Soils in Parliament

In celebration of the declaration of 2015 as the International Year of Soil by the United Nations Assembly, the UK Parliamentary and Scientific Committee dedicated a meeting to the issue of soil, under the title *"Are We Looking After our Soil"?*

During the meeting and the subsequent dinner, diverse aspects in regard to soil sustainability and possible actions to prevent soil degradation, were discussed.

The speakers, Chis Collins, Prof of Environmental Chemistry at the University of Reading, Jaqueline Hannam, Soil Scientist from the University of Cranfield, and Helen Browning OBE, Chief Executive of the Soil Association, presented approaches to the matter of soil from different perspectives namely, biological, chemical and organic farming respectively, but from a common point of view, the importance of the soil as a sustainer of life and its paramount role in providing food and resources for the global population.

The soil has a diverse range of uses, not just as source of food, but also as an interface between the hydrosphere, lithosphere, biosphere and atmosphere that regulates gases interexchange, working as system of water supply and purification, in regulating flood water, as well as providing several habitats for many multiples of species. All these functions are related to the structure of the soil and its composition, which depends on many factors, however the management of the soils is one of the most important. In a database of the University of Cranfield, there are over 700 different types of soils in England and Wales and the main difference between them relates to the amount of carbon in the soil. The fertility of the soil is strongly related to carbon content and organic matter, which is located mainly in the upper horizon (A) of those in which soils are structured (Fig1). It is also the layer with the higher biodiversity of the soil. Just a teaspoon of soil, could contain one billion bacteria, along with many others organisms such as mycorrhiza, nematodes, insects, worms or plants. The fertility and function of the soils depends to a great extent on the health of this stratum.

Any perturbation of this level of the soil will have great repercussions in the loss of function of the soil. When there is a perturbation of the soil (erosion, compaction, loss of organic matter, soil sealing), the soil resists against this, showing a capacity to recover, which is highly related to the diversity of the soil. The higher the perturbation, the more difficult its recovery to its initial status, which could become unrecovered (Grandy, A S; Fraterrigo, J M; Billings, S A;, 2012).

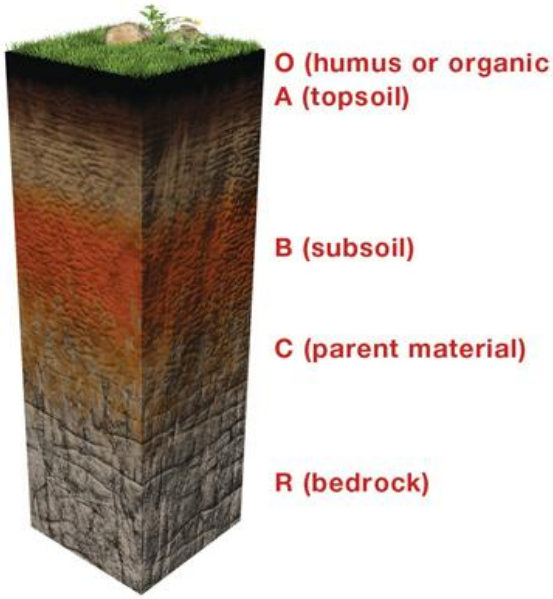

Figure 1. *Soil profile, distributed in layers or horizons (A, B, C and R). Most soils have three major horizons (A, B, C) and some have an organic horizon (O) also called humus.*
Source: Soil Science Society of America, 2015

One of the major perturbations of the soil is related to its use in agriculture. It has been reported that the soil of a grassland has a higher organic carbon content than arable soil (MacLauchlan, et al., 2006). Intensive agriculture decreases the biodiversity in soils, reducing the number of functional groups and the species richness (Tsiafouly, et al., 2015). A lower biodiversity in soils also means it has a lower resilience, even affecting the soil aggregate stability - its physical structure. In other words, an abuse of the soil affects its health in terms of physical, biological or its chemical characteristics. A combination of these three factors is essential to a specific soil function.

Nine percent of the surface of the land is cultivated, which means about 78 000 km^3 of soil sustains around 7 billion humans. By 2030 there will be a need for 50% more food to feed the increasing global population (UNDESA, 2015), but the rate of loss of arable soil by erosion and degradation exceeds rates of soil formation by 1 to 2 orders of magnitude globally, according to Prof Chris Collins. The need to increase production of food in the next 15 years, in contrast to the requirement to preserve and protect the soils, raises the necessity of looking for alternatives to current intense agricultural practises, through policies that encourage other agriculture uses, forcing the research into alternative technologies that allow a compromise between sustainable agriculture and maintenance of the yield.

In fact, there is a demand from the farming sector for new solutions that allow a more respectful and sustainable agriculture. It is estimated that the degradation of the soil costs the economy of England and Wales £1.2 billion every year, due to loss in crop yield, flood damage or water treatment (Shepherd, 2015), e.g. the intense production of oilseed rape crop produces a loss between £43 and £86 million per annum. According to the Soil Association, the implementation of organic farming could achieve an increase in 20% of soil organic matter within 20 years. That might mean more profit for growers and more resilient farms. Practises such as crop rotation, agroforestry, or covering up bare soil with continuous plant cover will improve the health of the soils and encourage the proliferation of soil organisms.

In this scenario, the use of biofertilisers based on beneficial microorganisms could play an important role in soil recovery, through the diminishing use of chemical products inputted into to the soil while at the same time providing essential nutrients for the plants, such as nitrogen, phosphates, microelements or phytohormones. The use of plant growth promoter microorganisms (PGP) provide several benefits to the plants, and at the same time that reduce the prevalence of pests, improving the biodiversity in the soil.

During the further discussion following the meeting, important questions arose, such as the role of the Government and the population in the improvement of the health of our soils. Perhaps, soil should be treated as a climate change issue? Maybe now is the moment to reflect about a change of habits for us as consumers with regard to soils, making responsible choices as customers, and demanding policies that encourage and protect agriculture uses more respectful to the environment, which enhance the health of the soil and prevent its degradation.

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