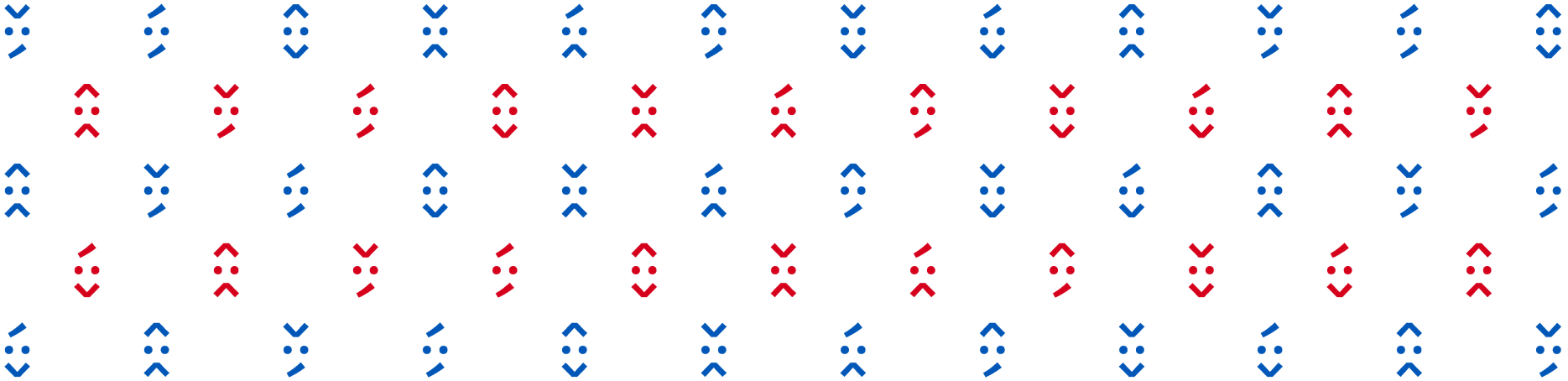
Slovak Presidency of the Council
of the European Union



CULTIVATION OF ENERGY CROPS IN CONTAMINATED AREAS - A CASE STUDY IN SOUTHERN SARDINIA

Guido Bonati, Council for Research in Agriculture and Economics, Italy,
guido.bonati@crea.gov.it

International Conference CONTAMINATED SITES 2016
Bratislava, 12. – 13. 09. 2016

SK EU2016

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No691846.

FORBIO – Main features

WIP – Renewable Energies

Food and Agriculture Organization of the United Nations

Geonardo Environmental Technologies Ltd.

Consiglio per la Ricerca in Agricoltura e l'Analisi dell'Economia Agraria

Biochemtex Spa

Blacksmith Initiative - UK

Scientific Engineering Centre "Biomass" Ltd.

Center for Promotion of Clean and Efficient Energy

Forschungsinstitut für Bergbaufolgelandschaften e.V.

Polish Biomass Association

European Landowners' Organization

University of Limerick

- FORBIO is made of **11 partners** from **8 EU Member States + 1 partner from Ukraine**

- Started in January 2016 and expected to end by **December 2018**, for a duration of **36 months**, the project received funding for **1.9 million EUR**

- The coordinator of FORBIO is WIP-Renewable Energies (Germany)

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Evaluation of the agronomic and techno-economic potential of the selected advanced bioenergy value chains in the case study sites of the target countries

- Partners responsible for this activity are the **national teams** in Italy, Germany and Ukraine: FIB and Biochemtex, with support of CREA, SECBio, Bi;

- Data **collection** and **verification** to **assess biomass production potential** and limitations (literature and on-going projects); Technical feasibility of **bioenergy conversion; and Economic feasibility of the proposed value chains**

D2.1 Feasibility Study Italy –Agronomic feasibility. **June 2016**
D2.2 Feasibility Study Italy - Technical and economic feasibility. **Dec 2016**
D2.3 Feasibility Study Germany – Agronomic feasibility. **Dec 2016**
D2.4 Feasibility Study Germany - Technical and economic feasibility. **June 2017**
D2.5 Feasibility Study Ukraine – Agronomic feasibility. **Dec 2016**
D2.6 Feasibility Study Ukraine - Technical and economic feasibly. **June 2017**

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Assessment of environmental, social and economic sustainability of the selected advanced bioenergy value chains in the target countries

Partner responsible for this activity is FAO with contributions from the national teams in Italy, Germany and Ukraine

Development of a tailored set of sustainability indicators for bioenergy based on the specific conditions of each of the case study sites
Reference tool: GBEP Sustainability Indicators for Bioenergy
Adaptation: National, ex-post => Local, ex-ante

Compilation of existing environmental, social and economic data necessary for the measurement of the tailored set of sustainability indicators and data gaps analysis

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GBEP sustainability indicators

INDICATORS		
1. Lifecycle GHG emissions	9. Allocation and tenure of land for new bioenergy production	17. Productivity
2. Soil quality	10. Price and supply of a national food basket	18. Net energy balance
3. Harvest levels of wood resources	11. Change in income	19. Gross value added
4. Emissions of non-GHG air pollutants, including air toxics	12. Jobs in the bioenergy sector	20. Change in consumption of fossil fuels and traditional use of biomass
5. Water use and efficiency	13. Change in unpaid time spent by women and children collecting biomass	21. Training and re-qualification of the workforce
6. Water quality	14. Bioenergy used to expand access to modern energy services	22. Energy diversity
7. Biological diversity in the landscape	15. Change in mortality and burden of disease attributable to indoor smoke	23. Infrastructure and logistics for distribution of bioenergy
8. Land use and land-use change related to bioenergy feedstock production	16. Incidence of occupational injury, illness and fatalities	24. Capacity and flexibility of use of bioenergy

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Identification and removal of barriers to the market uptake of bioenergy in the case study sites

Partner responsible for this activity is FAO with contributions from all partners and in consultation with national stakeholders in each study site

Analysis of the economic and non-economic barriers to the market uptake of the selected sustainable bioenergy technologies in the case study sites

Exchange of information on Best Management Practices for bioenergy policy, regulations, support schemes and technical actions which allow the most sustainable and energy efficient use of bio-resources

Development of strategies to remove the afore-mentioned barriers including roles and likely timelines (by November 2018)

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Knowledge transfer and capacity development for innovative value chains

- **Inform farmers** and **owners** of contaminated and underutilized lands in the selected sites **on how** to start actions concerning the **sustainable production of non-food biomass** by presenting and discussing the results of the different assessments and **scenarios (by June – Sept 2018)**
- Replicate the knowledge gained on these sites to other regions or countries (**outreach countries**)
- **Strengthen the capacity** of relevant stakeholders in areas where conditions of **feasibility are documented by FORBIO** in order to enable them **to set up sustainable bioenergy supply chain:**
    - **Capacity Assessment**
    - **Info days**
    - **Trainings**
    - **Study tours**

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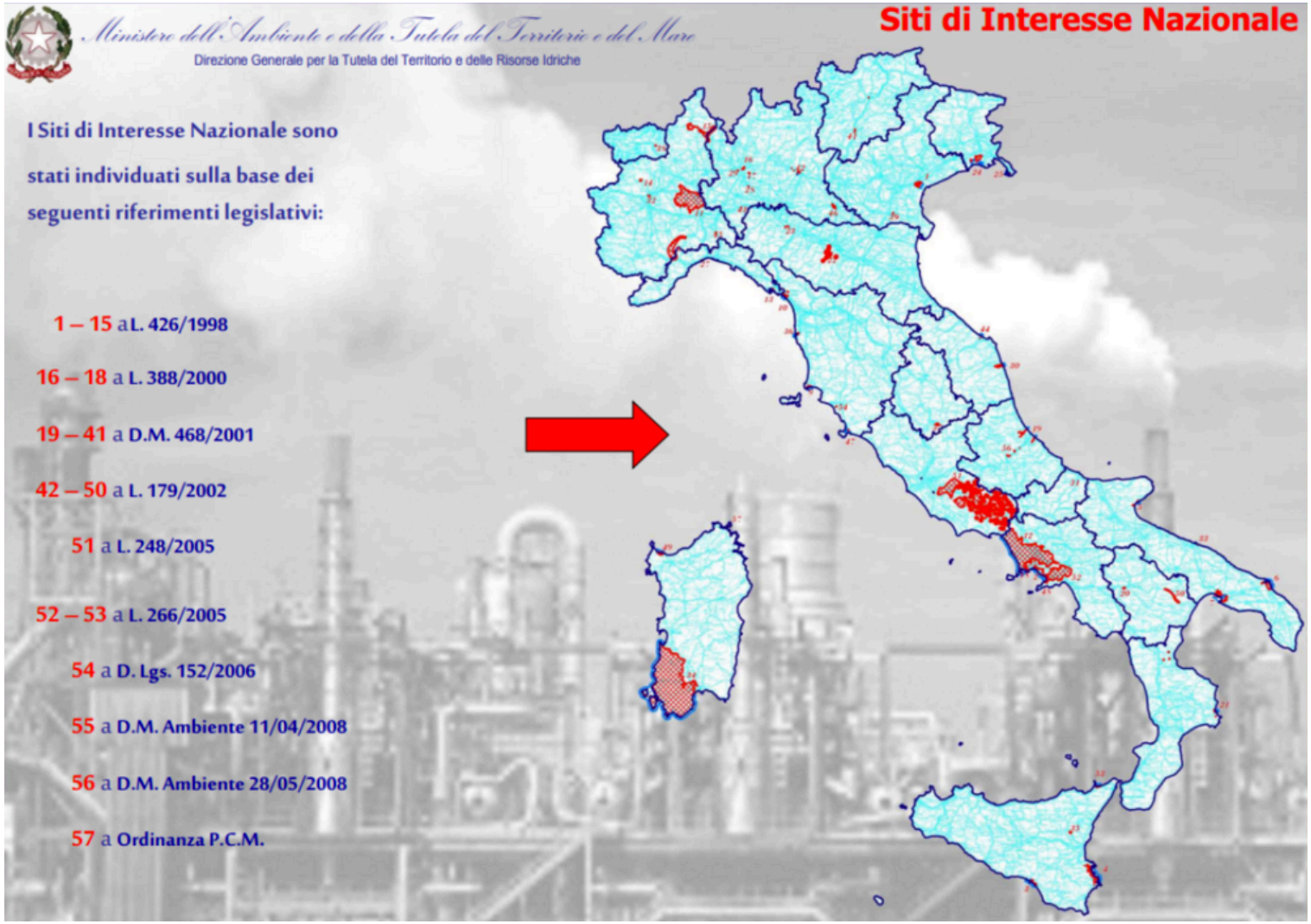
SIN areas



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Location of the Sulcis case study

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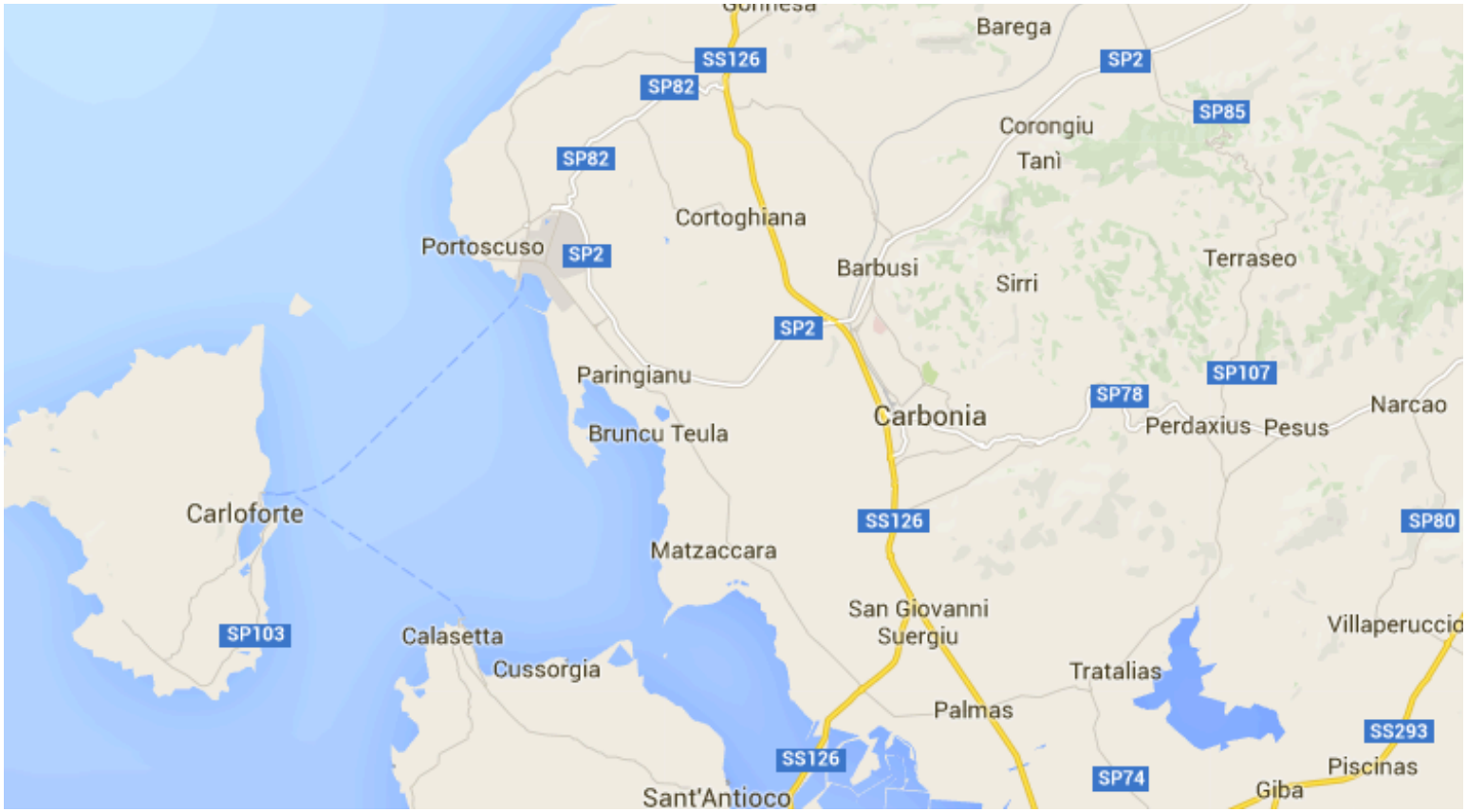
Portoscuso – Gonnesa – Carbonia - Tratalias



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Type of contamination

- The suggested area has mid-high concentration of lead, zinc, copper and sulphur of iron, zinc, copper, with minor quantities of cadmium, arsenic, wolfram, chromium, mercury, aluminum and manganese.

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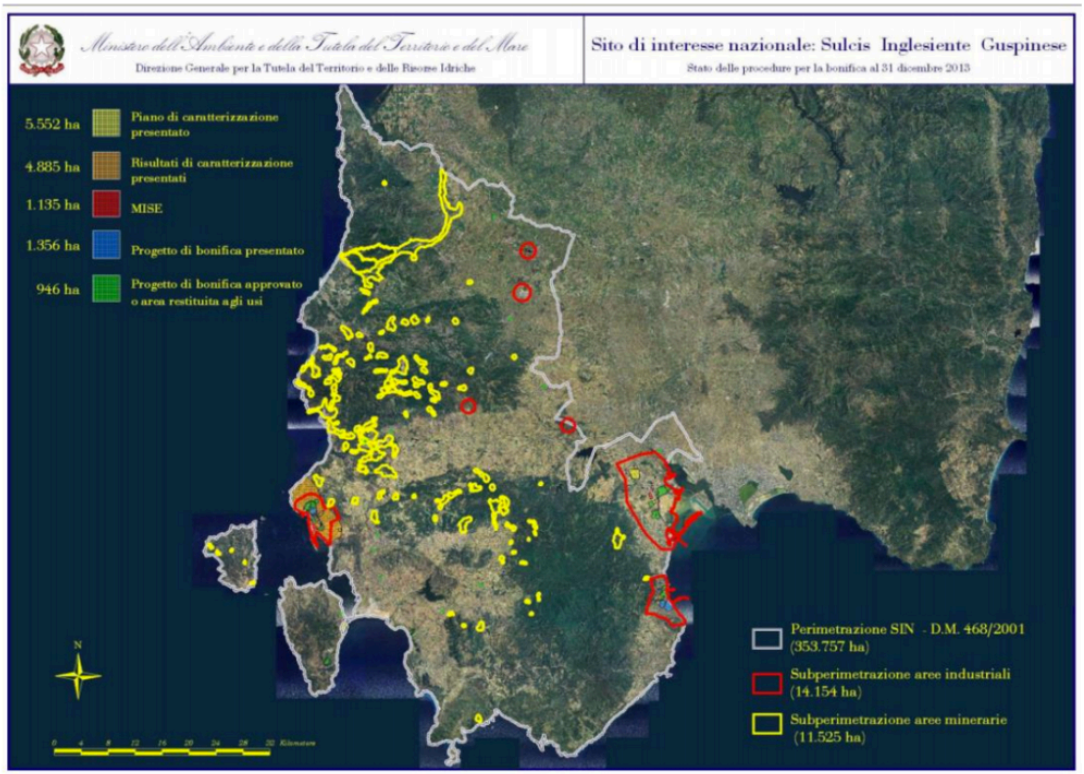
Sources of land contamination



Mining activiries (12.000 ha), energy and alluminium production (14,000 ha) have polluted a vast area

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Industrial areas in the Portoscuso municipality

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EUR Allumina

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Economic aspects

- The area suffers of de-industrialization and abandonment of industrial production (Euroallumina, Alcoa, ENEL); also the mining sector (coal) is suffering because of high extraction costs and low coal quality.
- The area is also interesting for agricultural production, especially vineyards, orchards and artichokes, but the sector is suffering from abandonment of agricultural activities.

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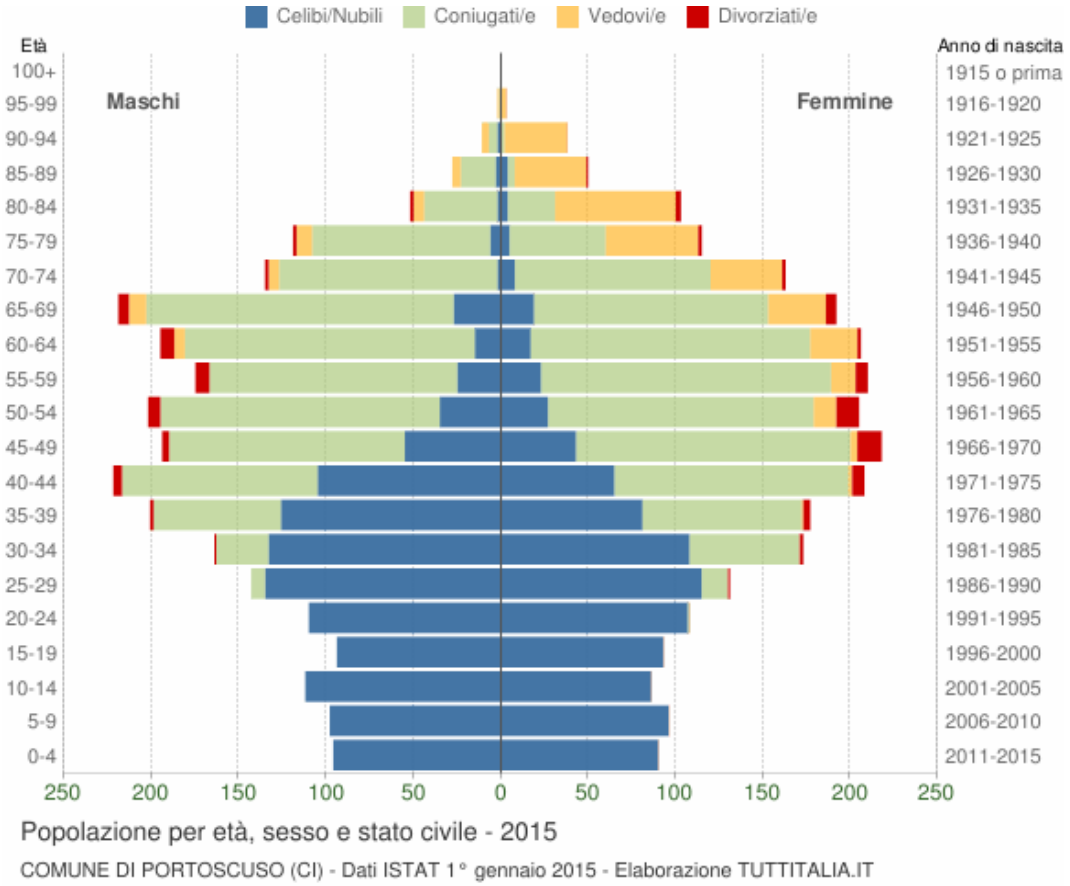
Portoscuso – population pyramid



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A few important elements

- The pilot area is sufficiently vast for the case study
- The agricultural context is fragile, but susceptible of further developments
- Pollution is due to various sources and involves several chemical elements
- Sustainable bioenergies can be a real economic driver for the development of the area

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… possible measures of circular economy in Sardinia.. R&D needed!

Cultivation of ADX and other cellulosic crops in polluted lands

- ✓ Arundo donax (Giant reed)
- ✓ Panicum virgatum (Switchgrass)
- ✓ Others

→ **Prevention food contamination**
→ **Use of polluted lands (revenues)**
→ **Phytoaccumulation of pollutants**
→ **Land restoration**

Re-cycling of waste water to provide sustainable irrigation

→ **Reused of secondary resources**
→ **Avoid competition with food**

Collection of spontaneous ADX along rivers and streams

→ **Flood and fire protection**
→ **Environmental service**

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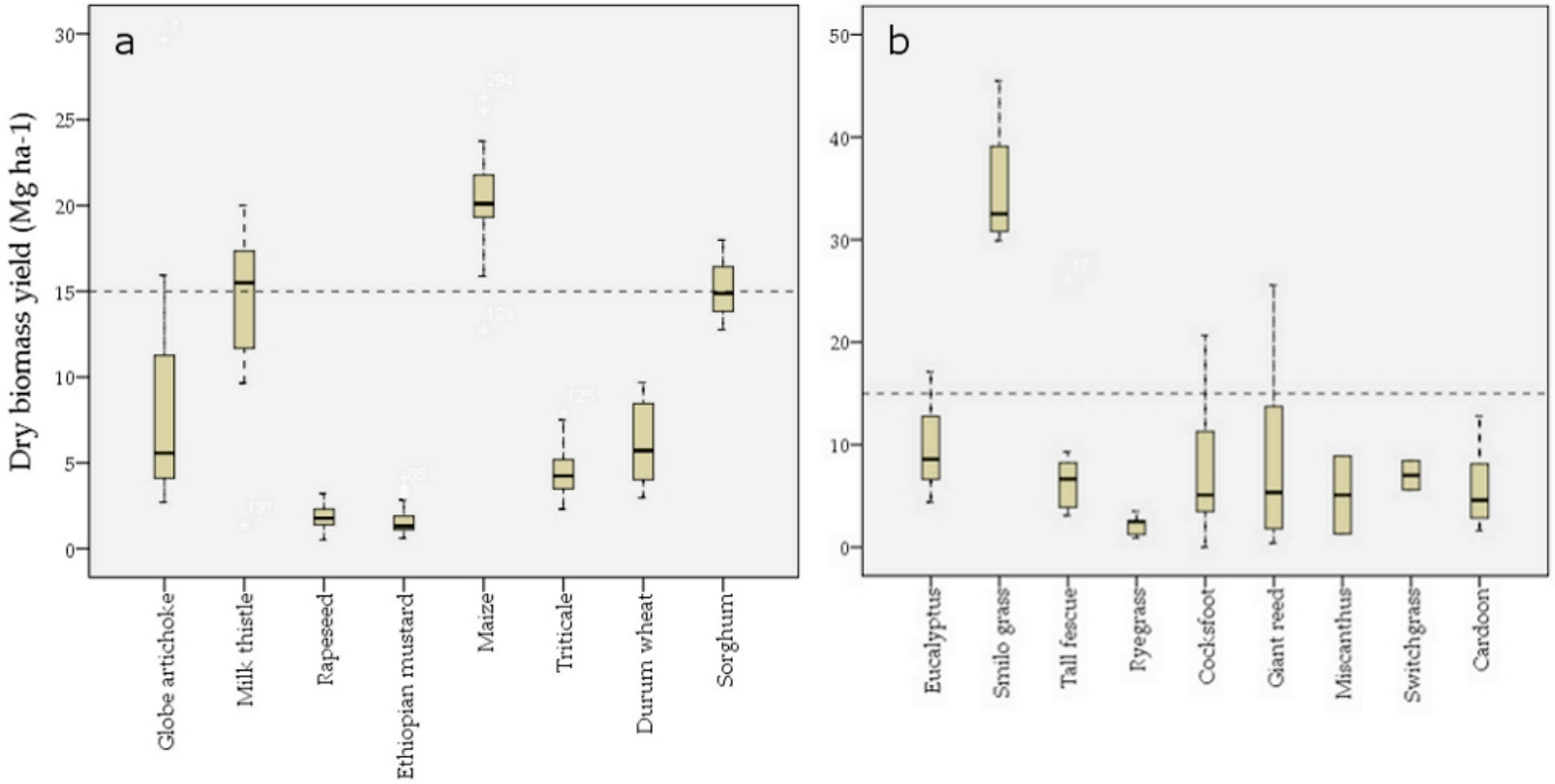
Box-plot of biomass yield for annual crops and for perennial crops



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THANK YOU FOR YOUR ATTENTION

GUIOD BONATI – guido.bonati@crea.gov.it

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