

# Metaphors about soil. An interdisciplinary investigation to reveal biases, inconsistencies and foster action for soil conservation

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Our work on soil metaphors began with the observation that there are many metaphors to talk about soil. Often, they are only suggested.

In order to develop them and understand how metaphors act, we interviewed researchers dealing with soil from different disciplines within soil sciences, agronomy, ecology and social sciences.

We conducted two series of interviews, in France and in Senegal.

We found that metaphors provide insights on soil issues and leave in the dark some aspects of soil reality. In that way metaphors do influence research and policy recommendations about land management.

For instance

## 1. “Soil as a heritage” to be protected and transmitted

helps to understand that soil is the result of a process of accumulation and transformation of organic matter.

In the short term, the metaphor of a bank account is used to recommend not to draw more than the interest, that is not to extract all the biomass from a cultivated field. Overexploitation would lead to a degraded soil, corresponding to an overdrawn account and possibly a bank ban.

This metaphor seems suitable for measurements and calculations of stocks and flows of carbon. It is at the heart of the 4 per 1000 Initiative where soil is considered as an investment for future generations.

In the long term, the metaphor of soil as a historical monument represents soil as an ancient construction. Indeed, the creation of one centimetre of soil requires several centuries.

And just as a monument can be destroyed quickly, soil can be destroyed by land management or land use change.

The main limit of the metaphors of soil as a heritage, bank account or monument, is that they ignore the living aspect of soil.

Hence the interest of a second group of metaphors where the soil is a living and reactive body or an organ

The metaphor of the body highlights the vital aspect of soil, as the matrix of all life on Earth.

It is a very old metaphor, still used in some cultures where the soil is more than a body, it has a personality.

A researcher told us about a woman farmer in Africa considering the soil would become too greedy if she gave it chemical fertilisers.

Another researcher tells farmers that their soil needs diversified food as well as clothing, just like the farmers themselves. This means not leaving the soil bare.

The idea of the metaphor here is to generate a better global understanding of the functioning of the soil and to create empathy towards the soil.

The 2nd group also includes the metaphor of soil health, an emerging property of complex systems, understood from analysing not only elements in isolation but also mechanisms linking these elements.

With soil health, functions of the soil are measured, not only components. We can see here how a metaphor may influence research.

One researcher pointed out that it is more accurate to think in terms of society to represent soil than in terms of the individual body.

Hence the relevance of seeing the

### 3. Soil as a multitude of communities

The communities can be seen as a house, or a village or a city or as different human cultures.

The metaphor of soil as a city highlights interactions with the notion of network. For instance the nematode would be the bus, with preferential paths, buildings, reserves.

The metaphor of a village would better grasp interactions between the human and non-human communities: insects, plants, micro-organisms.

According to a sociologist, the different types of communities could be seen as coexisting human cultures. Communities are co-creative: if there were only one culture, we would be extremely poor.

Moreover, the different telluric communities have been around for much longer than humans, they may be better able to adapt.

This refers to another metaphor, the soil as an archive.

So you see, metaphors complement each other, sometimes they overlap. For example, soil as a living body complements soil as a heritage and a heritage could be a monument housing several communities.

With those interviews, we brought researchers from different disciplines to share their knowledge on soil and to grasp the limit of what can be explained by only one metaphor.

We continued our investigation by organising interdisciplinary workshops.

## **Interdisciplinary workshop**

To use metaphors for impact, we propose to invite soil experts together with experts on the topic used as a metaphor.

For example, to investigate soil health, we have invited human health experts together with soil experts.

This gives a unique opportunity to enrich the metaphor and raise new questions.

This process helps to think “out of the box” because we integrate the views of those experts while going through metaphorical exploration. (réf Paul Watzlawick)

## **Workshop on soil health**

We organised a workshop on soil health with

2 soil scientists: a microbiologist and a pedologist,

and for human health: an immunologist, a nurse, and a midwife,

for a half day meeting.

We have just followed a few tracks for a first exploration.

To start with, it was striking to notice that the soil health metaphor is strongly criticised by some as a concept that is not scientific, although nobody would dare say that human health is

not a scientific concept; even if human health is not very precisely defined. (López-Otín et Kroemer, 2021).

We have then compared briefly the actors of human health and soil health.

Well, concerning human health the first actor is the individual himself.

The way he reacts and cures himself...

What about the soil?

How does she react after a perturbation? What are the mechanisms by which the soil recovers health?

Who plays the role of the physician? of the nurse? is that the tree? Or maybe the microorganisms?

## **a cultivated soil as a pregnant woman**

We've then looked at the metaphor of a cultivated soil as a pregnant woman through a dialogue between a midwife and soil scientists.

The pregnant woman and the cultivated soil are both in full health, and need special care. In particular, the mental well being of a pregnant woman is fundamental and does have biological impact on the baby. Similarly, soils need to express themselves, and to be listened to.

There is a need for continuity of care: the mother needs the protection and help of a midwife, to be able to protect and help well her baby.

The poor situation of mid wives in hospitals, that make them unable to fulfill entirely their mission of care, is comparable to the stress faced by peasants.

Both are under high level of pressure, that makes them unable to be protective enough.

To improve the situations, one would need to look with care at the difficulties they faced and how those difficulties could be released.

## **A multidisciplinary challenge**

We then look at a major multidisciplinary challenge that concerns the relation between human health and soil health:

30% of the new infectious diseases (IPBES, 2020, p19), are caused by the change of use of soils

That sounds like an invitation to look at the coherence of human health and soil health policies;

## **Revealing inconsistencies**

This approach reveals inconsistencies in a very striking way.

1. There is a very poor culture of prevention in Europe, concerning both human health and soil health.

For instance, in France the first prevention plan for health was implemented in 2018

Concerning soils, the European Soil Framework Directive, has been voted by the European Parliament, in 2007 but it is still not applied because some member states are blocking it.

Therefore, if we want to become protective for soil, we need to realise that we badly miss a culture of prevention. What is needed here is a cultural change in our way to apprehend the world.

2. The impact of soil health on human health is overlooked in health programs.

This is primarily because environmental issues are neglected there. Even in the One Health program, the environment is not enough considered.

(ref L'environnement le grand impensé du plan cancer/ The Lancet)

## **Fostering actions**

To foster action:

- at a global level, there is a strong argument for requiring a central role for soil health in global health programs
- in bottom up processes, there is a need to start by looking at the actual situations of peasants, to understand the pressure they face, and suggest solutions for soil preservation that would help to release their difficulties.

In conclusion,

Metaphors are like mushrooms in the forest. It may be hard to find the first ones but once you have identified some, you'll find others and see them everywhere.

Therefore it is important to learn their virtues and potential dangers.

Metaphors are like spotlights, shedding light but also leaving in the dark some aspects of reality.

That is why we plead for metaphor plurality.

Metaphor use for interdisciplinarity is like gymnastics that requires warming up and brings flexibility, that is, the ability to combine research from different disciplines.

Gymnastics also brings strength, that is the capacity to change paradigm by integrating proposals from experts called in for deeper metaphorical exploration.

Thank you very much for your attention