

ECONOMIC CASE FOR INVESTING IN NUTRITION IN AFRICA: KEY MESSAGES

Based on the background paper: Hoddinott, J., 2016. The economics of reducing malnutrition in Sub-Saharan Africa

Key Messages

- Nutrition is central to development. Good nutrition is not just an outcome of development, but also a driver of human development and economic growth.
- Better nourished populations are more economically productive. Africa's future economic success lies in increasing human capital. Human capital is an important determinant of labour productivity and raising labour productivity lies at the heart of raising incomes across Africa.
- Malnutrition in all its forms (undernutrition, micronutrient deficiencies, and overweight and obesity) continues to be one of the main barriers that prevent children and societies from realising their full potential. In particular, chronic undernutrition in the first 1,000 days of a child's life- from the start of a woman's pregnancy to her child's 2nd birthday- has long term adverse consequences.
- Undernutrition in sub-Saharan Africa remains pervasive. Across Africa, 56 million or 36% of children under the age of 5 are chronically undernourished and 13 million or 8.5% are acutely undernourished. Micronutrient deficiencies are widespread and overweight and obesity is increasing.
- Malnutrition imposes high social and economic costs. It costs African economies between 3 and 16% of GDP annually.
- Investing in nutrition interventions, along with policy actions to address the underlying causes of malnutrition, would help millions of children to develop into healthy and productive members of society.
- Reductions in malnutrition will occur most rapidly when countries undertake investments in both nutrition-specific and nutrition-sensitive interventions. For example, investing in agriculture and food systems for healthier diets and improved nutrition can accelerate nutrition gains.
- Interventions that reduce chronic undernutrition are excellent investments; for a typical African country, every dollar invested in reducing chronic undernutrition in children yields a \$16 return. This is further supported by benefit cost ratios of up to 21.6.

- For 15 African countries, meeting the 2025 World Health Assembly target for stunting will add \$83 billion dollars to national incomes.

Nutrition is essential to development

Good nutrition allows for healthy growth and development of children, and inadequate nutrition is a major contributing factor to child mortality. Put simply, improving the nutritional status of children is intrinsically valuable.

Africa's future economic success lies in increasing human capital- schooling, knowledge and skills that will allow Africans to compete and thrive in a global economy. In debates regarding African economic development strategies, it had long been assumed that increasing human capital comes about through investments in the formal education system but this is only partially true. Investments in nutrition- particularly in the nutrition of very young children- are equally important.

Malnutrition continues to be one of the main barriers that prevent children and societies from realising their full potential, and hence represents a significant economic burden.

Chronic undernutrition in the first 1,000 days of a child's life has long term adverse consequences. Ensuring good nutrition for women and adolescent girls is critical to laying a strong foundation for healthy and productive society. Growth failure in the first 24 months of life is associated with reduced stature in adulthood. The economic consequences are captured by evidence showing associations between height and outcomes in the labour market. In Senegal, men who were stunted when they were two years old were 9.0 cm shorter in adulthood compared to men who were not stunted (Stein et al., 2010; Alderman et al., 2006). A useful rule of thumb is that every loss of one percent of attained height in adulthood reduces adult earnings by 2.4%.

Chronic undernutrition has neurological consequences that lead to cognitive impairments, which result in children starting school later, dropping out earlier and attaining fewer grades of schooling.

The economic consequences of cognitive impairments arise because of the well-documented links between schooling, cognitive skills and earnings and income in adulthood.

While there has been improvement since 2000, undernutrition in sub-Saharan Africa remains pervasive. Across Africa, 56 million or 36% of children under the age of 5 are chronically undernourished¹ and as of 2013, no country had a stunting prevalence of less than 19%. More than 13 million are acutely undernourished (8.5%). Micronutrient deficiencies in children under five are also widespread: 41% of children are Vitamin A deficient; 40% are iodine deficient; 20% suffer from iron deficient anaemia; and 24% are zinc deficient (Black et al., 2013).

Micronutrient deficiencies result in economic losses. Both iodine deficiency and iron deficient anaemia lead to cognitive damage. Iodine deficiency in childhood adversely affects psychomotor skill development (movement, balance, fine motor skills) and there is some evidence linking it to slowed physical growth. A series of meta-analyses suggest that iodine deficiency results in a loss of 13-15 IQ points. Horton and Ross (2003) estimate that iron deficiencies cost African economies between 2.7 and 4.2% of GDP annually.

¹ Undernutrition reflects inadequate nutrient intake: calories, proteins and micronutrients. There are two manifestations of undernutrition: anthropometry (height and weight); and micronutrient deficiency. The World Health Organization has developed and validated anthropometric standards for children. A child is considered chronically undernourished, or stunted, if a child is too short given her age and sex. A child is considered acutely undernourished, or wasted, if she is too thin given her height.

Overweight and obesity also negatively impact development, as they increase the risk of developing diet related non-communicable diseases, such as heart disease and diabetes. They represent a high burden for healthcare systems and can also result in lower productivity, incomes and also premature death. While the prevalence of obesity across much of sub-Saharan Africa is low, there are places and groups (such as adult women in southern Africa) where it is rising rapidly (Ng et al., 2014).

Improved nutrition requires investment in nutrition interventions

Acceleration of progress in nutrition will require large-scale nutrition-sensitive interventions that address the underlying determinants of nutrition and can improve the effectiveness of nutrition-specific programmes. Nutrition sensitive interventions are embedded across several sectors including agriculture, health, WASH, social protection and education. Efforts to revitalise African agriculture and food systems represents a key opportunity to achieve healthy diets, improve nutrition and meet the comprehensive goals of the Sustainable Development Goal (SDG) Agenda.

High-impact nutrition-specific interventions are found in the 1000 days' window. Recent work by Bhutta et al. (2013) has identified 10 interventions² that will significantly reduce undernutrition. The logic behind these is that well-nourished children require well-nourished mothers and so measures to reduce undernutrition should focus primarily on these two groups. The 10 interventions, scaled up at 90% coverage, would reduce severe acute undernutrition by 61%, stunting by 20% and, globally, would save nearly 1 million deaths per year.

The nutrition-specific investments will not, by themselves, generate the reductions in undernutrition needed to meet the 2025 WHA targets. These need to be complemented by nutrition-sensitive interventions that will accelerate reductions in undernutrition, including those in agriculture and food systems.

Undernutrition, micronutrient deficiencies, overweight and obesity are all preventable and timely investment in preventive strategies early in an individual's life can mitigate the long term consequences and large costs across the lifespan.

What are the costs of not investing in nutrition?

Human Cost: Poor nutrition kills. Malnutrition contributes to 45% of all deaths of children under age 5 (Black et al., 2013). The costs associated with mortality are identified in losses to national productivity. The Cost of Hunger in Africa (COHA) studies reported a 1-8% reduction in the national workforce due to child mortality associated with undernutrition (AU, NEPAD, ECA and WFP, 2013).

Health Cost: The COHA studies report that most of the health costs associated with undernutrition occur before the child turns 1 year-old. Child undernutrition generates health costs equivalent to between 1 and 11% of the total public budget allocated to health. These costs are due to episodes

² 10 nutrition-specific interventions: 1. Universal salt iodization; 2. Multiple micronutrient supplementation during pregnancy; 3. Calcium supplementation during pregnancy; 4. Energy protein supplementation during pregnancy; 5. Vitamin A supplementation during childhood; 6. Zinc supplementation during childhood; 7. Breastfeeding promotion; 8. Complementary feeding education; 9. Complementary food supplementation; 10. Management of severe acute malnutrition.

directly associated with the greater quantity and intensity of illnesses that affect underweight children and the relevant treatment (Table 1) (African Union Commission et al., 2014).

Table 1: Economic Impact of Child Undernutrition on Health

Country	Underweight children	Annual additional morbidity episodes	Economic Cost		Proportion covered by the families
			National currency	USD (millions)	
Egypt	658,516	901,440	EGP1.1 billion	213	73%
Ethiopia	3.0 million	4.4 million	ETB1.8 billion	155	90%
Swaziland	9,645	25,446	SZL60.7million	7	88%
Uganda	975,450	1.6 million	UGX525.8 billion	254	87%

Education & Labour Productivity: Undernourished children are likely to complete fewer years of school and have a reduced earning potential. The COHA studies report that stunted children achieve 0.2 to 1.2 years less in education and that 40-67% of working age populations in the African countries studied suffered from stunting as children.

Do economic benefits justify investments that reduce undernutrition?

Faced with multiple demands on limited resources, and the overarching need to raise economic growth rates, is there also an economic case for investments that reduce undernutrition? There are three complementary ways of answering this question:

Case 1: Measuring the cost of doing nothing in terms of lost GDP

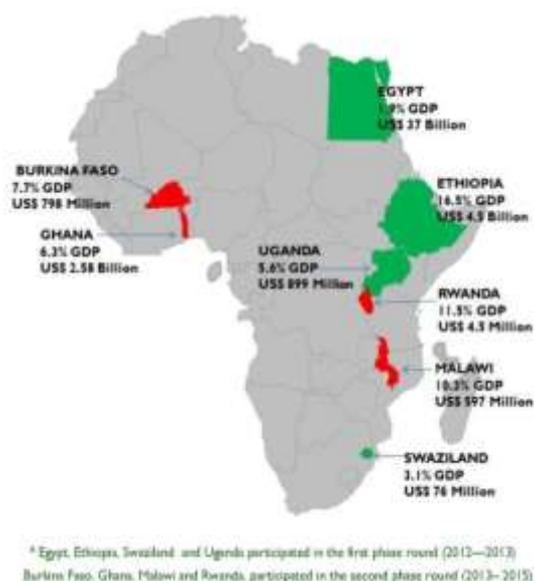
Seven African countries have participated in the COHA exercise to quantify the impact of undernutrition across individuals of different ages. These were: ages 0-5 – economic costs associated with higher prevalence of illness and increased mortality; ages 6-18 – economic costs associated with higher rates of grade repetition and increased dropout; and ages 15-64 – economic costs associated with lower productivity arising from reduced physical capacity and lower levels of schooling (Federal Government of Ethiopia, 2013). A further five countries are undertaking this analysis. The COHA model estimate that a halving of the prevalence of stunting by the year 2025 can generate annual average savings of between \$3 million and \$376 million for the countries analysed. The cost to GDP is presented in Table 2 and represented in Figure 1.

Table 2: Annual cost of undernutrition: National estimates

Country	Annual cost of undernutrition (% of GDP)
Ethiopia	16.5
Rwanda	11.5
Malawi	10.3
Burkina Faso	7.7
Ghana	6.3
Uganda	5.6
Swaziland	3.1

Source: www.costofhungerafrica.com

Figure 1: Annual cost of undernutrition: National estimates



Case 2: Measuring the benefits of working towards the World Health Assembly targets for nutrition

There are large GDP gains to be had by meeting the 2025 World Health Assembly target of a 40% reduction in chronic undernutrition. The large magnitudes calculated for this paper are consistent with the work undertaken by African governments in the COHA studies. For the fifteen countries listed in Table 3, the cumulative addition to GDP is ~\$83.8 billion.

Table 3: Cumulative additions to GDP associated with accelerating investments to meet the WHA 2025 target for stunting: 2035-2060 (illustrative estimates for 15 countries)

Country	Cumulative addition to GDP (millions of 2016 USD)
Benin	1,571
Chad	3,718
Ethiopia	15,908
Lesotho	151
Madagascar	1,800
Malawi	1,513
Mali	2,814
Niger	5,553
Nigeria	29,274
Rwanda	1,028
Senegal	1,723
Togo	842
Uganda	7,464
United Republic of Tanzania	7,952
Zambia	2,513
TOTAL	83,824

Source: Author’s calculations (Hoddinott, J., 2016). **Note:** The magnitudes vary across countries because of population (countries with larger numbers of children will see larger increase), the existing prevalence of stunting (countries where current prevalences are low will see smaller increases) and median per capita incomes in 2016 (countries with higher per capita incomes will have larger increases in GDP). These numbers are conservative.

Case 3. Calculating the benefit:cost ratios associated with investments in nutrition.

The benefit:cost ratios of 15 African countries indicate that investments to reduce chronic undernutrition are excellent investments. Any investment with a benefit:cost ratio that exceed one is a good investment. The ratios presented in Table 4 are calculated using the per-child cost of the 10 nutrition-specific intervention package. The economic benefits derive largely from averting stunting, which gives children greater capacity to learn, and learning is rewarded in the labour market with higher wages. Not only are they high in absolute terms, they are also high relative to other investments. When asked to rank alternative investments that would improve welfare and economic growth in developing countries four Nobel prize winning economists ranked investments in reducing undernutrition ahead of investments in schooling, health and family planning (Kydlund et al., 2013).

Table 4: Benefit: Cost Ratios associated with reduction in stunting in 15 African countries

Country	Benefit: Cost ratio
Benin	16.2
Chad	21.6
Ethiopia	16.9
Lesotho	10.8
Madagascar	5.9
Malawi	7.0
Mali	14.2
Niger	17.1
Nigeria	16.8
Rwanda	11.5
Senegal	21.2
Togo	15.8
Uganda	17.4
United Republic of Tanzania	13.9
Zambia	12.6

Source: Author's calculations (Hoddinott, J., 2016).

How much should Governments invest?

A recent study estimated that an additional \$7 billion per year over the next ten years is needed to reach the WHA global targets for stunting, wasting, anaemia in women and exclusive breastfeeding³; resulting in 3.7 million child lives saved, at least 65 million fewer stunted children and 265 million fewer women suffering from anaemia as compared to the 2015 baseline (Shekar et al., 2016). Currently, investment in improving nutrition receives little investment from world leaders, despite nutrition being one of the most cost-effective investments. Much more could be done.

³ The WHA 2025 targets are 40% reduction in the number of children under 5 who are stunted; 50% reduction of anaemia among women of reproductive age; 30% reduction in low birth weight; no increase in childhood overweight; increase the rate of exclusive breastfeeding in the first 6 months up to at least 50%, and reduction and maintenance of childhood wasting (acute malnutrition) to less than 5%.

References

- African Union Commission, NEPAD Planning and Coordinating Agency, UN Economic Commission for Africa, and UN World Food Programme. The Cost of Hunger in Africa: Social and Economic Impact of Child Undernutrition in Egypt, Ethiopia, Swaziland and Uganda. Report. Addis Ababa: UNECA, 2014
- African Union Commission, NEPAD (New Partnership for Africa's Development), UN Economic Commission for Africa, and UN World Food Programme, 2013. The Cost of Hunger in Egypt: Implications of Child Undernutrition on the Social and Economic Development of Egypt.
- Alderman H., Hoddinott J. and Kinsey B., 2006. Long term consequences of early childhood malnutrition. *Oxford Economic Papers* 58, 450-474.
- Black, Robert E., et al. "Maternal and child undernutrition and overweight in low-income and middle-income countries." *The Lancet* 382.9890 (2013): 427-451.
- Bhutta Z.A., Das J.K., Rizvi A., Gaffey M.F., Walker N., Horton S., Webb P., Lartey A., Black R.E., 2013. Evidence-based interventions for improvement of maternal and child nutrition: what can be done and at what cost? *The Lancet*, August 382(9890): 452-477.
- Coly A.N., Milet J., Diallo A., Ndiaye T., Benefice E., Simondon F. et al., 2006. Preschool stunting, adolescent migration, catch-up growth, and adult height in young Senegalese men and women of rural origin. *Journal of Nutrition* 136, 2412–2420.
- Diofasi, A. and N. Birdsall, 2016. The World Bank's Poverty Statistics Lack Median Income Data, So We Filled In the Gap Ourselves, <http://www.cgdev.org/blog/world-bank-poverty-statistics-lack-median-income-data-so-we-filled-gap-ourselves-download-available> accessed March 3, 2016.
- Federal Government of Ethiopia, 2013. *The cost of hunger in Ethiopia*. Addis Ababa.
- Hoddinott, J., H. Alderman, J. Behrman, L. Haddad and S. Horton, 2013a. The economic rationale for investing in stunting reduction, *Maternal and Child Nutrition*, 9(Suppl 2): 69-82.
- Hoddinott, J., J. Maluccio, J. Behrman, R. Martorell, Paul Melgar, Agnes R. Quisumbing, Manuel Ramirez-Zea, Aryeh D. Stein, and Kathryn M. Yount, 2013b. Adult consequences of growth failure in early childhood, *American Journal of Clinical Nutrition*, 98: 1170-1178.
- Horton, S., and Ross, J., 2013. The economics of iron deficiency. *Food Policy* 28:51-75.
- Kydland, F. et al., 2013. Expert panel ranking, in *Global problems, smart solutions*. Cambridge: Cambridge University Press.
- Ng, M. et al., 2014. Global, regional and national prevalence of overweight and obesity in children and adults during 1980-2013: a systematic analysis for the Global Burden of Diseases Study 2013. *The Lancet* 384(9945): 766-781.
- Ruel, Marie T., Harold Alderman, and Maternal and Child Nutrition Study Group. "Nutrition-sensitive interventions and programmes: how can they help to accelerate progress in improving maternal and child nutrition?" *The Lancet* 382.9891 (2013): 536-551.
- Shekar, M., et al., 2016. Investing in nutrition- the foundation for development. An investment framework to reach the global nutrition targets. The World Bank, Results for Development, Bill and Melinda Gates Foundation and the Children's Investment Fund Foundation, 1,000 days.
- Stein A. D., Wang M., Martorell R., Norris S.A., Adair L.S., Bas I. et al., 2010. Growth patterns in early childhood and final attained stature: Data from five birth cohorts from low- and middle-income countries. *American Journal of Human Biology* 22, 353-359.
- United Nations, Department of Economic and Social Affairs, Population Division. World Population Prospects: The 2015 Revision. (Medium variant)

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