

Role of Micro and Secondary Nutrients in Achieving Food and Nutritional Security

Opinion

In spite of great strides in fight against hunger, yet an unacceptably large number of people still lack the food and quality they need for an active and healthy life. Out of 795 million undernourished people (consuming <1800 kilocalories a day) in the world (2014-16), the vast majority of the hungry (780 million) live in the developing regions - 233 million in Africa, 522 million in Asia and 34 million in Latin America & the Caribbean [1]. As regards the prevalence of under-nutrition which signifies deficiencies not only in energy, but protein, essential vitamins and minerals also, about 2 billion people suffer from micronutrient malnutrition [2]. Out of 667 million children under age 5 worldwide, 159 million are too short for their age (stunted) and 50 million do not weigh enough for their height (wasted) [3]. An estimated 45 percent of deaths of children under age 5 are linked to malnutrition [4].

The challenge of ensuring food and nutritional security is significant as world's human population is projected to increase from around 6.9 billion in 2010 to around 9.7 billion by 2050 [5]. The largest population increase is projected to occur in Asia, particularly in China, India and Southeast Asia. Relatively, Africa will experience the most rapid growth than in Asia (annual growth of 2.55% versus 1.04% in Asia during 2010-15) [5]. In sub-Saharan Africa, the population is projected to increase from about 840 million in 2010 to nearly 2.1 billion by 2050. Malnutrition and poor diets constitute the major driver of the global burden of disease. Food and nutritional security is critical which is the platform for progress in health, education, employment, female empowerment, poverty and inequality reduction. In this context, the World Health Organization (WHO) has adopted ambitious targets for maternal, infant, and young child nutrition to achieve by 2025 - a 40 percent reduction in the number of children under 5 who are stunted, a 50 percent reduction of anemia in women of reproductive age, a 30 percent reduction in low birth weight, wasting in children under 5 at less than 5 percent [2]. Easy and widespread access to adequate and nutritious food to masses across the globe is most important in achieving success in fight against hunger and under-nutrition.

Promotion of complementary feeding to children in food-secure and food-insecure populations and multiple micronutrient supplementations for women are generally promoted practices to address maternal and child under-nutrition. Food aid has saved millions of lives, but it cannot, by itself, solve hunger and under-nutrition issues. Such direct under-nutrition interventions have been estimated to achieve only limited success and there is a large gap to be filled-in [6]. For wider impacts, equitable economic growth is necessary for sustaining progress in efforts to reduce poverty, hunger and under-nutrition. Rural people make up a high percentage of the hungry and undernourished in developing countries, and efforts to promote growth in agriculture and the rural sector can be an important component of a strategy for

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promoting inclusive growth and improving food security and nutrition. The emphasis on the linkages between agriculture and nutrition is need of the hour. Low crop yields in dry lands of Asia and Africa is a major challenge and opportunity for enhancing food availability. Land degradation due to soil fertility decline is a major hindrance in enhancing food production and realizing productivity potential. Due to prolonged nutrient mining, drylands are depleted not only in primary nutrients but also secondary and micro nutrients like sulphur, zinc, iron and boron [7-12]. The strategies to rejuvenate farm soil health through balancing the deficient micro and secondary nutrients along with primary nutrients have shown 20% to 70% higher food production [13-16]. Even in comparatively drier years, application of balanced nutrients through including micro and secondary nutrients significantly increases grain yield and aboveground dry matter which provides resilience against drought and food security [17]. There is also evidence of relation of soil quality and balanced fertilization with food quality. Along with higher food production with balanced fertilization, the food nutritional quality including micronutrients tends to improve [12,18,19]. What is appealing is the fact that the implication of such persistent nutrient deficiencies is, most often, perceived from their impacts on reduced grain production and quality, but the outcome of soil nutrient depletion predominant crop-livestock farming system in the dry lands is far beyond reducing grain production. It affects livestock feed quantity and quality [20-22]. In view of the increasingly important role of crop residue as feed components in the dominant mixed crop-livestock systems, the effects of improved nutrients input on feed availability and feed quality are very important. Improved fertilizer inputs affect crop residue yield and the quality. It increases metabolizable energy (ME) productivity (ME ha⁻¹) and thereof the potential milk yield ha⁻¹ by as high as 40% [23]. Thus, adding deficient micro and secondary nutrient inputs on crop land positively impacts productivity of the crop production and livestock compartment of mixed crop-livestock farming system and quality of the food and diversity of diets.

The role of deficient micro and secondary nutrients in enhanced food quantity and quality and helping individuals and communities to build sustainable food security is well demonstrated in one of Indian state in Karnataka [2]. A great learning in this initiative in India is that ensuring food and nutritional security need not wait any new major scientific breakthrough, but a political will, collective action and innovations in system to take simple technologies to farmers' doorsteps. Soil health mapping to diagnose critical nutrients, and institutional arrangements for awareness and capacity building along with access to critical micro and secondary nutrient inputs brought significant growth in agriculture and rural economy. It promoted inclusive growth through improved incomes and livelihoods of the poor, and is therefore an effective strategy in the fight against hunger and malnutrition. Scaling out deficient micro and secondary nutrients to smallholders in dry lands of Asia and Africa is critical to addressing food and nutritional security. Investing in the Science of delivery of knowledge and timely access to needed inputs is the key.

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