

# FERTILE SOILS:

## FUNDAMENTAL IN THE STRUGGLE AGAINST HUNGER AND CLIMATE CHANGE!

When experts, politicians and stakeholders discuss global challenges such as achieving food security and combatting climate change, they fail to consider one of the most vital resources of all: soils. And no wonder - the multiple functions of soil are not exactly obvious at first glance. And: It takes hundreds of years for a few centimeters of lost soil to renew itself. Despite the enormous losses involved, soil degradation often occurs so slowly that it takes more than a single human lifetime for its effects to become noticeable. It is high time for rethinking and urgent acting! Protection of soils has to be a political goal as much as the fight against hunger and protection of the climate.

### SOILS ARE ... essential for life:

Without fertile soils, world food security would be at risk: soils are the basis for more than 90% of worldwide food production. According to FAO calculations, one eighth of the world's population – 842 million people – is suffering from hunger (FAO, 2013). The situation is especially critical in southern and eastern Asia and in sub-Saharan Africa. Rural areas are the most severely affected; 75% of the people suffering from hunger live there. To make matters worse, the poorest segments of the population often have to secure their survival from soils of the most limited fertility, due to degradation of the soil for which they themselves are not responsible.

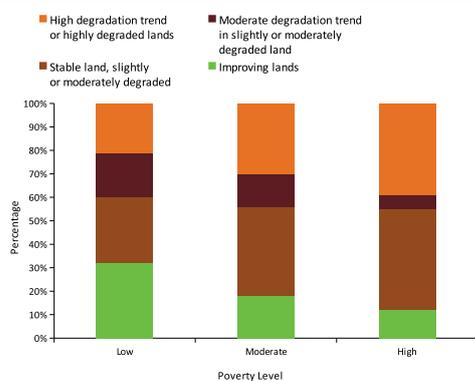
The problems are particularly acute in those regions where shortages of water and land coincide with processes of soil degradation. India is a major example of this. The 2012 European Report on Development, which addressed the sustainable use of scarce resources such as water and land, forecast that as a result of growing demand for food, a further increase in pressure on limited resources such as soil would take place. The sustainable management of soil is essential for the struggle against hunger and poverty.

### SOILS CAN PUT A BRAKE ON CLIMATE CHANGE

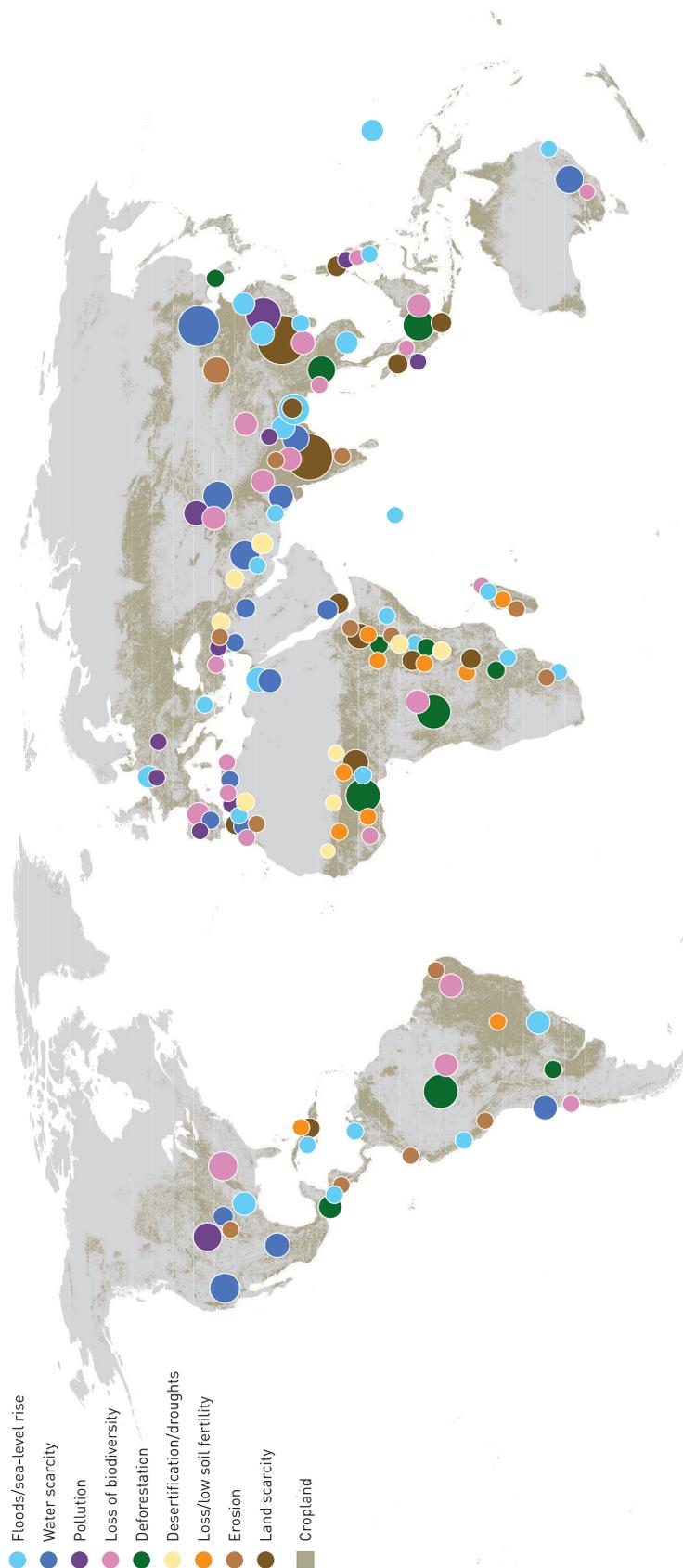
Soils store more than 4000 billion tons of carbon. By way of comparison, the forests store 360 billion tons of carbon as woody biomass, and the atmosphere more than 800 billion tons in the form of carbon dioxide. That means that soil contains over ten times more carbon than do the trees. With responsible management, soil can act as a carbon sink to counteract climate change.

On the other hand, non-sustainable soil management causes soil to set carbon free. In view of the large quantities of stored carbon, the necessary result is an aggravation of climate change.

The connection between soil degradation and poverty



Source: FAO 2011 (modified)



Source: The State of the World's Land and Water Resources for Food and Agriculture, FAO (2011).



● Atmosphere: 800 bn tons ● Forests: 360 bn tons

Soil contains much more carbon than the atmosphere and the trees put together. Non-sustainable agriculture causes this carbon in soil to be set free, and can thus lead to an aggravation of climate change.

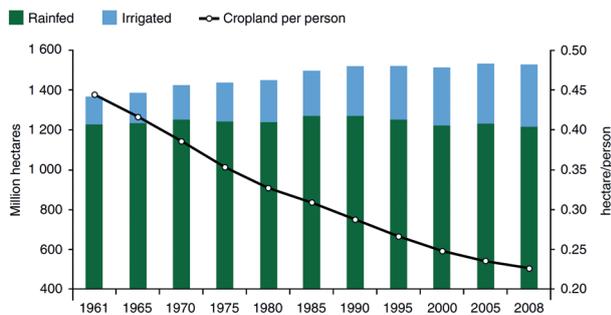
### SOILS ARE... finite:

Agriculturally usable soil is only available to a limited degree. It accounts for only 12% of the Earth's surface, and cannot be restored within a human generation. The formation of an inch-thick (2.5 cm) layer of fertile humus soil takes approx. 500 years on agriculturally used land.

The opening up of new land potentially usable for agriculture to feed the world's growing population involves immense financial and ecological costs, and is therefore possible only to a limited degree: More than two thirds of the potentially usable land consists of soil of insufficient quality, or is on slopes which are difficult to farm. Another major portion of the area is covered with forests.

With increasing population growth, the amount of agriculturally usable land specifically available to us per capita is continually dropping. Currently, each human being has only 0.22 ha to his or her disposal; in 1960, that figure was still 0.5 ha.

Reduction in agriculturally usable land per capita, 1961-2008



Source: FAO 2011

### SOILS ARE... threatened:

One quarter of the earth's surface is already degraded, which affects 1.5 billion people today. Degradation processes such as erosion, impervious soil coverage, or desertification are causing the worldwide total of agriculturally usable soil to diminish continually. For example, an estimated 24 billion tons of soil are lost to erosion every year.



More than 24 billion tons of soil is lost due to erosion every year – this is more than 3 tons of soil per inhabitant yearly.

According to the report The Environmental Food Crisis by the UN Environmental Program (UNEP), published in 2009, soil degradation in Africa is reducing crop yields by an average of 8%. In Rwanda alone, 1.4 million tons of soil, which could feed 40,000 people, is lost every year. The value of the food lost in that way comes to 1.9% of Rwanda's gross domestic product.

Often, soil degradation is associated with desertification in arid areas. However, soil degradation is a global phenomenon. Take the example of the impervious coverage of the soil: If the current trend of urban population growth continues, and if urban sprawl proceeds at the maximum rate, the world's total urban area, which is associated with impervious soil coverage, will increase by 1.2 million sq. km by 2030, an expanse equal to the area of South Africa. That would be a tripling of the global urban land surface since 2000. The most valuable soils for agricultural use are often lost in this way, for cities are usually built on highly productive agricultural land.



Source: NASA 2002

## SOILS ARE... unequally distributed:

In Brazil for example, at 84.4% of all farms fall in the category “small;” they account for 24.3% of the cultivated land. On the other hand, less than 1% of the farms has over 1000 ha, and account for 44% of agriculturally used land. According to the current UNEP Development Report for Columbia, for 2011, the degree of unequal distribution of land has increased further, although Columbia already has one of the most unequal land distribution situations worldwide.

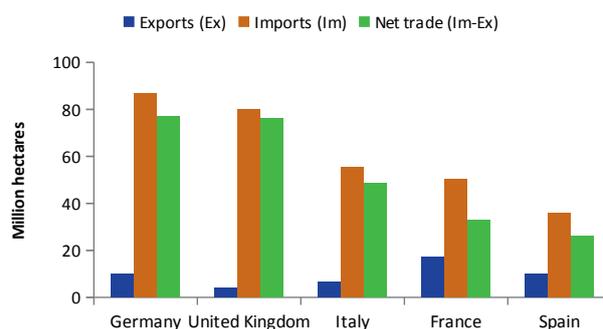
Women are especially affected by the unequal distribution of land and soil. Worldwide, they produce more than 50% of all food – in fact, between 60 and 80% in the so-called developing countries. However, women owned less than 2% of the land. In Kenya for example, women perform 70% of all agricultural work, but only 1% of them over their own land. It is estimated that women could increase the yields of their farms by 20 to 30% if they had the same access to productive resources as men do.

## WE'RE LIVING ON CREDIT

### Virtual land imports

The production of most agricultural products requires soil. If these products are internationally traded, the land required to produce them is in fact being indirectly traded, too: this is what is called “virtual land.”

According to the study Europe’s Global Land Demand, the 27 EU countries in 2004 thus imported 370 million ha of virtual land, while exporting only 37 million ha. That net import of over 330 million ha means that 60% of the land area needed to cover Europe’s demand for food is located outside of Europe. Germany alone had a net import of 77 million ha of land in 2004. These figures show that we are living above our means. Our consumption of land and forestry products in Germany requires more soil resources than we in Germany have at our disposal.



Source: Europe’s Global Land Demand, SERI (2011)

## LAND GRABBING

The limited availability of fertile farmland has led to a massive growth in foreign direct investment in land in some developing countries. This often endangers the land rights of the local population, and aggravates the problems of hunger and poverty. Very often, water rights are also surrendered in the context of this kind of irresponsible investment in land, which aggravates the effects of these investments still further. Studies by civil-society organizations have shown that products consumed in Germany contain additives produced on farmland which was the object of such irresponsible land investment. Exemplary studies include Oxfam’s work on sugar in the context of the “Behind the Brands” campaign, or the Greenpeace studies on soybeans and leather from the Brazilian Amazon.

## THE SITUATION OF SOILS IN GERMANY

Although the absolute quantity of land in Germany to be newly built-up or used for transportation purposes per day has dropped from 120 ha during the years 1993-1996, to 77 ha in 2009-2010, the latter figure is still twice as high as the sustainability goals set by the federal government. According to that goal, the daily new consumption of land could be reduced to 30 ha by 2020. However, this goal, too, may not be achieved, for 51 ha are currently being forecast for 2030. Soil erosion, too, is a major factor in Germany. The federal Environmental Protection Agency (UBA) in a 2011 study describing the extent of erosion by water alone pointed out that one seventh of the farmland in Germany shows a long-term average soil-erosion loss due to water of more than three tons per hectare per year. Another serious problem is the contamination of groundwater by pollution in the soil. The Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU) in a 2008 report estimated the number of toxically contaminated surfaces in Germany at over 300,000.

In order to reduce the degradation of soils in Europe, the European Commission in 2006 presented the draft of a Soil Framework Directive. Today, it has still not been adopted, in large part to resistance from Germany, and the EC is even considering withdrawing it, due to the unlikelihood of its passage.

## SOLUTIONS ARE AVAILABLE

### **Reduction of the impervious coverage of the soil**

A reduction in impervious coverage of the soil was achieved in Great Britain. The stipulation of green belts around cities will for the foreseeable future prevent further impervious coverage of the soil due to urban sprawl. These green belts must be permanently maintained for agricultural, forestry or recreational use. In that way, some 1.6 million hectares of land have been saved from impervious coverage due to urban sprawl since 2003. There are positive reports, too, from Germany: in 2006, the city of Stuttgart introduced a soil-protection strategy, as a result of which there was almost no loss of soil due to land-consumption between 2007 and 2010, in spite of intensive planning activities and construction projects. For at the same time, a consistent policy of urban densification and sustainable land management was implemented.

### **Careful land-use**

Land management methods for the enrichment of the humus content of soil, through mulching, farm forestry or inter-cropping, increase the storage capacity of the soil for water and nutrients, and promote organic activity in the soil. Such humus-rich soils can better buffer the effects of climate change than can humus-poor soils, and they are less prone to erosion. Reduced use of plowing, or doing without it entirely, which can be integrated into both conventional and organic farming methods, and is an effective method for reducing soil loss to erosion.

### **Secure and fair access to land, protection of the commons**

Secure access to land is a decisive precondition for fighting poverty in many rural areas. Even minimal improvements in land access can lead to significant improvements in the income situations of rural households. Studies show, moreover, that a fair distribution of land results in higher average GDP growth rates. Secure land-use and land-access rights are also an important factor for creating incentives for sustainable agricultural use. Studies in the Ethiopian region of Tigray have shown that secure land rights increases investment in soil protection measures. Research results by the IASS in Burkina Faso have illustrated the problems that result if land rights are not assigned and protected. There, in part due to the unclear legal situation, 80% of the forest land in the Samorogouan region

has been cut down over the past thirty years.

Secure land rights are not necessarily individual land rights. The research conducted by Elinor Ostrom, winner of the Nobel Prize for Economics in 2009, showed that user groups can sustainably use collectively managed resources by the negotiated assignment of rights within the group. It is particularly important that the users have the necessary rights of self-administration, and that these be recognized and protected by superior government authorities. Studies in the Brazilian Amazon region show that rainforest areas which are used by the population groups living in them can be better protected from deforestation than strictly protected areas.

All in all, it is important that soil policy protect the right to food. A decisive step in this direction is the implementation of the so-called voluntary guidelines for responsible management of soil and land-use rights, fishing rights and forests in the context of food security at the national level.

## THE CONTRIBUTION OF THE GLOBAL SOIL WEEK

### **Bridging Knowledge. Empowering Transformation**

The Global Soil Week is a collective process and knowledge platform for sustainable soil management and responsible land governance worldwide.

Part of the Institute for Advanced Sustainability Studies (IASS) in Potsdam, we promote the transdisciplinary transfer of knowledge between scientists, policy-makers and representatives of civil society organizations in Africa, America, Asia, Europa and Australia/Oceania. The Institute's founder and Executive Director, Prof. Klaus Töpfer, is a widely known proponent of this approach. Based on our success in 2012 and 2013, the IASS intends to use the third Global Soil Week ([www.globalsoilweek.org](http://www.globalsoilweek.org)) as a special opportunity to raise awareness about the important role of soils and land for sustainable development, and to draw the attention of policy-makers and the public to the finite and forgotten resource soil. The year 2015 offers tremendous opportunities: the United Nations General Assembly has declared 2015 the International Year of Soils, and parties of the United Nations Framework Convention on Climate Change will gather in Paris to craft a global agreement to mitigate climate change. Moreover, negotiations for the Post-2015 Development Agenda and the Sustainable Development Goals (SDGs) will be in full swing.

In the aftermath of the Global Soil Week 2013, the IASS, together with its partners, moderated discussion processes which carried thematic threads from the Soil Week forward. The results are to be discussed at Global Soil Week 2015, in a broader circle of participants, and have already served as the basis for an action plan which is to constitute the

roadmap for a common approach by various actors for the protection of the soil. This will require a joint process, to be initiated by Global Soil Week. Our Partners in the Global Soil Week include the European Commission, the UN Food and Agriculture Organization, the UN Convention to Combat Desertification, the UN Environment Programme, the German Federal Ministry for Economic Cooperation and Development, the Deutsche Gesellschaft für Internationale Zusammenarbeit, the German Federal Environment Agency and the International Union of Soil Sciences.

**GLOBALSOILWEEK.ORG**  
**#SOILWEEK**  
**IASS-POTSDAM.DE**

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