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Soil functioning relates to land use in a sustainably managed agro-sylvo-pastoral ecosystem

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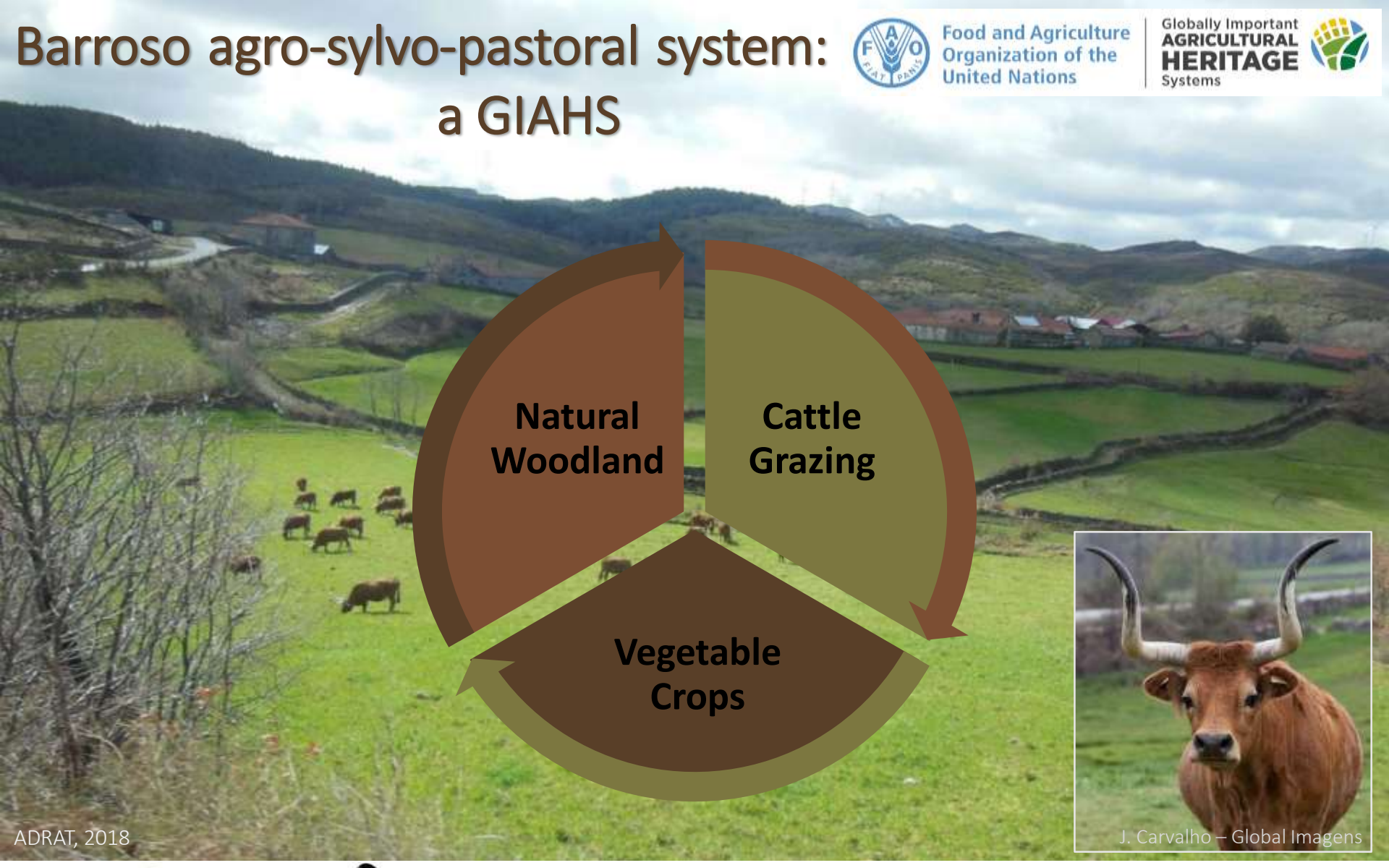
Barroso agro-sylvo-pastoral system: a GIAHS

Food and Agriculture Organization of the United Nations

Globally Important AGRICULTURAL HERITAGE Systems



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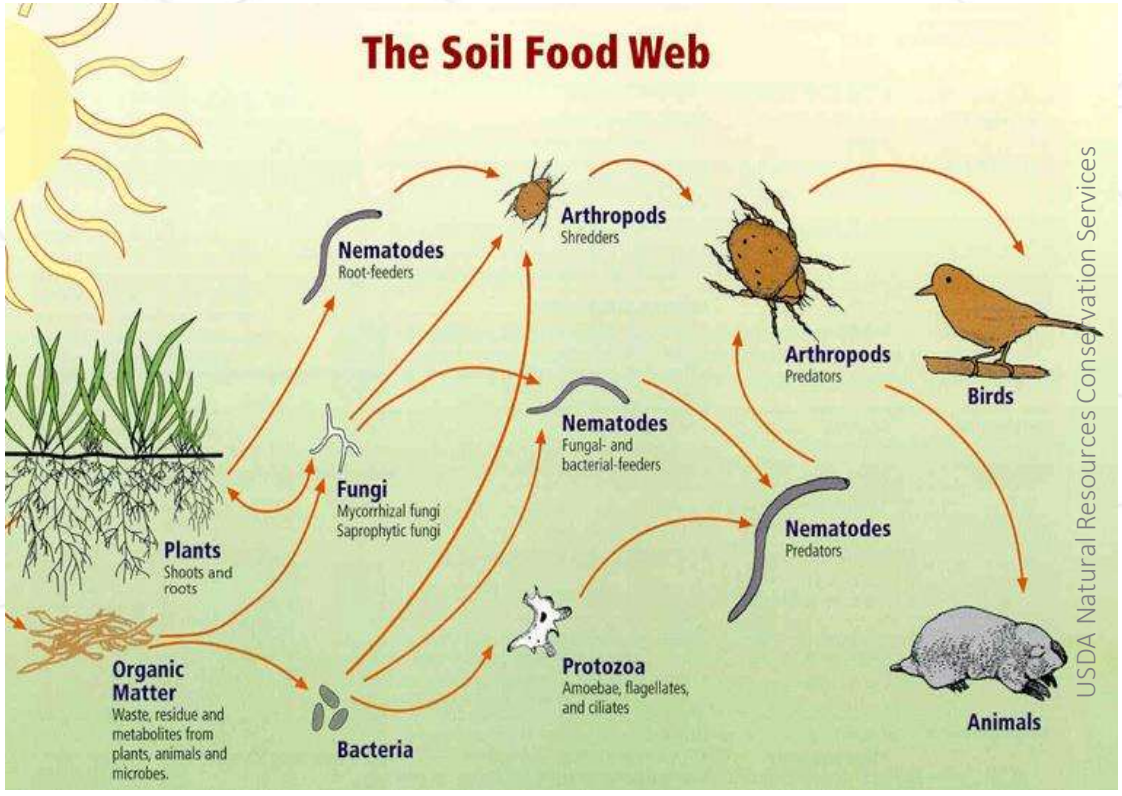
Research Questions:

- Does the soil system mirror the aboveground mosaic of complexity and sustainability?
- Do agriculture and pasture impact the soil in this GIAHS? How?

Methods

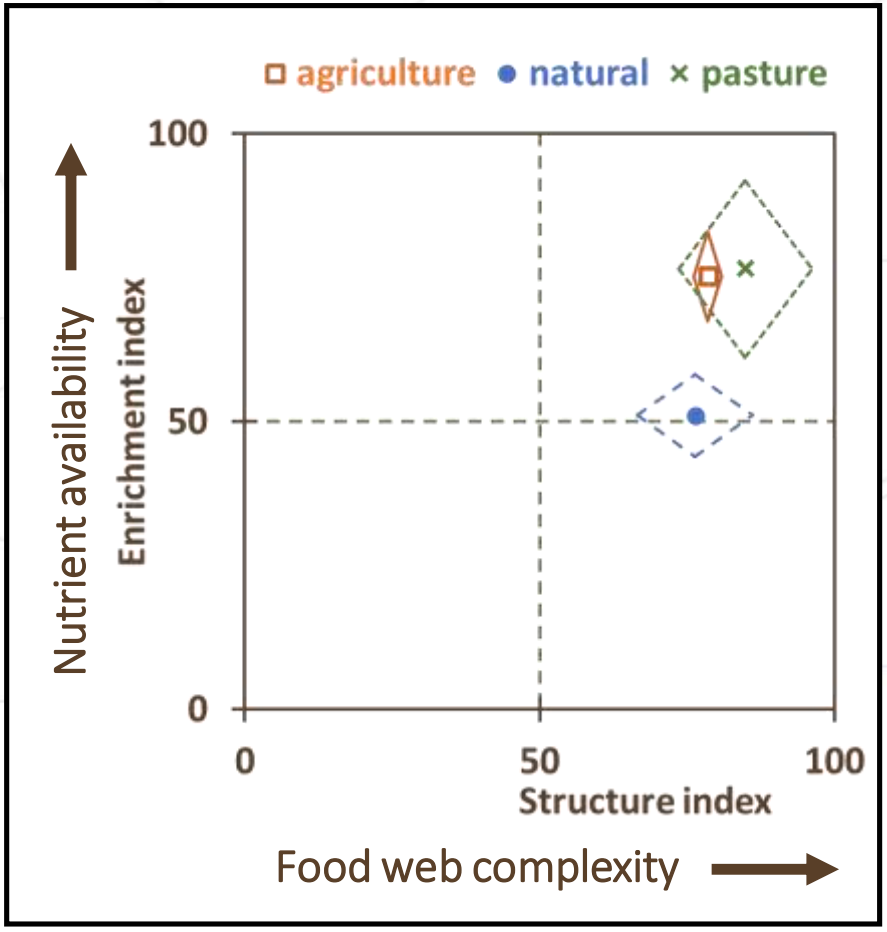
Analysis of nematode communities as bioindicators of soil processes



Results

- **Complex soil food webs**
- **Natural** system less fertile*
- Unbalanced food web nutrients and complexity in **agriculture**
- Nutrient-use efficiency higher in **pasture***
- Limited regulatory role in **agriculture***

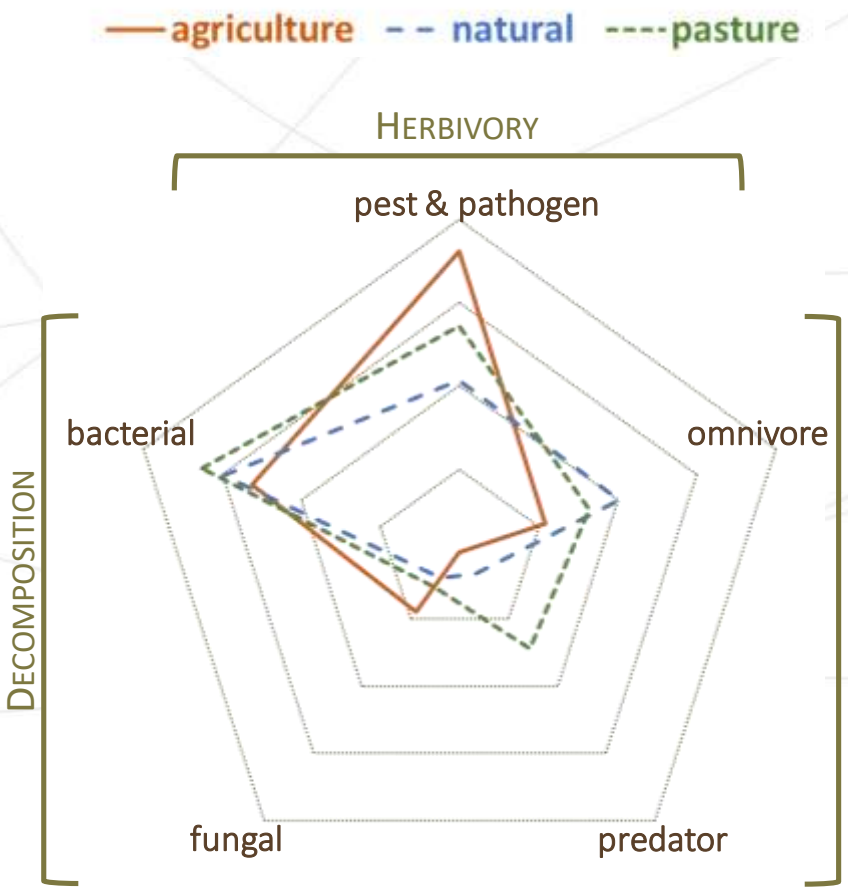
* statistically significant ($p<0.05$)



Results

- **Bacterial-driven decomposition**
- Larger regulation service in **natural** soil and **pasture**
- Larger decomposition service in **pasture***
- Larger herbivory disservice in **agriculture** and **pasture***

* statistically significant ($p<0.05$)



Conclusions

- **The traditional, sustainable aboveground land-use of the Barroso GIAHS is mirrored belowground**

- Input of organic matter of cattle origin in agriculture and pasture **increased soil fertility, but also herbivory**

- With the largest herbivory pressure and the low nutrient-use efficiency and regulation in the food web, **agriculture was the most disturbed system**

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Thank you for
your attention