

Hidden threat to health

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Micronutrients first need to be in soil, and then to make it through to the foodchain. Credit: Rothamsted Research

One of the most ambitious programmes to provide lasting improvements in nutrition in sub-Saharan Africa begins today when a diverse multinational team of experts from agriculture to ethics start looking for ways to end dietary deficiencies in essential micronutrients.

Rothamsted Research is contributing soil and crop expertise to the programme, known as [GeoNutrition](#), which has received a grant of £4.4 million from the Bill & Melinda Gates Foundation to cover 43 months' work in Ethiopia and Malawi, principally.

"We will be able to gain a better understanding of the multiple factors that influence the transfer of nutrients from soil to crops to diets," says Steve McGrath, a specialist in the bioavailability of nutrients at Rothamsted.

The programme is focusing on deficiencies in selenium and zinc, which impair growth, inhibit cognitive development and suppress the immune system. It aims to map cropland, test the efficacy of micronutrient-enriched fertilisers, assess public health policies and strengthen training networks.

"We will allow appropriate interventions to be taken that respond to the specific local conditions that underlie micronutrient deficiencies," adds McGrath.

Rothamsted will be drawing on its work for the Africa Soil Information Service (AfSIS) and on another project, also known as GeoNutrition, which it is piloting in Ethiopia and Malawi with the support of the Biotechnology and Biological Sciences Research Council.

"There are implications for the UK," notes McGrath. Food basket analyses and blood plasma measurements in the UK indicate dietary deficiencies in selenium, he says: "Any interventions that work for other areas can also be considered for the UK."



GeoNutrition for African farms will benefit the global foodchain. Credit: Rothamsted Research

The Gates Foundation programme brings together teams in Ethiopia, Malawi, Kenya and the UK.

In Ethiopia, there are Addis Ababa University, the International Maize and Wheat Improvement Centre (CIMMYT) and the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT); in Malawi, Lilongwe University of Agriculture & Natural Resources (LUANAR); in Kenya, CIMMYT again and the World Agroforestry Centre (ICRAF); and, in the UK, Rothamsted, the British Geological Survey (BGS), the

London School of Hygiene and Tropical Medicine (LSHTM) and the University of Nottingham, which is leading the programme.

"Micronutrient-containing fertilisers are routinely used in Finland to improve the nutritional quality of food crops," says Martin Broadley, Professor of Plant Nutrition in the School of Biosciences at Nottingham. "Our team is exploring if biofortification can be effective for improving human health at a national scale in Ethiopia and Malawi including creating new, geographically-informed baselines."

"GeoNutrition takes a geographical approach to nutrition," says Edward Joy, an LSHTM expert in nutrition and sustainability. "This exciting approach lets us look at the movement of micronutrients through agriculture and food systems, and how a variety of physical and social factors end up influencing the nutritional status of people."

"Zinc and selenium deficiencies are endemic in many communities in Ethiopia and Malawi, affecting more than half the population," says Dawd Gashu, an expert in food science and nutrition at Addis Ababa, which leads research in Ethiopia. "Thanks to this project, we can now work with volunteers from Ethiopian and Malawian villages to test how nutrient-enriched crops can improve the diets and health of our children and future generations."

"Soils in southern and eastern Africa are many thousands of years older than most soils in Europe and North America. They are highly-weathered and can lack sufficient micronutrients to keep our crops, livestock and people healthy," says Patson Nalivata, an expert in crop and soil science at LUANAR, which leads research in Malawi.

"We can improve our soils by incorporating organic matter and by applying balanced fertilizers to include micronutrients such as zinc," notes Nalivata. "Whilst such solutions are conceptually simple, the 'trade-

offs' in terms of investment priorities for farmers can be complex. Experts in agriculture and nutrition need to work together to best advise policy makers, extension services, and farmers."

"Values determine the demand, supply and implementation of evidence into policy," says Joseph Mfutso-Bengo, an international expert in bioethics and Director of the Center of Bioethics for Eastern and Southern Africa, College of Medicine, University of Malawi. He adds: "Valuing evidence needs people with values that value evidence."

Provided by Rothamsted Research

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