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Scientific Coordinator Spoke 9 Agritech

Chair PRIMA Foundation, Barcellona

Università di Siena

International context

- Hunger, malnutrition, food security
- AgriFood Systems affect/are affected by climate change -> The MED area a hot spot

Italian context

Culture, reputation, local values -> Export: 65 kkk; Denomination of origin: 855, € 20KKK

Key role of private sector

Technological and management Innovation is needed

but

ITALY: Fragmentation, traditional sector, difficulties in accessing the ecosystem of innovation

What to do?

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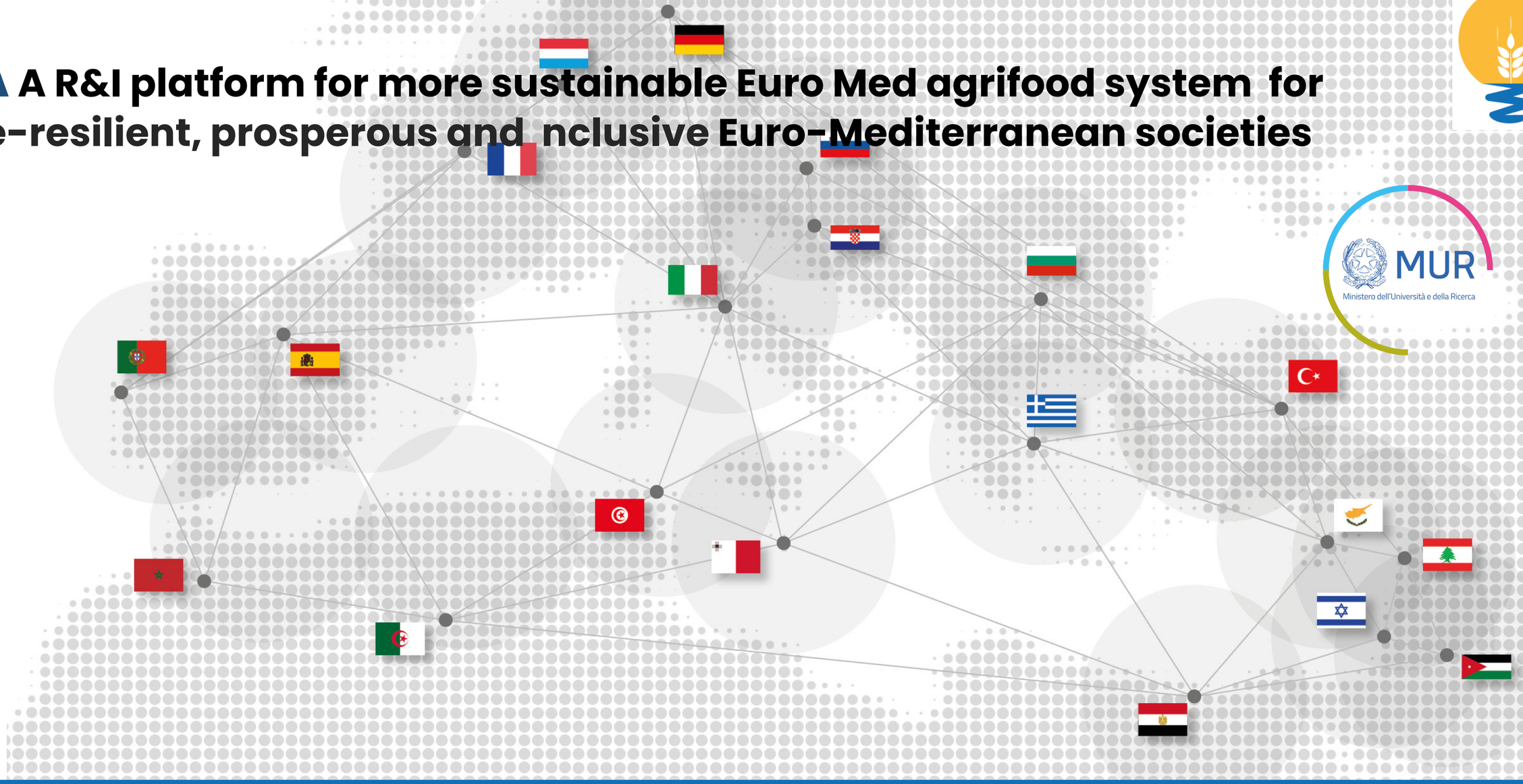
The role(s) of Agrifood R&I Platform

1. To promote innovation and its adoption

PRIMA A R&I platform for more sustainable Euro Med agrifood system for climate-resilient, prosperous and nclusive Euro-Mediterranean societies



PRIMA: Initiative ex Art 185 TFEU, with the participation of 20 Countries and the EC, based on Equal Footing

Budget 2018-2027: approx. 700 million euro, through competitive calls managed by PRIMA Foundation in Barcelona, at UfM

PRIMA ACHIEVEMENTS (2018-2023)

2500+
# of total eligible submissions

22K+
# of participating entities

ALL
PRIMA PS received funds

239
# of funded projects (16 MPC coordinators)

349 M€
Total Budget Allocated

29%
MPC Total Budget Share

23%
Budget Share of Private Sector

2300+
# of Total Beneficiaries

53
# of Funded Projects - Water

96
# of Funded Projects - Farming

77
# of Funded Projects – Agro Food

13
# of Funded Projects - Nexus

PRIMA ACHIEVEMENTS (2018-2023) - ITALIA

Overview Italia
2018-2023

183 / 238
Progetti finanziati
coinvolgono unità di ricerca italiane

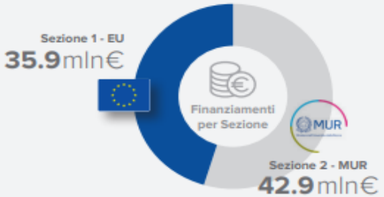
di cui

81
Progetti coordinati
da un'unità di ricerca italiana

39 | 73 | 62 | 9
Progetti per area tematica

57 Sezione 1 **126** Sezione 2
Progetti per sezione

78.8 mln€ / 349.6
Finanziamenti totali



Azioni

388 Unità di ricerca /2290

2018
28 /35
Progetti finanziati
di cui
11
Progetti coordinati
9 | 11 | 8
Progetti per area tematica
51 Unità di ricerca
9.8 mln€

2019
34 /48
Progetti finanziati
di cui
16
Progetti coordinati
6 | 15 | 11 | 2
Progetti per area tematica
70 Unità di ricerca
12 mln€

2020
35 /46
Progetti finanziati
di cui
16
Progetti coordinati
5 | 18 | 10 | 2
Progetti per area tematica
84 Unità di ricerca
16.1 mln€

2021
32 /39
Progetti finanziati
di cui
17
Progetti coordinati
5 | 19 | 6 | 2
Progetti per area tematica
67 Unità di ricerca
13.8 mln€

2022
30 /34
Progetti finanziati
di cui
10
Progetti coordinati
11 | 5 | 13 | 1
Progetti per area tematica
58 Unità di ricerca
13.1 mln€

2023
24 /36
Progetti finanziati
di cui
11
Progetti coordinati
3 | 5 | 14 | 2
Progetti per area tematica
56 Unità di ricerca
14 mln€

iGUESSMED- Il digitale per una produzione efficiente

Innovativo DSS per serre di **pomodoro** per **fertirrigazione efficiente** e **gestione dei parassiti**

Modalità di attuazione:

- **controllo climatico basato su IoT** (Internet of Things);
- uso di **sensori** per il calcolo degli evotraspiratori

Pilota in TUR, SPA, IT

Partner: ITA, SPA, TUN, TUR
Partner ITA: CREA,

SUREFISH- Tracciabilità e digitalizzazione

Valorizza il pesce tradizionale del Mediterraneo attraverso una innovativa **tracciabilità che** sfrutta i campi elettromagnetici**, per confermare l'autenticità e prevenire le frodi**.

Partner: ITA (Università di Napoli, ENCO srl.), TUN, LIB, SPA, EGI

Come promuove l'adozione dell'innovazione?
Collaborazione EuroMED; Crescente TRL; Siti pilota e dimostratori;
Sinergie con FAO e CIHEAM; obbligatorietà presenza imprese

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Strategic Objectives

Technologies for sustainable agriculture

01 RESILIENCE

productivity and promoting resilience to climatic change

02 LOW IMPACT

Reducing wastage and environmental impact

03 CIRCULAR

Development of circular economy strategies

04 RECOVERY

Sustainable development of marginal areas

05 TRACEABILITY

Promoting safety, traceability and typical traits in agri-food chains

Finanziato dall'Unione europea
NextGenerationEU

Ministero dell'Università e della Ricerca

Italiadomani
PIANO NAZIONALE DI RIPRESA E RESILIENZA

Affiliates

- 24 Public Universities
- 4 Private Universities
- 5 Research Centers
- 14 Companies in research
  Eni, CNH, IBF, Relatech, Casillo, Antares Vision, Telespazio, e-geos, SIS, CAI, Graded, Engeneering, irritec, De Matteis
- 4 Hub Companies
  Intesa, BF, CDP, Nestle,

1 • Plant, animal and microbial genetic resources and adaptation to climatic changes

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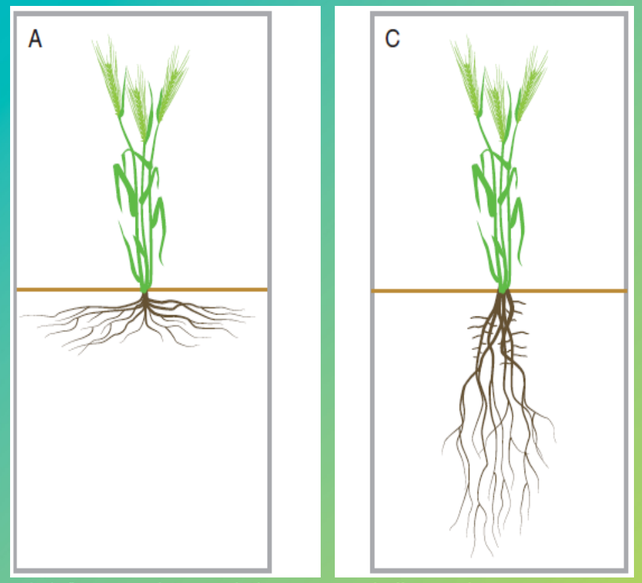
NEED: to adverse environmental conditions like drought and/or nutrients shortage

Solution: Development of new root ideotypes in small-seed cereals (ie. barley and durum wheat) to increase tolerance

The root system architecture affects water and nutrient uptake of plants from different layers of the soil



Model from White, Philip J., et al. "Matching roots to their environment." Annals of botany 112.2 (2013): 207-222.

Wild Type

Unibo, unpublished.

Hypergravitropic mutants

New genes and phenotypes

Pre-breeding material

Research Institution

Breeders

Seed companies

- **Isolation and characterization of genes affecting root growth angle and root distribution in the soil;**
- **Organizing and initial testing of the newly isolated genes in pre-breeding materials;**
- **Scale up for larger testing in breeding context**

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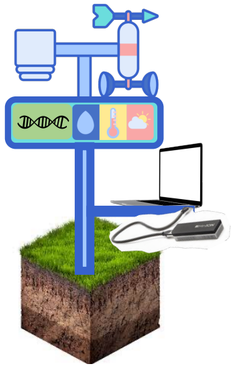
NEED: develop IoT-based station to monitor functional biodiversity

Solution: AgriBioSentinels

Biological complexity

The tool



Presence/absence and abundance of key functional taxa

Agroecosystems: living organisms release traces of their presence (sounds, DNA molecules …). We exploit these traces in an innovative manner!

AgriBioSentinels detecting i. airborne DNA; ii. eDNA circulating in the soil; iii. artificial flowers and chromotropic traps coupled with HQ cameras; iv. audio recordings; v. camera traps for invertebrates; vi. Proximal soil- and plant-based sensors

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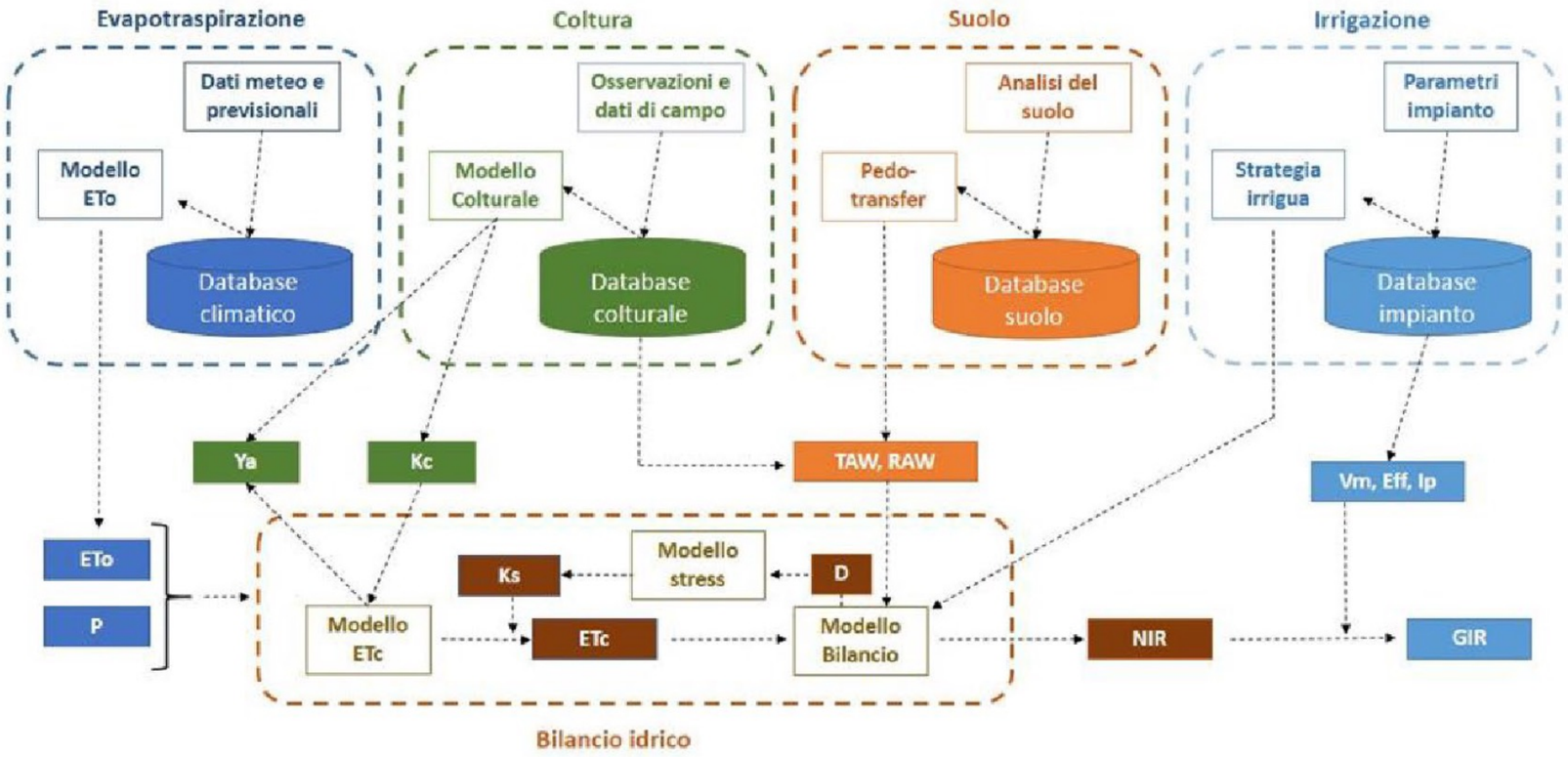
NEED: lack of water

Solution: Sub-surface drip irrigation system: irrigation management systems for smart irrigation through DSS and complex networks of Soil-Plant-Atmosphere **sensors for adapting crops** to climate change, increasing irrigation efficiency, rec



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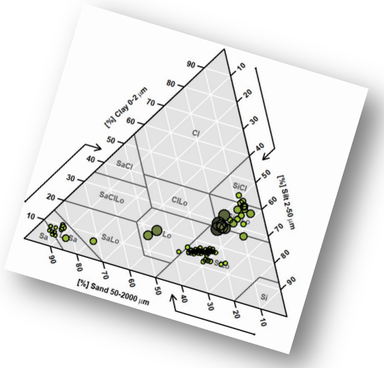
NEED: To estimate and map soil attributes

Solution: Soil spectroscopy

Fast, cost-effective, environmentally friendly, nondestructive, reproducible and repeatable method to measure soil properties and map the spatial variability. It is based on the interaction between matter and electromagnetic radiation

Experimental farm, Legnaro (PD)



Lagosanto, Ferrara (FE)

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NEED

Estimation and monitoring of quantity (fresh and dry matter) and quality (fiber composition, protein, etc.) of pasture biomass to improve pasture management (i.e. avoid over grazing) and livestock welfare (i.e. avoid malnutrition).

Solution

A DSS using satellite data together with agro-environmental data, predicting biomass characteristics and livestock load

6 – Management models to promote sustainability and resilience of agricultural production system

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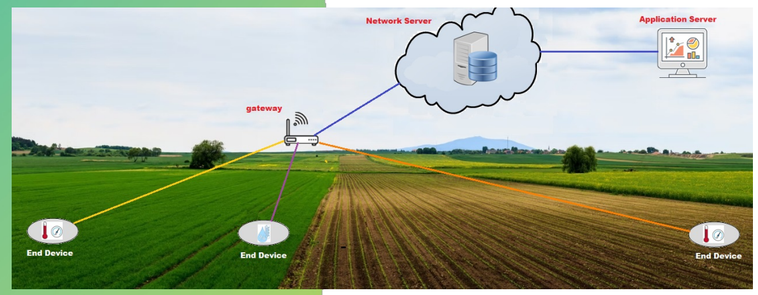
NEED: To overcome digital divide

Solution: identify procedures to collect, transfer and store data, to overcome limitations and inhomogeneity caused by lack of connectivity

UNIVERSAL LOW POWER-WAN PLATFORM

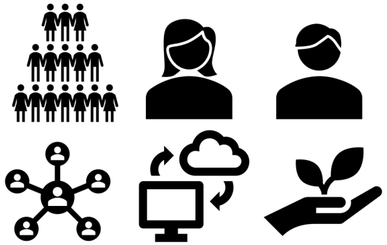


Design, implementation and testing of an easy to deploy Long Range-Wide Area Network network

OPEN PROXIMAL SENSORS

Open sensing technology with LoRa-WAN interface that are robust, small, ergonomic, replicable and universal, energy independent, referable, anywhere accessible, open source

USERS AND PROSPECTIVES



Empowerment of farmers and communities to better use data collected and shared at different scales, through the development of DSS to maximise efficiency thereby improving sustainability of the primary production systems

7 – Integrated models for the development of marginal areas to promote multifunctional production systems enhancing agro-ecological and socio-economic sustainability

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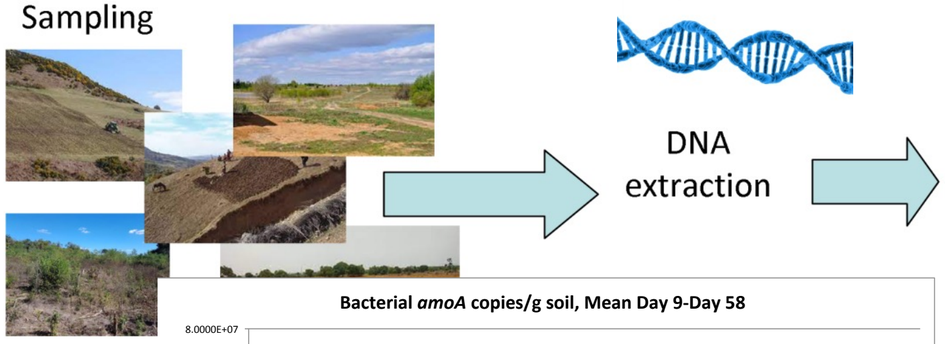
NEED: to assess functional agro-biodiversity and to quantify ecosystem services in order to restore and maintain sustainability in marginal areas

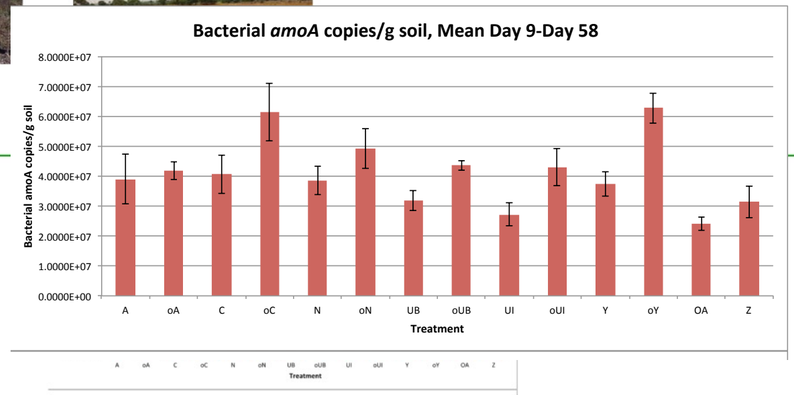
Soil Scoring by DNA analysis is the solution

Solution: by extracting DNA from marginal soils and quantifying specific microbial genes that are responsible of the main biogeochemical cycles of the plant nutrients, to score each soil potentialities using RealTime Polymerase Chain Reaction



DNA extraction

Target genes Amplification



Ecosystem services assessment (Nitrogen cycling)

QuantStudio™ 12K Flex Real Time qPCR System

8 – Circular economy in agriculture through waste valorization and recycling

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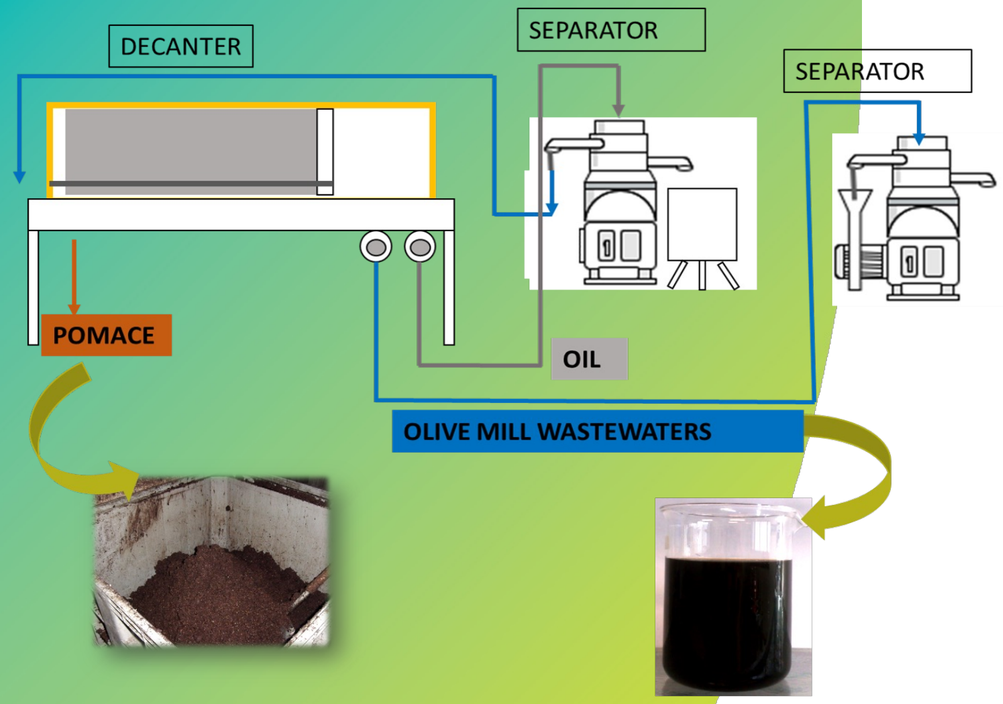
ALMA MATER STUDIORUM
UNIVERSITÀ DI BOLOGNA

NEED: To produce bioenergy and to increase the value of olive waste



Olive pomace
Moisture content: 42.2% (w/w)
Total lipids: 4.2% (w/w)

Olive mill wastewaters
Moisture content: 73.2% (w/w)
Total lipids: 0.6% (w/w)

Solution: bioenergy production from olive waste, constructing a prototypal separator device for pomace

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TRUSTAGRI

Traceability and Sustainability tools

NEED

Trust is a key word in agrifood systems.

Consumers, agri-foodvalue chain leaders, large distribution organizations, regulators, and banks require more reliable information about products' origin and sustainability

Solution

New methodologies for assessing geographical origin of products and the sustainability performance of agri-food value chains

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Come promuove l'adozione dell'innovazione?

Agritech Academy

Organization and management of technology transfer initiatives

- Innovation brokers
- Acceleratore -> Farming future
- Accordi con associazioni di categoria
- Programma di Open innovation e Startupper

2. Promuovere la Diplomazia Scientifica e la Diplomazia del Cibo

'PRIMA è riuscita a promuovere una **effettiva collaborazione tra Paesi delle diverse sponde del Mediterraneo**, sulla base di una fiducia reciproca. '
'PRIMA, quale strumento rilevante di **diplomazia scientifica**, ha promosso la cooperazione tra Paesi (anche tra quelli della sponda sud del Mediterraneo) e favorito un'integrazione scientifica che sarebbe stata improbabile in sua assenza.'

Interim Evaluation Report 2022

Iniziativa Governativa del MAECI, altri Ministeri, FAO, altri Paesi MED

con incontri ministeriali e missioni diplomatiche in Egitto, Tunisia e Albania

- Presentazione Agritech e PRIMA e Valutazione risultati di ricerca e opportunità di innovazione
- Partenariati con attori del mondo produttivo
- Coinvolgimento delle istituzioni regionali e nazionali (es. UpM, Ministeri e Agenzie nazionali)
- Comprensione delle esigenze specifiche del territorio e analisi degli stakeholder
- Preparazione e progettazione di un piano di attuazione
- Coinvolgimento dei donatori (es. cooperazione internazionale).

In sintesi

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Punti di forza:

Centralità della tematica

Elevate potenzialità nella promozione dell'adozione dell'innovazione e nella diplomazia scientifica e del cibo

Creazione di reti nazionale (Agritech) e EuroMED (PRIMA), in sinergia

Punti di debolezza:

Agritech: Frammentazione delle imprese; Post PNRR

PRIMA: Complessità delle relazioni

Centro Nazionale di Ricerca per
le Tecnologie dell'Agricoltura

Agritech

Plan. Plant.
Planet.

Grazie dell'attenzione