

The contribution of soil standardization when dealing with the challenges of climate change and global food production

1. Challenges

The world faces considerable challenges due to climate change and the need to supply food for an ever growing human population. Soil is an essential asset. It is on the basis of our very existence and has an essential role in, for example, food and biomass production, nutrient recycling and water filtration. Additionally, the soil is, after the oceans, the second carbon pool on the planet.

Soil degradation is a serious threat as it might hamper the essential soil functions. Climate change will cause soil degradation and will consequently affect future human welfare. Climate change will result in (significant) changes in the distribution of heat and rainfall over the surface of the planet. Excessive heat and lack of rainfall will result in an increased level of desertification, and structural loss of organic matter. Desertification will result in the loss of valuable agricultural soils, while diminished crop production will occur both as a result of desertification as well as due to excessive rainfall in other regions.

A global rise of the temperature will result in loss of carbon from soil, accelerating the rise of the carbon dioxide concentration in the atmosphere. The development of policies to preserve or even increase the soil organic matter content is urgent. At the same time, technical instruments will be needed to provide policy makers and others with the means to determine the effects of measures.

2. Value of Soil

Soil is of significant economic value. Part of that value relates to the soil as a basis for human housing, business activities and related infrastructure. The highest soil value will be found in regions with the largest economic pressures, thus where the scarcity of soil is dominant over any function of the soil. The growing human population and animal stock is a burden to our soil, due to the need for housing and infrastructure, the need for agricultural land and the need of increased agricultural production. Inadequate agricultural practices will exhaust the soil, while at the same time local soil quality will not always allow all potential soil functions.

Soil performs a key role in eco services. The soil purifies water which allows us to use it as a source of drinking water. The fertility of the soil allows for example crop and wood production, natural reserves as well as it serves recreational purposes. Soil is the habitat for soil organisms which play an essential role in the eco services. Preservation and development of the soil characteristics is of major importance for the future. As such there is a need to measure and monitor these characteristics.

3. The current situation

Currently, when decisions are taken on future land use, in the majority of situations no or insufficient attention is paid to the soil characteristics. The desired function is imposed upon the soil, without taking care of the capabilities of the soil. Deforestation, overcropping, severe erosion – even up to total loss of soil – are the well known consequences. Less visual, but nevertheless severe, problems are for example caused by providing too much or too little nutrients, or the wrong kind of nutrients. Contamination problems, both local as well as regional, also have a negative influence on soil quality. Currently only a limited number of countries actually recognizes the associated problems of contamination soil. And if so, often it is only a fraction of the real soil contamination problem that is acknowledged. Contamination of groundwater, as a source of drinking and irrigation water, obviously is closely related to soil contamination. Contaminated surface water, for example due to industrial spillage, often is a source for soil, sediment and groundwater contamination. Sediments will eventually become soils again in delta areas.

Understanding the possibilities and opportunities the soil provides, as well as understanding its limitations, is essential for our sustainable use of the soil. Given its often neglected importance, improved knowledge and understanding of the soil characteristics might prove to be essential for the long term existence of mankind.

4. The need for knowledge

Characterization of the soil in the past had either an agricultural or geological background. In more recent years, and until now only for part of the countries worldwide, characterization of contaminated soils became an additional issue. An integrated approach, determining and assessing the possibilities, opportunities as well as the threats to soil is still missing in the vast majority of countries.

When characterizing the soil it is important to use well defined, scientifically sound techniques. Moreover, these techniques should be fit for purpose: they should be able to provide a result that is relevant to the answer that is sought for. Obtaining an answer often implies comparing the result to either a classification system, a (class) limit value or to other results. In all of these situations comparability and reliability of results is vital. Without comparable and reliable results, it is impossible to make informed decisions.

5. ISO/TC 190 'Soil Quality'

Reliable results can be obtained when applying characterization and assessment methods that are accepted by an outstanding group of soil experts. International standardization (ISO) provides the ultimate platform for this, where ISO/TC 190 'Soil Quality' has an excellent track record of 25 years of standardization for the characterization of soil; producing well over 100 ISO-standards in this field. ISO/TC 190 has published methods that are to be used for the determination of physical, biological and chemical characteristics of the soil. Keeping up with developments in the field, this process still continues, seeking, amongst others, for the publication of state of the art methods in its field. Additionally, the committee more and more not only develops the characterization method, but also defines the assessment procedures. For example assessing the bioavailability or the leachability of the soil. Currently the committee is looking into more general assessment methods, like for example the possibility to develop a soil erosion index.

ISO/TC 190 'Soil Quality' organizes meetings for national, often worldwide renown, soil experts, and allows them to join forces in an international context, providing tools that help beating the soil related challenges that are posed upon mankind.

ISO/TC 190 'Soil Quality' maintains direct relations to a number of worldwide organizations with a direct responsibility to the soil quality on our planet, like the FAO of the UN and the WHO.

6. Opportunity

ISO/TC 190 provides an opportunity to establish methods, both for the characterization, as well as for the assessment of soil. ISO/TC 190 will gladly provide standardized methods to support policies aimed to tackle the challenges posed by the climate change and food production.

In order to exploit that opportunity, we invite you to contact the TC Chairman to discuss what role you see for the ISO/TC 190 and how we can fulfill that role.

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