



Soil, Food Security and Human Health

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“Upon this handful of soil our survival depends. Husband it and it will grow food, our fuel, and our shelter and surround us with beauty. Abuse it and the soil will collapse and die, taking humanity with it” Vedas Sanskrit Scripture, 1500 BC.

As the world's population increases issues of food security become more pressing as does the need to sustain soil fertility and to minimize soil degradation. Soil and land are finite resources, and agricultural land is under severe competition from many other uses. Lack of adequate food and food of poor nutritional quality lead to under-nutrition of different degrees, all of which can cause ill- or suboptimal-health. The soil can affect human health directly and indirectly. Direct effects of soil or its constituents result from its ingestion, inhalation or absorption. For example, hook worms enter the body through the skin and cause anaemia, and fungi and dust can be inhaled resulting in respiratory problems. The soil is the source of actinomycetes on which our earliest antibiotics are based (actinomycin, neomycin and streptomycin). Furthermore, it is a potential reservoir of new antibiotics with methods such as functional metagenomics to identify antibiotic resistant genes. Indirect effects of soil arise from the quantity and quality of food that humans consume. Trace elements can have both beneficial and toxic effects on humans, especially where the range for optimal intake is narrow as for selenium. Deficiencies of four trace elements, iodine, iron, selenium and zinc, will be considered because of their substantial effects on human health. Relations between soil and human health are often difficult to extricate because of the many confounding factors present such as the source of food, social factors and so on. Nevertheless, recent scientific understanding of soil processes and factors that affect human health are enabling greater insight into the effects of soil on our health. Multidisciplinary research that includes soil science, agronomy, agricultural sustainability, toxicology, epidemiology and the medical sciences will promote greater understanding of the complex relationships between soil and human health.