

Soil Security Dimensions Brief

Soil scientists have long been telling of the importance of soil to provide for our growing demand for food, water and energy, while also expecting soil to provide ecosystem services that affect climate change, human health and maintain biodiversity. Soil has a role in biophysical and socio-economic perspectives, yet an overarching concept that brings these together is wanting and this has led to the launch of the Soil Security concept.

Securing soil is (literally) vital, as a speaker at the soil security conference, we invite you (the speaker) to present your perspective on how to achieve soil security...

Soil security is 'concerned with maintaining and improving the world's soil resource to produce food, fibre and freshwater, maintain the biodiversity and ecosystem services and contribute to human health'. There are five dimensions the frame soil security, where capability and condition address the biophysical challenges, by questioning, 'what can soil do' and, 'how is soil affected by its use and management'. Soil security also requires a value to be placed on soil, and this value is aligned with the need for policy to aid in securing soil by encouraging sound soil management and protecting against mismanagement. Policies and consumer decisions that benefit soil only have currency when people identify with how they are connected to soil and the benefits soil provides.

The dimensions of soil security are; Capability, Condition, Capital, Connectivity and Codification.

- For each dimension there is the common question of how they contribute to the measurement, analysis, and/or management (solutions) to the 6 global challenges of Food, Water and Energy Security, maintaining Biodiversity and Human Health, and adapting to or mitigating climate change. Examples of implementation and success are encouraged.

Capability.

The capability of a soil refers to its potential functionality and addresses the question of what can a soil is expected to do, what service does it maintain, or what can it produce? Currently, this dimension calls for a reference state to be identified for any given soil and acknowledges that soil varies in its physical, social, economic and geographic properties. This dimension needs to be linked to the functions that soil performs and contribute to other land classification frameworks such as *Land Suitability*. This could be achieved by establishing a local reference state defined by a 'particular soil' or exemplar that needs to be included in some level in soil classification. Due to long periods of land use in parts of the world a reference state defined by soil in its natural condition may not be appropriate.

- Do we need a reference state?
- Relationship between capability and resilience?
- How do you measure capability?
- What are the indicators of the multi-functionality?
- If so what is a reference and how is it defined it and measure it?
- What are the soil functions that are relevant to the reference state?
- What are the soil properties that define the reference state?
- If soil cannot return to the reference state then this is not the local reference state.

Condition

The condition of the soil is concerned with its current state and can be compared to the reference state to determine if it is maximizing its capability. The soil condition is particularly useful to those who want to know about (i) the impact of changes in management practices, and (ii) justification for investment to maintain or improve the soil resource. The condition would be assessed using a collection of indicators that describe soil functions and these can be used to assess the services provided by soil. The soil condition has similarities and contributes to the concepts of soil quality, health and protection, but importantly recognises this as a measure of the biophysical and the need to separate the indicators of the socio-economic dimensions that affect the soil resource.

- How is the soil condition similar to, and different from, earlier concepts of soil quality, health and protection?
- How can soil condition contribute to the concepts of intensive agriculture and/or increasing green water utility?

Capital

The dimension of soil capital is underpinned by the notion that by placing a monetary value on an asset enables a society to value or secure the asset and make meaningful comparisons of soil with different capabilities and conditions. This dimension is influenced by the ideas developed to frame natural capital and views soil as a stock that contributes to flows in the system, and in turn these stocks and flows affect the services that the soil resource provides. A clear need is to identify soil indicators that contribute to soil value and what indicators contribute to the values of soil itself as opposed to the goods, i.e. the rent or what the soil produces, and the management of the resource. This collective would be used to develop a soil account that can be itemized accordingly.

- How do economists place a value on soil?
- How does direct and indirect use affect the value of soil?
- How does the options value of soil affect decisions on soil?
- What soil indicators are useful when valuing soil?
- At what scale is the socio-economic data represented and how does this connect with biophysical soil data?

Connectivity

This brings in the social dimension around soil and in part is concerned with whether a person who is responsible for the soil or any given piece of land has the right knowledge and resources to manage the soil condition and use soil according to its capability. Effective education strategies and suitable communication about soil can be discussed. Stewardship of soil is one mean of establishing connectivity and enables those having tenure to value the resource. An emerging challenge is how to engage the broader community with soil and when they do how can the knowledge, actions and ideas they create contribute to the future of securing the soil resource. Is there also a need to trace who soil has contributed to the products it produces for consumption and how could this be done effectively?

- What soil metrics should be used for Social Licensing?
- How can technologies developed to track the source of material be incorporated into branding of soil?
- How is this best represented?
- Who will support a soil 'footprint' and traceability?
- What is the public recognition, for example, of the term *Terra Rossa*?
- What is the role of social media and crowd sourcing in gather soil information?
- Who will validate this information and how will the credibility of the information affect its use?
- How managers of soil (land) are connect with direct and indirect uses of soil?
- How does this affect the decision support frameworks used to manage soil?

Codification

No matter how secure soil may be through management for ideal condition and capability, valuing it through its capital and being highly connected to society there is still remains the need for public policy.

- Does the lack of soil being used explicitly in national or international policies make soil more vulnerable to mismanagement?
- How is soil data or information used in the development of land related policy?
- What is the best way to get soil explicitly named in soil policy?
- Do we need an international treaty on soil?