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From soil to diet: Linking soil micronutrient to hidden hunger in northern Ghana

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Abstract

Hidden hunger, also known as micronutrient deficiency, impacts the entire globe. About half the population of preschool-aged children and two-thirds of women of reproductive age are affected by at least one micronutrient deficiency. In Ghana, the situation is worse in the rural areas of the Northern region, where up to 40 % of the children are reportedly stunted. In terms of human nutrition, micronutrients are not limited to mineral elements like Fe, Mn, Cu, Zn and Mo, but also include vitamins. It is, however, notable that soil micronutrients influence vitamin synthesis by plants. As such, soil micronutrients have both direct and indirect effects on human nutrition. Indeed, a major cause of micronutrient malnutrition/hidden hunger in humans is the inadequate micronutrient availability in soils, which is the primary source of the essential micronutrients. Besides mitigating hidden hunger, adequate supply of soil micronutrients also improves crop output and farmers' wellbeing. Consequently, if the soil is fertile, the plants will absorb all nutrients in adequate amounts. The animals and humans that feed on those plants will, in turns, get an adequate amount of the nutrients from the food (plants and animals) they consume. Soil micronutrients are generally variable across Northern Ghana, with corresponding impacts on rate of plant absorption and concentration in food. Plant-available iron (Fe) and manganese (Mn) are high across the region. Fe and Mn malnutrition would expectedly be low in the region, especially if crops with efficient absorption and assimilation capacity are grown and consumed. Molybdenum (Mo) is low across the region, so Mo malnutrition may be endemic. Copper (Cu) is moderate, while Zinc (Zn) ranges from low to moderate. This is an indicator of low to moderate Cu and Zn malnutrition in the region. Therefore, to effectively improve crop productivity and mitigate hidden hunger in Northern Ghana, efficient and sustainable Mo, Zn and Cu fertilisation is essential.

Keywords: Hidden hunger, linking soil to diet, malnutrition, micronutrient deficiency, stunting

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