



Food and Agriculture  
Organization of the  
United Nations

# Launch of the International Network on Soil Biodiversity

in the framework of the  
Global Soil Biodiversity Observatory

3<sup>rd</sup> December 2021 | 🕒 14:00 CET



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**SOIL BIODIVERSITY**  
INITIATIVE

*A SCIENTIFIC EFFORT*

**Diana H. Wall, Science Chair**

School of Global Environmental Sustainability

Department of Biology

Colorado State University, USA



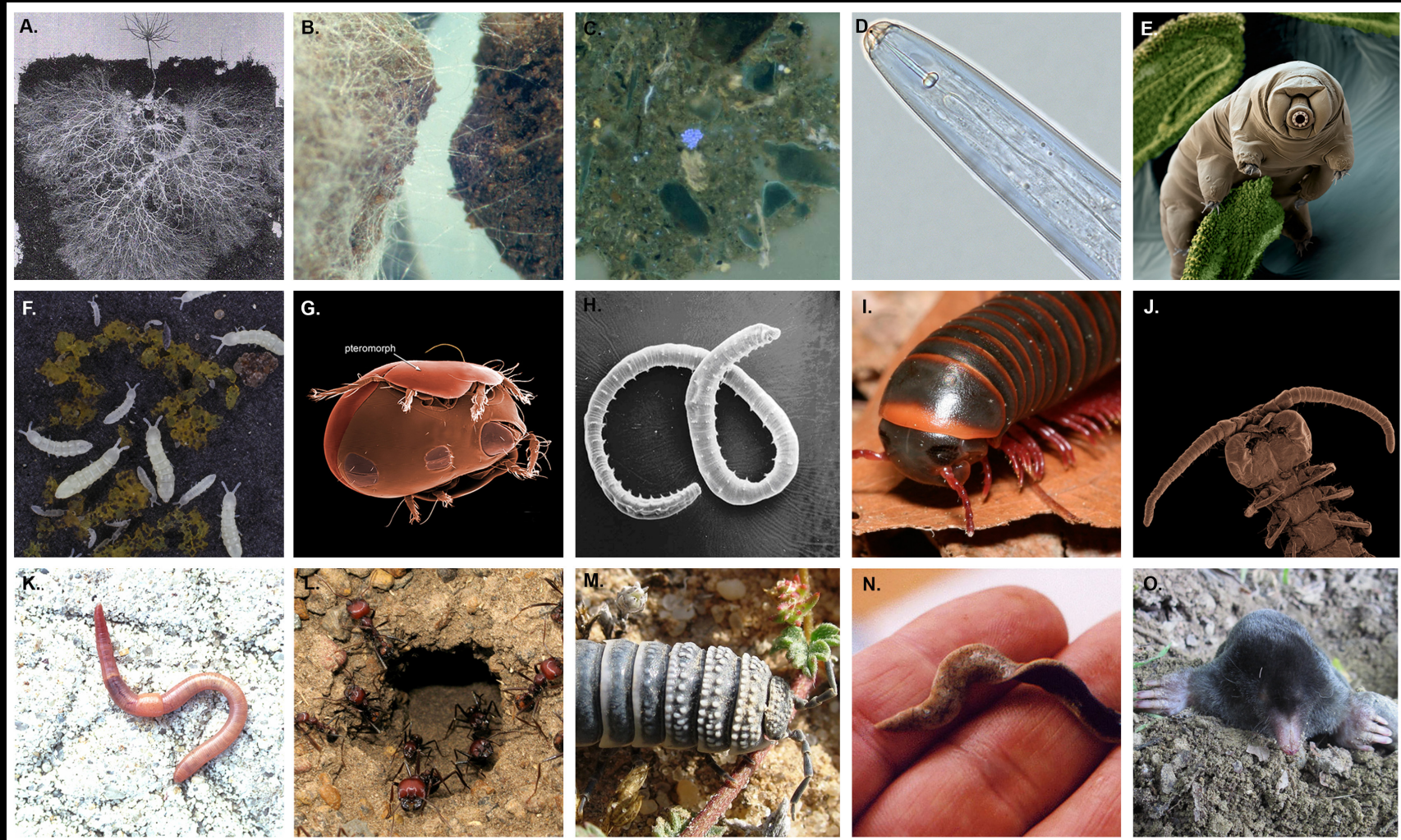
# GLOBAL SOIL BIODIVERSITY

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*Globalsoilbiodiversity.org*

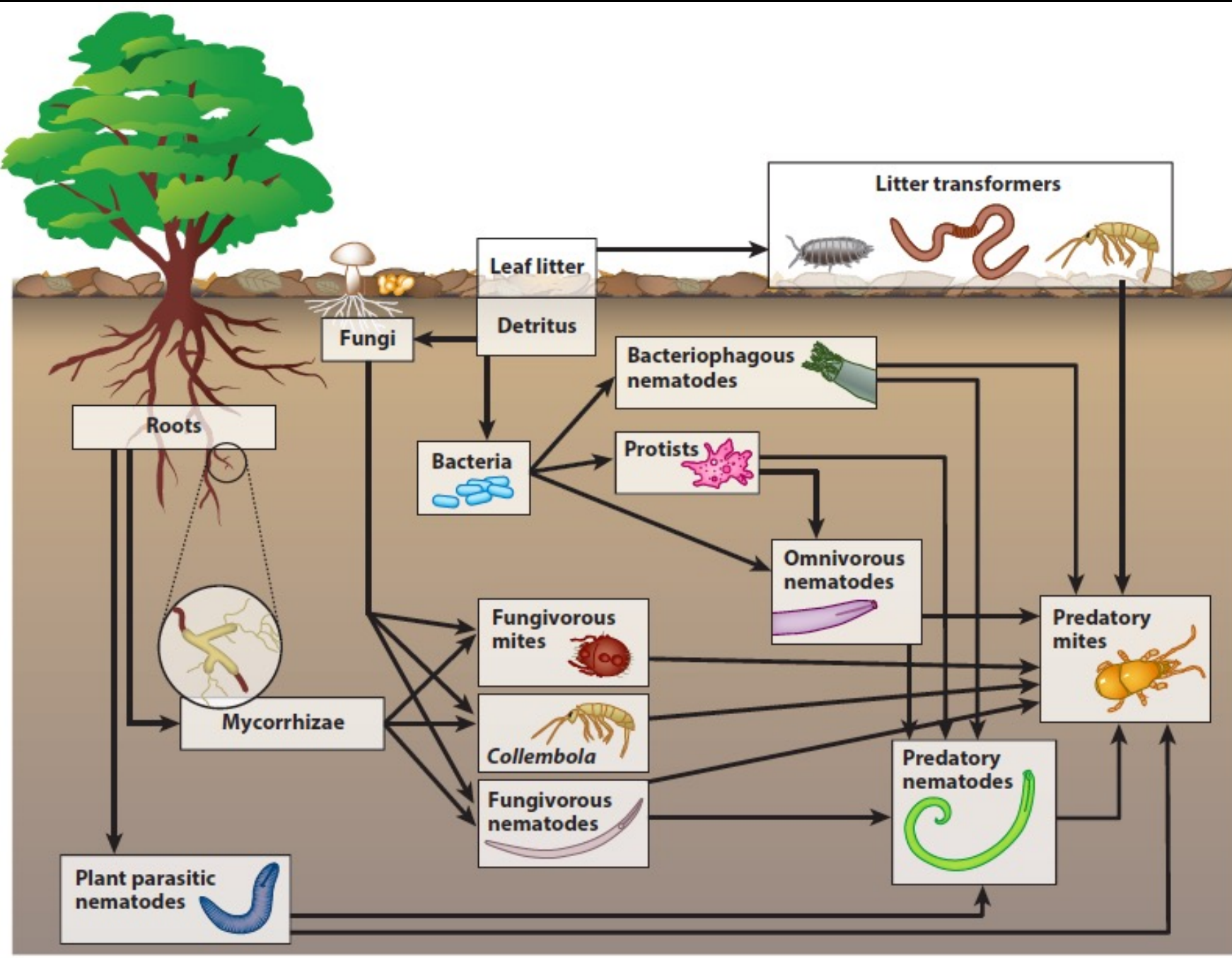


# At least one quarter of diversity on Earth is belowground



*Bardgett and van der Putten (2014) Nature 515, 505-509.*





Nielsen, Wall and Six, 2015, *Ann. Rev. Env. Resources*





***GSBI: inform decisions, advance conversation, engage scientific collaboration***

- Include global soil biodiversity knowledge:
  - **Soil biodiversity – invertebrates, fungi, microbes** - are key regulators of multiple ecosystem processes
  - **Soil biodiversity knowledge has accelerated** on genes, species, distributions and functions

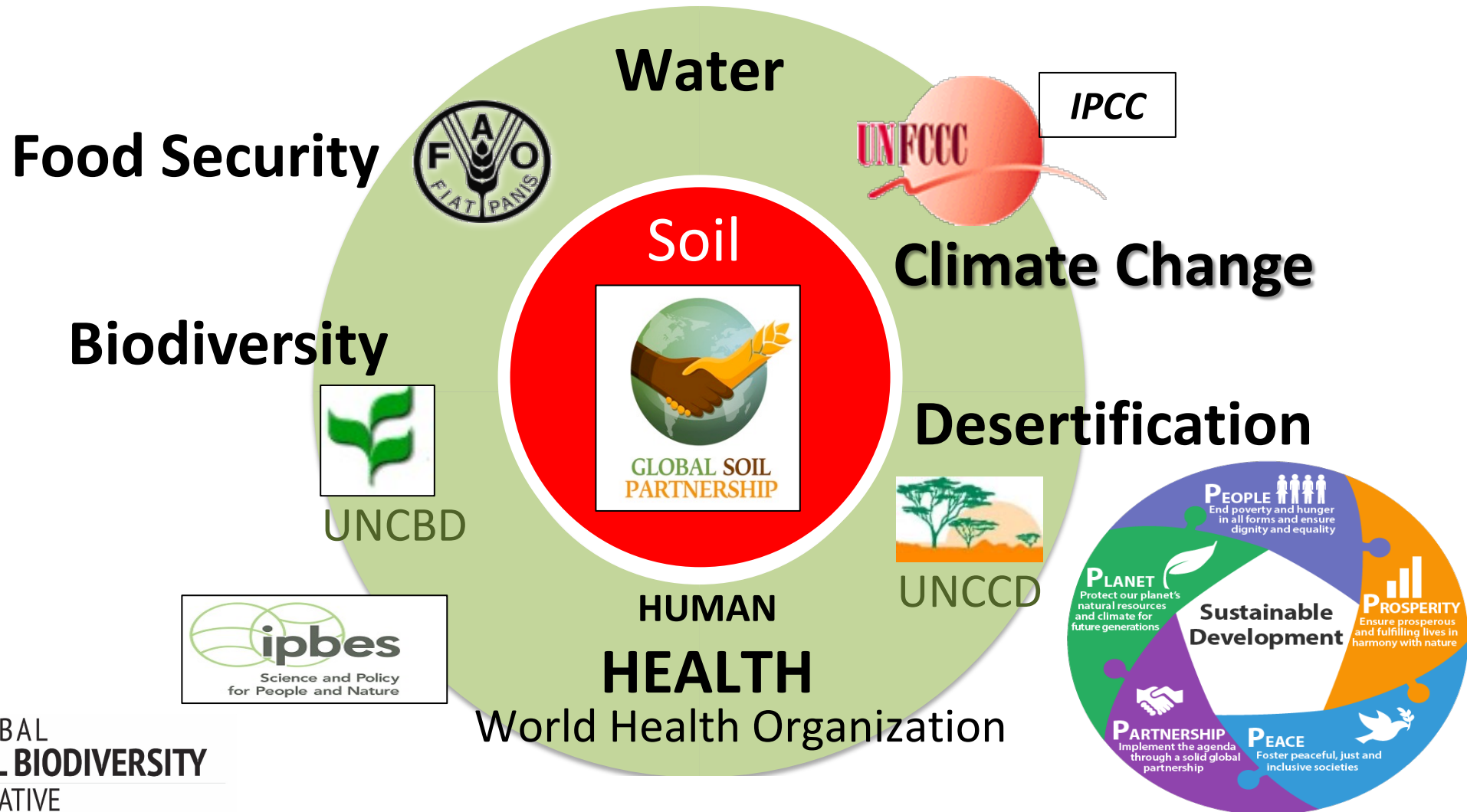
Environmental challenges are great and time is short



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# 2011 – Multiple global environmental challenges

*But the life in soil is largely ignored*



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# 1. Bringing science of soil biodiversity to the table



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# GLOBAL SOIL BIODIVERSITY INITIATIVE

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## Linking with partners



UNCCD

*International Soil  
Modelling  
Consortium*

LandPotential.  org



**GLOBAL SOIL  
PARTNERSHIP**



**UNCBD**



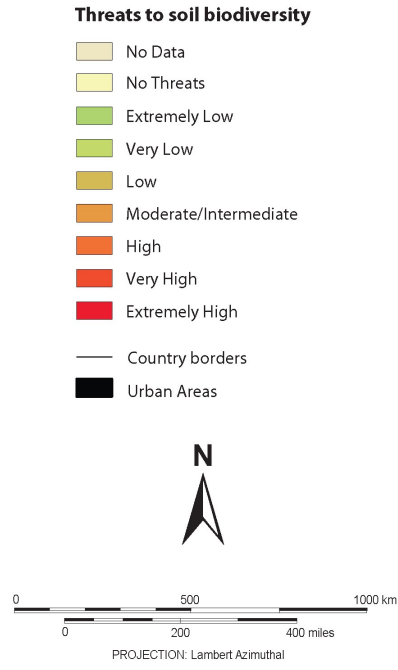
**Global Urban Soil Ecology  
and Education Network**





5.2 Map of Soil Biodiversity Potential Threats

Vulnerability of soil biodiversity in Europe  
(land use, invasive species, soil sealing, SOM loss)



Soil biodiversity potential threats have been selected and ranked on the basis of Expert Evaluation, realised on the basis of the Budget Allocation approach. The following threats have been considered in the calculation of the indicator, where data existed:

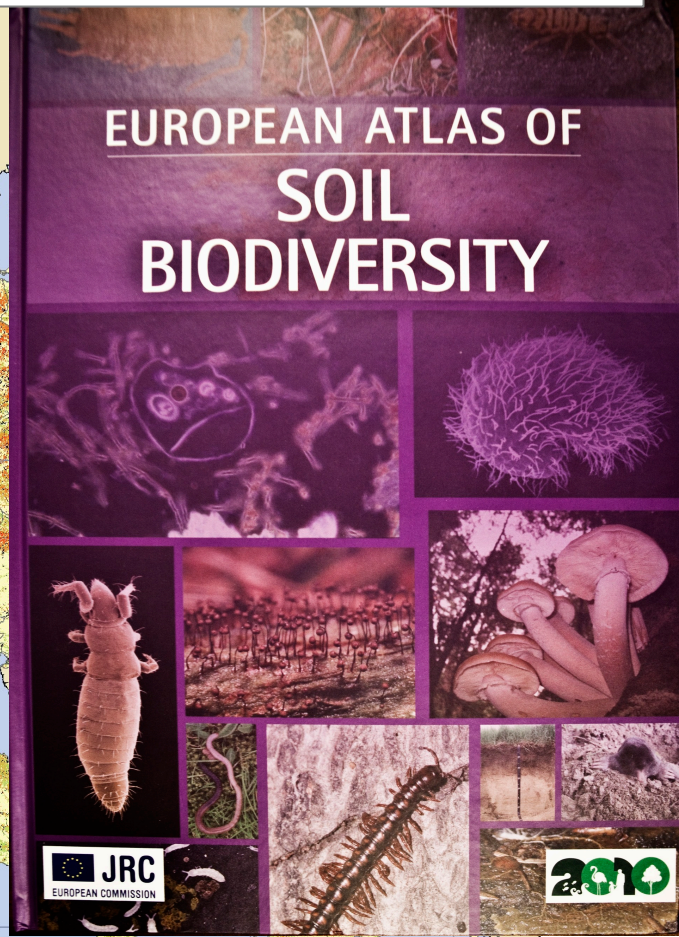
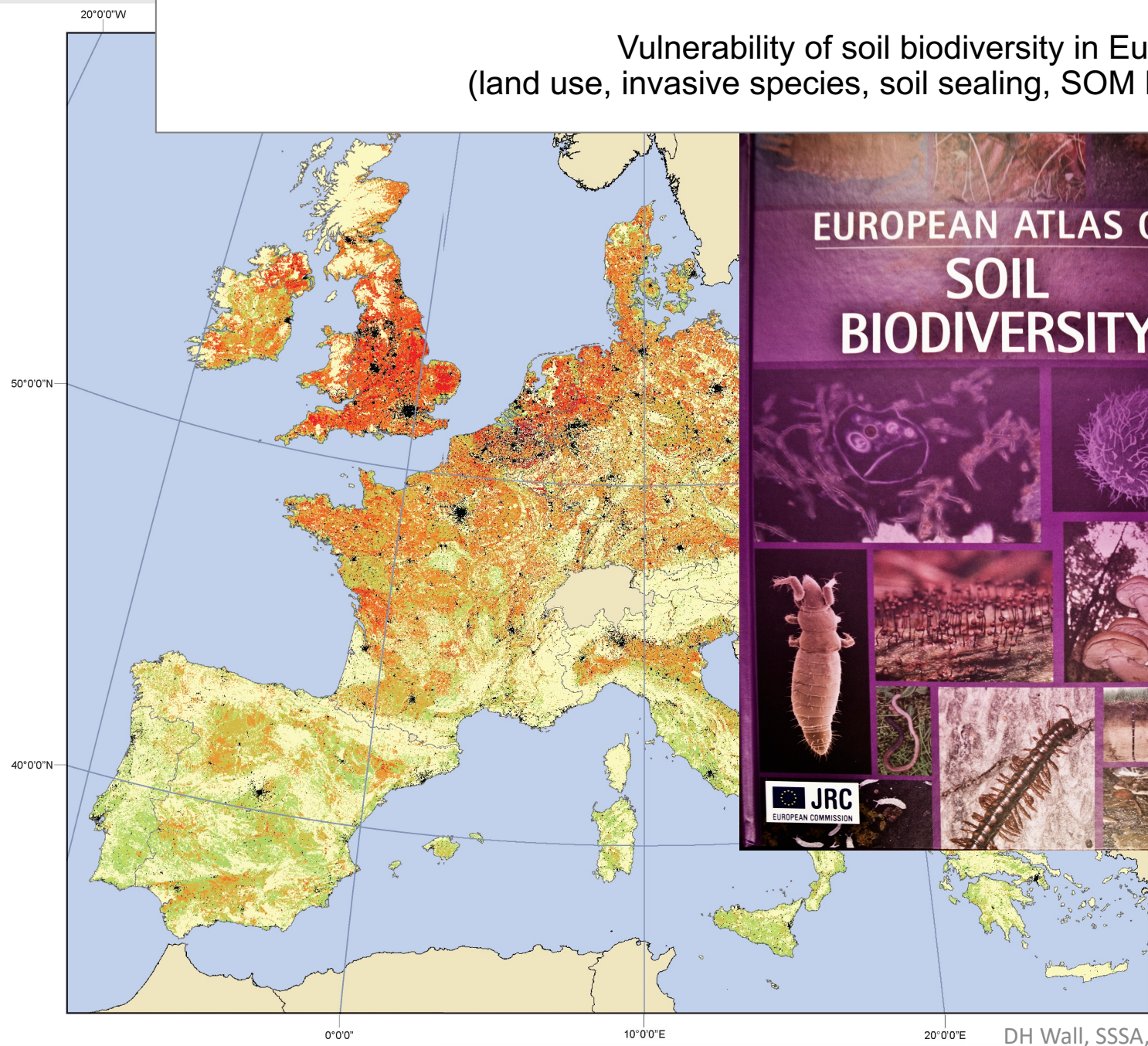
- Land use change/Habitat disruption
- Human intensive exploitation
- Invasive species
- Soil compaction
- Soil erosion
- Soil organic matter decline
- Soil pollution

For each of the above parameters a map, in form of a raster layer (1 x 1 km grid cells) has been realized. The values present in each grid have been classified into 5 classes. These values have been weighted using the coefficients obtained from the expert evaluation (Fig. 5.2).

The final indicator has been calculated, with an operation of map-algebra, as the sum of the individual raster values. The values displayed on the map are related to the potential threats on soil biodiversity, for twenty three EU countries and are not representative of the actual level of soil biodiversity. In the following two pages, maps showing the distribution of four of the seven factors considered in the calculation of the index are presented.

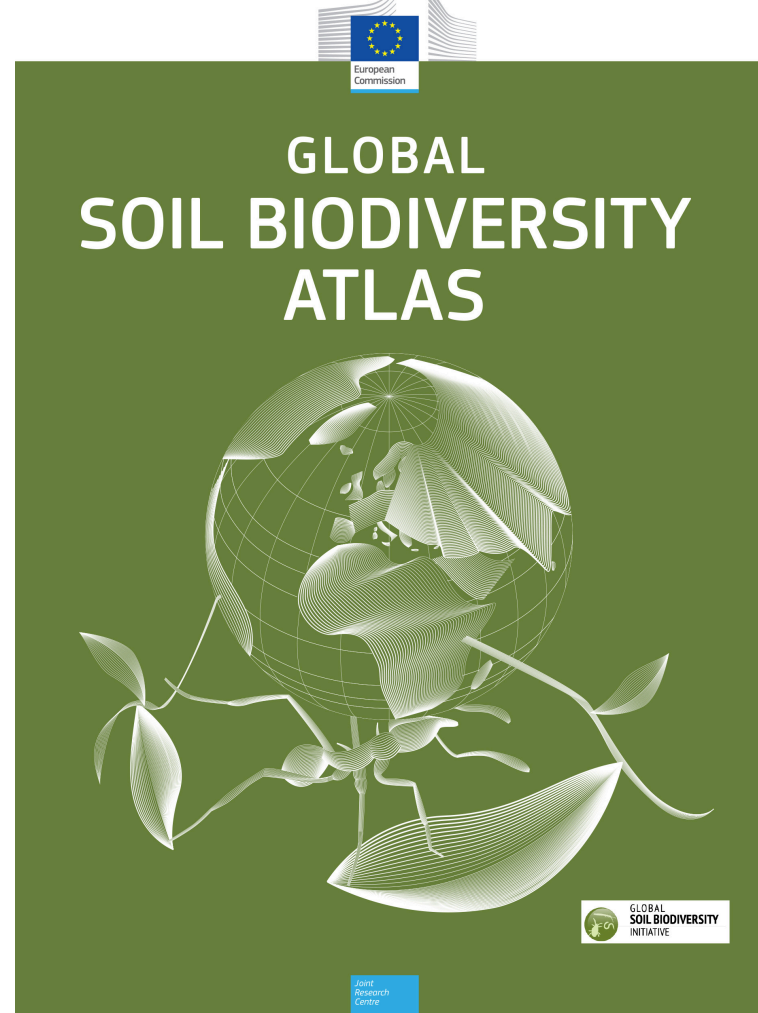
The high score (high potential threats) of several parts of the UK and central Europe are determined by the combined effect of a high intensity agriculture, with a high number of invasive species and by the risk for soil to lose organic carbon. Compared to these situations, the intensive agricultural areas of southern Europe are less affected by the risk of losing organic carbon, and by the effect of invasive species.

It should be kept in mind that the map indicates an evaluation of the potential risk of soil biodiversity decline (with respect to the current situation) and is not a representation of the actual level of soil biodiversity.



Jeffery,  
Giardi et al  
2010, EC.  
Online.

# European Commission and Global Soil Biodiversity Initiative



*Origazzi et al. 2016, **GSBI & European Commission.***

Download free; single chapters download at  
[globalsoilbiodiversity.org/atlas-introduction](http://globalsoilbiodiversity.org/atlas-introduction)

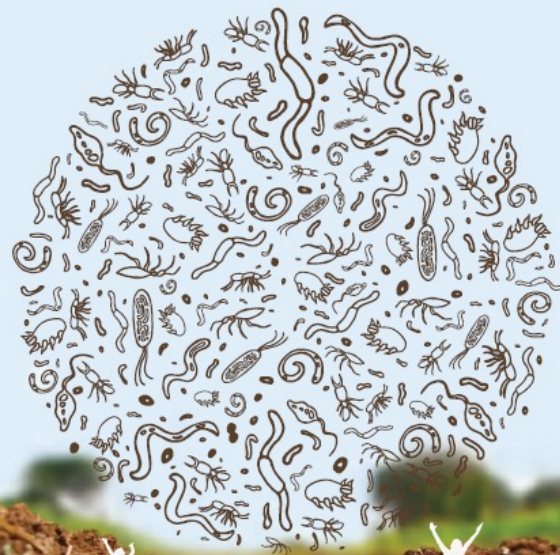




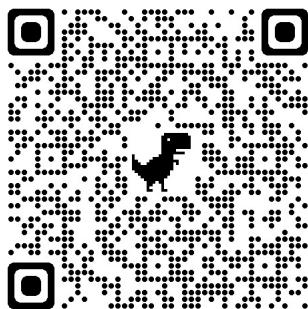
Food and Agriculture  
Organization of the  
United Nations

Report  
2020

# STATE of KNOWLEDGE of SOIL BIODIVERSITY



Status, challenges and potentialities



Summary for policy makers 2020  
Full Report free in multiple languages  
<http://www.fao.org/3/cb1929en/cb1929en.pdf>

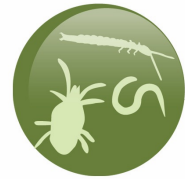
*Thanks to > 300 scientists who  
contributed to 1st Global Assessment  
of Soil Biodiversity*



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[Globalsoilbiodiversity.org](http://Globalsoilbiodiversity.org)

# Connecting soil biodiversity scientists – Global meetings



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International Union of Soil Sciences

2015  
International  
Year of Soils



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With the Patronage of



MILANO 2015

FEEDING THE PLANET  
ENERGY FOR LIFE



THE FIRST GLOBAL  
**SOIL BIODIVERSITY  
CONFERENCE**  
Assessing soil biodiversity and its role for ecosystem services

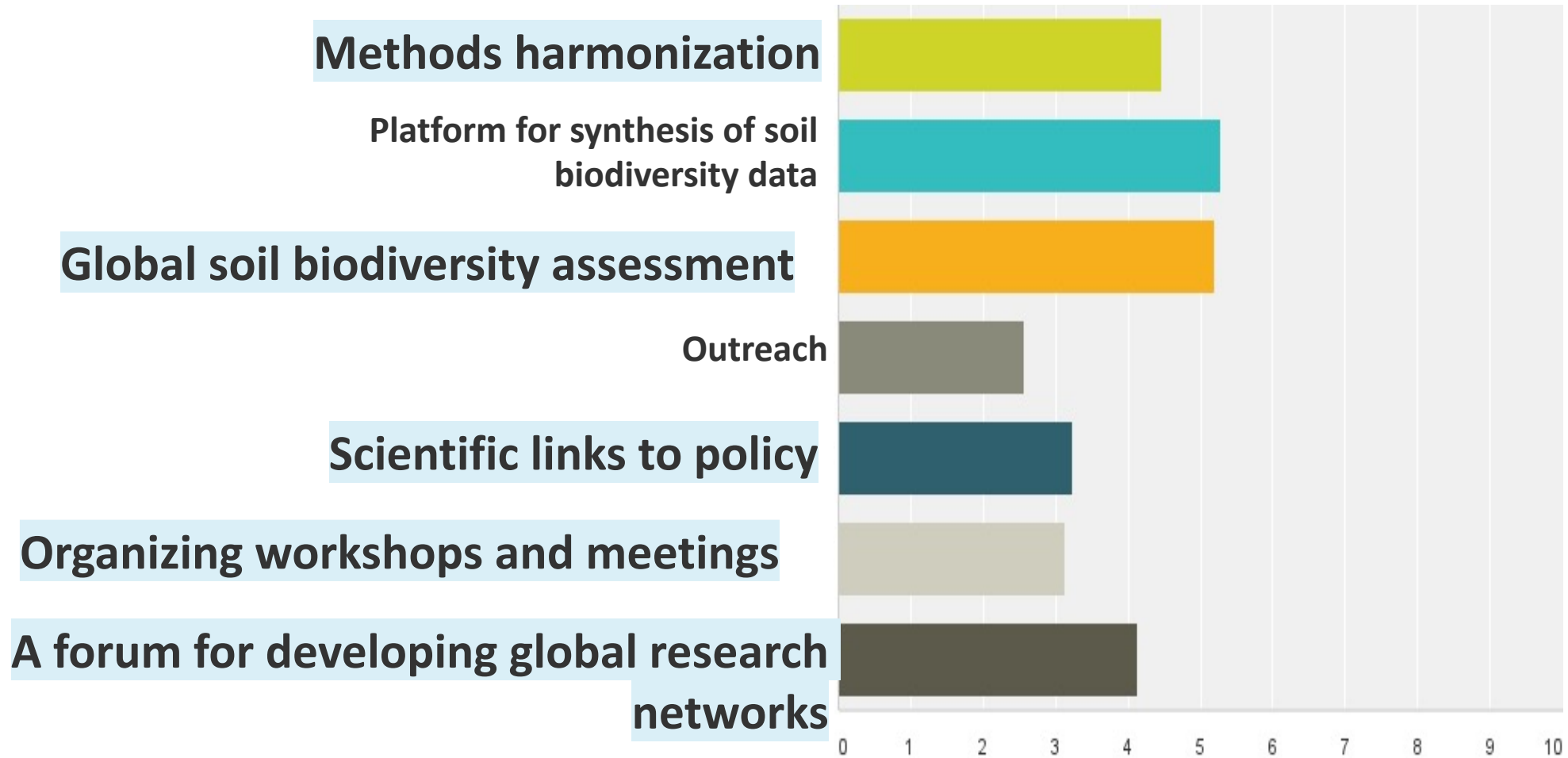




# 2014 --What next for GSBI? Rank the following in order of priorities.

Survey of 700+ participants, GSBI 2014 meeting, Dijon.

Answered: 259







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**THE 3RD GLOBAL SOIL  
BIODIVERSITY CONFERENCE**

Dublin, Ireland / 13-15 March 2023

**WWW.GSB2021.IE**





# Blogs, networks, catalyzing research



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**THIS WEDNESDAY "GSBI Speaks"!**

## **Soil Biodiversity and Resilience to Climate Extremes**

Moderated by Wim van der Putten (Netherlands Institute of Ecology)

**Wednesday, March 17, 2021, 8am-9:30am MT;  
2pm-3:30pm GMT**



Franciska de Vries



Tancredi Caruso



Mary Firestone



Cameron Wagg



Wim van der Putten



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**Stay Tuned:**

**[Towards a Global Soil Biodiversity  
Observatory](#)**

**January 12, 2022**

Wim van Der Putten

Carlos Guerra

Ronald Vargas

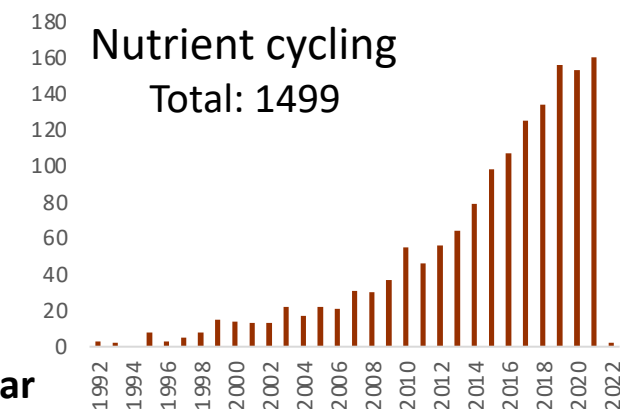
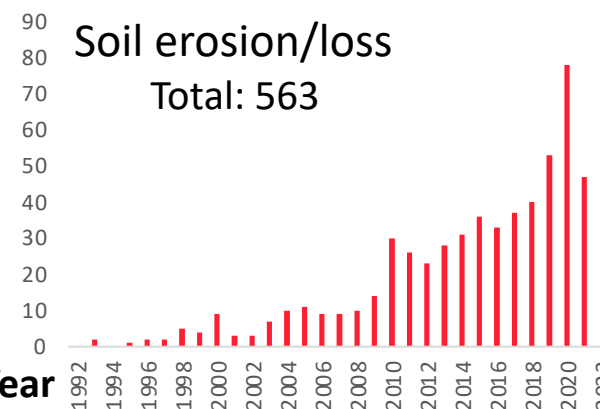
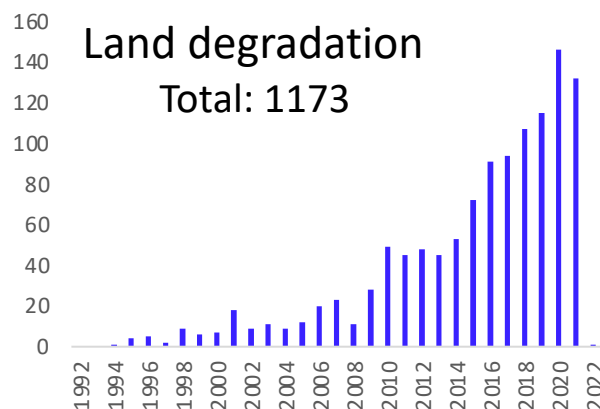
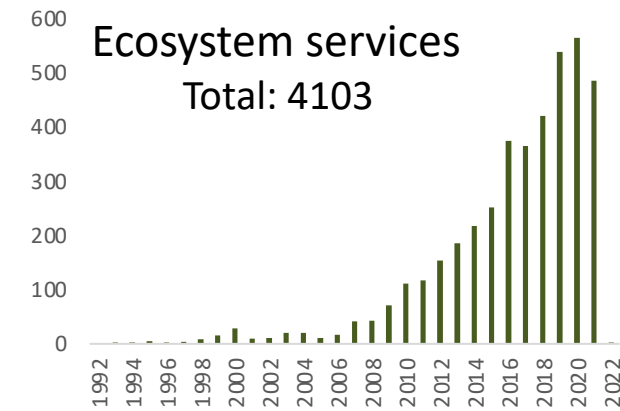
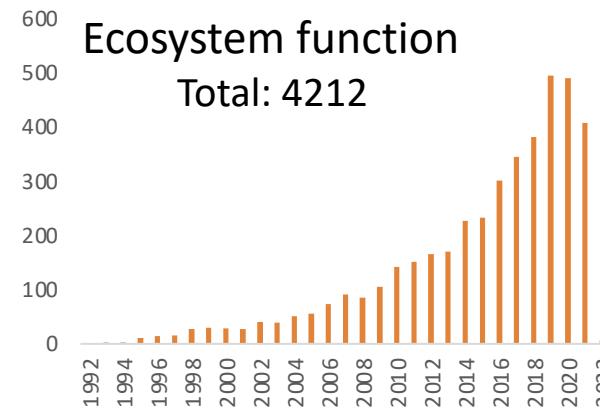
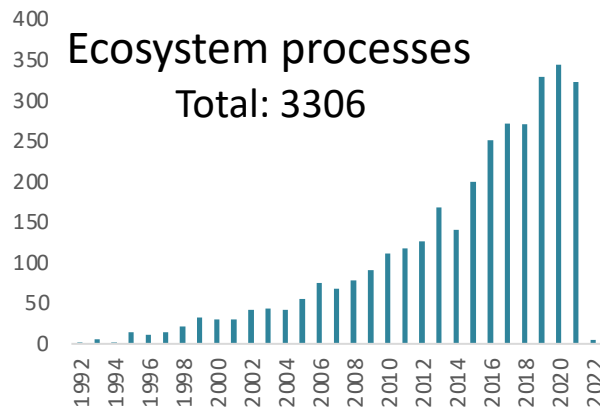
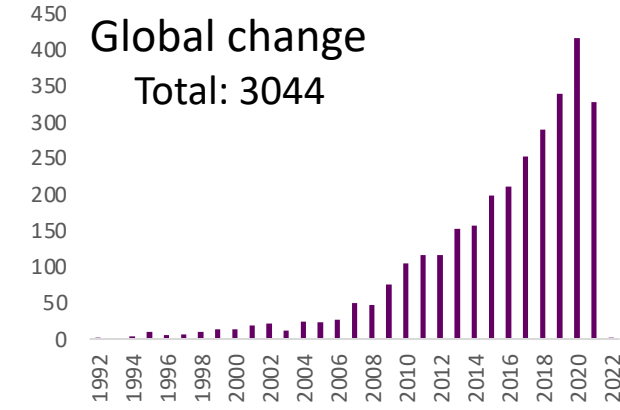
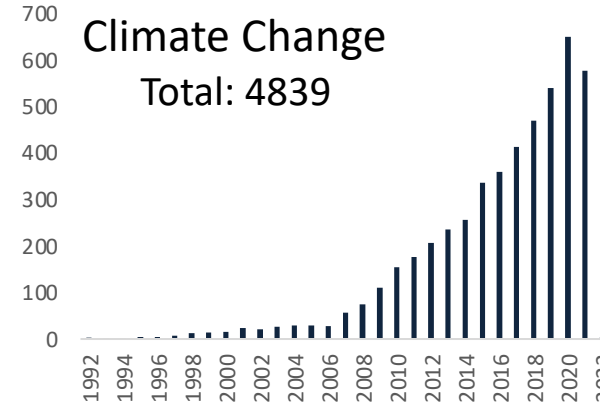
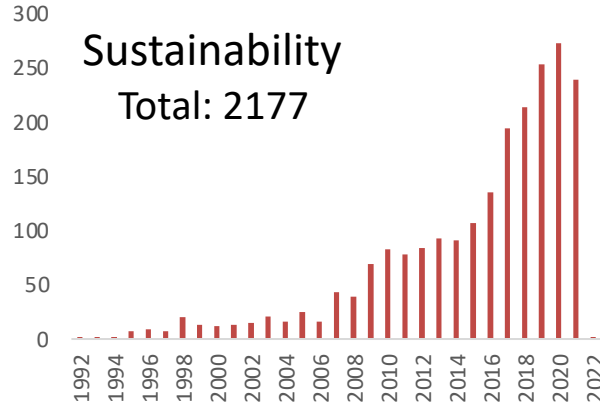
Luca Montanarella

# Advances in Soil Biodiversity Research

**1992 to Oct 2021**  
**Web of Science**

Number of items  
published in each  
year:

**'Soil Biodiversity'**



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*Globalsoilbiodiversity.org*

# UN Outcome Document with 7 recommendations



1. **Establish a Global Soil Biodiversity Observatory**
2. **Develop Guidelines for measuring, assessing and monitoring Soil Biodiversity**
3. **Develop and Implement Capacity -Building program on Soil Biodiversity, including national assessments, monitoring, good management practices and restoration**
4. **Develop a Field Manual on Soil Biodiversity that addresses Soil Biodiversity loss/ conservation**
5. **Develop a technical booklet on the main Soil Borne Diseases**
6. **Develop methodology for economic valuation of Soil Biodiversity**
7. **Performance of an assessment of effective policies and legal instruments to control Soil Biodiversity Loss.**



# GSBI welcomes NETSOB

Action Plan of the International Initiative for the Conservation and Sustainable Use of Soil Biodiversity

**Ms Sakhile Koketso, CBD**

FAO's Commission on Genetic Resources: microorganisms and invertebrates

**Ms Irene Hoffmann, Secretary, Commission on Genetic Resources for Food and Agriculture, FAO**

Global Initiative of Crop Microbiome and Sustainable Agriculture

**Mr Brajesh Singh, President and Scientific Chair**

EUSO Soil Biodiversity Technical Working Group

**Mr Alberto Orgiazzi, European Commission Joint Research Centre**

Soil Biodiversity Observation Network

**Mr Carlos Guerra, Co-Lead of the global Soil Biodiversity Observation Network**

The Global Fungal Red List

**Mr Gregory Mueller, Chicago Botanic Garden**

Digital availability of soil biodiversity data

**Mr Dmitry Schigel, Global Biodiversity Information Facility, Secretariat**

IUCN Global Species Programme Red List

**Mr James Westrip, International Union for Conservation of Nature**

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## What's next for GSBI?

- New is NETSOB – GSBI will support it & the Outcomes
- Important role in bringing together the science community
- Role in educating the next generations of soil biodiversity researchers
- Provide asked and “unasked” advice to global organizations and nations
- A fruitful collaboration with NETSOB and all partners



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# Soil biodiversity science is needed for a sustainable future



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***Atlas.globalsoilbiodiversity.org***  
Global Soil Biodiversity Atlas, Orgiazzi et al. 2016