

Healthy soils, healthy lives

Nutrient deficiencies affect approximately 2 billion people worldwide

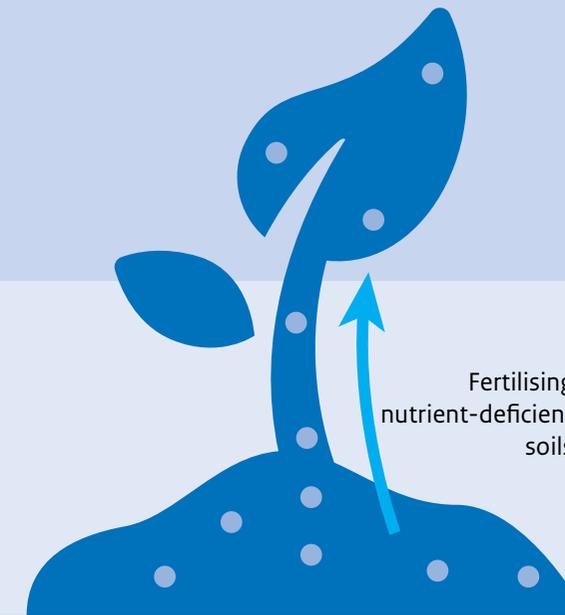
Whereas hunger affects 800,000 people worldwide, malnutrition, or nutrient deficiencies, affects a much larger population. Nutrient deficient soils are one of the major causes of low crop productivity and may affect low nutritional quality of produce. Micronutrient deficiencies are widespread in Africa and have profound societal effects.

One of the causes of dietary nutrient deficiency is a lack of nutrients in the soil. Healthy soils are important for plant growth and for stimulating agricultural intensification. An important factor among the many that influence soil health is the concentration of the macronutrients and micronutrients that are essential for plant growth. In most African soils, these concentrations are low, prompting a renewed focus on the limitations imposed by the lack of micronutrients, such as zinc and boron.

Several options are available to remedy the situation, the most interesting of which are the application of fertilisers, breeding new plant varieties and providing food supplements. The most effective policy response – addressing both low crop yield and malnutrition – is likely to be a mix of these three, though the weight of each may differ substantially from one country to another depending on the severity of the local problems.

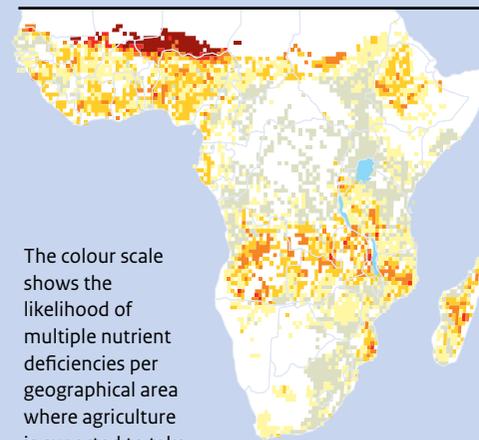
Plant productivity

Nutrient deficient soils is one of the major causes of low crop productivity and, possibly, of low nutritional quality of produce. Healthier soils lead to production increases and larger amounts of nutrients fixed in crops, which are then available for human consumption. Healthy soils may eventually bring down malnutrition.



Micronutrient deficiency

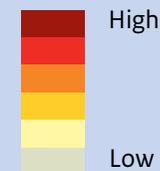
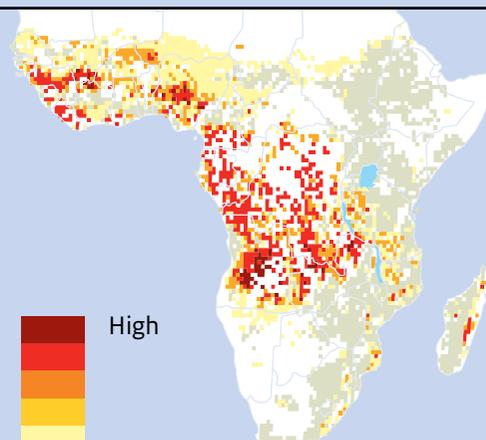
(B, Cu, Fe, Mn and Zn) in the bottom 25% range of each nutrient distribution in Sub-Saharan Africa.



The colour scale shows the likelihood of multiple nutrient deficiencies per geographical area where agriculture is expected to take place until 2050 (Business as usual)

Macronutrient deficiency

(Ca, K, Mg, and N) in the bottom 25% range of each nutrient distribution in Sub-Saharan Africa.



MEASURES

Fertiliser application

The use of fertilisers increases overall soil nutrient concentrations. Unlike widely available macronutrient fertilisers, those providing micronutrients are rarely available on local African markets. To ensure effectiveness of micronutrient fertilisers under varying local soil conditions, they need to be custom-made. But dwindling global reserves may cause problems. Zinc is in scarce supply, and over 90% is used in industrial products, such as cars and electric appliances. The fact that fertilising zinc-deficient soils in Africa may consume up to 3% of the annual zinc supply, highlights the vulnerability of Africa's agricultural sector to supply distortions.

Human nutrition and health

Zinc-intake deficiencies are a prime cause of infant mortality. The element also plays a critical role in the growing brain and cognitive development. Deficiencies of iodine and iron, together with stunting, can contribute to children not reaching full developmental potential.

Plant breeding

When geared towards increasing the relative content of essential nutrients in crops, breeding programs can enhance the bioavailability of essential nutrients in local produce. Although promising, breeding programs take long to produce results and improved varieties have been developed for a few crops only. In addition, plant breeding does not address the issue of low nutrient concentrations in soils.

Food supplements

Deficiencies in human consumption can be offset outside the field of soils and agriculture, through the distribution of food supplements, fortification of commonly purchased foods and awareness campaigns on the benefits of dietary diversity. These initiatives can effectively reduce malnutrition and improve health, but obviously, none targets low levels of soil nutrients and poor crop yields.



Brain and cognitive development



Infant mortality