

An Investment Framework for Meeting the Global Nutrition Target for Stunting

Meera Shekar^a, Jakub Kakietek^a, Julia Dayton Eberwein^a, Jon Kweku Akuoku^a, Audrey Pereira^a,
and Mary D'Alimonte^b

Key Messages

- Reaching the stunting target is feasible but will require large coordinated investments in key nutrition interventions and a supportive policy environment.
- Scaling up high-impact interventions in all low- and middle-income countries, along with expected improvements in underlying determinants of undernutrition, would lead to a 40 percent decline in the number of stunted children by 2025. Scaling up the high-impact nutrition interventions necessary to reach this target would require an investment of \$49.5 billion over 10 years.
- Mobilizing additional resources will require country governments, donors, and innovative financing sources to work in partnership, with country governments investing \$2.6 billion on average and donors an additional \$2.1 billion annually by 2025.
- This scale-up in intervention coverage, along with improvements in underlying determinants, would result in 65 million fewer children stunted in 2025 and, over 10 years, would prevent about 2.8 million deaths among children under age five.
- The scale-up of the key nutrition-specific interventions is estimated to generate about \$417 billion in economic benefits. Every \$1 invested in stunting reduction will generate \$11 in economic returns.



STUNTING TARGET

**REDUCE THE NUMBER OF
STUNTED CHILDREN UNDER
AGE 5 BY 40% BY 2025**

Stunting is not only a failure to achieve one's own genetic potential for height but is also a predictor of many other developmental constraints, including cognitive deficits and loss of future economic opportunities. In 2012, the World Health Assembly agreed on a global target to reduce the number of stunted children under age five by 40 percent by 2025 (WHO 2012). This target was also adopted under Sustainable Development Goal (SDG) target 2.2 (United Nations 2015a).¹ This summary describes the estimated resources urgently needed to achieve this target, and the impact investing in stunting reduction is expected to have on nutrition, health, and economic outcomes.

¹ The SDG target is: "By 2030, end all forms of malnutrition, including achieving, by 2025, the internationally agreed targets on stunting and wasting in children under 5 years of age, and address the nutritional needs of adolescent girls, pregnant and lactating women and older persons" (United Nations 2015b).

Note: This summary is based on Shekar, Meera, Jakub Kakietek, Julia Dayton Eberwein, and Dylan Walters. 2017. *An Investment Framework for Nutrition: Reaching the Global Targets for Stunting, Anemia, Breastfeeding, and Wasting*. Directions in Development. Washington, DC: World Bank. doi:10.1596/978-1-4648-1010-7, available at <https://tinyurl.com/InvestmentFrameworkNutrition>. Suggested citation for this brief is: Shekar, Meera, Jakub Kakietek, Julia Dayton Eberwein, Jon Kweku Akuoku, Audrey Pereira, and Mary D'Alimonte. 2017. *An Investment Framework for Meeting the Global Nutrition Target for Stunting*. Washington, DC: World Bank Group. All dollar amounts are U.S. dollars.

^aThe World Bank Group. ^bResults for Development Institute.

Why Stunting?

Stunting, or being short for one's age (low height-for-age), is the leading measure of chronic undernutrition. Stunting is a remarkable proxy for exposure to a host of early life behavioral and environmental insults that limit children's overall developmental potential. Childhood stunting has lifelong consequences not just for health but also for human capital, poverty, and equity (Victora et al. 2010). Importantly, chronic undernutrition can be transmitted through an inter-generational cycle, where malnourished mothers are more likely to have stunted children (Aguayo et al. 2016; Ozaltin, Hill, and Subramanian 2010). Being stunted in early childhood is associated with a delayed start at school (Daniels and Adair 2004), reduced schooling attainment (Fink et al. 2016; Martorell et al. 2010), and substantially decreased adult wages when measured at both the individual (Hoddinott et al. 2008) and country level (Fink et al. 2016). One study found that young children who were stunted were 33 percent less likely to escape poverty as adults (Hoddinott et al. 2011). These consequences add up to overall GDP losses of 4 to 11 percent in Africa and Asia (Horton and Steckel 2013).

Investments in Nutrition Build Human Capital and Boost Shared Prosperity



SCHOOLING

Early nutrition programs can increase school completion by one year



EARNINGS

Early nutrition programs can raise adult wages by 5-50%



POVERTY

Children who escape stunting are 33% more likely to escape poverty as adults



ECONOMY

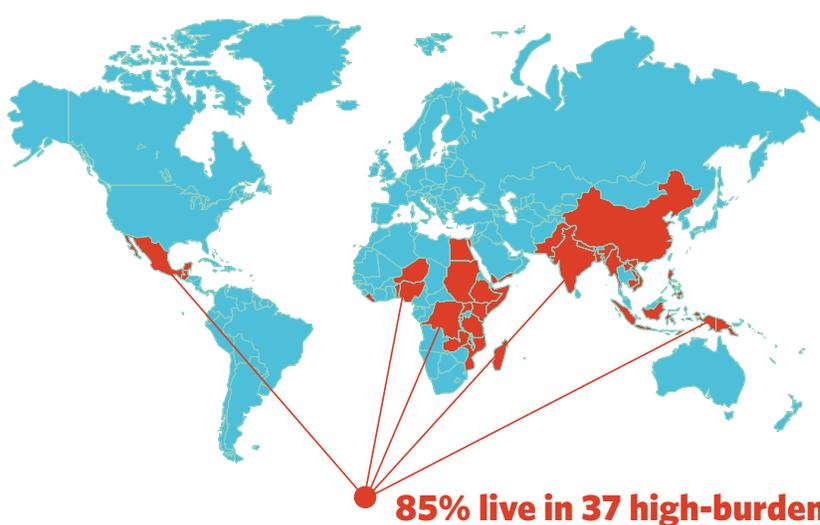
Reduction in stunting can increase GDP by 4-11% in Asia and Africa

Data sources: Hoddinott et al. 2011; Hoddinott et al. 2008; Horton and Steckel 2013; and Martorell et al. 2010.

The Magnitude of Stunting

As of 2015, 159 million—or 1 in 4—children under age five were stunted, with the highest burden concentrated in low- and middle-income countries (UNICEF, WHO, and World Bank 2015). Although worldwide prevalence of stunting has declined since 1990, stark regional differences persist, with South Asia and Sub-Saharan Africa remaining above the global average both in terms of prevalence and numbers of stunted children.

Global Stunting Prevalence as of 2015



**159 MILLION
CHILDREN
UNDER 5
ARE STUNTED
WORLDWIDE**

85% live in 37 high-burden countries

Source: UNICEF, WHO and World Bank, 2015.

Investing in Proven Interventions to Meet the Stunting Target

The analyses presented in *An Investment Framework for Nutrition* focus on seven high-impact nutrition-specific interventions with strong evidence of efficacy in reducing stunting (Bhutta et al. 2008, 2013). Scale-up financing needs for these interventions are estimated for a sample of 37 high-burden countries and extrapolated to all low- and middle-income countries.

An additional \$49.5 billion, over and above current spending, is needed over 10 years to scale up this package of interventions to prevent stunting (see the table). This includes \$44.2 billion in direct service delivery and an additional \$5.3 billion for monitoring and evaluation, capacity building, and policy development. Prophylactic zinc supplementation and the public provision of complementary food for young children account for about 60 percent of the intervention costs. Some of these interventions are expensive when applied at scale, while others—especially prophylactic zinc supplementation and balanced energy protein supplementation for pregnant women—also require further implementation research in order to deliver them at scale. Therefore, two alternative resource-mobilization scenarios, a priority package and a

Interventions to be Scale Up and Total Financing Needs to Meet the Stunting Target

INTERVENTION		ADDITIONAL FINANCING NEEDS 2016–2025 (US\$, MILLIONS)	SHARE OF TOTAL (PERCENT)
FOR PREGNANT WOMEN AND MOTHERS OF INFANTS	Antenatal micronutrient supplementation Includes iron and folic acid supplementation and at least one more micronutrient delivered for 180 days per pregnancy as part of antenatal care	2,309	5%
	Infant and young child nutrition counseling Individual or group based counseling sessions to promote exclusive breastfeeding (0-5 months of age) and continued breastfeeding and timely introduction and appropriate quality and quantity of complementary foods for children 6-23 months of age	6,823	15%
	Balanced energy-protein supplementation for pregnant women Nutrition supplementation for pregnant women who are food insecure (living under the poverty line of \$1.90/day) delivered through community, health facility, or social safety net programs ^a	6,949	16%
	Intermittent presumptive treatment of malaria in pregnancy in malaria-endemic regions At least two doses of sulfadoxine-pyrimethamine delivered during pregnancy as part of antenatal care	416	1%
FOR INFANTS AND YOUNG CHILDREN	Vitamin A supplementation for children Two doses per year for children 6–59 months old delivered through mass campaigns	716	2%
	Prophylactic zinc supplementation for children 120 packets of zinc (10 mg/day) per child per year for children 6–59 months of age; assumed to be delivered through community mechanisms similar to micronutrient powders (MNP) supplementation	14,212	32%
	Public provision of complementary foods for children Supplemental foods for children 6–23 months of age living under the poverty line \$1.90/day) delivered through community-based nutrition programs or existing public food distribution or social safety net programs	12,750	29%
SUBTOTAL		44,175	100%
Program (monitoring and evaluation, capacity strengthening, and policy development)		5,301	n.a.
TOTAL		49,476	n.a.

Note: a Since this analysis was completed, the World Health Organization (WHO) has issued revised guidelines that recommend this intervention for women with a low body mass index (BMI <20). The revised guidelines also recommend nutrition counseling, but this is not included as part of this intervention in the current study. See WHO 2016. n.a. = not applicable.

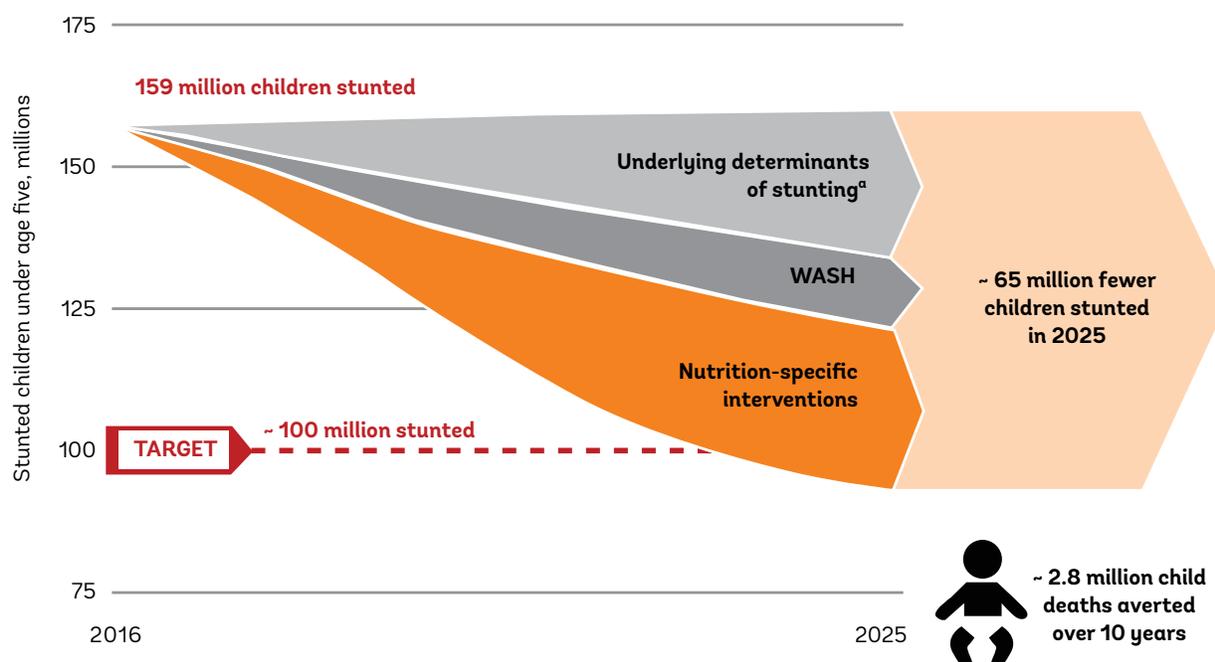
catalyzing progress package, are recommended to take these interventions to scale, with adequate investments in research and delivery science.²

About 50 percent of the estimated global financing needs (\$23.5 billion) is for the scale-up of nutrition interventions in Sub-Saharan Africa, with South Asia and East Asia and Pacific each accounting for a little over 20 percent (\$10.8 billion and \$10.4 billion, respectively). Two countries, India and China, account for about a quarter of the global total (26.3 percent) because of the large size of their populations and large numbers of stunted children.

The Impact of Investing in the Stunting Target

The additional investment of \$49.5 billion over 10 years in the package of nutrition-specific interventions, alongside existing investments and projected improvements in the underlying determinants of undernutrition (growth in per capita GDP and improvements in food availability and diversity, women’s health, education, and empowerment), would enable countries to achieve significant reductions in stunting. By 2025, there would be about 65 million fewer stunted children in low- and middle-income countries compared to the 2015 baseline.

Costs and Impacts of a 10-Year Scale-Up of Interventions to Reach the Stunting Target



Note: ^aIncludes food availability and diversity, women’s education, women’s empowerment and health, and water, sanitation and hygiene (WASH).

The scale-up of the key nutrition-specific interventions is estimated to generate about \$417 billion in economic benefits over the productive lives of beneficiaries in low- and middle-income countries. The bulk of the benefits (about 98 percent) would be the consequence of the cognitive losses avoided in children

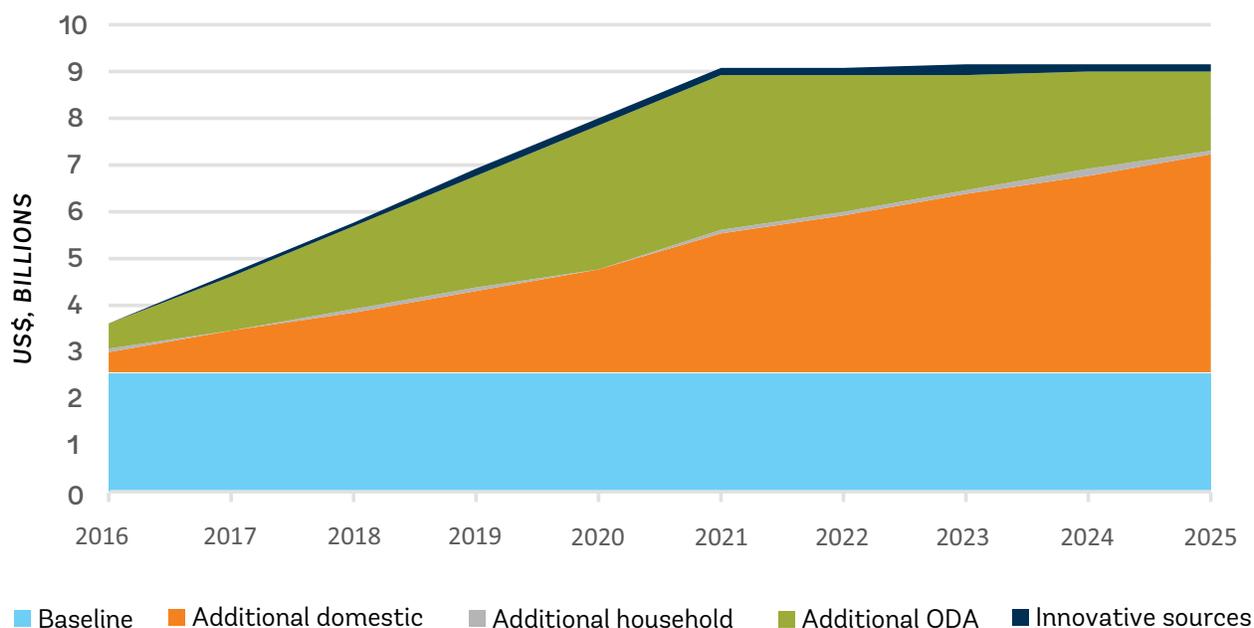
² The priority package includes antenatal micronutrient supplementation, infant and young child nutrition counseling, intermittent presumptive treatment of malaria in pregnancy in malaria-endemic regions, vitamin A supplementation for children, wheat and maize flour fortification, and iron and folic acid supplements for adolescent girls in school. The catalyzing progress package would scale up the priority package plus a more phased-in expansion of the other interventions to improve delivery mechanisms and program implementation. For more information, please see: Catalyzing Progress towards the Global Nutrition Targets: Three potential financing scenarios for investing in nutrition.

under age five and the resulting improvements in their economic productivity. The remaining 2 percent would result from premature mortality averted by the interventions. Comparing those benefits with discounted costs yields a benefit-cost ratio of 11. This means that one dollar invested in stunting reduction will generate more than 11 dollars in economic returns.

Financing Needs

Despite the economic benefits and high returns from investing in reducing stunting, both country and donor investments are inadequate. Currently about \$2.6 billion—\$2.2 billion from country governments and \$0.4 billion from donors—is spent globally each year on this core package of interventions known to reduce stunting. The additional \$49.5 billion needed over 10 years to reach the global stunting target can be mobilized through a coordinated effort between governments, donors, and new innovative financing mechanisms such as the Power of Nutrition (see the figure below). Country governments would be expected to contribute \$25.5 billion and donors \$21.4 billion over 10 years in order to meet the target.³

Financing Scenario to Mobilize Resources Needed to Reach the Global Stunting Target



Global Success Is Possible

Although the estimate of what it would take to achieve the global stunting target is based on ambitious scale-up assumptions, some countries have demonstrated that rapid scale-up of nutrition interventions can be realized and can lead to swift declines in stunting, albeit each country’s path to success has been different. Rapid declines in stunting have been achieved recently in Bangladesh, Ethiopia, Ghana, Malawi, Peru, Senegal, Tanzania, and Vietnam, among other countries. In Peru, for example, the share of children under five who are stunted declined from 28 percent in 2005 to 14 percent in 2014. In Senegal, prevalence of stunting in children under five fell from 26.5 percent in 2012 to 18.7 in 2015, despite a period of uneven economic growth.

³ The remaining \$2.6 billion would be financed from other sources including innovative financing mechanisms as well as household contributions to some interventions.

Call to Action

Child stunting is a silent emergency of a magnitude as large as that of the AIDS epidemic, affecting 159 million children with negative consequences such as greater risks of illness and death, reduced cognitive ability, poor learning outcomes, and poverty. The benefits of reducing child stunting can more than offset the extra cost, with a return of more than \$10 for every dollar invested. As we stand at the cusp of the new SDGs, with global poverty rates having declined to less than 10 percent for the first time in history (World Bank 2015), we now have an unprecedented opportunity to save children's lives, build future human capital, and drive faster economic growth by improving nutrition and tackling stunting. The cost is nearly \$50 billion over 10 years, but the costs of inaction are likely to be significantly higher.

Acknowledgments

These results are based on a joint effort between the World Bank Group, Results for Development Institute, and 1,000 Days, with financial support from the Bill & Melinda Gates Foundation and the Children's Investment Fund Foundation.

For more information please see: <https://tinyurl.com/InvestmentFrameworkNutrition>

References

Aguayo, V. M., R. Nair, N. Badgaiyan, and V. Krishna. 2016. "Determinants of Stunting and Poor Linear Growth in Children under 2 Years of Age in India: An In-Depth Analysis of Maharashtra's Comprehensive Nutrition Survey." *Maternal & Child Nutrition* 12 (Suppl. 1): 121–40.

Bhutta, Z. A., T. Ahmed, R. E. Black, S. Cousens, K. Dewey, E. Glugliani, B. A. Haider, B. Kirkwood, S. S. Morris, H. P. S. Sachdev, and M. Shekar. 2008. "What Works? Interventions for Maternal and Child Undernutrition and Survival." *The Lancet* 371 (9610): 417–40.

Bhutta, Z. A., J. K. Das, A. Rizvi, M. F. Gaffey, N. Walker, S. Horton, P. Webb, A. Lartey, and R. E. Black. 2013. "Evidence-Based Interventions for Improvement of Maternal and Child Nutrition: What Can Be Done and at What Cost?" *The Lancet* 382 (9890): 452–77.

Daniels, M. C. and L. Adair. 2004. "Growth in Young Filipino Children Predicts Schooling Trajectories through High School." *Journal of Nutrition* 134: 1439–46.

Fink, G., E. Peet, G. Danaei, K. Andrews, D. C. McCoy, C. R. Sudfeld, M. C. Smith Fawzi, M. Ezzati, and W. W. Fawzi. 2016. "Schooling and Wage Income Losses Due to Early-Childhood Growth Faltering in Developing Countries: National, Regional, and Global Estimates." *The American Journal of Clinical Nutrition* 104 (1): 104–12.

Hoddinott, J., J. A. Maluccio, J. R. Behman, R. Flores, and R. Martorell. 2008. "Effect of a Nutrition Intervention during Early Childhood on Economic Productivity in Guatemalan Adults." *Lancet* 371 (9610): 411–16.

Hoddinott, J., J. Maluccio, J. R. Behrman, R. Martorell, P. Melgar, A. R. Quisumbing, M. Ramirez-Zea, R. D. Stein, and K. M. Yount. 2011. "The Consequences of Early Childhood Growth Failure over the Life Course." IFPRI Discussion Paper 01073. International Food Policy Research Institute, Washington, DC.

Horton, S. and R. Steckel. 2013. "Malnutrition: Global Economic Losses Attributable to Malnutrition 1900–2000 and Projections to 2050." In *The Economics of Human Challenges*, edited by B. Lomborg, 247–72. Cambridge, U.K.: Cambridge University Press.

Martorell, R., B. L. Horta, L. S. Adair, A. D. Stein, L. Richter, C. H. D. Fall, S. K. Bhargava, S. K. Dey Biswas, L. Perez, F. C. Barros, C. G. Victora, and Consortium on Health Orientated Research in Transitional Societies Group. 2010. "Weight Gain in the First Two Years of Life Is an Important Predictor of Schooling Outcomes in Pooled Analyses from Five Birth Cohorts from Low- and Middle-Income Countries." *The Journal of Nutrition* 140: 348–54.

Ozaltin, E., K. Hill, and S. V. Subramanian. 2010. "Association of Maternal Stature with Offspring Mortality, Underweight, and Stunting in Low- to Middle-Income Countries." *JAMA* 303 (15): 1507–16.

Shekar, Meera, Jakub Kakietek, Julia Dayton Eberwein, and Dylan Walters. 2017. *An Investment Framework for Nutrition: Reaching the Global Targets for Stunting, Anemia, Breastfeeding, and Wasting*. Directions in Development. Washington, DC: World Bank. doi:10.1596/978-1-4648-1010-7.

UNICEF, WHO, and World Bank (United Nations Children's Fund, World Health Organization, and World Bank). 2015. *Joint Child Malnutrition Estimates*. Global Database on Child Growth and Malnutrition. <http://www.who.int/nutgrowthdb/estimates2014/en/> (accessed October 2015).

United Nations. 2015a. *Historic New Sustainable Development Agenda Unanimously Adopted by 193 UN Members*. <http://www.un.org/sustainabledevelopment/blog/2015/09/historic-new-sustainable-development-agenda-unanimously-adopted-by-193-un-members/>

———. 2015b. Sustainable Development Goal 2: End hunger, achieve food security and improved nutrition and promote sustainable agriculture. <http://www.un.org/sustainabledevelopment/hunger/>

Victora, C. G., M. de Onis, P. C. Hallal, M. Blössner, and R. Shrimpton. 2010. "Worldwide Timing of Growth Faltering: Revisiting Implications for Interventions." *Pediatrics* 125: e473–e80.

WHO (World Health Organization). 2012. *Global Targets 2025* (accessed December 1, 2015). http://www.who.int/nutrition/topics/nutrition_globaltargets2025/en/

———. 2016. *WHO recommendations on antenatal care for a positive pregnancy experience*. <http://apps.who.int/iris/bitstream/10665/250796/1/9789241549912-eng.pdf?ua=1>

World Bank. 2015. *Global Monitoring Report 2015*. <http://www.worldbank.org/en/publication/global-monitoring-report>. accessed 31 December 2015.

