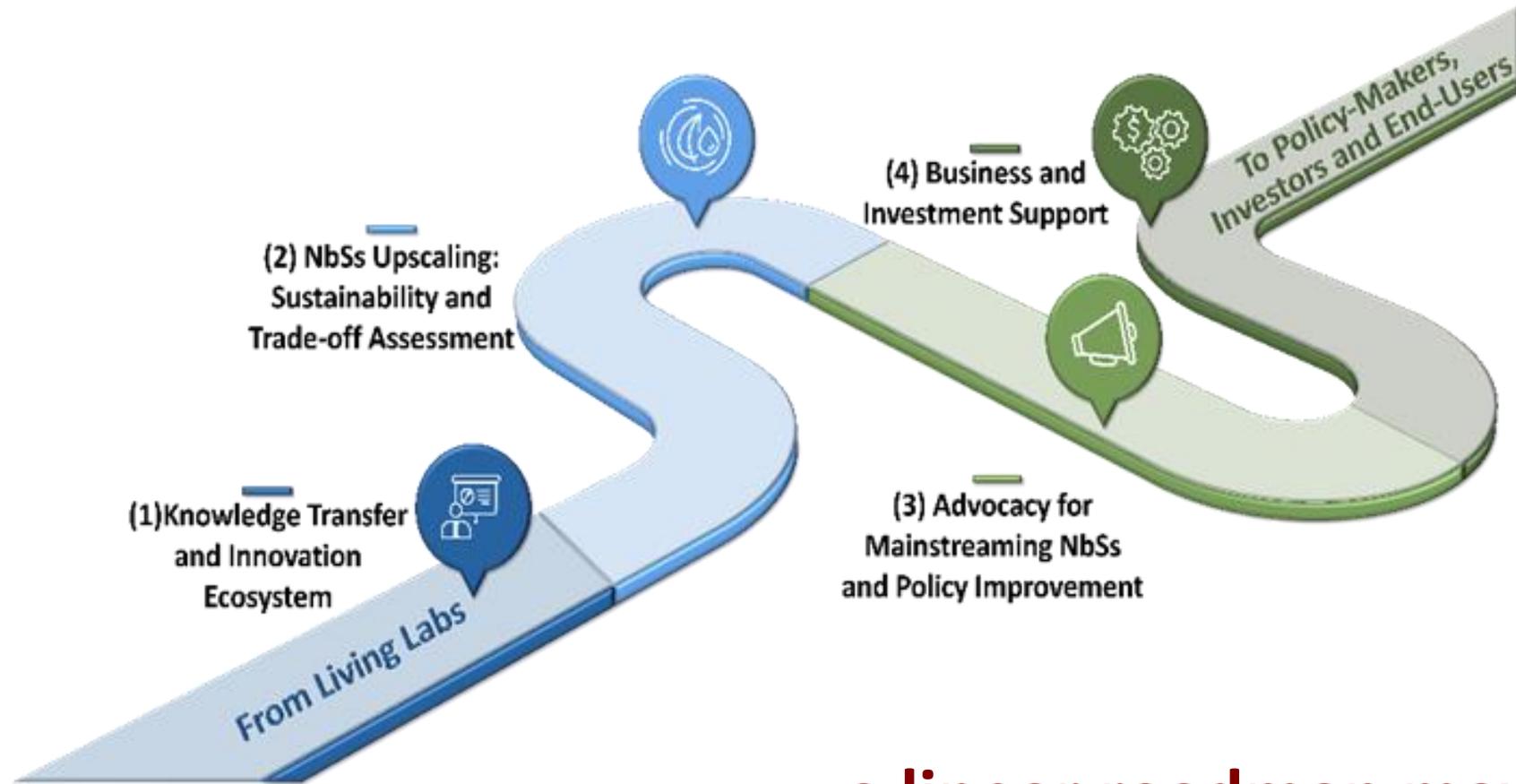


## Second Roundtable early 2024

Drawing up of action plans  
based on the use of Nature-  
based Solutions through the  
use of **Participatory GIS**



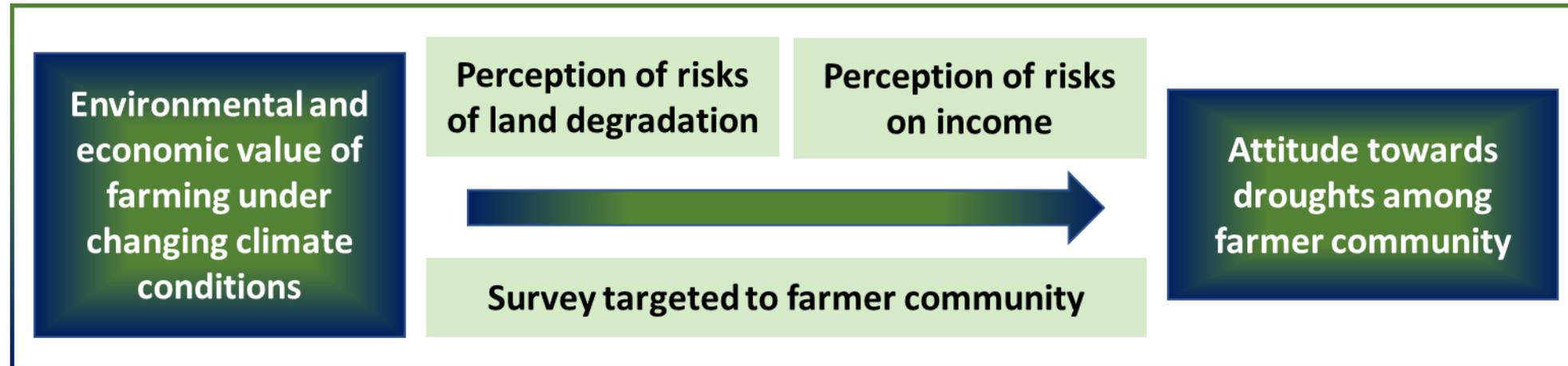
# Mara-Mediterra's Roadmap



**... a linear roadmap may not be the most cost and/or time efficient**

# Living Lab activities will be **synchronized** with:

Assessing the local **governance framework** through **interviews** with policy- and decision-makers in Mara-Mediterra & a **perception-value-attitude survey** addressed to farmers in UNIMED



**Identifying** investment opportunities at the local, national and international level

# Coming soon!



**PRIMA**  
PARTNERSHIP FOR RESEARCH AND INNOVATION  
IN THE MEDITERRANEAN AREA



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**Mara-Mediterra  
Spotlight on  
Conversion to  
Organic Farming**



**Testimony by Cane,  
an organic vegetable  
grower in Malta**



**PRIMA**  
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**Mara-Mediterra  
Spotlight on  
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**Testimony by farmer  
Josef Farrugia, an  
organic vegetable grower  
in Malta**



## Thank you for your attention



# UNIMED

UNified framework to cope with droughts under  
MEDiterranean climate change conditions

## MCST-TÜBİTAK Joint Call for R&I Proposals

In 2020, the Malta Council for Science and Technology (**MCST**) and the Scientific and Technological Research Council of Türkiye (**TÜBİTAK**), signed a collaborative agreement to **bilaterally** support cooperation in Science, Technology and Innovation between Malta and Turkey.

These Calls are an integral part of the **PRIMA Programme**, as it aims to support R&I in the three priority areas defined in the PRIMA **Strategic Research and Innovation Agenda (SRIA)**, namely in the fields of,

- **Water Management**
- Farming Systems
- Agro-food Value Chain



OPEN CALL

MATCH MAKING TOOL

Call Description	MCST and TÜBİTAK
Funding	MCST and TÜBİTAK
Launch	Q1 (March)
Consortium obligatorily	At least one Malta-based entity and at least one Turkey-based entity
Project Duration	24 months (max.)
MCST allocated budget	€300,000
Stages	One-Stage

... Closed Calls

Call 2022 National Rules Non-State Aid Rules Application Form

Call 2021 National Rules Non-State Aid Rules Application Form

Funded Projects

For more information, please contact MCST or prima.mcast@gov.mt or 434-22154.

**UNIMED**

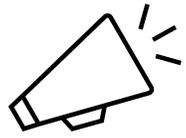
**Unified framework to cope with droughts under Mediterranean climate change**

MCST-TUBITAK Call: 2022  
PRIMA Theme: Water Management  
Project duration: 24 months  
Project Budget: €145,000  
Maltese Beneficiaries: Integrated Resources Management (IRM) Company Ltd (MCAST)  
Malta College of Arts, Science and Technology (MCAST)



UNIMED is aimed at the methodological development of a Survivability-of-Droughts Index in the context of the Water-Energy-Food-Ecosystem (WEFE) Nexus. This is a novel idea that will derive from a quantification of four underlying indicators: perception, resilience, adaptability and recoverability. Each of these indicators will draw on a subset of relevant, yet mutually exclusive, economic, social and environmental indicators. In addition to the scrutinization of the proposed subsets of indicators, also the testing and validating of the methodology will be achieved through stakeholder engagement activities.

## MCST-TÜBİTAK Joint Call for R&I Proposals



MCST-TUBITAK Call:2022



PRIMA Theme: Water Management



Project duration: 24 months (Start date: 01.04.2023)



Project budget: € 143,199



**Assoc. Prof. Cem P. Cetinkaya**



**Prof. Ali Gul**



**Prof. Gulay Onusluel Gul**



**Prof. Hulya Boyacioglu**



**Assoc. Prof. Filiz Barbaros**



**Res. Asst. Mert  
Can Gunacti**

# I R M

INTEGRATED RESOURCES MANAGEMENT



**Anna Spiteri**



**Dirk De Ketelaere**



# MCAST



**Carmelina Frendo**



**Massimo Pierucci**

## UNIMED aims;

*to come up with a unified, indicator-based, framework to better assess, adapt and ultimately cope with agricultural droughts under Mediterranean climate change conditions.*

**Survivability-of-Droughts Index (SDI)** will derive from the quantification of four underlying indices, i.e., **perception**, **vulnerability**, **adaptability** and **recoverability**. Each of these indices will draw on a mutually exclusive set of relevant economic, social and environmental indicators, ensuring that the assessment framework is aligned with the **Water-Energy-Food-Ecosystem (WEFE) Nexus** approach.

## Specific Objectives (SO)

**SO1.** To ensure **active engagement of stakeholders** throughout the foreseen project duration.

**SO2.** To invite the **Communities of Practice** (CoP) to scrutinize and test the sets of mutually exclusive economic, social, and environmental indicators connected to the **perception, vulnerability, adaptability, and recoverability** of drought.

**SO3.** To define appropriate **normalization** and **weighting methods** that will ultimately allow the production of a unified **Survivability-of-Droughts Index**.

**SO4.** To translate the findings in the context of recently issued **EU policies and strategies** (New CAP, the Green Deal, and the Circular Economy), and linked to the achievement of the related **Sustainable Development Goals** (SDGs).

**SO5.** To **regularly communicate** about progress, planned stakeholder events, and project outcomes.

## Specific Objectives (SO)

**SO6.** To **disseminate the research outcomes** in international conferences/workshops and through open-access publications.

**SO7.** To **present the methodological approaches to PhD and MSc students** (in Turkey) and to students following an **agriculture and/or water-related diploma course** (in Malta); as well as to lecturers.

**SO8.** To **present** the findings to the relevant **policy-making entities** at the EU and organized actors & interest groups at the Mediterranean level.

**SO9.** To ensure wider impact of UNIMED by building a strong synergy with the PRIMA funded **Mara-Mediterra** project, aimed at accelerating the uptake of agro-ecological practices in the Mediterranean Region through the setting up of Living Labs in hotspots of environmental degradation.

## Novelty of UNIMED

Going beyond the currently available drought assessment and monitoring approaches to also include the aspects of,

Together, these four aspects constitute the underlying indices that make up the overall **Survivability-of-Droughts Index.**

### Perception

The farmers' degree of preparedness for droughts

**Vulnerability**  
of the agricultural sector

**Adaptability**  
to cope with oncoming droughts

**Recoverability**  
of the agricultural sector in the aftermath of a severe drought



## Milestones

- **M1 – Project Launch (Delivery Month [DM]:1) *WP1***
- **M2 – Communication Launch (DM:3) *WP2***
- M3 – Feedback on proposed indicator set – First CoP Workshop (DM:3)  
*WP2, WP4***
- **M4 – Initial Value-Perception-Attitude Survey completed (DM:6) *WP2***

## Milestones

- ➔ **M5 – Workshop (DM:12) *WP2, WP4***
- ➔ **M6 – Dissemination addressed to Scientific Community (DM:18) *WP2, WP3, WP4***
- ➔ **M7 – Validation of overall assessment of framework by CoP (DM:21) *WP2, WP4***
- ➔ **M8 – Online, high-level stakeholder event addressed to policy- and decision makers at EU and regional level (DM:24) *WP4***

**Thank you for your attention!**



The Malta Council for  
**Science & Technology**



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TÜRKİYE BİLİMSEL VE TEKNOLOJİK ARAŞTIRMA KURUMU



**MCAST**



# Examining the historical evidence of droughts around the Mediterranean

Mara-Mediterra Info-  
Session  
24 April 2023

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# Drought analysis based on observed precipitation data around the **Mediterranean** through the use of: **Standard Precipitation Index (SPI)**

Index developed by McKee, Doesken and Kleist (1993)  
quantifies the precipitation deficit for multiple time  
scales compared to these same months historically

$$SPI = \frac{X_{ij} - X_{im}}{\sigma}$$

$X_{ij}$  is the seasonal precipitation at the  $i$ th raingauge station and  $j$ th observation,  $X_{im}$  is the long-term seasonal mean and  $\sigma$  its standard deviation

7 SPI Classes	SPI Values
Extremely Wet	>2.00
Very Wet	1.50 to 1.99
Moderately Wet	1.00 to 1.49
Near Normal	-0.99 to 0.99
Moderately Dry	-1.00 to -1.49
Severely Dry	-1.50 to -1.99
Extremely Dry	<-2.00

A drought event for time scale  $i$  is defined as a period in which the **SPI** is continuously negative, and the **SPI** reaches a value of -1.0 or less and does not end until a positive **SPI** value is reached

**Frequency, Magnitude and Duration of droughts will be compared for the hydrological years of the periods 1960 – 1990 and 1990 - 2020**

**The Drought Magnitude (DM)** provides an assessment of the drought severity and is expressed in units of months

$$DM = - \left( \sum_{j=1}^{j=x} SPI_{ij} \right)$$

where  $i$  represents the time scale, and  $j$  starts with the first month of a drought and continues to increase until the end of the drought (month  $x$ )



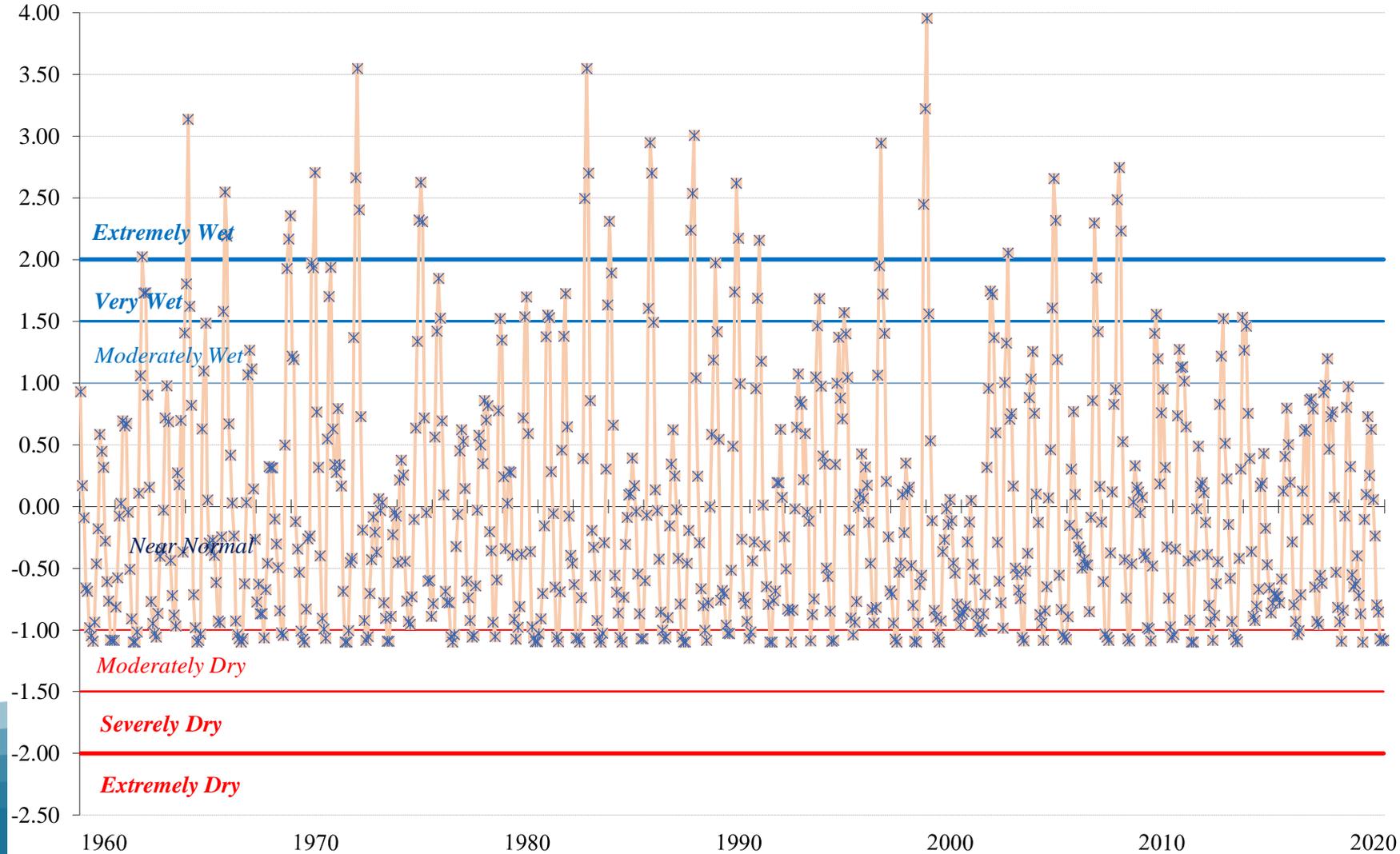
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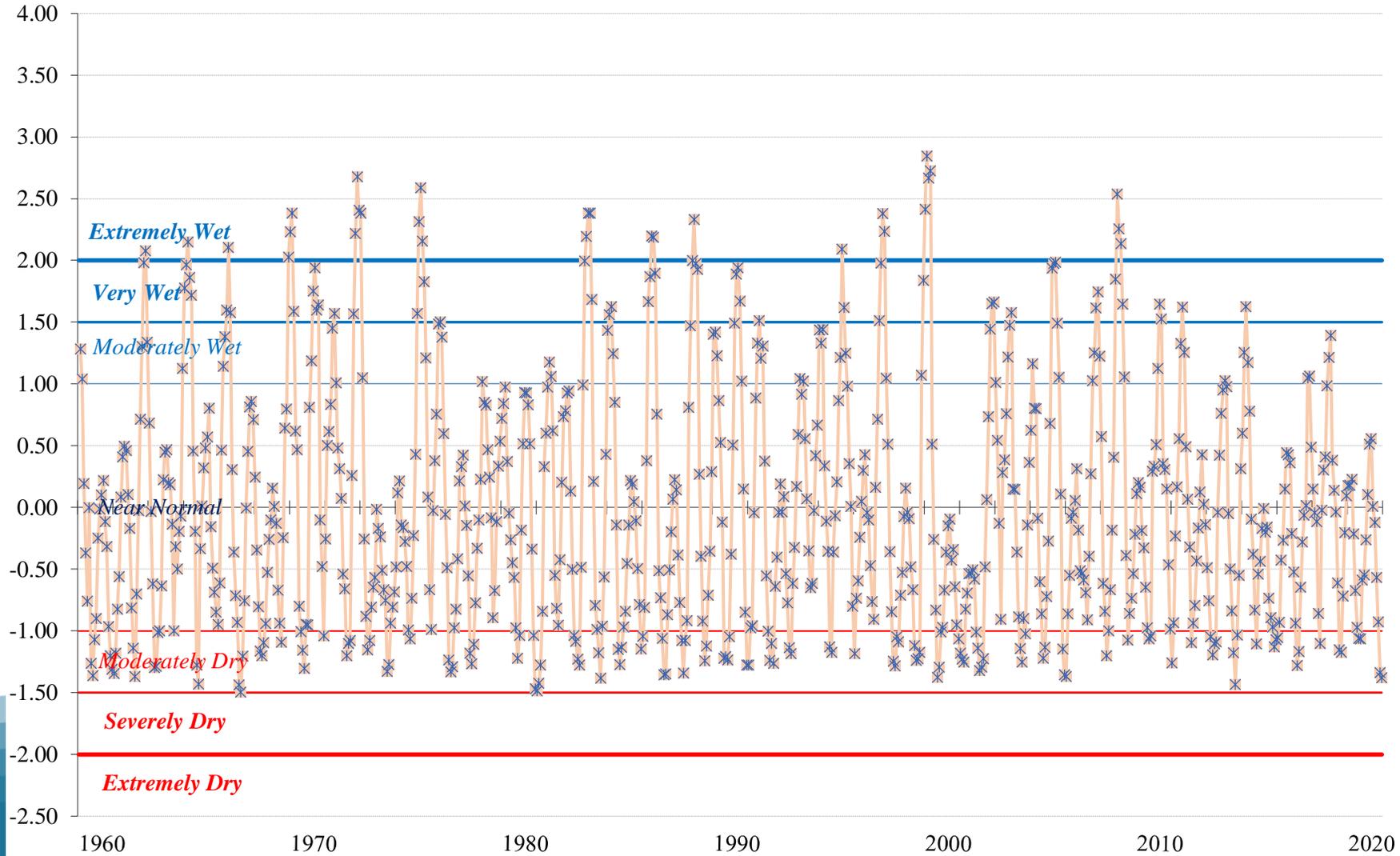
In **UNIMED** the **SPI** values will be determined at timescales of  
**3, 6, 9, and 12 months**

Sharing outcomes of a first drought analysis around the  
Mediterranean based on precipitation data recorded at the  
**Luqa Meteorological office, Malta**

### SPI - 3 Month Timestep



### SPI - 6 Month Timestep





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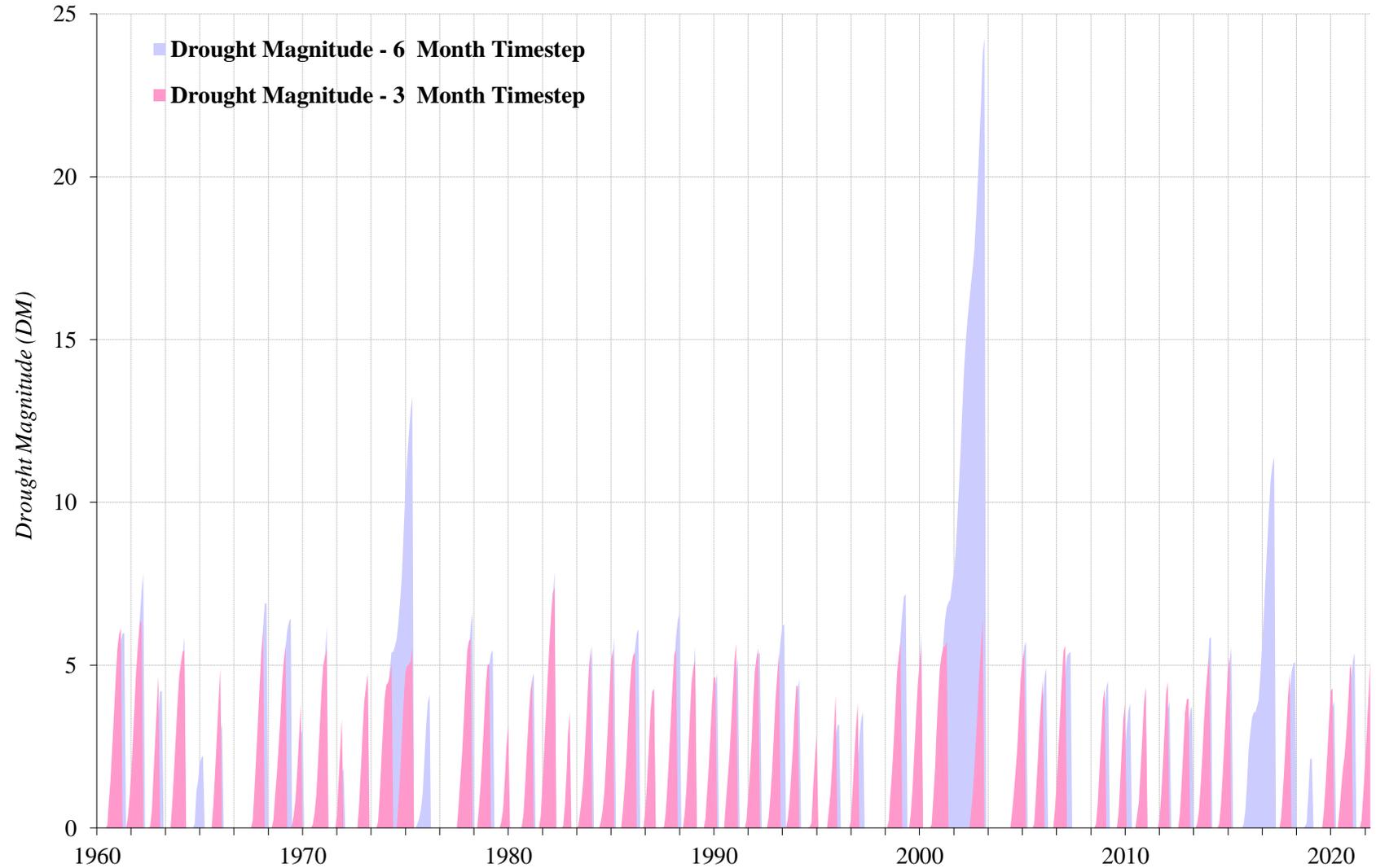
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### Drought Magnitude for 3 and 6 Month Timesteps

<b>SPI - 3 Months</b>	Frequency	Average Duration	Average Magnitude
1960-1990	26	7.42	5.10
1990-2020	24	6.54	4.64

<b>SPI - 6 Months</b>	Frequency	Average Duration	Average Magnitude
1960-1990	26	7.08	5.36
1990-2020	24	7.92	5.66



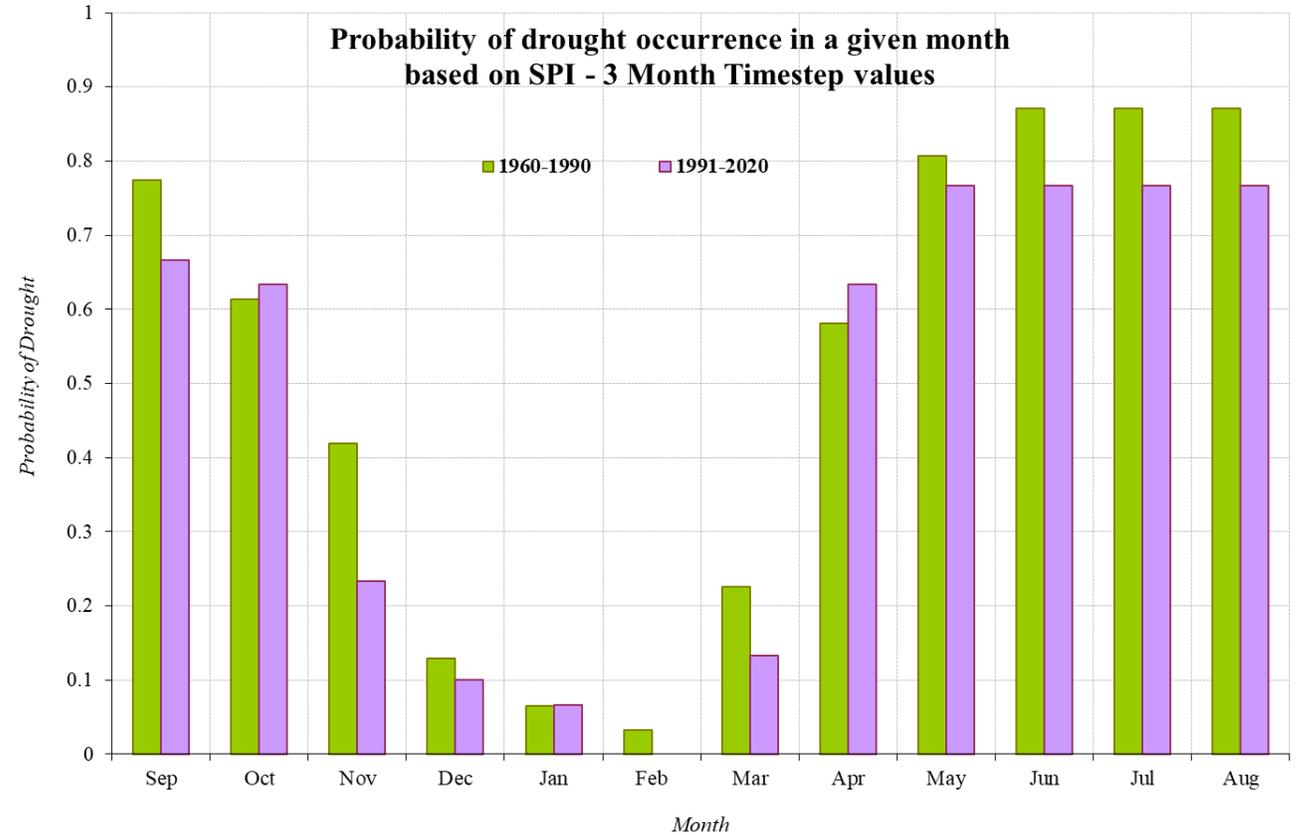
SPI-3	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1959-60												
1960-61												
1961-62												
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2019-20												

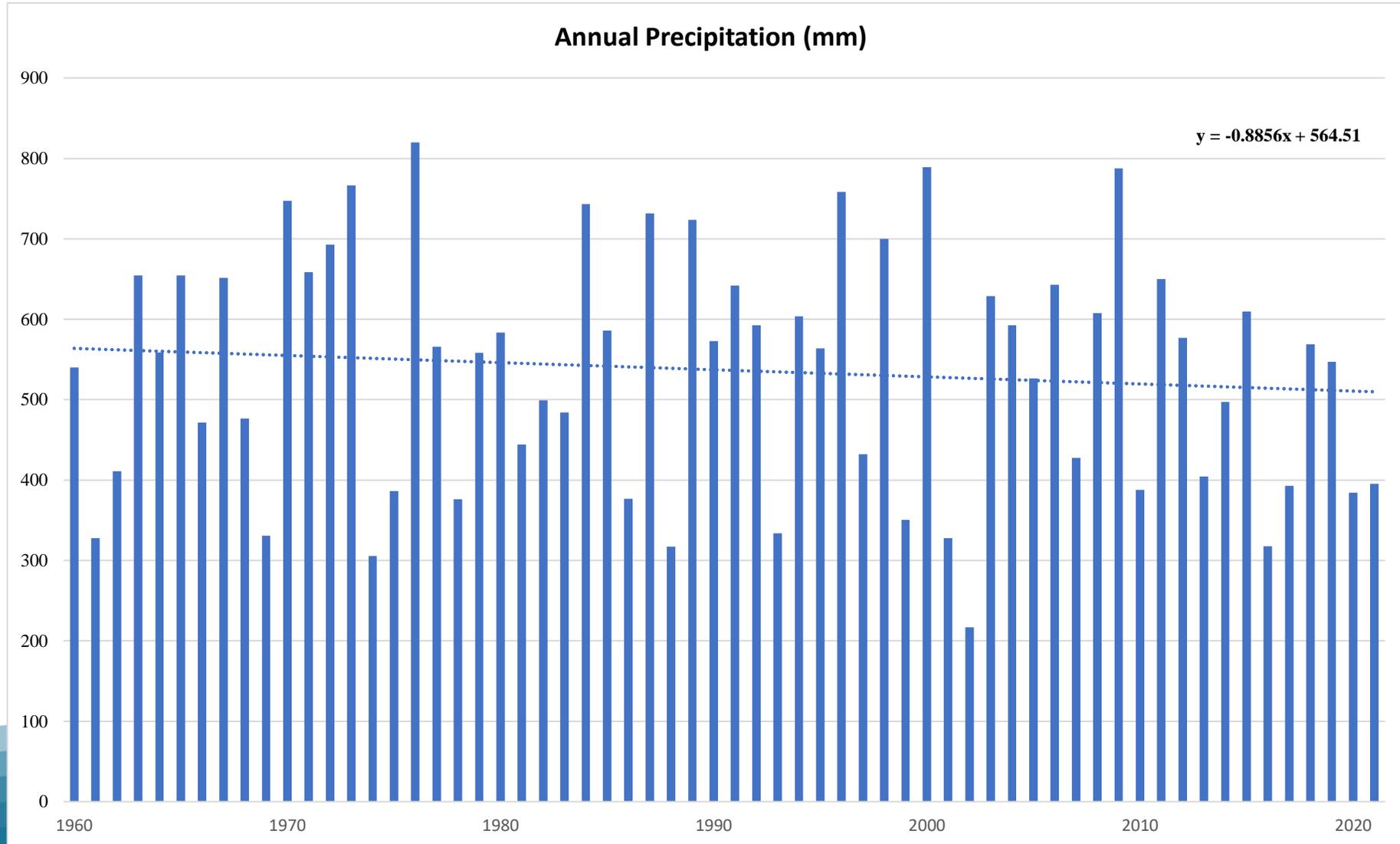
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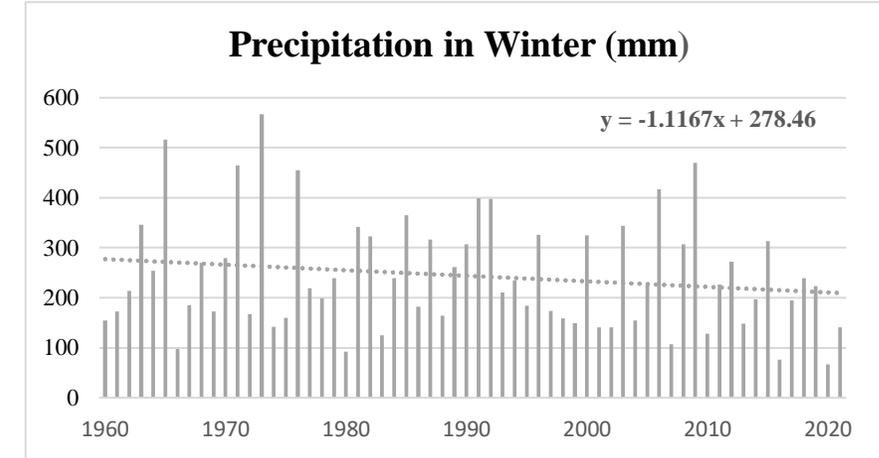
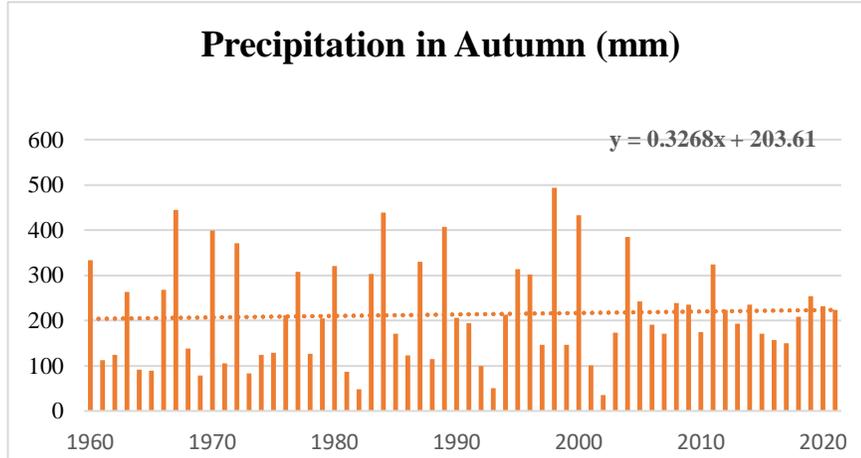
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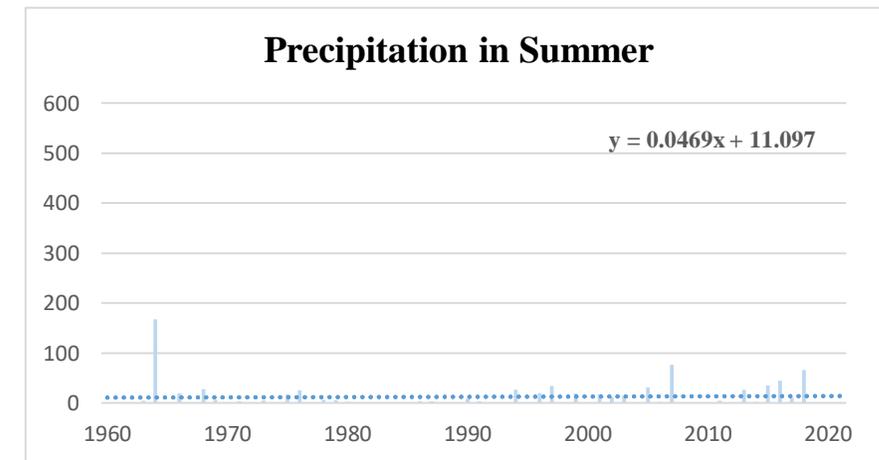
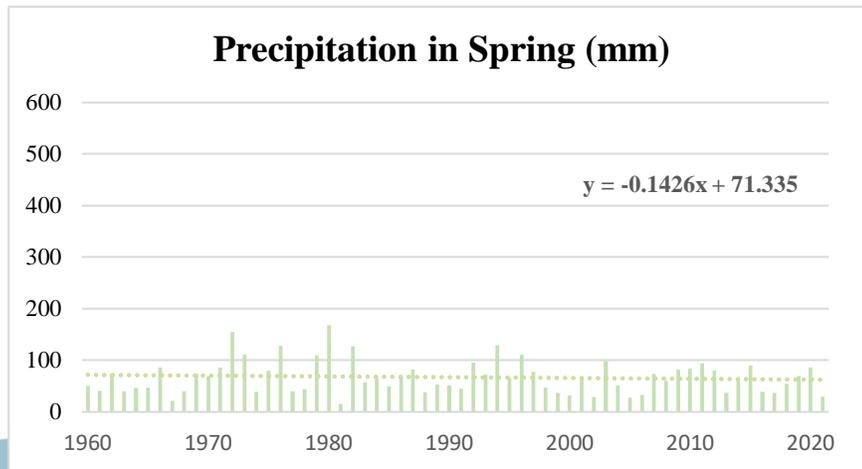


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DEC  
JAN  
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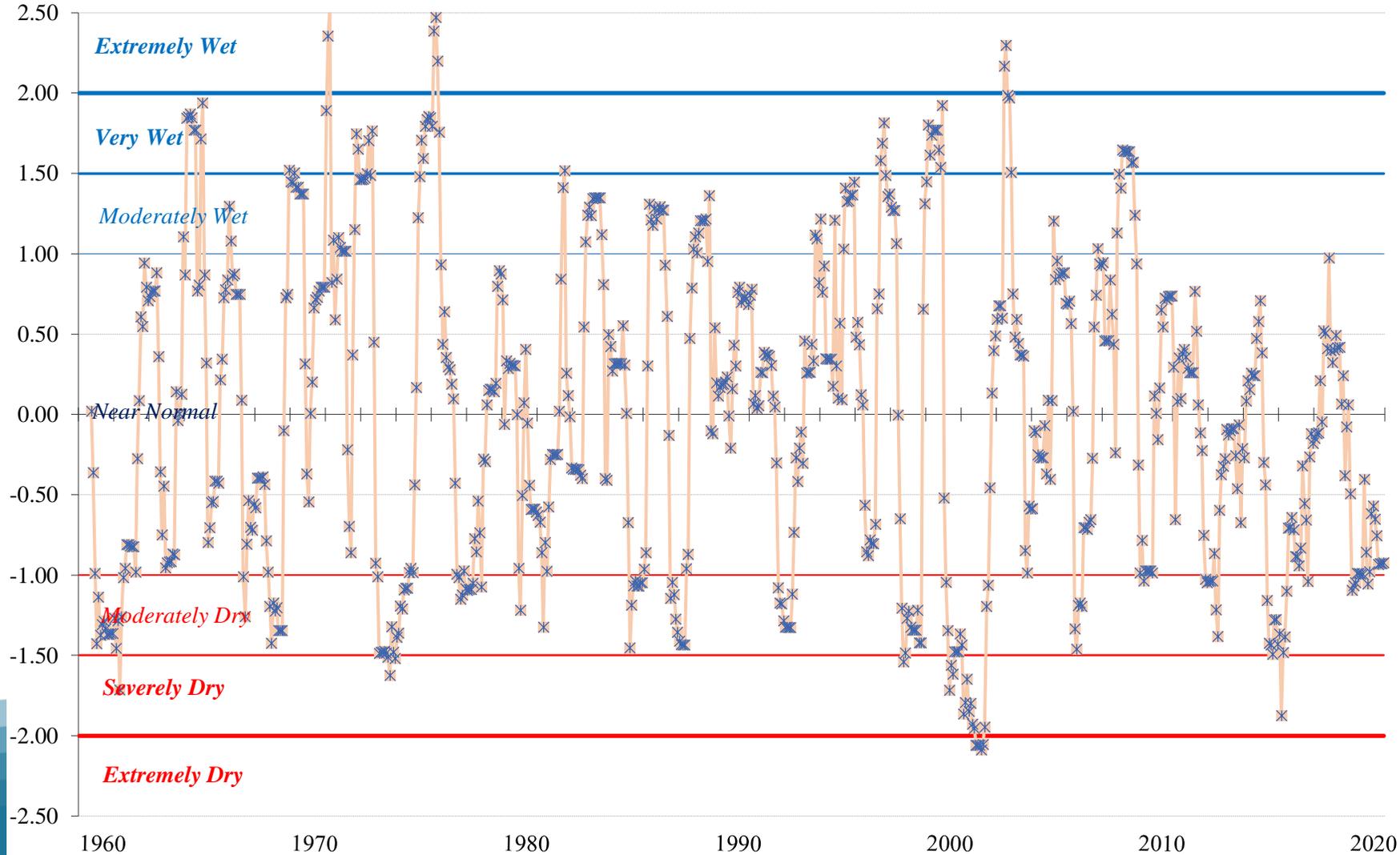
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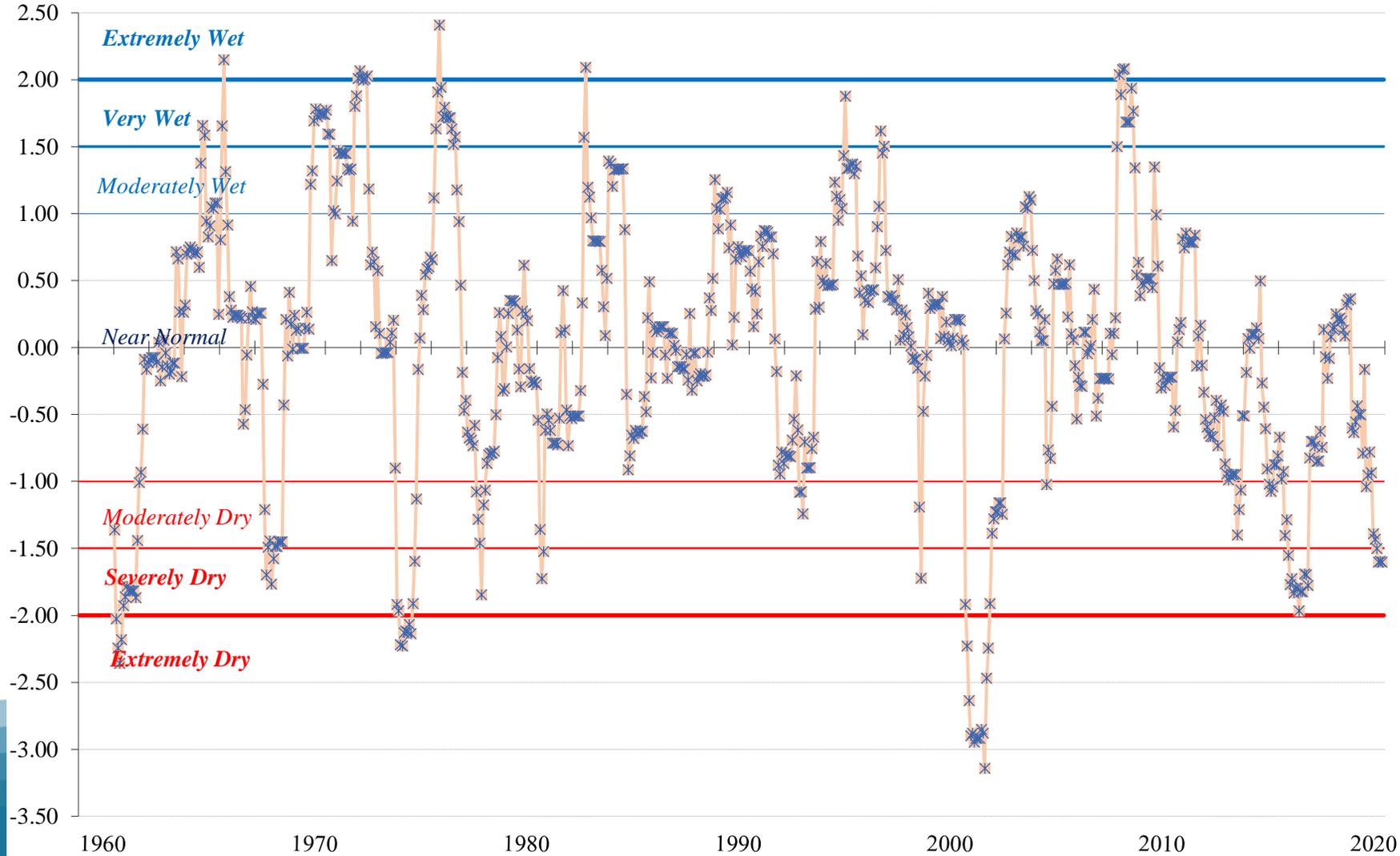


### SPI - 12 Month Timestep





### SPI - 24 Month Timestep

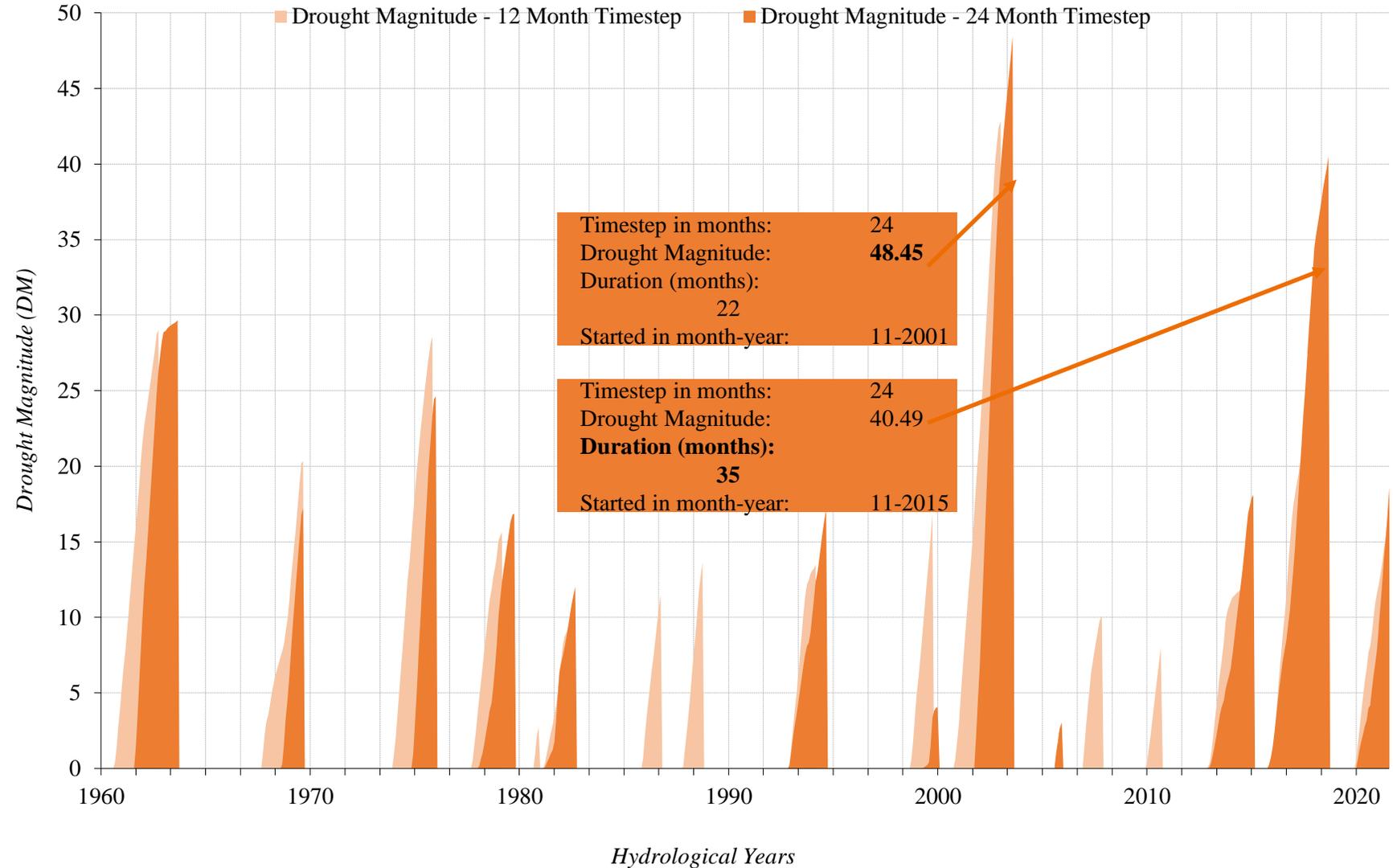




### Drought Magnitude for 12 and 24 Month Timesteps

<b>SPI - 12 Months</b>	Frequency	Average Duration	Average Magnitude
1960-1990	8	17.00	16.42
1990-2020	6	23.83	22.05

<b>SPI - 24 Months</b>	Frequency	Average Duration	Average Magnitude
1960-1990	5	18.20	20.08
1990-2020	6	20.83	21.88





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**Thank you for your attention!**

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Info-Session

Exploring further  
synergies with EU  
funded projects  
modernAKIS and MED-  
WET

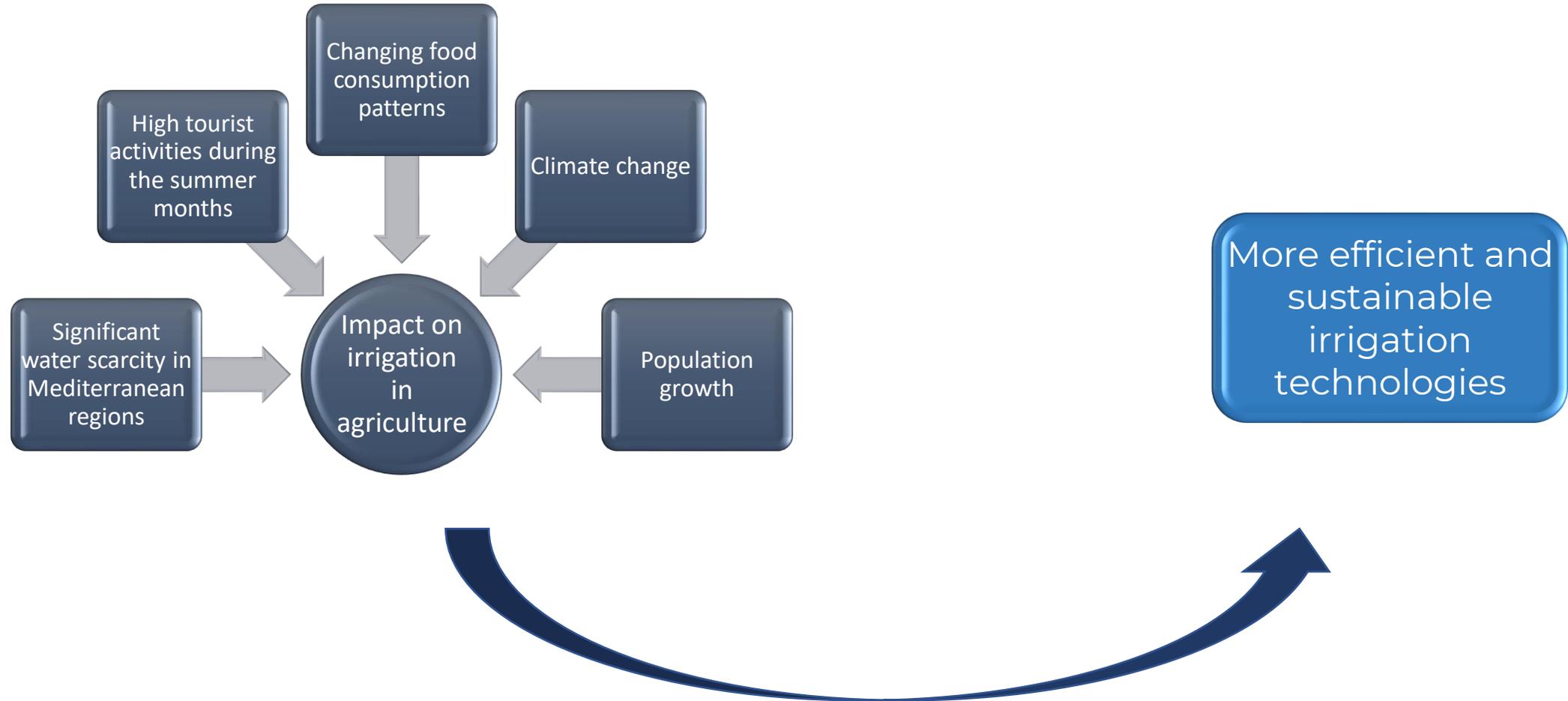
Dr. Sarah Camilleri

Dr. Francesca Busuttil

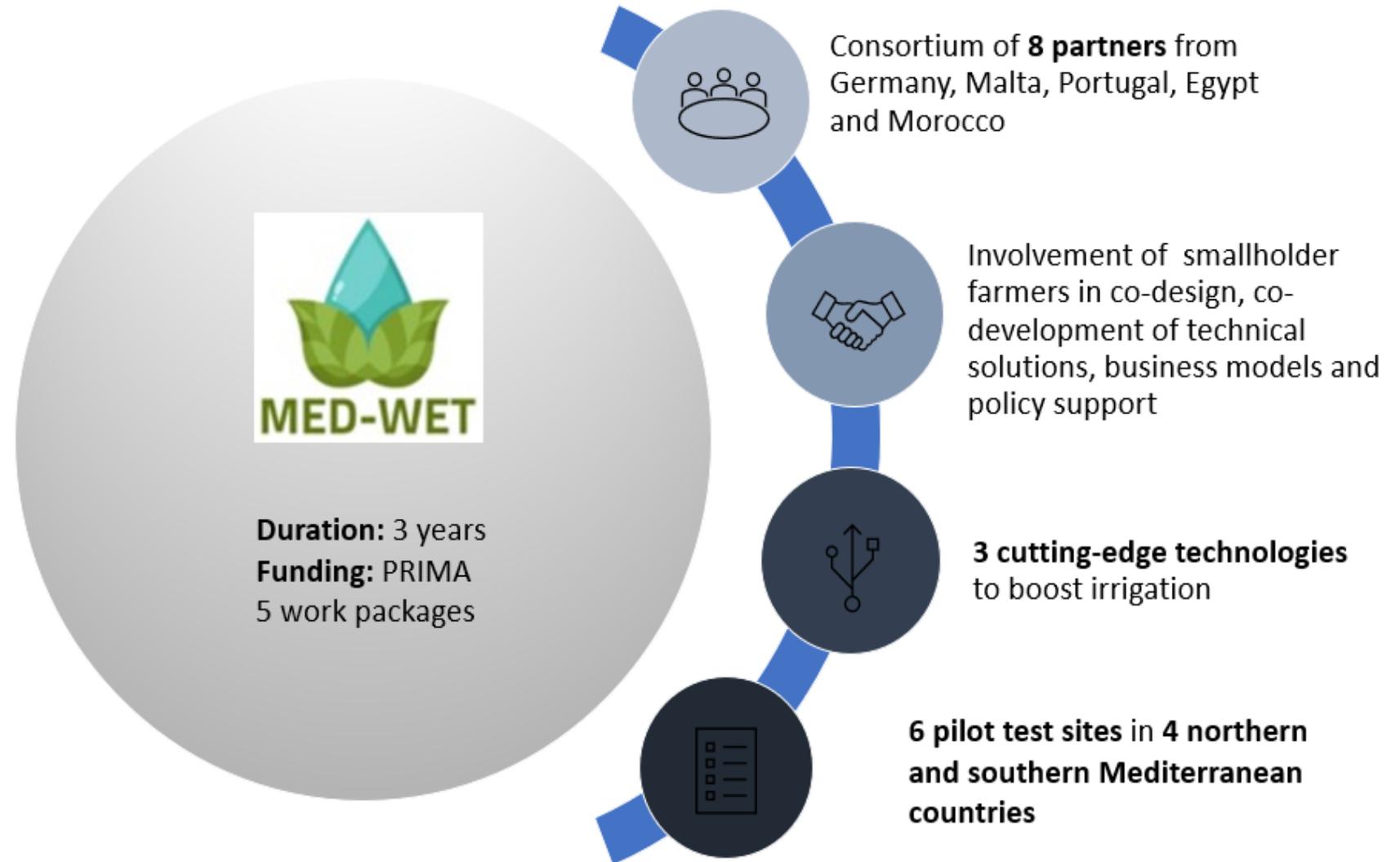
Applied Research & Innovation Centre (ARIC)



# MED-WET: Background



# The MED-WET project



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The PRIMA programme is supported and funded under Horizon 2020, the Framework European Union's Programme for Research and Innovation

# Project technologies

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## **Self-regulating, Low Energy, Clay based Irrigation (SLECI)**

- A subsurface irrigation technique that uses the actual suction force of the surrounding soil for regulation of the system's water release
- Water is transported via clay tubes which have a higher suction tension than the applied hydraulic pressure, so the surface of the clay tubes stays damp

## **Solar desalinisation**

- Evaporation greenhouse compartments based on the principle of solar desalination
- Saltwater is evaporated (raw water) and recondensed as sweet water

## **Constructed wetlands**

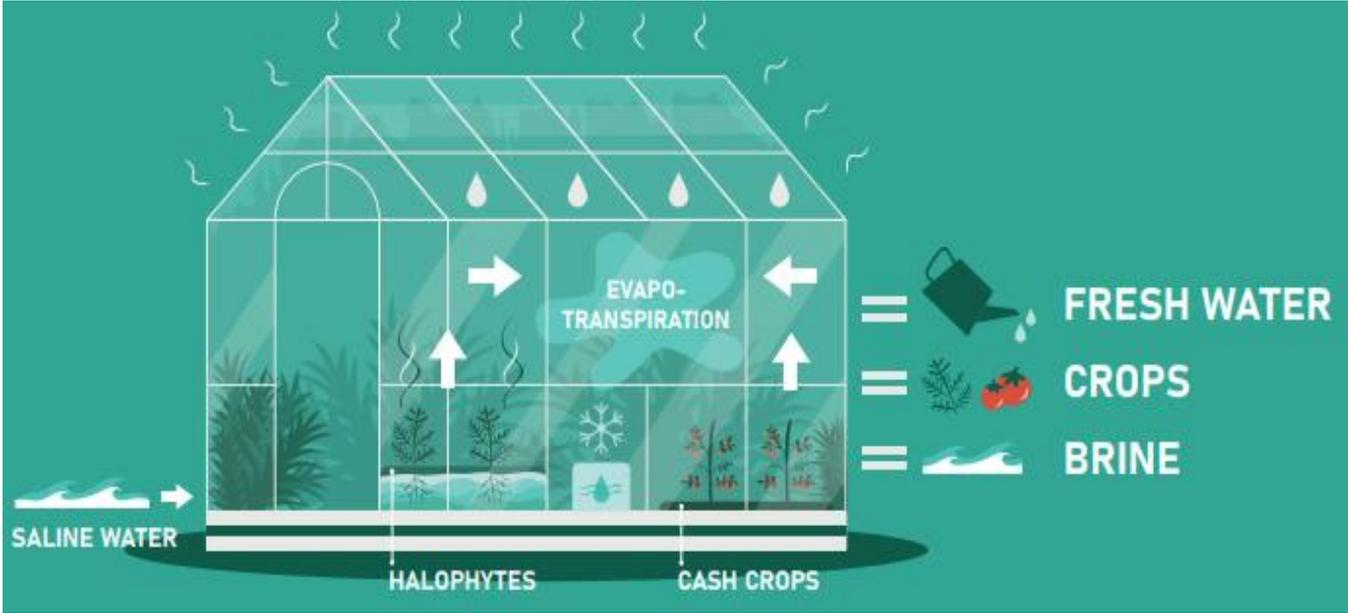
- Constructed wetlands will be produced to transform vineyard wastewater into reclaimed irrigation water, which flows into the further production units with edible crops

# Project technologies

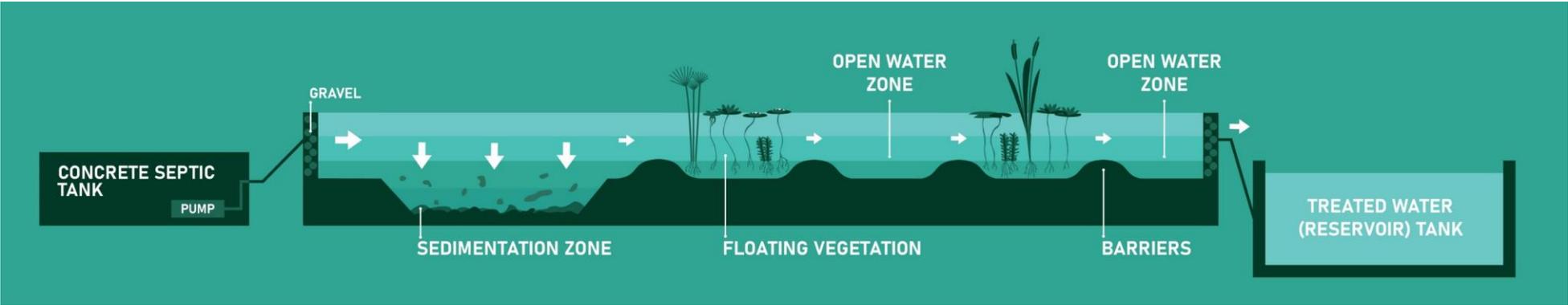
SLECI



Solar desalination greenhouse



Constructed wetlands



# Social media

← **MED-WET project**  
8 Tweets



**MED-WET project**  
@med\_wet

MED-WET aims to improve the irrigation efficiency of smallholder farmers in the Mediterranean region, in a 3 year project (2021 - 2024).

Science & Technology ⓘ Joined February 2023

1 Following 1 Follower

Follow



**Med-Wet**  
42 likes • 66 followers

Liked Message Search



**MED-WET project**  
MED-WET aims to improve the irrigation efficiency of smallholder farmers in the Mediterranean region  
Water Supply and Irrigation Systems · 20 followers

Following More

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# modernAKIS = **Modernization** of Agriculture through more efficient and effective **Agricultural Knowledge and Information Systems**

## ✓ **Horizon 2021** funded

- Cluster 6:- HORIZON-CL6-2021-GOVERNANCE-01
- Call:- Innovative governance, environmental observations and digital solutions in support of the Green Deal

## ✓ **MCAST** - as official MT partner

## ✓ partners from **all 27 EU member states**

## ✓ 7 years (2022-2029)

## ✓ supported by the **Ministry for Agriculture, Fisheries and Animal Rights (MAFA)** & the **Agricultural Directorate**



**Funded by  
the European Union**



# What is an Agricultural Knowledge and Innovation System (AKIS)?



**The main players:** farmers/foresters, advisors, researchers, organizations, NGOs, networks, retailers, media, services, various ministries...

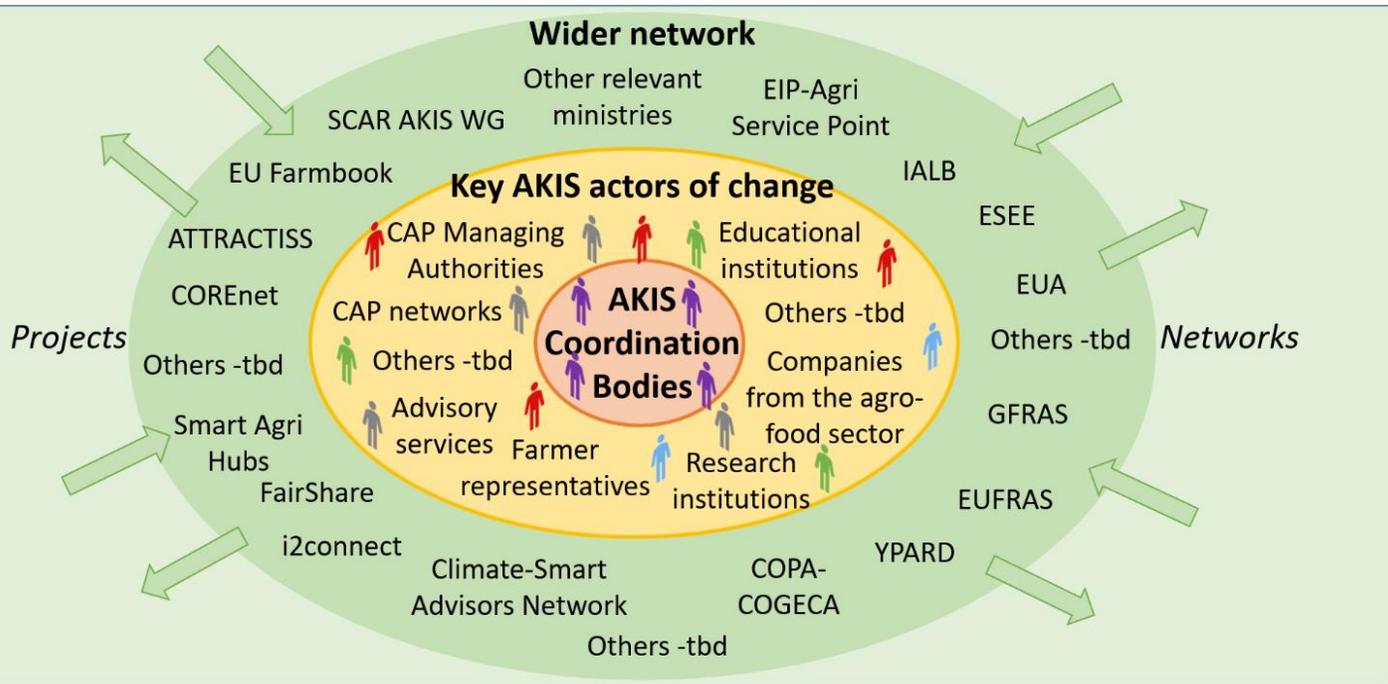
**Defined as** a set of organizations and people, including the interactions between them, that are active in the creation, dissemination and use of knowledge and information, with the aim of supporting decision-making, problem-solving and innovation in agriculture

- **European Union (EU) visionary goals** (e.g. European Green Deal) to tackle climate change, sustainability etc.
- Timely access and ability to integrate rapidly evolving scientific knowledge, innovation and technological developments across all actors who participate in agricultural value chains is key to a successful transition towards the European vision
- **2021-2027 Common Agricultural Policy (CAP)** stipulates the importance of effective Agricultural Knowledge and Innovation Systems (AKISs) in this regard.

# Project objectives

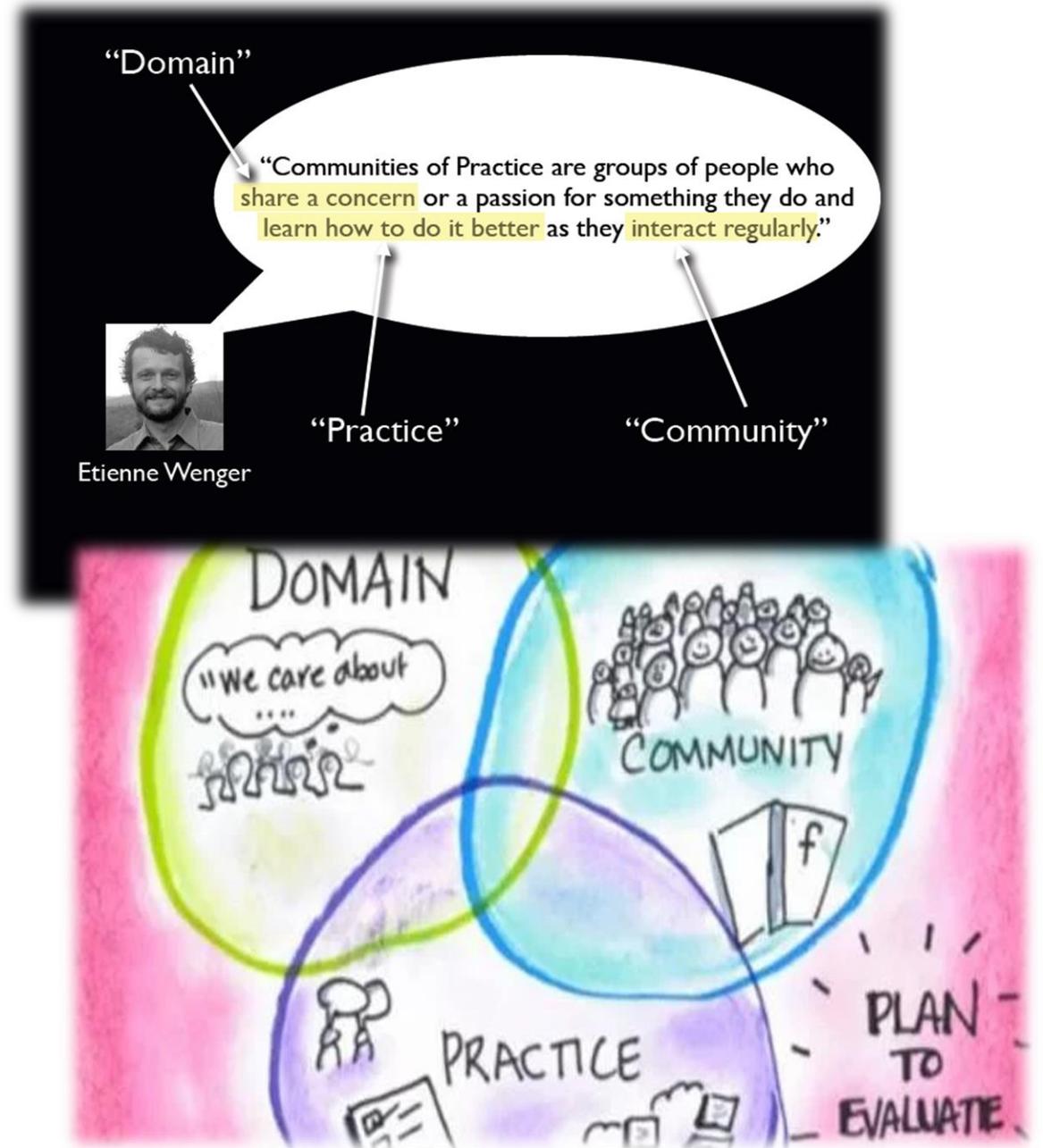
- ✓ **Build a European network** of AKIS actors from all EU MS
- ✓ **Build capacities of AKIS coordination bodies (AKIS CBs)** to improve the organization and functioning of their AKIS and to enhance interaction between AKIS actors.
- ✓ **Build capacities of key AKIS actors** and coach them to set-up and sustain local/regional/national AKIS **Communities of Practice in all MS**

- ✓ Provide a **forum to support AKIS CBs** to find adequate governance solutions
- ✓ Provide a **knowledge exchange platform, tools and methods** supporting knowledge flows
- ✓ **Collect and exchange practice-oriented knowledge** on how advisors and innovation support can be integrated into the AKIS
- ✓ Development of **cross-border approaches** to initiate and incentivize innovation



# Communities of Practice

- **DOMAIN** = shared topics of interest (e.g. organic farming, eco-schemes, AKIS & digitalization)
- **COMMUNITY** = members + their relationships (e.g. multi-actor group representing managing authority, farmers, R&I etc.)
- **PRACTICE** = channels and collective body of knowledge (e.g. discussions chat archives, video and audio interviews etc.)



# How can we build synergies?



1. How to move from 'stand-alone' project results/scientific findings to a centralized database and constant data flows. **(How to move from fragmentation → centralization)**
2. MEDWET hopes to build links to smallholder farmers and businesses / entrepreneurs. **How can such links to be maintained?**
3. modernAKIS can contribute as a supporting backbone to knowledge sharing. **What are the current gaps and challenges?**
4. Challenges with ensuring representation by relevant stakeholders. **How to earn stakeholder trust and interest?**
5. What is **MCAST's role in fostering/supporting such knowledge flows?** How does it stand to benefit? How can it promote expertise and contribute to the closing of knowledge/skill gaps in the agri-food sector?