

EVALUATION OF THE ECONOMIC FEASIBILITY OF A BIOFORTIFICATION INTERVENTION IN NICARAGUA

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In Nicaragua, iron and zinc deficiencies affect more than 30% of the population, with serious implications for the country's social and economic development. The project aimed to estimate the cost-effectiveness of the development and dissemination of biofortified staple crops (rice, beans, maize and cassava) in Nicaragua compared with others approaches such as conventional fortification and supplementation in order to identify 1) the most cost-effective intervention to combat iron and zinc deficiencies and 2) its potential economic impact. The Disability-Adjusted Life of Years (DALYs) methodology was used to estimate the number of productive years lost by a society (or DALYs lost) due to any given micronutrient deficiency in two scenarios—one with biofortification and the other without (the status quo). The difference between these scenarios is the potential impact of biofortification or the number of productive years that a society would save thanks to biofortification. To estimate the economic impact a monetary value was assigned to the DALY using the national per capita income.

Crop	Micronutrient	DALYs Saved (Impact)	Impact in monetary terms (US\$)	Cost per DALY Saved (US\$) (Cost-effectiveness)
Rice	Iron	404	366,832	269.94
	Zinc	2,116	1,921,328	51.54
Beans	Iron	989	898,012	96.49
	Zinc	1,139	1,034,212	134.05
Maize	Iron	1,317	1,195,836	82.81
	Zinc	2,045	1,856,860	53.33
Cassava	Iron	117	106,236	1,305.00
	Zinc	592	537,536	257.90

According to the World Health Organization, supplementation and fortification interventions have a cost in Latin America per DALY saved of US\$487 and US\$215, respectively for iron and US\$79 and US\$27, respectively for zinc. In sum iron-biofortified beans, maize and cassava are more cost-effective options than supplementation and fortification. For zinc, biofortified rice and maize are more cost-effective than supplementation but not than fortification. In conclusion, biofortified crops can be a cost-effective strategy for addressing iron and zinc deficiencies in Nicaragua.

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