Innovative Optimization for Malnutrition Treatment

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According to WHO’s Global Database on Child Growth and Malnutrition nearly one third of children under 5 suffer irreversible damage to their physical and cognitive development due to severe nutritional shortages. Prevention and treatment of malnutrition typically requires provision of ready-to-use food (RUF). However, current RUF is not optimized for nutrients, cost, and local contexts. I developed a linear programming tool (LPT) to create RUF optimized for low cost while maintaining necessary constraints, including nutrients, flavor, and crop water efficiency. This tool utilizes a database of the nutritional value, price, and water efficiency of suitable ingredients and allows the user to adjust constraints. The LPT is designed to: a) address all nutrient requirements, conforming to current standards and practice, including protein digestibility-corrected amino acid score (PDCAAS); b) optimize RUF formulae for low ingredient cost; c) adjust RUF formulae for locally grown crops, local prices, and water footprint; and d) include automatic calculation of the ideal micronutrient premix as part of optimization. My LPT creates formulae free of expensive dairy ingredients, ensuring desired PDCAAS by automatically balancing proteins with complementary quantities of essential amino acids. Using my tool and public information on Nigeria, I created optimized RUF formulae suitable for local production using local crops that meet all nutrient requirements at a fraction of the ingredient cost and water footprint of current formulae, demonstrating the tool’s effectiveness. Use of my tool by donor organizations, governments, and NGOs could help provide less costly and more tailored RUF to treat and prevent malnutrition.

Awards Won:
Fourth Award of $500