



## AN INVESTMENT FRAMEWORK FOR NUTRITION IN KENYA

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**December 2016**



### KEY MESSAGES:

- Despite recent reductions, over one-fourth of all Kenyan children under five remained chronically malnourished (stunted) in 2014.
- Scaling-up 11 key nutrition-specific interventions in all counties of Kenya would cost \$76 million in public and donor investments annually, and produce tremendous health benefits: 455,000 DALYs (disability-adjusted life years, or years of healthy life lost due to a health condition) averted, 5,000 lives saved, and almost 700,000 cases of stunting averted.
- This investment could increase economic productivity by \$458 million per year over the productive lives of the beneficiaries.
- Every dollar invested in this package of interventions has the potential to result in \$22 in economic returns.
- This package of interventions is highly cost-effective at \$207 per DALY averted.
- Focusing the scale up on 10 cost-effective interventions in counties with stunting prevalence above 20 percent would require \$48 million annually and would avert almost 295,000 DALYs and save more than 3,000 lives, with a cost per DALY averted of \$179.

### Introduction

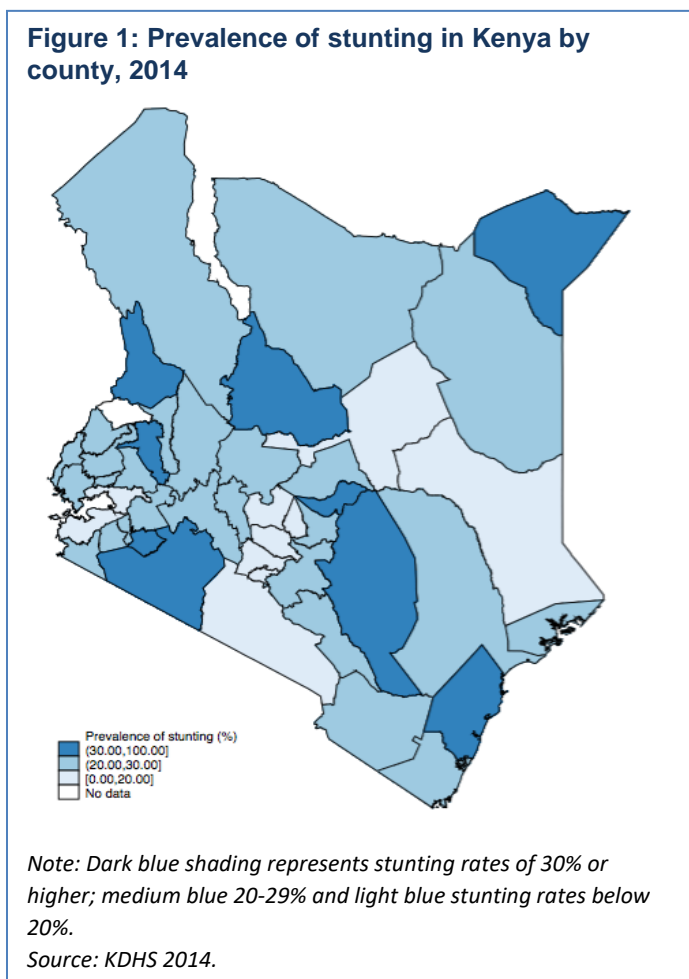
This Knowledge Brief presents the costs of scaling up key effective nutrition interventions in Kenya and compares different scale-up scenarios to determine which one produces the best results for the lowest cost. The goal of the analysis is to inform program planning by identifying the most cost-effective packages of interventions and by leveraging additional resources from domestic budgets and development partners.

Evidence from around the world shows that a number of interventions are effective in reducing malnutrition. Those interventions are consistently identified as some of the most cost-effective development actions, with huge potential to reduce poverty and boost prosperity (Hoddinott et al. 2013; World Bank 2010). Investing in nutrition can increase a country's GDP by between 3 and 11 percent annually (Horton and Steckel 2013). Investments in early nutrition boost wages by 5 to 50 percent and make children

33 percent more likely to escape poverty in the future, and have a potential to reduce gender inequities (Hoddinott et al. 2008; Hoddinott et al. 2011).

## Malnutrition in Kenya

The prevalence of chronic undernutrition in children under five, as measured by stunting, was 26 percent in 2014. Although this is a marked decline from 35 percent in 2008–09, it nevertheless represents a heavy burden of undernutrition in Kenya. In 2014 Kenya met the Millennium Development Goal for underweight, bringing underweight rates down to 11 percent. However, micronutrient deficiencies (*hidden hunger*) are prevalent, with vitamin A deficiency and anemia rates particularly high. Finally, there is great geographical disparity in stunting rates, varying from 15 percent in Nyeri to 46 percent in West Pokot, highlighting the need for well-targeted interventions (Figure 1).



## An Effective Package of Interventions to Reduce Malnutrition

This analysis considers 11 evidence-based nutrition-specific interventions identified by the Kenyan Ministry of Health as priority actions (Box 1)<sup>1</sup> We modelled the impact of the interventions on DALYs averted, lives saved and cases of stunting averted. Cost-effectiveness was established by estimating the cost per DALY averted, the cost per life saved, and the cost per case of stunting averted. The estimation includes the total costs for scaling up all 11 interventions nationwide, and also more modest scale-up options: (1) scale-up in counties with high burden of malnutrition, (2) scale-up of the most cost effective interventions and (3) scale-up of the most cost effective interventions in high burden counties.

### Box 1: Eleven Effective Interventions Considered in the Analysis

1. Promotion of good infant and young child nutrition and hygiene practices including promotion of breastfeeding and appropriate complementary feeding
2. Vitamin A supplementation
3. Therapeutic zinc supplement with oral rehydration salts for diarrhea treatment
4. Micronutrient powder supplementation for children
5. Deworming
6. Iron-folic acid supplementation for pregnant women
7. Iron fortification of staple foods
8. Salt iodization
9. Public provision of complementary food
10. Treatment of severe acute malnutrition in children
11. Management of moderate acute malnutrition in children

Scaling up the 11 nutrition-specific interventions to full 100% coverage in all counties in Kenya would cost \$76 million in public and donor investments annually in addition to current expenditures and would produce tremendous health benefits (Table 1). The cost per DALY averted is \$207 which is highly cost-effective by WHO standards. These investments have the potential to increase economic productivity by \$457 million over the productive lives of the beneficiaries and are estimated to yield an impressive internal rate of return of almost 22.2 percent.

**Table 1: Cost, Benefits and Cost-effectiveness of Key Scenarios to Scale Up Nutrition interventions in Kenya**

Scale up scenario	Additional annual public and donor investment (US\$, millions)	Lives saved (thousands)	Cases of stunting averted (thousands)	DALYs averted (thousands)	Cost/DALY averted
Scale Up all 11 interventions nationwide	\$76	5.1	700.0	455.0	\$207
Scale up 10 cost-effective interventions* nationwide	\$62	4.3	—	385.0	\$198
Scale up 10 cost-effective interventions* in 37 high- burden counties	\$48	3.4	—	295.0	\$179

\*excludes the public provision of complementary food. — = not available

The benefit cost ratio is 22, which means that every dollar invested in nutrition interventions would result in 22 dollars in economic returns.

Resource constraints are likely to prevent immediate and full national scale-up. Therefore, we also identified two more modest and cost-effective scale-up options, as shown in the table. The first is to scale up 10 most cost-effective interventions (all interventions with the exception of the public provision of complementary foods<sup>2</sup>) in all counties in Kenya. The second is to scale up 10 cost-effective interventions only in 37 counties where stunting prevalence exceeded 20 percent.<sup>3</sup>

The second of those scenarios - scale up 10 cost-effective interventions (excluded is the public provision of complementary food) from current coverage levels to full coverage in 37 high-burden counties, is most cost effective one, with a cost per DALY averted of \$179. It is also the least costly, requiring \$48 million in public and donor resources annually in addition to current expenditures on nutrition. This expansion of services would avert almost 295,000 DALYs and save more than 3,000 lives.

## Conclusion

Our findings suggest that scaling up nutrition-specific interventions in Kenya is an excellent investment with a potential to generate 22 dollars in economic returns for every dollar invested. The analysis also suggests that scaling up 10 most cost-effective interventions in a targeted fashion focusing on the 37 countries with a high burden of chronic malnutrition would be the most cost-effective investment strategy.

Even though this brief focuses exclusively on nutrition-specific interventions, the causes of malnutrition are multifactorial. Therefore, the longer-term approach to improving nutrition outcomes must also include nutrition-sensitive interventions through multiple sectors. An

important next step will be to identify the most cost-effective nutrition-sensitive interventions to complement the interventions identified here.

## Sources

Hoddinott, J., H. Alderman, J. R. Behrman, L. Haddad, and S. Horton. 2013. "The Economic Rationale for Investing in Stunting Reduction." *Maternal and Child Nutrition* 9 (Suppl. 2): 69–82

Hoddinott, J, Maluccio, JA, Behrman, JR, Flores, R, and Martorell, R. 2008. "Effect of a nutrition intervention during early childhood on economic productivity in Guatemalan adults." *Lancet*. **371**: 411–416

Hoddinott, J., J. Maluccio, J. R. Behrman, R. Martorell, P. Melgar, A. R. Quisumbing, M. Ramirez-Zea, A. D. Stein, and K. M. Yount. 2011. "The Consequences of Early Childhood Growth Failure over the Life Course." Discussion Paper 1073. International Food Policy Research Institute, Washington, DC.

Horton S. and R. Steckel. 2013. "Global Economic Losses Attributable to Malnutrition 1900–2000 and Projections to 2050." In *The Economics of Human Challenges*, ed. B. Lomborg. Cambridge, UK: Cambridge University Press.

KDHS (Kenya Demographic and Health Survey). 2014. *Kenya Demographic and Health Survey 2014*. Rockville, MD: ICF International and Kenya National Bureau of Statistics (KNBOS). (Published in 2015).

WHO (World Health Organization). 2014. *Cost-Effectiveness and Strategic Planning: Threshold Values for Intervention Cost-Effectiveness by Region*. Geneva: WHO-CHOICE (Choosing Interventions that are Cost-Effective) Program. [http://www.who.int/choice/costs/CER\\_levels/en/](http://www.who.int/choice/costs/CER_levels/en/)

World Bank. 2010. *Scaling Up Nutrition. What Will It Cost?* Washington, DC: World Bank.

## Notes

This brief is based on the report: Dayton Eberwein, J., J. Kakietek, D. de Beni, G. Moloney, A. Pereira, J.K. Akuoku, M. Volege, S. Matu, and M. Shekar. 2016. *An Investment Framework for Nutrition in Kenya: Reducing stunting and other forms of child malnutrition*. HNP Discussion Paper. Washington, D.C.: World Bank Group.

A DALY (also known as a disability-adjusted life year) is equivalent to a year of healthy life lost due to a health condition and premature death.

All dollar amounts in US dollars.

<sup>1</sup> An examination of the cost-effectiveness of nutrition-sensitive interventions—those that address nutrition in sectors other than health—is not included in this analysis.

<sup>2</sup> All 11 interventions are very cost-effective, although one intervention, the public provision of complementary foods, is much less cost-effective than the others according to WHO-CHOICE criteria (WHO 2014).

<sup>3</sup> The counties include: Nyandura, Mombasa, Kwale, Kilifi, Tana River, Lamu, Taita-Taveta, Marsabit, Meru, Tharaka-Nithi, Embu, Kitui, Machakos, Makueni, Wajir, Mandera, Siaya, Migori, Kisii, Nyamira, Turkana, West Pokot, Samburu, Tran Nzoia, Uasin Gishu, Elgeyo-Marakwe, Nandi, Baringo, Laikipia, Nakuru, Narok, Kericho, Bomet, Kakamega, Vihiga, Bungoma, Busia.

## Acknowledgements:

We are grateful for the strong collaboration provided by the Government of Kenya in supporting this work. In particular, we would like to acknowledge the leadership and commitment of Gladys Mugambi, Head of Nutrition Division at the Ministry of Health and John Mwai, Ministry of Health. This work was carried out in partnership with UNICEF and we would like to thank DFID who funded the UNICEF component of the exercise. The report also benefitted from the advice and consultation provided by other partners, including the World Food Program, Hellen Keller International, and GAIN. Finally, the Bill & Melinda Gates Foundation (BMGF) was a strong partner with the World Bank in advancing this work and provided financial support. Ellen Piwoz from the BMGF provided valuable technical inputs.

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