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POSITION PAPER – Extended Summary

Role of Soils for Satisfying Global Demands for Food, Water and Bioenergy

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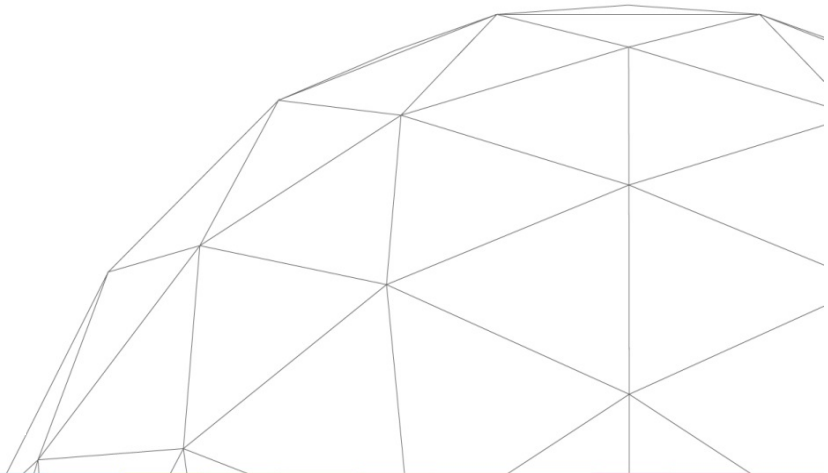

Day 3 | Population Growth

Role of Soils for Satisfying Global Demands for Food, Water, and Bioenergy

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Summary

Land and soil resources are providing goods and services for an increasing global population. They are also the basis for the specific demands expressed in the Sustainable Development Goals (SDG's), which, however, are to a great extend anthropocentrically focused and do not always consider, that only a well preserved nature can deliver all the desired goods and services, especially food, water, and bioenergy, see SDG's no.2, 6, and 7.

Looking into the available global land and soil resources for meeting these demands reveals that only 12% of the global land surface is suitable for the production of food and fiber. On these 12% of land about 25% of the world population produces all traded food without considering subsistence food production. 24% of the land can be used for grazing, 31% produce forests, and 33% of the global land surface is unsuitable for any kind of sustainable use.

We show how these different land uses are linked to different types of soils and their corresponding population as well as the global distribution of land and soil quality, subdivided into 9 quality classes, based on the characteristics of resilience and performance.

A further detailed analysis of the distribution of these quality classes in the major world biomes shows that two thirds of the best soils (classes 1-3) occur in the northern hemisphere, and only one third in the South with the highest number of food insecure people.

These land and soil resources are threatened by different impacts compromising the satisfaction of global needs, which can be distinguished between direct threats to soil and those caused indirectly by global change.

Direct threats are soil sealing through urbanization, industrialization, and transport which cause roughly estimated daily losses of fertile soils at the global scale of about 250-300 km^2/day. – Moreover, in sedimentary areas soil losses occur through land excavation for the production of construction material, e.g. bricks.

Besides sealing and excavation, additional forms of soil degradation, mainly caused by inappropriate land and soil management, are erosion, compaction, loss of organic matter, decline in biodiversity, contamination, salinization, desertification, nutrient mining, and floods and landslides, which are described in detail.

In addition to these direct threats endangering food production and fresh water supply through local and regional processes, there are global changes which are indirectly compromising the provision of goods and services by land and soil. These are population increase, migration from rural into urban areas, changes in life style and food habits, which increase the demand for space and food and at the same time threaten the natural resources needed for food production. Moreover, the increasing demand for and use of energy, and the destruction of natural resources, e.g. through deforestation for the extension of food and fiber production, cause additional impacts on climate change, which add to the already existing problems through the use of fossil energy.

The tendency to increase the production of biofuels, which competes with food production for space and energy, is a further threat to food security, in addition to the existing economic crisis and the emerging economic procedures in food production and marketing, such as land grabbing, hedging, and the use of derivatives in food trading.

All this underlines the fact that we are still far away from reaching the SDG's no.2, 6, and 7. – Without new approaches in biomass production, especially food production on local and worldwide levels protecting concomitantly the groundwater resources against contamination and our natural resources in general including biodiversity, it has to be expected, that within one or two decades food and water shortage will severely increase further food and water insecurity threatening millions of people, mainly in countries in development.

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