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SPOKE 7
Integrated models for the development of marginal areas

Matteo Spagnuolo

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UNIMONT

UNIVERSITÀ DEGLI STUDI DI MILANO

L'INNOVAZIONE È UNA SOLUZIONE PER LA PERMANENZA DELL'AGRICOLTURA IN MONTAGNA?
La visione degli allevatori delle valli lombarde

Milano 29 FEBBRAIO 2024

SPOKE 7

9 spokes across the 5 strategic objectives

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01 RESILIENCE

- Genetic resources: adaptation to climatic changes — 1
- Crop Health: reducing the use of agrochemicals — 2
- Enabling technologies and smart management of agricultural systems — 3
- Multifunctional and resilient agriculture and forestry systems — 4
- Sustainable productivity and mitigation of environmental impact in livestock systems — 5

02 LOW IMPACT

- New models of circular economy through waste valorization and recycling — 8

03 CIRCULAR

- Management models to promote sustainability — 6
- Integrated models for the development of marginal areas — 7

04 RECOVERY

05 TRACEABILITY

- Technologies and methodologies for traceability — 9

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Universities and Research Institutions : 33

Companies 19

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Expression of interest of companies and other institutions

Number of entities by Spoke	Spoke number	Spoke 1	Spoke 2	Spoke 3	Spoke 4	Spoke 5	Spoke 6	Spoke 7	Spoke 8	Spoke 9
	#	200	257	342	163	129	188	301	181	305

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Marginal areas

Marginal areas constitute a very high percentage of the territory in our country (almost 2/3).
Areas that are less favorable for a quality conventional agriculture, and where the production incomes barely covers the cultivation costs.

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Integrated models for the development of marginal areas to promote multifunctional production systems enhancing agroecological and socio-economic sustainability

SPOKE Leader

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

WP	**7.1** Integrated models to develop marginal areas	**7.2** Development of multifunctional production systems	**7.3** Circular bioeconomy and innovation in marginal areas	**7.4** Technological solutions and social impacts
GOAL	Improve sustainability and resilience of the agricultural and forestry systems	Valorization and development of foods, and no-foods chains	Develop nature-based solutions to generate energy and other high value products	Valorize traditional productions and tourism, and enhance socio-economic sustainability

WP 7.1	Integrated models to develop marginal areas

T 7.1.1. Tailored methods for land management and soil conservation in marginal areas and/or at risk of erosion

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T 7.1.2. Strategies for development of the agricultural and forestry systems, plant and animal biodiversity enhancement also at landscape level in marginal areas

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Plan. Plant. Planet.

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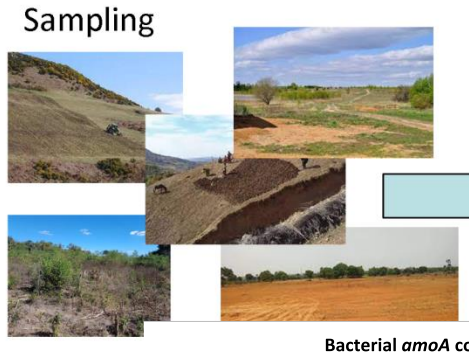
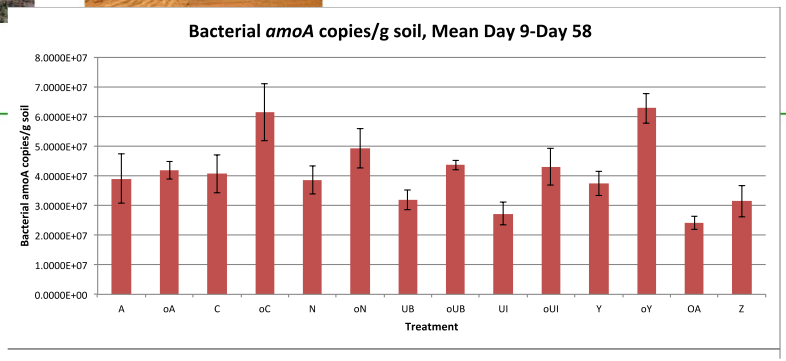
Soil Scoring by DNA analysis is the solution

How: 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



Nitrification : $NH_3 \xrightarrow{amoA} NO_2^- \longrightarrow NO_3^-$

Denitrification : $NO_3^- \longrightarrow NO_2^- \xrightarrow[nirK]{nirS} NO \longrightarrow N_2O \xrightarrow{nosZ} N_2$

Nitrogen fixation : $N_2 \xrightarrow{nifH} NH_3$

Ecosystem services assessment (Nitrogen cycling)

QuantStudio™ 12K Flex Real Time qPCR System

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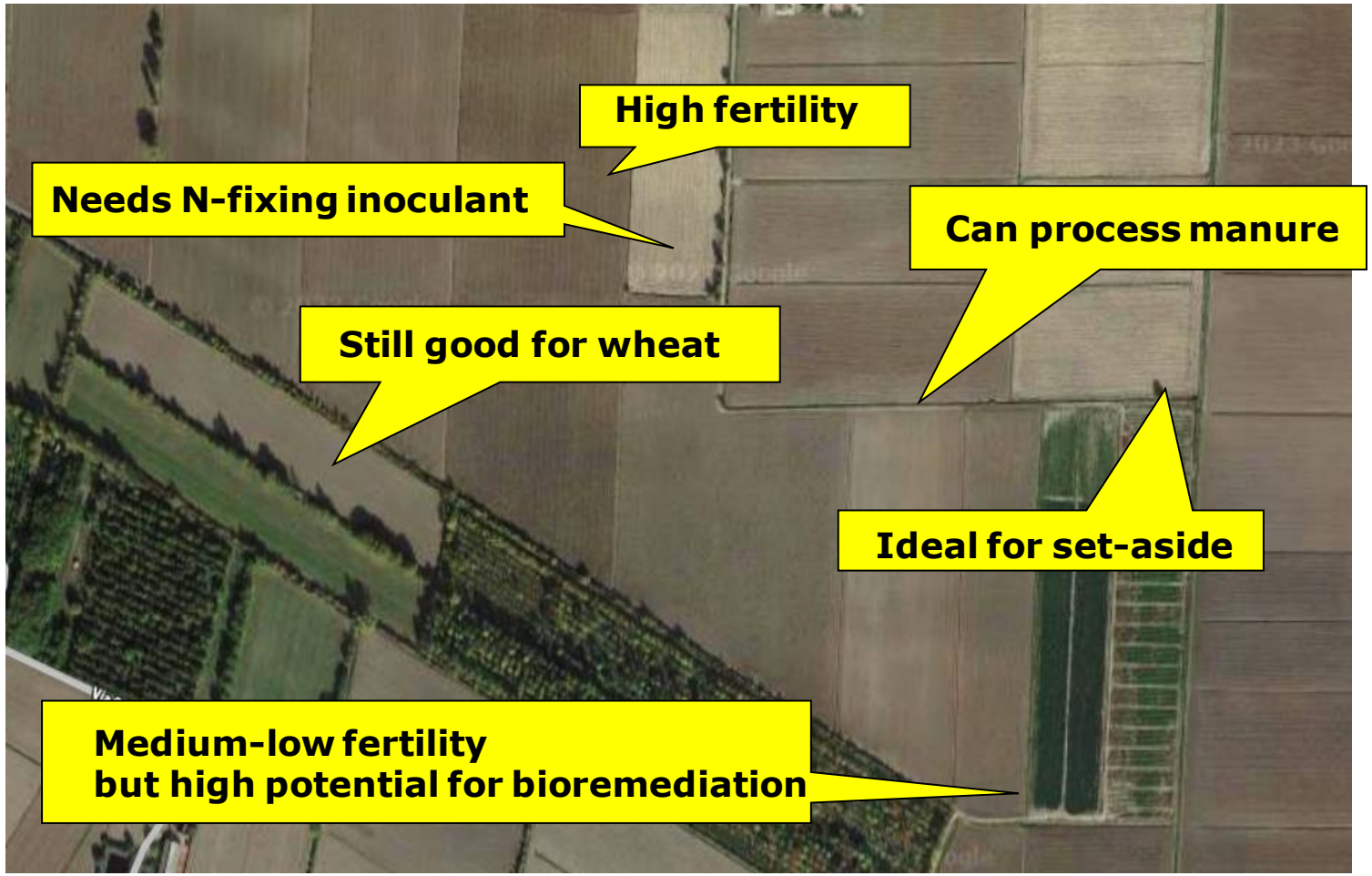
Soil Scoring by DNA analysis is the solution

For whom: the information, that can be shared in open databases serves the decisional needs of farmers to apply the proper treatments and to stakeholders from environmental management agencies to enact the proper policies for land protection and fertility restoration in marginal areas



WP 7.1	Integrated models to develop marginal areas

T 7.1.3.Infrastructure, roads and rural building valorisation

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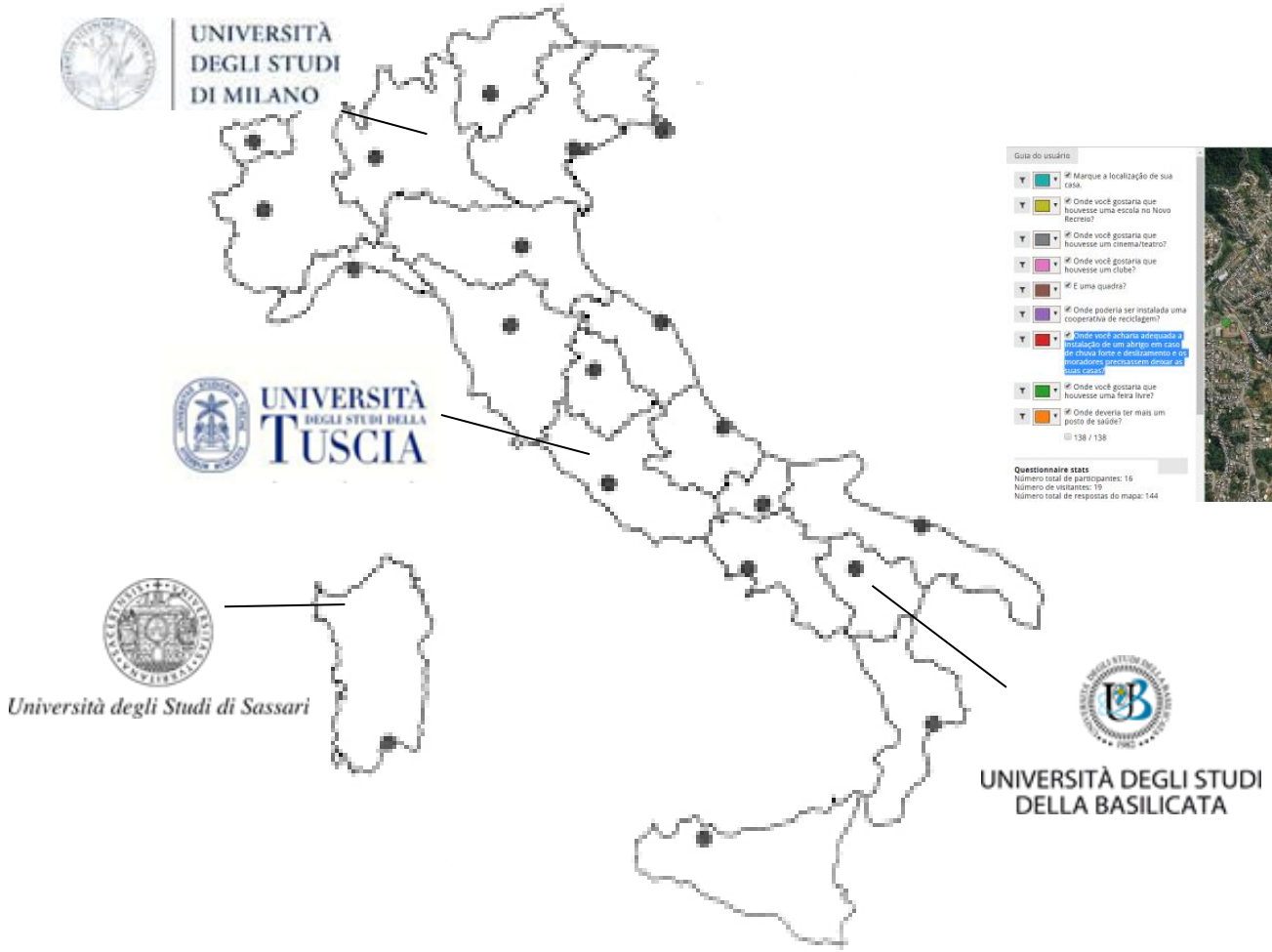

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WP 7.1	Integrated models to develop marginal areas

T 7.1.4 Living lab and case studies for the transition towards agro-ecology and climatic neutrality in marginal areas and/or at risk of erosion

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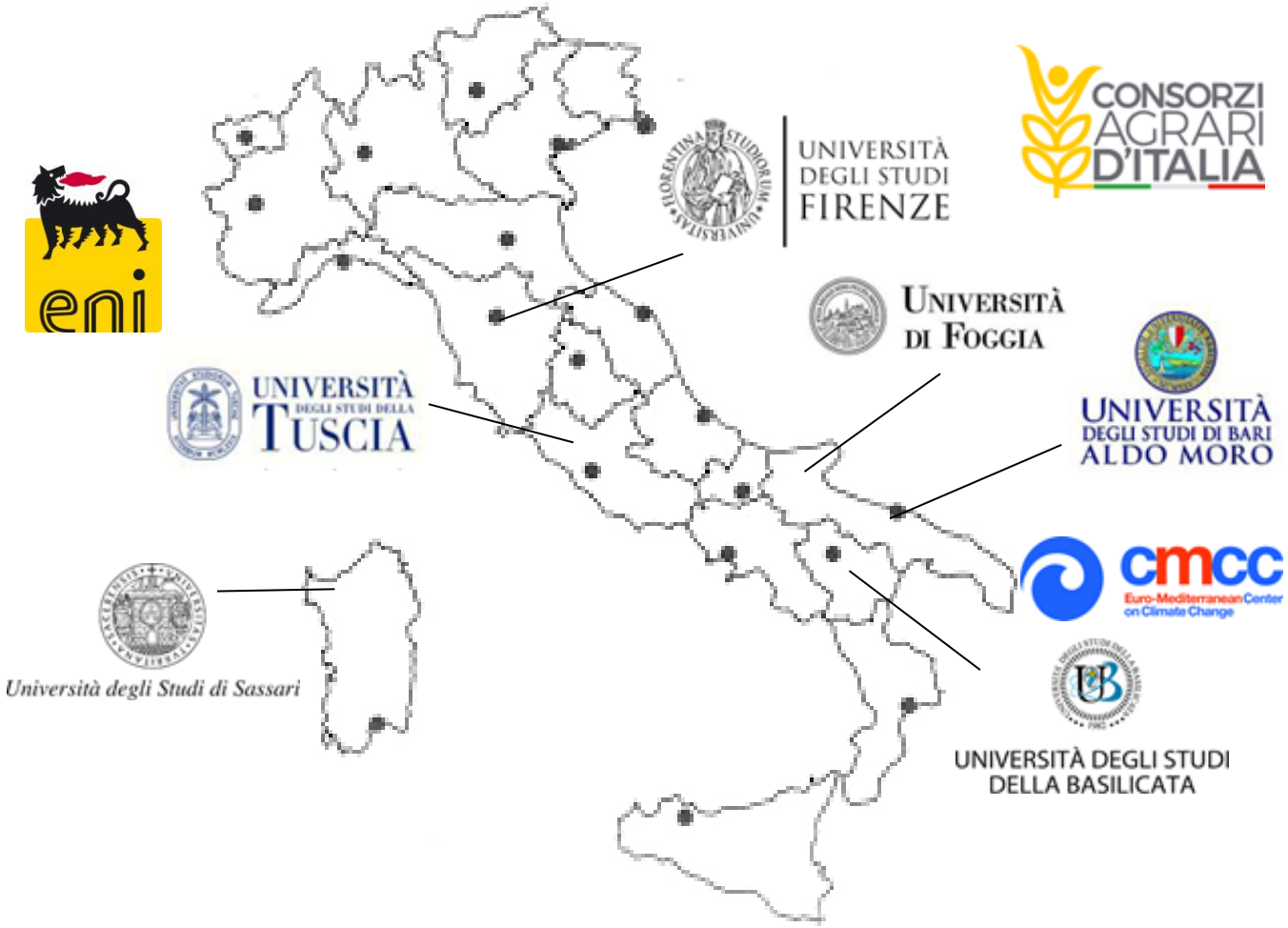

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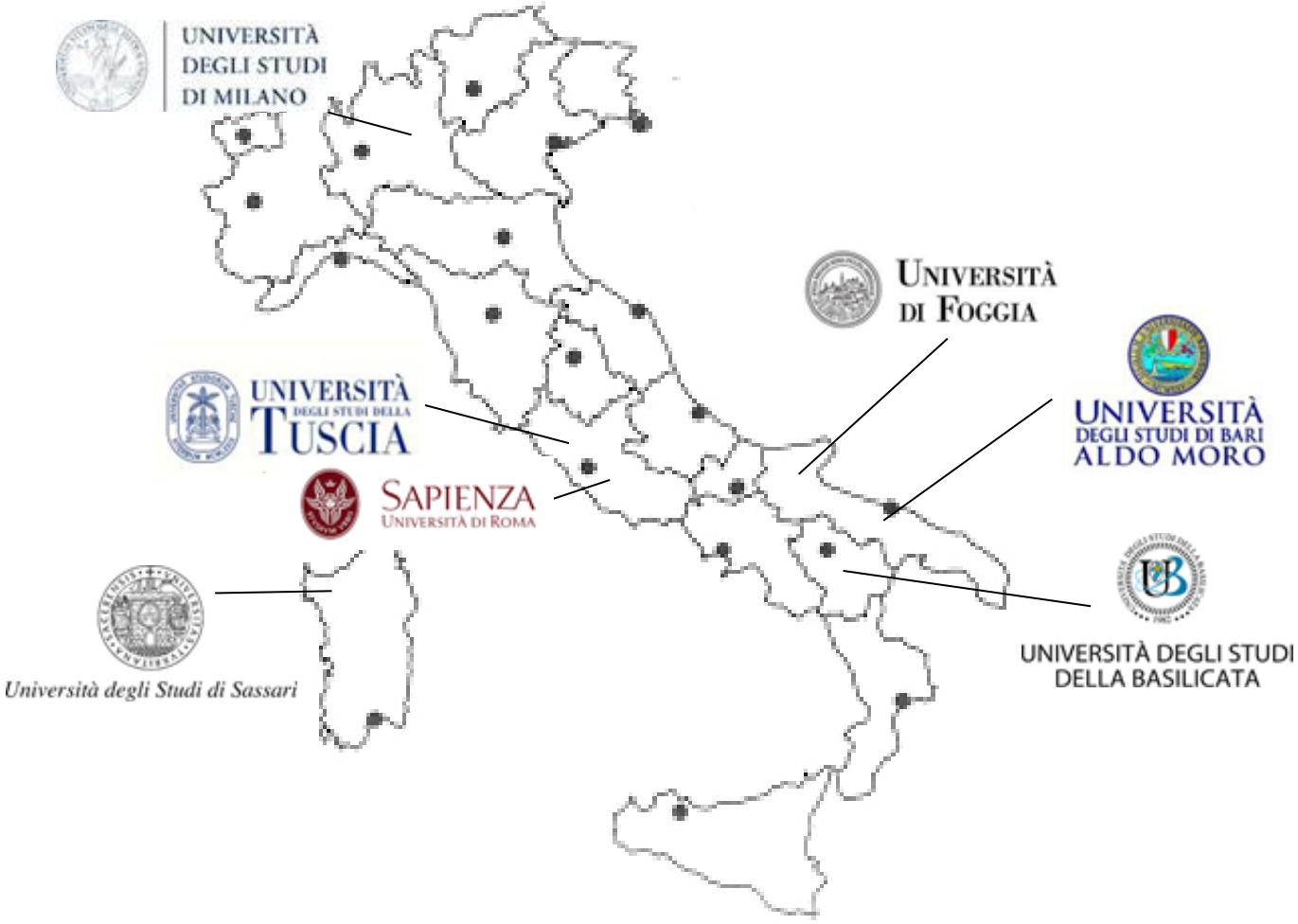
www.agritechcenter.it

WP 7.2	Development of multifunctional production

T 7.2.1 Identification of sustainable animal derived resources, crops, ornamental and medicinal plants



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WP 7.2	Development of multifunctional production

T 7.2.2 Promotion of wood and nontimber forest products, foods, and no-food chains (ecosystem services)

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WP 7.2	Development of multifunctional production

T 7.2.3. Case studies and living lab of multifunctional production systems and small-scale mechanisation

task leader

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WP 7.3	Circular bioeconomy and innovation in marginal areas

T 7.3.1 Specific actions for development of marginal areas: aquaponics, crop substitution, urban agriculture, soilless crops, enhancement of forest by-products

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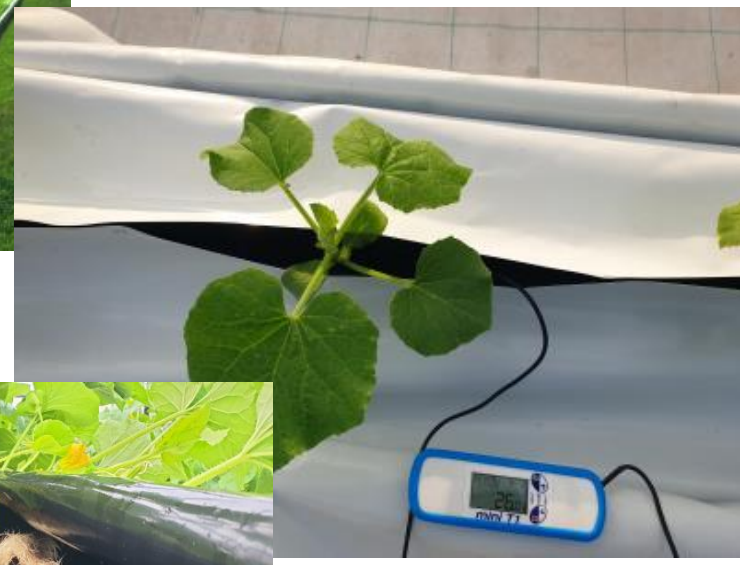

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WP 7.3	Circular bioeconomy and innovation in marginal areas

T 7.3.2. Tailored processes and biotechnological solutions for valorisation of by-products, energy production, plant-derived ingredients

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WP 7.3	Circular bioeconomy and innovation in marginal areas

T 7.3.3 Sustainable nature-based solutions for soil and water management and remediation specific for marginal areas

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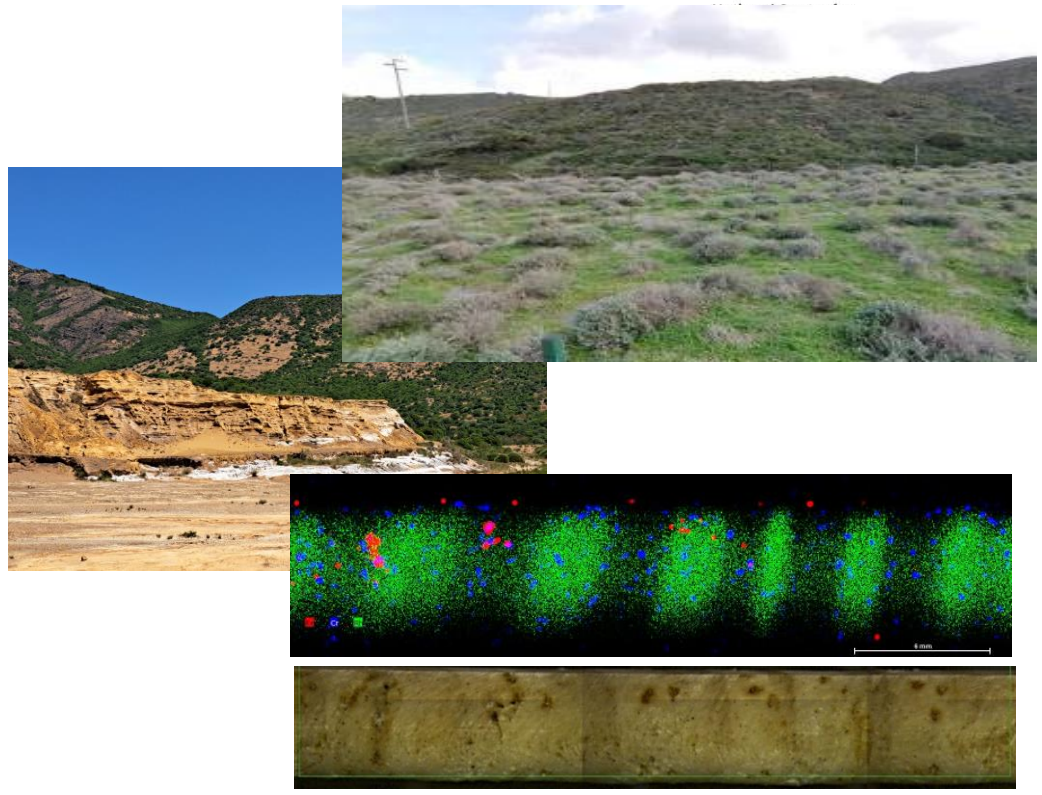

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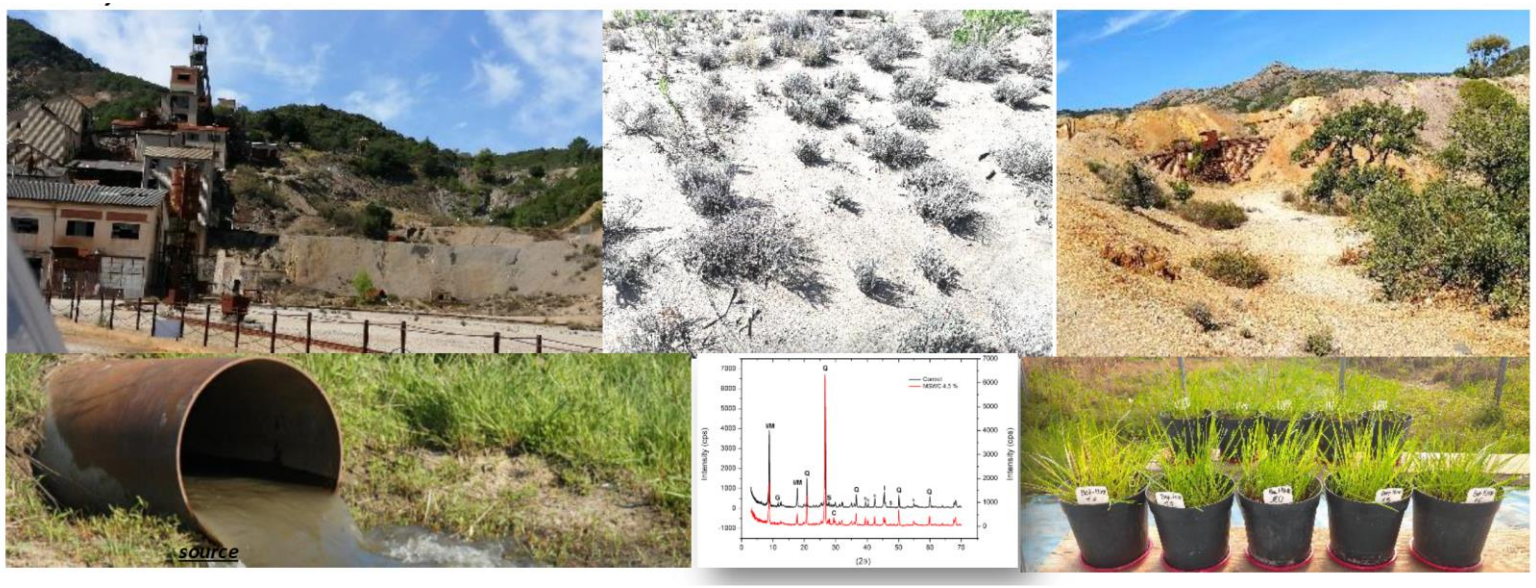

Need: recovery of soils contaminated by inorganic pollutants and rapid monitoring of the remediation process

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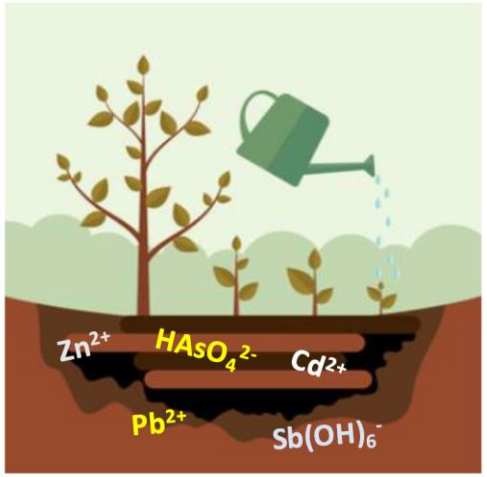
Phytoremediation and new monitoring technologies are the solution

Aim: to develop phytoremediation protocols and new technologies for the rapid monitoring of the recovery processes in soils contaminated by potentially toxic elements (PTEs)

Soil pollution by PTEs : threatens ecosystem functionality and productivity, poses relevant health risks



Soil remediation by (assisted)phytoremediation; **rapid monitoring,** with non-invasive and non-destructive technologies, of the contaminants uptaken by the plants

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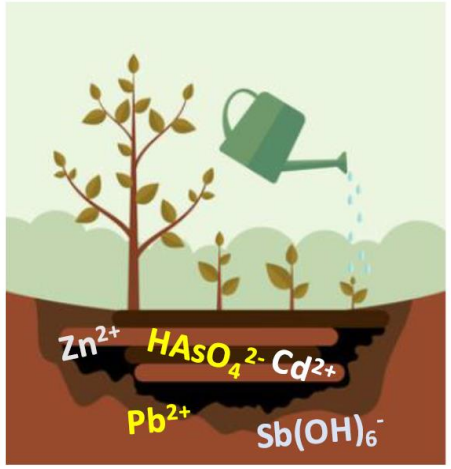
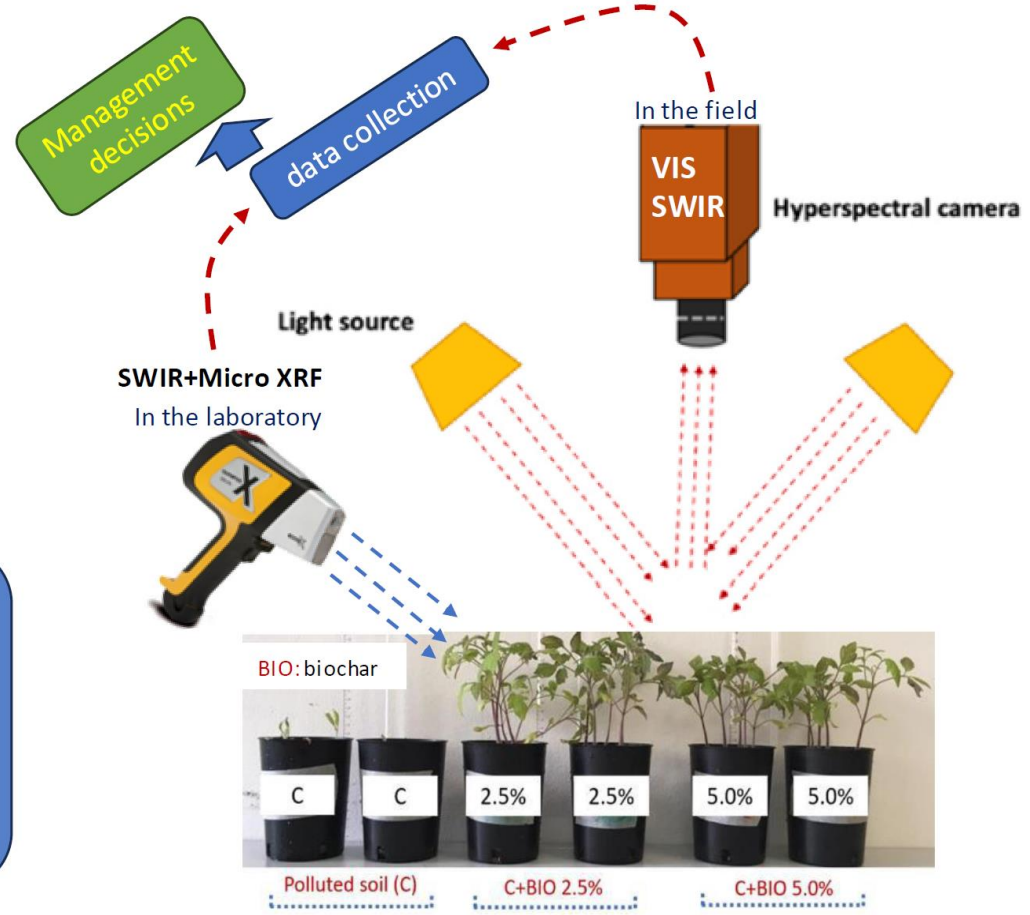
Phytoremediation and new monitoring technologies will be the solution



- Optimized protocols for (assisted) phytoremediation of PTEs-polluted soils
- Rapid monitoring of PTEs bioaccumulation by direct advanced analytical techniques



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T 7.4.1. Technological innovation through hubs, remote servers and sensing, communication systems to enhance sustainability of local and global agri-food, forest timber and non timber chains

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WP 7.4	Technological solutions and social impacts

T 7.4.2 Actions for the social development through analysis of development gaps, social context and training needs

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FONDO FORESTALE ITALIANO

Bosco Bene Comune di Rizomi ODV condotto senza tagli, rispettando le dinamiche evolutive naturali e custodendo le biodiversità.

Affiliato al Fondo Forestale Italiano
www.fondoforestale.it/rete
A0013 BA

Bosco di Monteferraro

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T 7.4.3 Valorisation of traditional productions, local unexploited resources and eno-gastronomic tourism

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Phenotype to Profit: Harnessing Genetic Insights into **Wool Traits** for Optimizing Local Sheep Value Chains

The contest: problems and chances

1. Wool market in Italy move **4,000** millions of euro
2. Based on foreign wool importation (**Australia, Argentina, China**)
3. Italy has the potential to fill all steps of the supply chain, but the **technological gap** is now enormous

1. Breeding & management
   i. lack of specialize
   ii. manpower use of archaic selection systems
   iii. lack of a "breeders" system

2. Shearing
   i. unspecialized operators
   ii. lack of official recognition
   iii. lack of generational turnover

3. Collection & classification
   i. inexistent

4. Scouring & carding
   i. from 2019 there are no scouring centers in Italy
   ii. lack of investment in alternative technologies

Phenotype to Profit: Harnessing Genetic Insights into **Wool Traits** for Optimizing Local Sheep Value Chains

who benefits from it?

LIVESTOCK FARMING SYSTEM:

IMPROVEMENT OF ECONOMIC CONDITIONS AND STEMMING THE ABANDONMENT OF MARGINAL AREAS;

ATTRACTION OF YOUNG (SKILLED) PEOPLE TO THE SECTOR THANKS TO THE DEMAND FOR SPECIALIZED PROFESSIONAL FIGURES AND THE INTRODUCTION OF TECHNOLOGIES

Precision livestock farming, genomics

INDUSTRIAL TEXTILE SYSTEM:

RECONSTRUCTION OF A NON-EXISTENT COMMERCIAL SECTOR BUT WITH GREAT ECONOMIC PROSPECTS

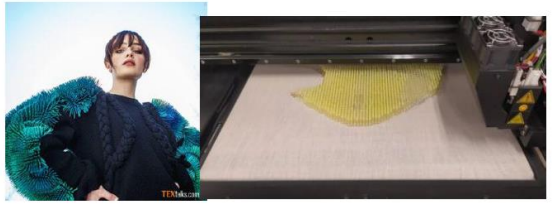
PARADIGM SHIFT TOWARDS A PRIMARY FIBER INDUSTRY THAT RESPECTS THE ENVIRONMENT AND WITH A HIGH INDEX OF TECHNOLOGICAL INNOVATION

Italian raw material production with high added value

FINAL TEXTILE SYSTEM:

DIRECTING THE INTERNAL AND EUROPEAN MARKET TOWARDS PRODUCTS WITH LOW ENVIRONMENTAL IMPACT,

TEXTILE PRODUCTS FROM NATURAL FIBRES, INTRODUCTION OF THE CONCEPT OF "PURE BREED" PRODUCTS



Innovative textile products (3D printed wool textile, “one breed” fibre etc.)

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Thank You

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