Sustainable Agroecology

Governance, practices, potentials, and tensions in a comparative perspective

1st workshop, GPN Workshop Series on Sustainable Agroecology

July 17 and 18, 2023, Witzenhausen

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Co-design of agroecology indicators with local communities: the challenges and perspectives for agroecological transition evaluation

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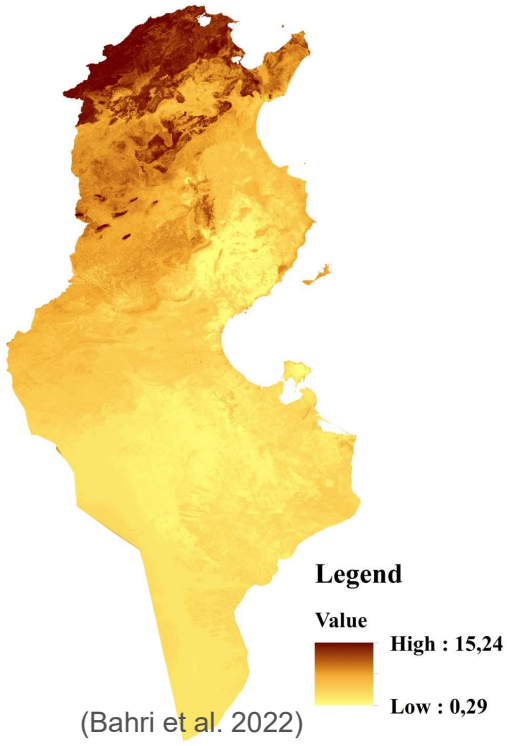
CGIAR's Agroecology Initiative: Transforming Food, Land, and Water Systems Across the Global South

https://www.cgiar.org/news-events/news/a-case-against-silver-bullets/

1 Background and Goals

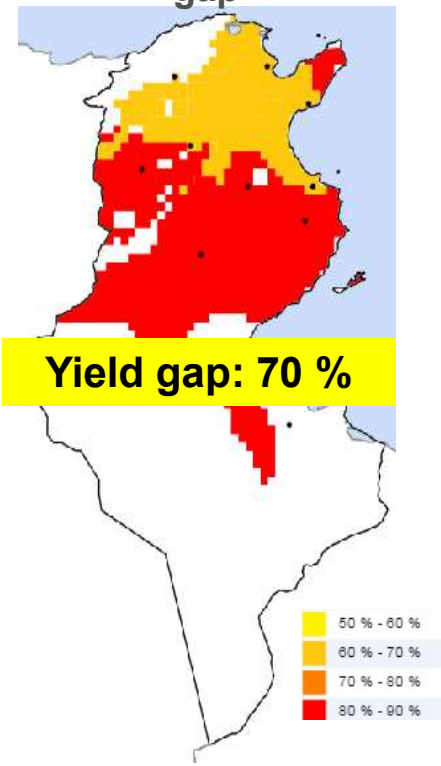
Water scarcity	**75 % territory suffers to aridity**
Soil degradation.	**23 000** ha of **soil eroded** per **year.**
Farm size	**80 % < 20 ha**
Climate Change	↗ **+ 1** to + **2** °C Temperature ↘ **- 10** to - **25**% precipitation **Horizon 2050**
Low and **unstable production.**	**1.5 t ha^{-1}** Vs potentiel **4 t ha^{-1}** (Wheat).

Very low soil organic content



(Bahri et al. 2022)

High wheat yield gap



https://www.yieldgap.org/gygaviewer/index.html

Major challenges

Achieving **sustainable production**
to **ensure food security** and **resource sustainability**.

Improve, Optimize, Redesign
our **production systems.**

Water scarcity

Soil degradation.

Climate Change

Low and **unstable production**.

"Conventional" systems

- Chemical inputs
- Excessive tillage
- Monoculture ...

>Transition >

Agro-ecological landscapes & Food systems

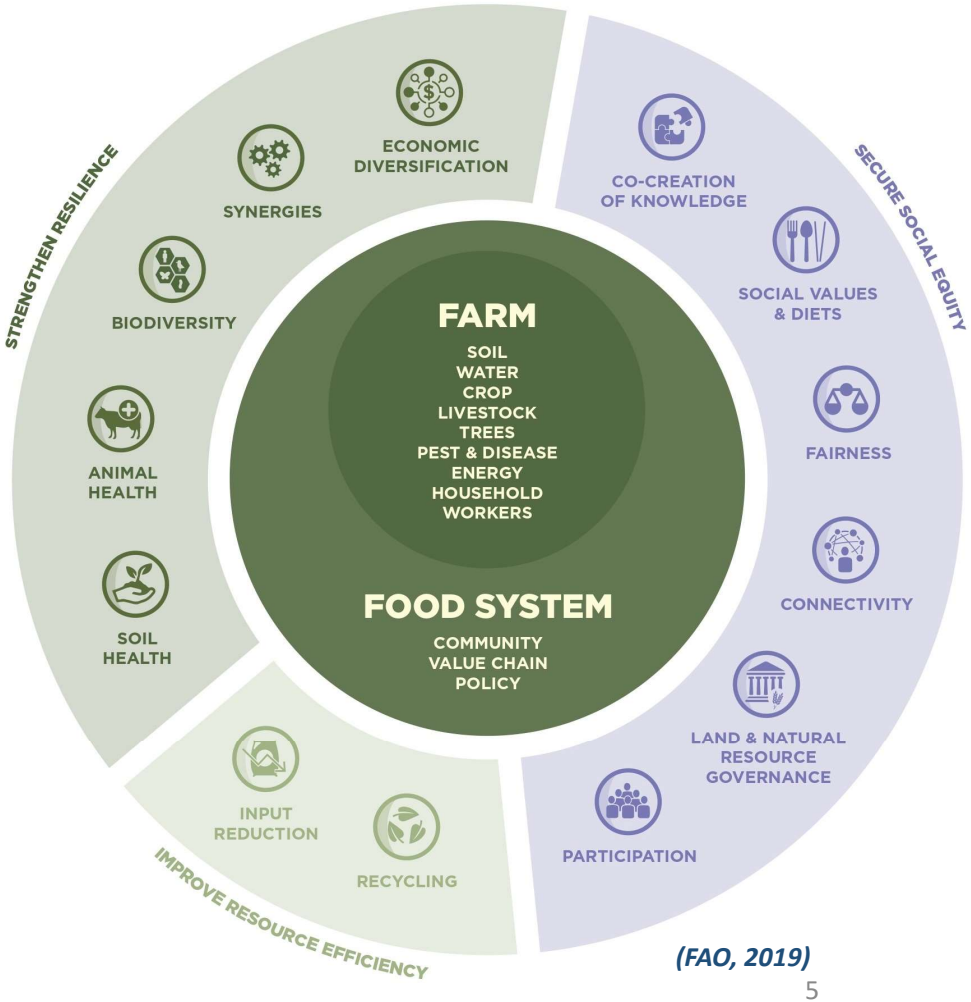
- Recycling / Efficiency
- Conservation agriculture
- Diversity
- Co-creation and sharing knowledge

*What is **Agroecology ? , Agro-ecological Food systems?***

Agroecology is a **holistic** and **integrated approach** that simultaneously **applies ecological** and **social concepts** to the **design** of **sustainable agriculture** and **food systems**.

Agroecology is based on **bottom-up**, helping to **deliver contextualized solutions** to **local problems**.

There is no single way to **apply agroecological approaches,** it **depends** on **local contexts**, **constraints** and **opportunities**.



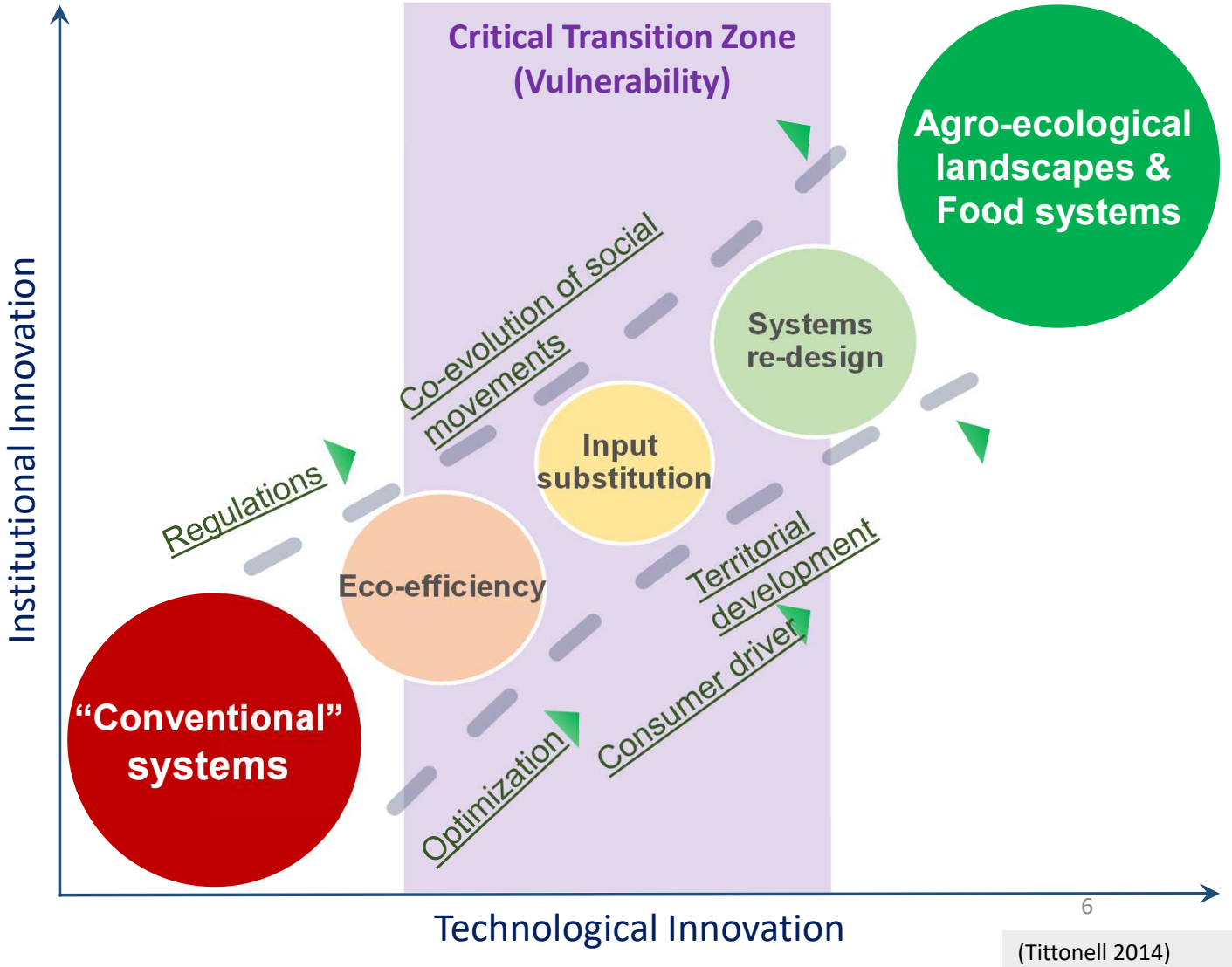
(FAO, 2019)

Agroecology transition

Agroecological transitions
require
Inclusive approaches
&
Social justice
&
gender equality

as framed in the
"**leaving no one behind principle**"
in Agenda 2030 .

Importance of co-design approach



(Tittonell 2014)

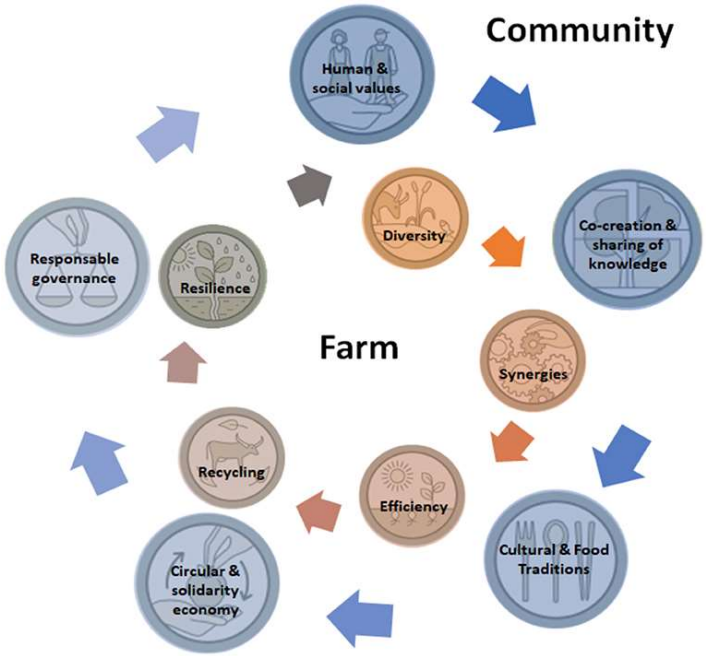
Agroecological Transition need evaluation

*Use **criteria** and **indicators** that **allow the characterization** of **agroecological levels of transition** and **assess key performance of agroecological systems**.*

Tool for **A**groecological **P**erformance **E**valuation (**TAPE**).

TAPE has been developed by FAO, integrating the contribution of representatives from 70 international organizations from around the world that support agroecological transitions (FAO, 2019).

- ***Gender is not involved***
- ***Necessity y of indicators***



The 10 elements that define agroecology, used in the TAPE framework.

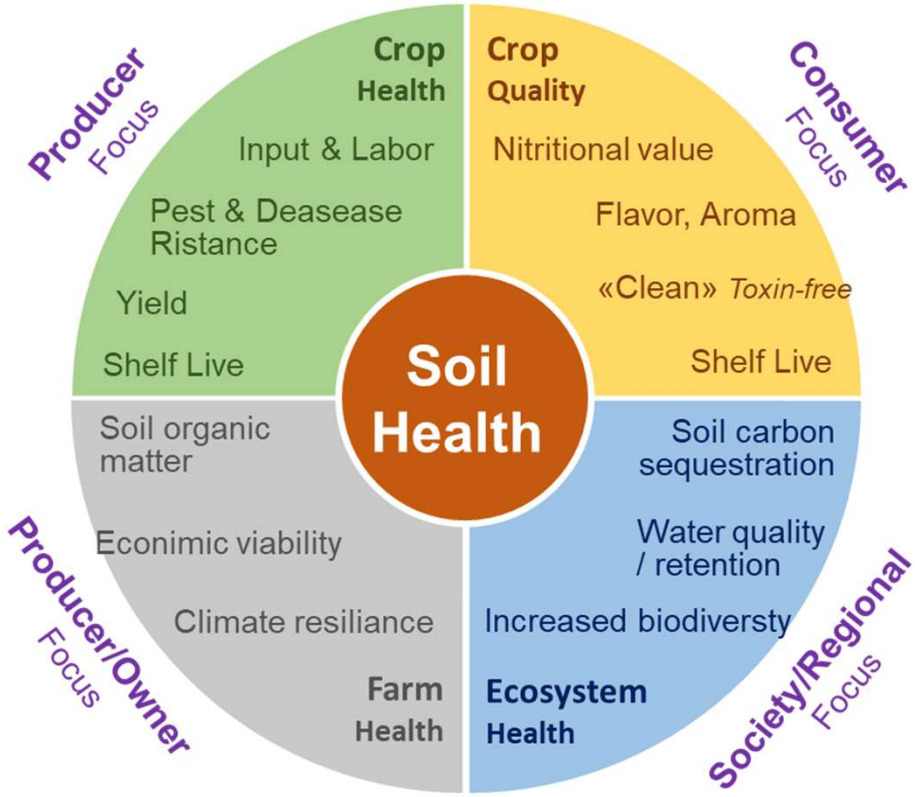
(Mottet et al., 2020)

Soil Health is Central:

Food, Crop, Farm and Ecosystem Health Dependence Upon Soil Health

Soil health covers the **stabilization of soil structure**, the **maintenance of soil life** and **biodiversity**, **retention** and release **of plants nutrients** and **maintenance of water-holding capacity**,

→ ***Soil health a key criterion not only for agricultural productivity but also for environmental resilience*** (FAO 2005).



North Coast Soil Health Hub, 2019

Goals

Identify the **relevance** and the **Influence** of **Soil Health Indicators** on Farmers' Decisions"

Study the **farmer's perception** of **soil health indicators** to **identify knowledge gap**

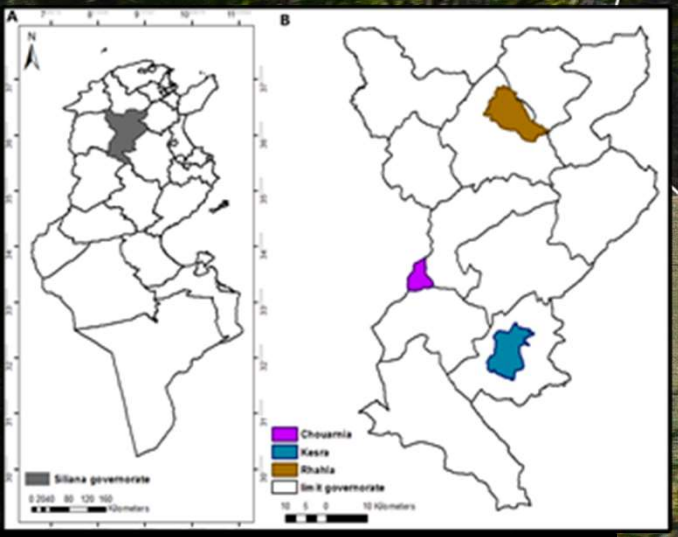


Photo of the study region : **Kesra**

8 CO-CREATION OF KNOWLEDGE

Enhance co-creation and horizontal sharing of knowledge including local and scientific innovation, especially through farmer-to-farmer exchange.

3 SOIL HEALTH

Secure and enhance soil health and functioning for improved plant growth, particularly by managing organic matter and by enhancing soil biological activity.

Tool for Agroecology Performance Evaluation (TAPE)

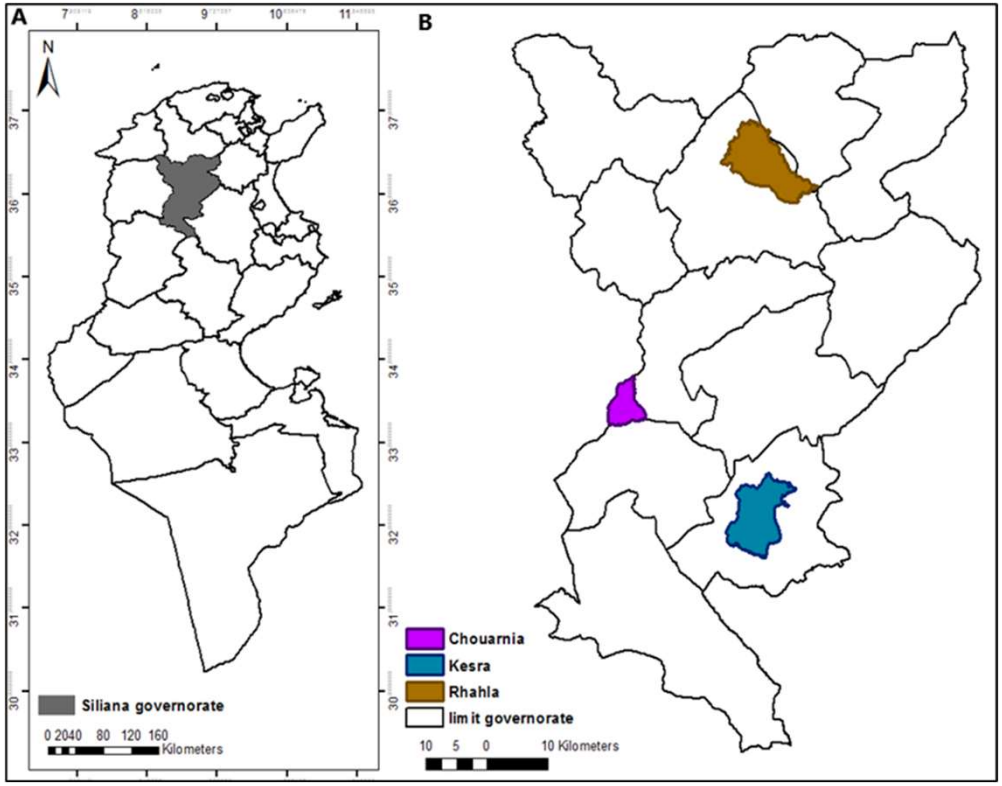
STEP 0:
Description of systems and context

STEP 1:
Characterization of agroecological transition (CAET)

2 Methodology : Visioning exercise

Assess the farmers' understanding and use of soil health indicators

Factor	Level	Regions: Rhahla	Kesra	Chouarnia	Total	
Gender	Women	7	4	2	13	
	Men	11	12	10	33	46
Surface (ha)	< 5	8	12	5	25	
	5_10	4	1	2	7	
	> 10	6	3	5	14	46

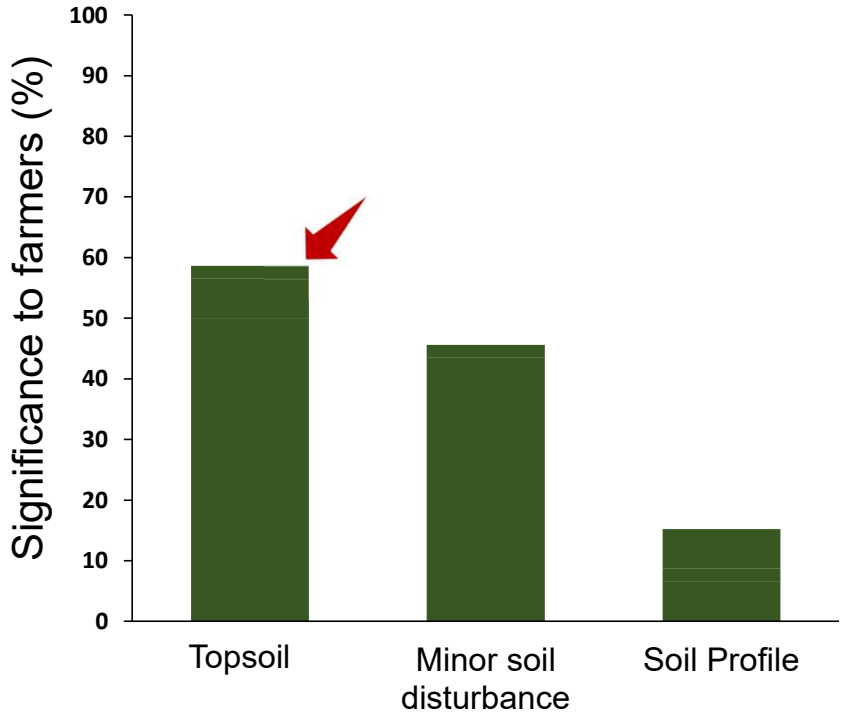


More than 50% of farm size are less than 5 ha

2 Main results

How farmers assess the health status of their soil :

- ✓ ***Topsoil,***
- ✓ ***Through minor soil disturbance***
- ✓ ***Through soil profiling***

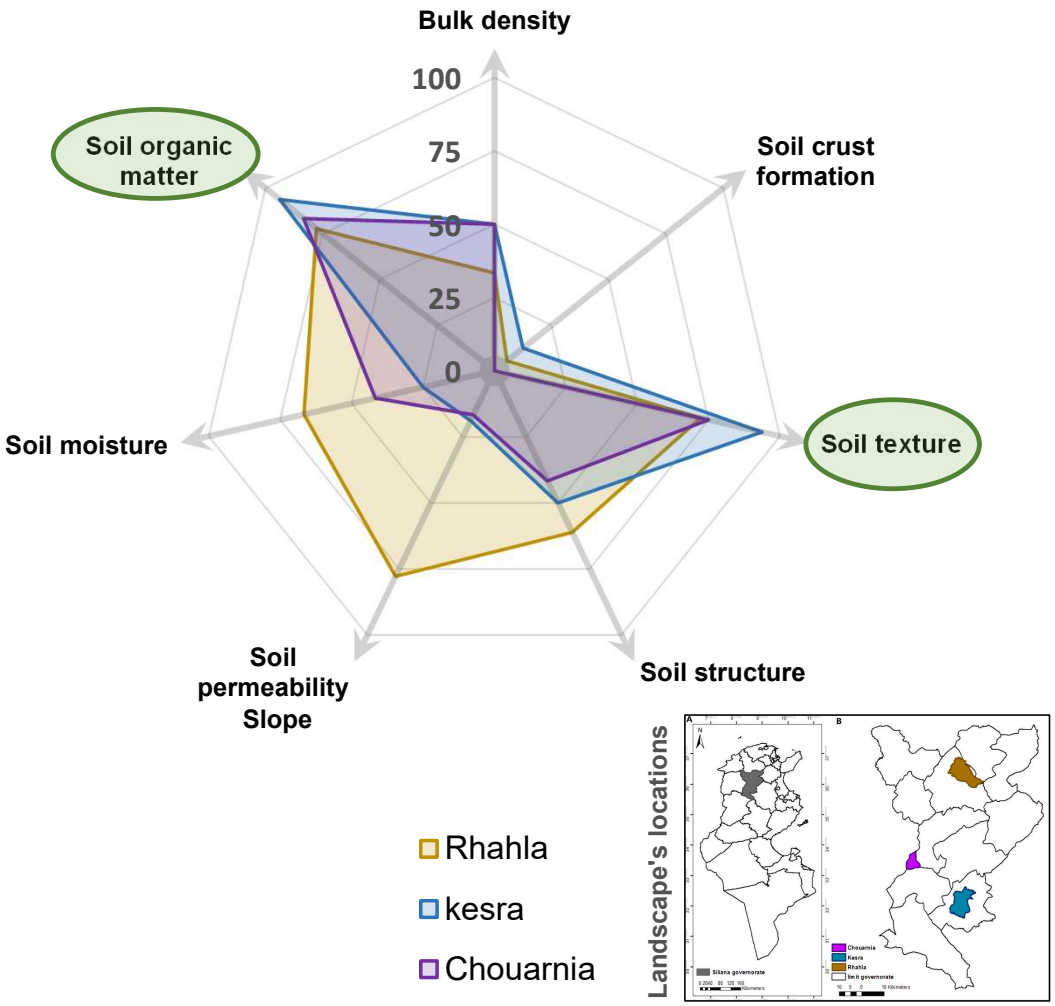


➢ **Farmers** tend to focus on the **topsoil** rather than **subsoil features** to **assess their soil health**

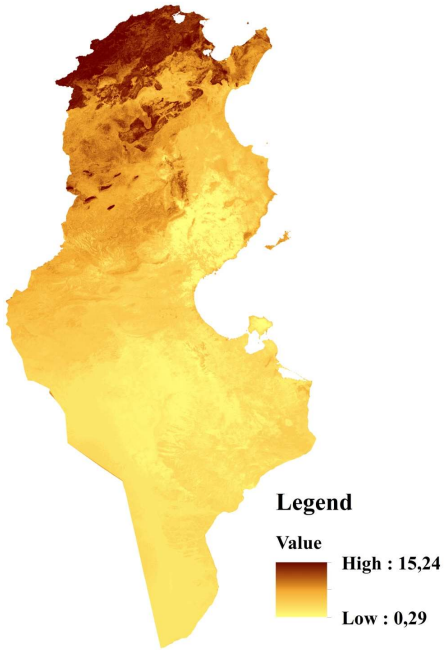
Knowledge gaps between **local communities** and **researchers** > ***Bridge*** *the* ***gap*** *between* ***research*** *and* ***farmer knowledge*** *through* ***inclusive approaches (training ….).***

2 Main results

Farmers' perception of **soil health indicators according** to **the landscape's locations**



Soil texture and **soil organic matter** are **identified as common soil health indicators** across all landscapes.



Soil organic carbon stock map of Tunisia

(Bahri et al. 2022)

2 Main results

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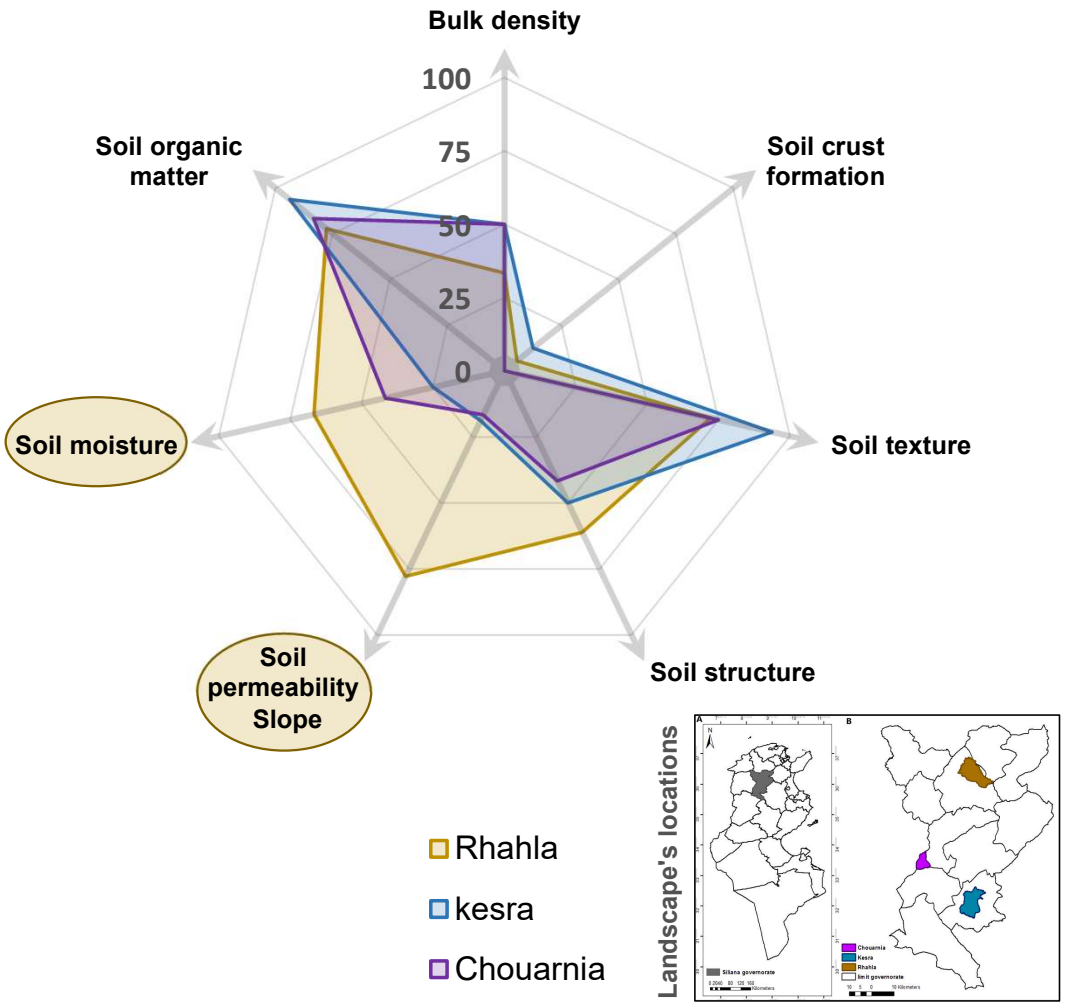
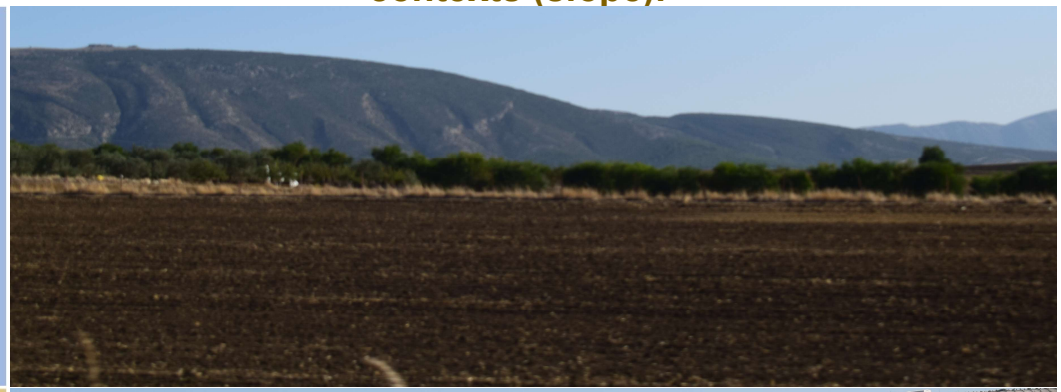


Farmers in the **Rhahla region know** the **importance** of **soil moisture** and **permeability due to the region's local contexts (slope).**

Kesra



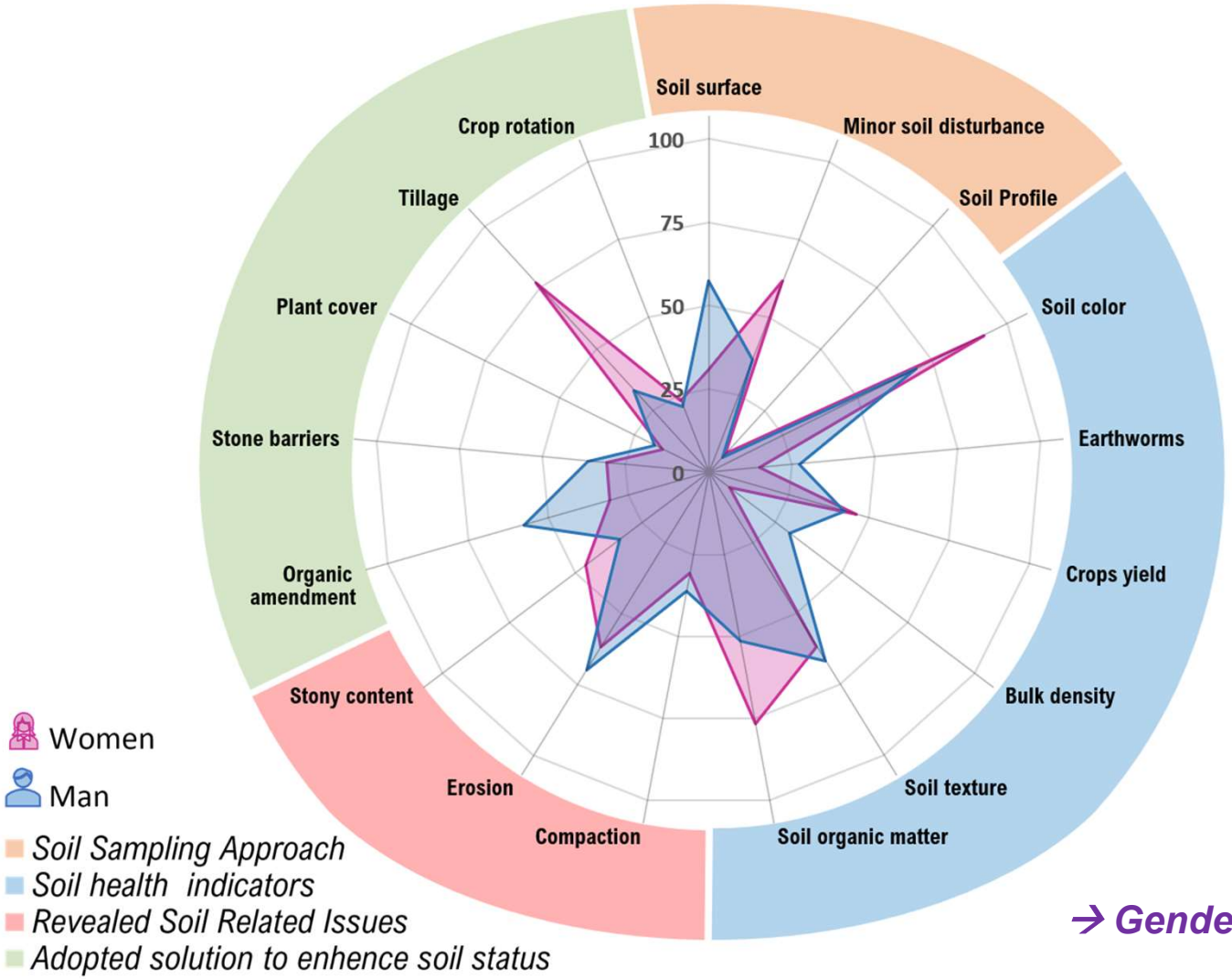
Rhahla

Indicators changes according to the local contexts.

→ Identification of local indicators is essential for agroecological transition

2 Main results

Gender effect of perceptions of soil health indicators



Main differences

Soil sampling approach

Topsoil	Minor soil disturbance

Soil health indicator

Bulk density	Soil organic Matter

Revealed soil issues

Erosion	**Erosion**

Adopted solution

Organic amendment	**Tillage**

Men propose the organic amendment to solve the erosion problem while women suggest tillage to limit runoff and increase water infiltration.

Including women in agricultural training can improve their knowledge about soil management.

→ Gender Differences in Knowledge, Attitudes, and Practices still require Attention

3 Main Conclusions

By emphasizing the **significance of soil health indicators** and **incorporating farmers' perceptions**, the **agroecological transition** becomes **more effective**, **adaptive**, and **beneficial for** both **agricultural productivity** and **environmental conservation.**

Agroecology can be also defined as a **dialogue**

among **different knowledges** and **ways of knowing**, **between farmers**' and **scientists**' **knowledge**,

between women and **men**,

between **practitioners** and **policy activists**

→ **Transdisciplinary approach**

3 Main Conclusions

Through **agroecological approaches**, **local communities** can **develop higher levels** of **autonomy** by **building knowledge**, through **collective action** and **inclusive approaches**


Rhahla, Siliana, 2023


Kesra, Siliana, 2023

Gender plays a key role in defining strategies for improving agro-ecological performance,

→ **Gender might be included in the TAPE framework.**

Tool for
Agroecology
Performance
Evaluation
(TAPE)

Thank you !

CGIAR

INITIATIVE ON

Agroecology

Photos are in Kesra, Siliana, 2023

4 References

Bahri et al 2022, Mapping soil organic carbon stocks in Tunisian topsoils. Geoderma Regional 30, e00561. https://doi.org/10.1016/J.GEODRS.2022.E00561

FAO, 2019, TAPE Tool for Agroecology Performance Evaluation 2019 – Process of development and guidelines for application, Rome, https://www.fao.org/documents/card/en/c/ca7407en/.

FAO, 2005, The Importance of Soil Organic Matter: Key to Drought-Resistant Soil and Sustained Food and Production. Rome: FAO Soils Bulletin 80. https://www.fao.org/3/a0100e/a0100e00.htm

Mottet, A., et al., 2020. Assessing Transitions to Sustainable Agricultural and Food Systems: A Tool for Agroecology Performance Evaluation (TAPE). Front Sustain Food Syst 4, 579154. https://doi.org/10.3389/FSUFS.2020.579154/BIBTEX

North Coast Soil Health Hub. (2019). Soil Health. Retrieved from http://soilhub.org/soil-health-and-its-many-co-benefits/

Tittonell, P., 2014. Ecological intensification of agriculture — sustainable by nature. Curr Opin Environ Sustain 8, 53–61. https://doi.org/10.1016/J.COSUST.2014.08.006