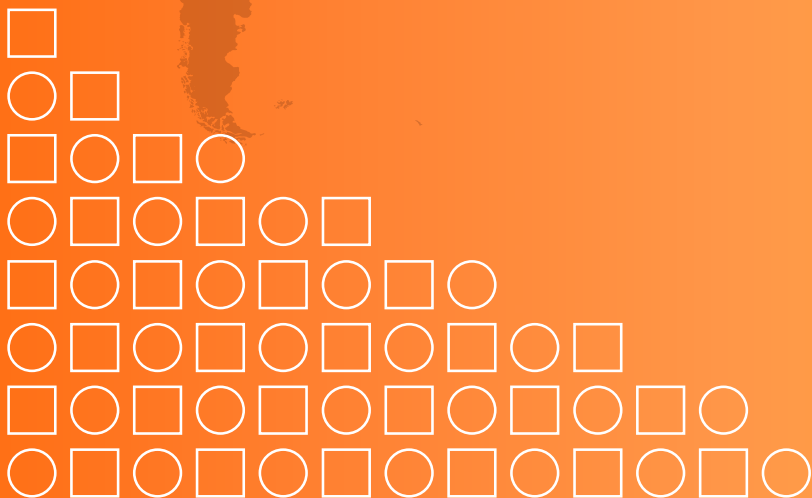
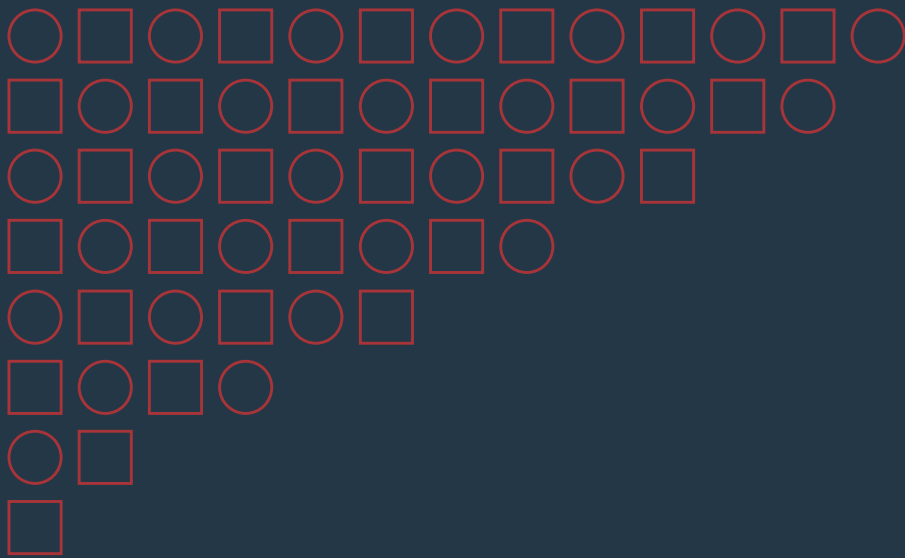


NUTRITION INTERNATIONAL

INVESTMENT CASE
2018 – 2024



Nourish Life



ACRONYMS

EBF	Exclusive breastfeeding
HIV	Human Immunodeficiency Virus
IFA	Iron and folic acid
IYCN	Infant and Young Child Nutrition
KMC	Kangaroo mother care
LiST	Lives Saved Tool
MNP	Multiple micronutrient powders
NI	Nutrition International
NIDEA	Nutrition Innovation Delivery Accelerator
NLIFT	Nutrition Leverage and Influence for Transformation
NMNAP	National Multi-Sectoral Nutrition Action Plan
NTD	Neural tube defect
NTEAM	Nutrition Technical Assistance Mechanism
ORS	Oral rehydration salt
ROI	Return on Investment
SDG	Sustainable Development Goals
SRH	Sexual and reproductive health
SUN	Scaling Up Nutrition
TA	Technical assistance
TAN	Technical Assistance for Nutrition
TB	Tuberculosis
TFNC	Tanzania Food and Nutrition Commission
TIBF	Timely initiation of breastfeeding
UNFPA	United Nations Population Fund
USI	Universal salt iodization
VAS	Vitamin A supplementation
WHO	World Health Organization
WIFA	Weekly iron and folic acid
WIFAS	Weekly iron and folic acid supplementation

CONTENTS

Executive Summary	2
1. The Opportunity	4
2. Why Nutrition International?	4
3. Our Strategy and Investment Case	5
4. Impact	13
5. Conclusion.....	20
Appendices.....	21
Appendix A. Technical Approach Overview.....	21
Appendix B. Summary of NI's Interventions.....	23
Appendix C. Impact pathways.....	24
Appendix D. Key Nutrition Indicators for NI Core Countries	29
Appendix E. References from Narrative	30
Appendix F. References from Appendices	31

EXECUTIVE SUMMARY

Why Nutrition: Nutrition is the foundation of good health, educational attainment, women's empowerment and human capital. Good nutrition is necessary to protect cognition and school performance, improve lifetime earnings and productivity, and ultimately break the cycle of poverty. The importance of nutrition is reflected in the fact that 12 of the 17 Sustainable Development Goals (SDGs) contain indicators that are highly relevant to nutrition. However, current progress towards ending malnutrition is too slow to achieve these goals by the 2030 target. Of the world's approximately 7.6 billion people, almost one-third lack key micronutrients, 151 million children are stunted, 1.6 billion people are anaemic and 2 billion adults are overweight or obese. Women and children still lack access to essential micronutrients such as iron, folic acid, zinc and iodine, which provide protection against disease and cognitive defects, and promote healthy development. The lack of food systems and health services that support good nutrition further exacerbates the problem.

A track record of operational excellence and achievement at scale: For over 25 years, Nutrition International (NI) has been working at the leading edge of nutrition and has successfully delivered life-saving micronutrients at scale. Each year, NI reaches more than 150 million children with two doses of vitamin A and 400 million people with iodized salt. As a result, over the last two and a half decades, 5 million child deaths have been prevented, 1.6 million permanent mental impairments have been averted among infantsⁱ, 10 million cases of stunting have been prevented, and 500,000 cases of anaemia have been averted among women. Few organizations can claim to have had such an impact on the lives of people in low-income countries in Africa and Asia through these kinds of nutrition interventions. In recent years, NI has extended its population-level coverage of hundreds of millions of people by leveraging partnerships with other organizations delivering services in health, education, and sexual and reproductive health (SRH). We have expanded our influence through technical assistance to more than 20 countries with large malnutrition burdens.

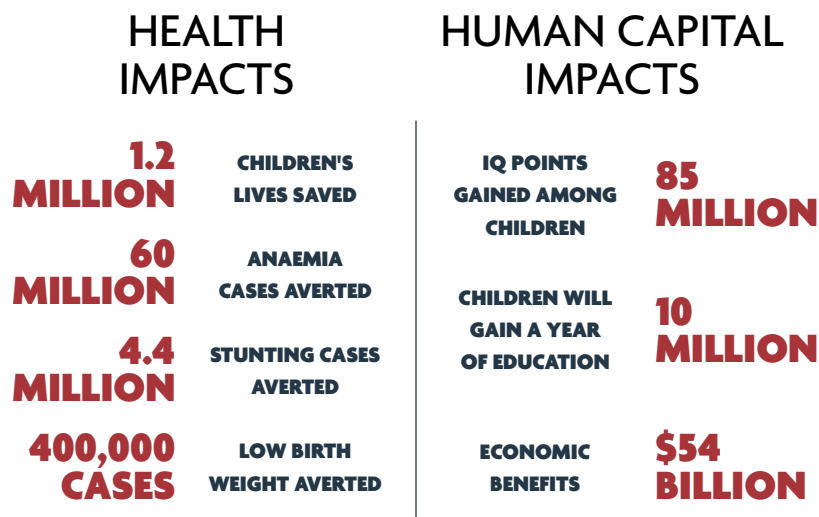
NI's strategy and Investment Case for 2018-2024: NI is seeking \$700 millionⁱⁱ over the next six years to achieve four strategic objectives:

- **Coverage:** Scaling up the delivery of low-cost, high-impact nutrition interventions, prioritizing women, adolescent girls and children in Africa and Asia
- **Leverage:** Integrating nutrition across sectors, strengthening local ownership and developing innovative approaches to scale
- **Influence:** Combining research, technical assistance, advocacy and partnerships to improve policies, programs, and to increase resources for nutrition
- **Gender Equality:** Mainstreaming gender equality throughout all aspects of NI programs and business models to promote gender equality and women and girls' empowerment

ⁱ 70 million infants have been protected from mental impairment because their mother consumed adequately iodized salt.

ⁱⁱ All figures are in Canadian dollars unless otherwise noted.

Health and human capital impacts: By implementing this \$700 million Investment Case, which was carefully developed based on its expected health and human capital impacts, NI will make a foundational contribution toward the realization of the SDGs by saving the lives of 1.2 million children, averting 4.4 million cases of stunting and preventing 60 million cases of anaemia.ⁱⁱⁱ As a result of NI's actions, at least 10 million children who would otherwise have had below-normal intelligence will reach their full cognitive potential^{iv} and will gain an extra year of school, and \$54 billion will be generated in economic benefits. Given NI's focus on improved nutrition for mothers, adolescent girls, and children in the first 1,000 days of life, the bulk of these gains will accrue to women and girls, reinforcing female empowerment and gender equality.



Making every dollar count: NI's \$700 million Investment Case for 2018-2024 will produce a return on investment (ROI) of 28:1. This is one of the highest ROIs possible in development, and compares favourably with the ROIs of other global health initiatives – such as Gavi and the Global Fund – that excel at delivering low-cost, high-impact interventions. Investing in NI means investing in reducing malnutrition and building a better future for millions of women, girls and children in more than 60 countries worldwide.

ⁱⁱⁱ Including 31 million among women and girls and 29 million among men and boys.

^{iv} An average of 8.5 IQ points each will be saved among 10 million children, saving a total of nearly 85 million IQ points.

1. THE OPPORTUNITY

In one of humanity's longest running battles, the fight against malnutrition, there is reason for optimism. Never before has the role of nutrition in achieving human progress been so well understood. Nutrition is now being recognized as the catalyst for delivering many of the SDGs.

A multitude of studies show that good nutrition is the foundation for human development. It is the critical ingredient every one of us needs to survive and thrive. Without it, the brain does not develop fully, the body does not grow properly, the immune system does not function effectively and individual potential – as well as overall health – is stunted for life.

Yet there remains a massive gap between our global commitments and action on the ground. Of the world's approximately 7.6 billion people, nearly 2 billion lack key micronutrients, 151 million children are stunted, and 2 billion adults are overweight or obese. Almost all countries face a serious burden of either two or three forms of malnutrition, which will require multiple actions to address.

One of the world's greatest injustices is the inability of human beings to achieve their full potential so they can create a better life for themselves and their children. However, just as undernutrition can stunt children for life, proper nutrition can connect them to a world of opportunity.

Investments in nutrition create a virtuous circle linking nutrition to health, education and economic empowerment. Well-nourished women have safer pregnancies and deliver healthier babies. Well-nourished infants and children are healthier with stronger immune systems, making them more able to resist infection and disease. Well-nourished adolescent girls are more likely to stay in school, succeed in their studies and delay their first pregnancy. Greater education and earnings reduce inequalities, particularly gender inequalities, which increases female empowerment and social inclusion. More education also increases lifetime earnings, which in turn increases overall economic growth and broadens the tax base. With more tax revenue, governments can increase their own investments in nutrition, health and education, thus reducing their reliance on external assistance.

For all these reasons, it is crucial that countries with high burdens of malnutrition and their international partners invest in the solutions we know will make a difference – including micronutrient supplementation and fortification, promotion of breastfeeding, improved infant feeding practices and dietary diversity. Despite the international community's best efforts, we continue to come up far short. This is where Nutrition International comes in.

2. WHY NUTRITION INTERNATIONAL?

For 25 years, NI has delivered high-impact, low-cost nutrition interventions. Working alongside governments, we combine deep technical expertise and know-how with a flexible approach, multiplying impact without increasing complexity or cost.

From modest beginnings as a small Canadian initiative in 1992, NI has become a leading global nutrition organization with world-class technical expertise and unique capabilities to support the acceleration of action at the country level and to increase the priority of nutrition at global, regional, and national levels.

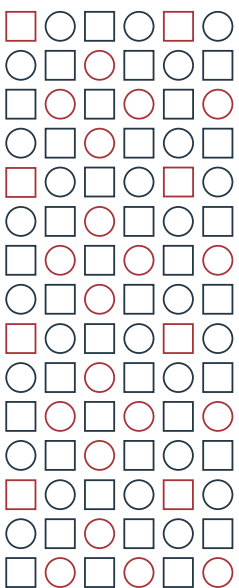
NI programs deliver life-saving interventions in more than 60 countries. We reach over 150 million children with two doses of vitamin A and over 400 million people with iodized salt each year. We improve the nutrition of adolescent girls through our ground-breaking investments in weekly iron and folic acid supplementation (WIFAS) and nutrition education, helping them stay in school longer and remain healthy. We help pregnant women have safer pregnancies and healthier babies through nutrition counselling, iron and folic acid (IFA) supplementation and a package of safe birth interventions. We help give children the solid foundation they need to reach their full potential through universal salt iodization (USI) and vitamin A supplementation (VAS).

Over the last two decades, our programs have averted half a million cases of potentially life-threatening anaemia among women^v, saved the lives of nearly 5 million children, prevented 10 million cases of stunting, and averted a 1.5 million cases of permanent mental impairments among infants. Today, we are the leading technical partner for the largest fortification program in the world, aiming to reach more than 100 million people in Pakistan.

NI achieves impact by maximizing:

- a) **Coverage:** Scaling up the delivery of low-cost, high-impact nutrition interventions, prioritizing women, adolescent girls and children in Africa and Asia
- b) **Leverage:** Integrating nutrition across sectors, strengthening local ownership and developing innovative approaches to scale
- c) **Influence:** Combining research, technical assistance, advocacy, and partnerships to improve policies, programs, and to increase resources for nutrition

Gender equality underpins all of NI's programming. We believe women and girls must be empowered advocates for their own health and nutrition. That is why we apply a gender lens directly into our projects and the program cycle of all our business models, programs, and partnerships.



SUPPORTING THE WORLD'S LARGEST FOOD FORTIFICATION PROGRAMME IN PAKISTAN

Malnutrition is at a crisis level in Pakistan. Today, one out of every two Pakistani women is malnourished – a condition that not only affects her health, but also the health of the next generation. Anaemia contributes to preterm births and low birth weight, which in turn lead to poor child health outcomes and an increased risk of disease later in life.

NI has partnered with Mott MacDonald on one of the largest food fortification programs in the world. Supported by United Kingdom's Department for International Development (DFID), the Food Fortification Programme in Pakistan (FFP) aims to support national efforts to improve nutrition, in particular for women and children.

As the lead technical partner, NI is providing technical support to commercial wheat flour and edible oil/ghee mills. We are also providing assistance to apply quality control procedures at both the production and market levels to ensure adequate fortification. Other components of the program include technical support to the government's food fortification regulatory system, support to increase awareness, and evidence generation to formulate relevant policies to combat malnutrition in Pakistan.

By increasing the micronutrient content of flour and edible oil/ghee and reaching more than 100 million people, the project aims to reduce iron deficiency anaemia and vitamin A deficiency in women and children as well as neural tube defects among newborns.

3. OUR STRATEGY AND INVESTMENT CASE

NI has developed an ambitious vision for the organization, which is aligned with the SDGs that are to be achieved by 2030. Our Strategic Plan 2018-2024 outlines the actions we will undertake to implement the first six-year phase of that vision leading to 2030. Approved by NI's Board of Directors, the Strategic Plan serves as a guide to staff, partners and donors on the directions and actions we will take from 2018-2024, and it drives our efforts to mobilize and allocate funding to priority activities.

3.1 Strategic Framework

NI's strategy positions the organization to build on its track record and expand its role as a global leader in scaling solutions to malnutrition (see Table 1 below).

^v With an additional 500,000 cases averted among men and boys.

TABLE 1: NUTRITION INTERNATIONAL STRATEGIC FRAMEWORK 2018-2024

VISION	A world where everyone, everywhere, is free from malnutrition and able to reach their full potential		
MISSION	To be a global leader in finding and scaling solutions to malnutrition through coverage, leverage and influence		
IMPACT	Improved survival, health and well-being of vulnerable people, especially women, newborns, children and adolescent girls		
TARGETS	BY 2024:		
	<ul style="list-style-type: none"> • Reach 800 million people, including 450 million women and girls, with one or more interventions • Avert 1.2 million child deaths • Prevent 60 million cases of anaemia • Avert 4.4 million cases of stunting • Prevent 400,000 cases of low birth weight • Develop new multi-sectoral partnerships that draw in more than \$50 million in matching funds • Continue to generate evidence and shape international and national policy and guidance • Lead global thinking and action on adolescent nutrition, focused on gendered needs of adolescent girls • Advise 25 high burden countries on their nutrition plans, guided by gender analysis, and/or transforming those plans into action 		
TARGETS	BY 2030:		
	Transform the lives of 1 billion vulnerable people, especially women, adolescent girls and children, by improving their nutritional status		
OBJECTIVES	COVERAGE: Scaling up the delivery of low-cost, high-impact nutrition interventions, prioritizing women, adolescent girls and children in Africa and Asia		
	LEVERAGE: Integrating nutrition across sectors, strengthening local ownership and developing innovative approaches to scale		
	INFLUENCE: Combining research, technical assistance, advocacy, and partnerships to improve policies, programs, and to increase resources for nutrition		
	GENDER EQUALITY: Mainstreaming gender equality throughout all aspects of NI programs and business models to promote gender equality and women and girls' empowerment.		
FOCUS	POPULATIONS	GEOGRAPHIES	CORE INTERVENTIONS
	<ul style="list-style-type: none"> • Adolescent girls • Pregnant women and newborns • Children under five • All populations 	<ul style="list-style-type: none"> • 10 high-burden core countries • Provision of technical assistance to ~20 countries^{vi} • Maintain provision of vitamin A to 60+ countries 	<ul style="list-style-type: none"> • Vitamin A supplementation • Salt iodization • Food fortification • Zinc & ORS for treatment of diarrhoea • Iron and folic acid (IFA) supplements for pregnant women • Weekly IFA for adolescents and nutrition education • Infant and young child nutrition • Birth package (incl. Kangaroo Mother Care, Early Initiation of Breastfeeding)
BUSINESS MODELS	Right Start NLIFT NTEAM		

^{vi} Bangladesh, India, Indonesia, Pakistan, Philippines, Ethiopia, Kenya, Nigeria, Senegal, Tanzania

3.2 Looking Back at the Previous Five Years

We approached our 2018-2024 strategic planning process with an open mind, starting by taking a critical look back at what we achieved during the previous five-year period. With a growing resource envelope averaging \$60 million per year over the past five years, NI has made a significant contribution towards improving global nutrition outcomes, including:

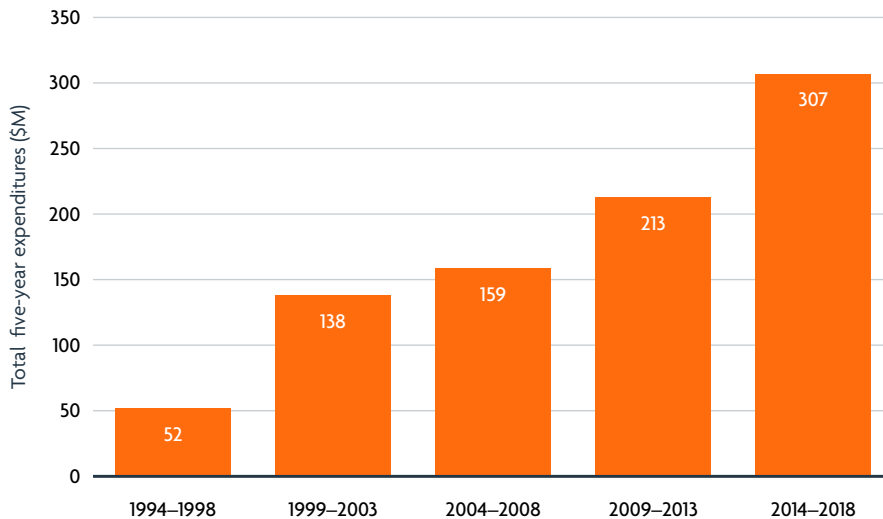
- Reaching 300 million children with VAS, preventing 800,000 deaths, and averting 3.4 million cases of stunting
- Reaching 400 million people with iodized salt, ultimately protecting 45 million children from iodine deficiency and averting 750,000 mental impairments
- Reaching more than 6 million women with IFA supplementation, averting 500,000 cases of anaemia
- Treating 60 million cases of childhood diarrhoea, reducing the severity and duration of their illness and averting approximately 5,000 deaths
- Assisting 12 countries with their national nutrition strategies
- Establishing more than 10 new partnerships to deliver nutrition through other sectors such as health, education and SRH, leveraging approximately \$20 million from partners

At the same time, we reorganized NI and added new staff and systems to be able to take on an expanded mandate over the next six years. Notably, we added over 130 new technical experts to bolster NI's expertise, restructured the executive leadership team, opened new field offices in Tanzania and the Philippines, and relocated our African regional office to Kenya. These changes allow us to reach more people with greater efficiency.

3.3 Investment Case

With these foundational investments and delivery platforms in place, we are now seeking \$700 million over the next six years, doubling our funding and more than doubling our scale of operations and impact. NI has considerable experience managing significant growth; as shown in Figure 2, NI has mobilized and programmed ~\$1 billion in the last 25 years, nearly one-third of which was in the last five-year period (2014-2018).

FIGURE 2: NI'S HISTORICAL EXPENDITURE BY FIVE-YEAR PERIOD



To develop the optimum plan for using \$700 million, we modelled a series of options and examined the expected impact and benefits. Our goal was to maximize impact, provide value for money and achieve balance in our investments, while at the same time promoting equity by helping the poorest and most disadvantaged in the countries where we work.

Our own custom built investment model combined the best impact estimates available from the literature with our own cost data for each intervention or service. It was built by Pharos Global Health Advisors and validated by Johns Hopkins University. We tested different ways to distribute \$700 million across interventions and geographies and compared the results in terms of lives saved and averted cases of anaemia, stunting, mental impairments and neural tube defects. Over half a dozen scenarios were tested, including: What if all of NI's funds were concentrated on just the lowest-cost nutrition actions? What if the only purpose was to save the most lives or eradicate anaemia? What if the goal was to touch the lives of the most people, even if that "touchpoint" was light?

Ultimately, we selected a strategy and accompanying Investment Case that offers an optimal balance between population coverage and impact as measured in lives saved, cases of anaemia averted and cases of stunting prevented, and positive results for children and girls by improving their cognitive skills and educational outcomes. See Appendix A for more information on the modelling approach.

3.4 Investments in Coverage, Leverage, Influence and Gender Equality

As shown in Table 2, NI will invest \$700 million to achieve its strategic goals through a combination of coverage (by scaling up the delivery of low-cost, high-impact nutrition interventions, prioritizing women, adolescent girls and children in Africa and Asia), leverage (integrating nutrition across sectors, strengthening local ownership and developing innovative approaches to scale) and influence (combining research, technical assistance, advocacy, and partnerships to improve policies, programs, and to increase resources for nutrition).

HOW NI ACHIEVES IMPACT

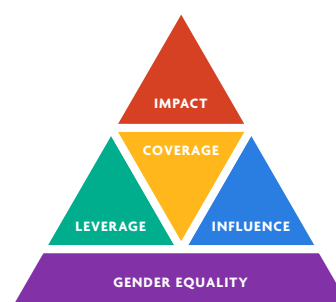


TABLE 2: PROJECTED REACH AND BUDGET BY INTERVENTION (2018-2024)

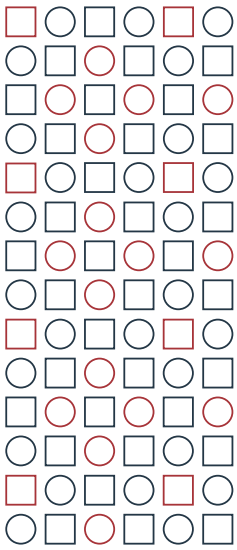
INTERVENTION*	PEOPLE REACHED (CUMULATIVE) **	PROJECTED BUDGET
Vitamin A supplementation (VAS)	360 M	\$94 M
Universal salt iodization (USI)	500 M	\$40 M
Food fortification	120 M	\$100 M
Zinc and oral rehydration salts (ORS) for the treatment of childhood diarrhoea	26 M	\$85 M
Iron folic acid (IFA) supplementation for pregnant women	11 M	\$114 M
Weekly folic acid supplementation (WIFAS) for adolescents	10 M	\$100 M
Infant and young child feeding	3 M	\$34 M
Birth package	1 M	\$22 M
Leverage (NLIFT, innovative technologies and financing, etc.)	TBD	\$50 M
Influence (research, demonstration projects, technical assistance, advocacy)	TBD	\$61 M
Total unique people reached	800 M	\$700 M

* See Appendix B for a summary of NI's focus interventions

** These reach estimates are not independent of each other. Some NI interventions overlap, which is a benefit of integrated service delivery.

NI's coverage objective is to scale up the delivery of low-cost, high-impact nutrition interventions, prioritizing women, adolescent girls and children in Africa and Asia. NI's interventions reach population groups with a heightened risk of nutrient deficiencies, including adolescent girls, pregnant women and newborns, and children under five. Through interventions such as WIFAS for adolescent girls and vitamin A supplementation for children, we help those who suffer disproportionately from malnutrition, responding to inequities in access to quality services.

We are also committed to reducing malnutrition for all population groups, leading the way on salt iodization and food fortification initiatives that effectively combat widespread nutrient deficiencies.



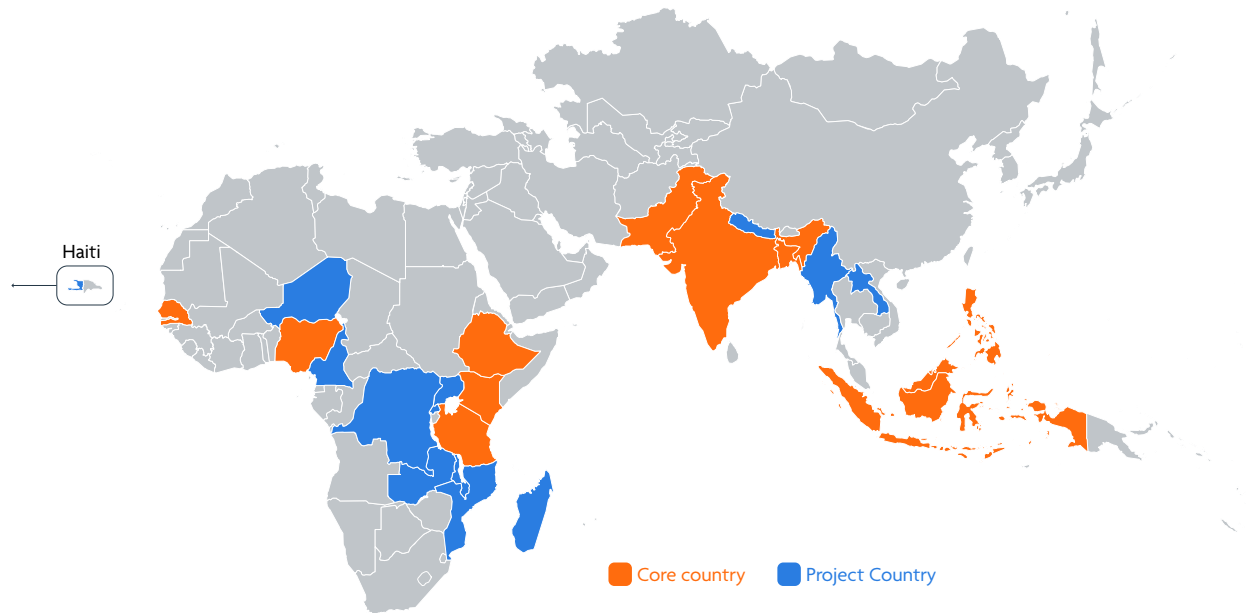
IMPROVING SERVICE COVERAGE AND QUALITY BY TRAINING FRONTLINE HEALTH WORKERS

The skills and capacity of health workers are key components of the health system that affect service coverage and quality. Currently many frontline health workers lack adequate practical nutrition training, resulting in poor undernutrition management practices. Each year, NI supports the training of hundreds of thousands of health workers, including facility-based staff and community health workers. In 2017, approximately 320,000 health workers were provided with in-service training as a result of NI's activities, which include the design, development and printing of learning and training materials, the delivery of training courses and post-training evaluation.

These activities strengthen a country's health system and improve service coverage. For example, after NI provided intensive hands-on-training to community midwives (CMW) in Pakistan, the average number of annual deliveries per CMW nearly quadrupled (from 24 to 94 per CMW). In the district of Khyber Pakhtunkhwa, the number of deliveries by the CMWs doubled from 332 to 706 in just three months. Mothers were drawn to this care by the improved knowledge of the staff and new equipment available to them.

We will continue to maintain our current geographic presence in 10 core countries across Asia and Africa^{vii}, while providing technical assistance to an additional 11 countries. Taken together, these 21 countries comprise 37 percent of the world's population, 52 percent of the global burden of anaemia among adolescent girls (15-19) and women 20 to 49 years of age, and 66 percent of under-five deaths. NI also delivers life-saving VAS to approximately 150 million children per year across 60 countries.

FIGURE 3: NI'S GLOBAL PRESENCE



NI's **leverage objective** is to integrate nutrition across sectors, strengthen local ownership and develop innovative approaches to scale. The global development architecture is not yet fit for purpose; it creates and perpetuates far too many missed opportunities to reach and improve, especially among women, children and adolescent girls. For instance, in many developing countries, the rainy season (when malaria peaks) and the hunger season (when farmers are between harvests and malnutrition peaks) are the same. So, when efforts are made to reach people with malaria services without considering nutrition, we miss opportunities to save lives and protect children.

^{vii} See Appendix D for key nutrition indicators for NI's 10 core countries.

There are also a range of missed opportunities related to inefficient and uncompetitive markets for nutrition products. On the demand side, those who would benefit most from products are often women and children living in poverty with little purchasing power and gendered barriers to access. On the supply side, developers may not see enough demand to develop a new product, manufacturers may not know how much to produce, and distributors may not see enough profit to justify delivery. The lack of financial innovation within the nutrition sector, which has been slower than other sectors to adopt innovative financing models, further highlights opportunities for better leveraging limited resources.

EMPOWERING ADOLESCENT GIRLS IN INDONESIA TO MAKE BETTER NUTRITION DECISIONS

Girls who are educated about nutrition make better decisions for themselves. With better nutrition, these girls can grow to become strong, empowered women.

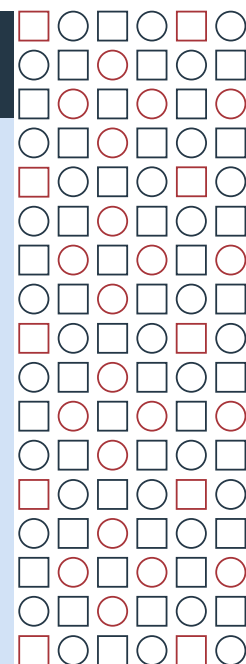
Through NLIFT, we have partnered with Girl Effect to integrate nutrition content into one of their global mobile platforms, Springster. A leader in targeted social media communication, Springster digitally connects and empowers girls in 66 countries through engaging articles in which real-life experiences, polls and advice on key social issues such as health, education, financial security and personal safety are shared. Springster creates a safe and accessible online space for girls to learn, ask questions and share their opinions without fear of retribution from their families or communities.

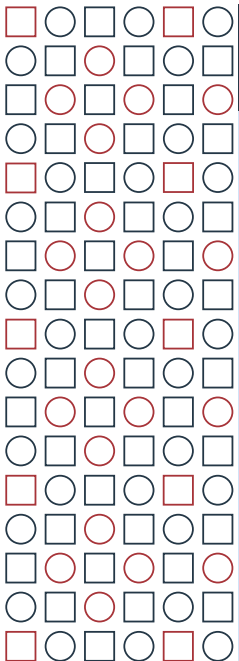
With support from NLIFT, Girl Effect will create evidence-based, age appropriate nutrition content for adolescent girls in Indonesia, where it already reaches 1.4 million girls. With this collaboration, we are hoping to increase girls' knowledge, awareness and behaviours around nutrition, promote gender equality and girls' empowerment, and increase the reach and engagement of the Springster platform in Indonesia to up to 4.8 million users (boys and girls.)

This initiative, which has the potential to be implemented in many more countries, will break new ground in harnessing the power of social media to deliver accurate and engaging nutrition content to a large audience of adolescent girls, helping them to improve their nutritional status, but also empowering them to reach their full potential.

To support and extend our coverage goals, we will leverage partnerships and innovative financial mechanisms to ensure that every dollar is maximized. Through our Nutrition Leverage and Influence for Transformation (NLIFT) model, we are investing in partnerships with organizations such as the United Nations Population Fund (UNFPA) and Amref to integrate nutrition programming into their large-scale networks, thereby gaining access to new delivery networks at a fraction of the cost that it would otherwise take to build these systems from scratch. We have a long history of shaping global markets and using our purchasing power to drive down prices and increase access to life-saving nutrition commodities, such as vitamin A.

Lastly, to ensure the long-term sustainability of our investments, we will increasingly work with national and local governments to assume ultimate responsibility for the financing and delivery of nutrition interventions. For example, NI is working to develop a domestic resource mobilization approach to nutrition financing through which both NI and local authorities would commit to increased multi-year funding for nutrition (see text box).





NI'S APPROACH TO DOMESTIC RESOURCE MOBILIZATION (DRM): INCENTIVIZING INCREASES IN SUB-NATIONAL NUTRITION BUDGETS

Donor budgets are insufficient to tackle development challenges on their own. Thus, domestic resource mobilization (DRM), which involves encouraging authorities in developing countries to invest local resources in human capital (e.g. health, nutrition, education), is a growing imperative.

On an ongoing basis, NI is discussing new financing mechanisms with local decision-makers in many countries where the responsibility for health care and nutrition has been devolved to the sub-national level. NI will take a multi-year approach to DRM, evaluating potential for mobilizing additional resources from national and sub-national governments, working with decision-makers and budget holders to increase the priority for nutrition (with a focus on low-cost, high impact interventions), and co-developing financing mechanisms that allow for matched funding to be transparent, results-based, and subject to third-party audits and verification.

We will complement this approach with long-term technical assistance to provide better data for decision-making, support budgeting processes, build capacity, and to help develop costed sub-national adaptations of national nutrition plans. We will match increases in sub-national nutrition budgets with our own in a stepped formula that provides maximum support in year 1, and maximum local ownership in year 5. Our aim is to focus on supporting a small number of local governments to scale up resources and results quickly until their performance is far above the average, and then invite others to learn from these experiences.

NI's influence objective is to combine research, technical assistance, advocacy and partnerships to improve policies, programs, and to increase resources for nutrition. Nutrition, a traditionally neglected sector, has been attracting increased attention and resources in the past decade. However, the resources, evidence, policies and programs for nutrition scale-up remain insufficient. For instance, global financing for nutrition is still very low compared to need. Nutrition policies and programs are often less than optimal due to gaps in the evidence base, including around nutrition information systems, programs and knowledge dissemination. Finally, although many developing countries are committed to scaling up nutrition, a lack of technical capacity to design, deliver and track the progress of gender-sensitive, multi-sectoral nutrition plans and programs can often make it very challenging to turn their vision into reality.

Throughout our 25-year history, NI's field experience has yielded many new discoveries in improving delivery and reaching more people effectively, from supporting the development of national fortification strategies to advocating for the addition of new interventions to existing delivery platforms. Looking ahead, we will continue to use our expertise to:

- Innovate, create and disseminate new knowledge through demonstration projects, such as testing the cost, acceptability and feasibility of delivering micronutrients to postpartum women (currently a neglected area).
- Improve the evidence base for adoption of multiple micronutrient supplementation for pregnant women.
- Use our international convening power and presence on global boards and other nutrition forums to call for increased multi-sectoral cooperation and coordination among countries and donors.
- Improve nutrition plans, programs and local ownership through gender-sensitive technical assistance, which engages girls and women in the process.

NUTRITION INTERNATIONAL'S TECHNICAL ASSISTANCE TO TANZANIA

When the National Nutrition Strategy concluded in 2016, the Tanzania Food and Nutrition Commission (TFNC) launched a roadmap to guide the development of the National Multi-Sectoral Nutrition Action Plan (NMNAP) 2017-2021. This document was to be a multi-sector collaboration strategy, aimed at securing the country's nutritional future through a series of technical and social interventions.

In 2016, NI's Technical Assistance for Nutrition (TAN) project, funded by DFID, provided initial technical assistance to support the Micronutrient Task Force's development, costing and finalization of the National Scale-up Plan for Micronutrients 2017-2021. Of note, expertise in gender led to productive discussions on gender issues (including planning for early interventions on anaemia to improve the health of adolescent girls) that were incorporated into the micronutrient scale-up plan.

This micronutrient component eventually became part of the broader NMNAP process, coordinated in-country as part of subsequent assistance also provided through the TAN project at the request of the TFNC.

The NMNAP 2017-2021 was officially launched by the Government of Tanzania in September 2017 and is now being used to guide program and budget planning for nutrition in the country. Moving forward, NI will provide additional support, including to develop anaemia prevention guidelines and tools.

NI's gender objective is to mainstream gender equality throughout all aspects of NI programs and business models to promote gender equality and women and girls' empowerment. While malnutrition affects everyone, women and girls suffer disproportionately due to social, cultural and biological reasons. Gender equality underpins all of Nutrition International's programming. Over the next six years, gender analysis will inform all our work in order to identify inequalities and inequities in status, health, and service access. We believe women and girls must be empowered advocates for their own health and nutrition. That is why we apply a gender lens directly into our projects and the program cycle of all our business models, programs and partnerships.

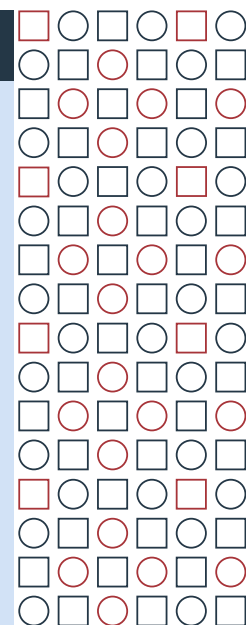
3.5 Business Models that will Deliver the Investment Case

In 2015, NI launched a new suite of business models. These models have been tested and refined over the past three years, and are now ready to be the main vehicles through which our 2018-2024 Investment Case will be implemented.

The Right Start Initiative accelerates the scaling up of a comprehensive package of nutrition interventions, aiming to improve the nutrition status of at least 100 million infants, young children, adolescent girls and women in nine high-burden countries in Asia and Africa. Over the past three years, Right Start has reached millions of people with life-saving interventions. It has also led to pioneering interventions for adolescent girls, including the establishment of inter-ministerial partnerships between the Ministries of Health and Ministries of Education in many countries. This model is funded by Canada, with contributions from other donors such as Australia.

The Nutrition Leverage and Influence for Transformation (NLIFT) model, which is central to our leverage goals, provides catalytic funding to non-nutrition organizations to integrate nutrition into existing non-nutrition platforms. In doing so, NI and its partners are able to crowd-in additional investments and achieve greater synergies. With anchor funding from Canada, NLIFT has forged innovative partnerships and integrated nutrition into health, education and SRH programs, leveraging an estimated \$20 million in cash and in-kind contributions from partners to date.

The Nutrition Technical Assistance Mechanism (NTEAM), which is key to our influence goals, is a global hub of expertise that provides targeted technical assistance to governments and multilateral agencies, particularly for the planning, budgeting, delivery, monitoring and evaluation of nutrition programs, in order to strengthen programmatic delivery capacity within countries. NTEAM has become one of the largest suppliers of technical support to countries in the Scaling Up Nutrition (SUN) Movement. Its anchor funding comes from the United Kingdom.

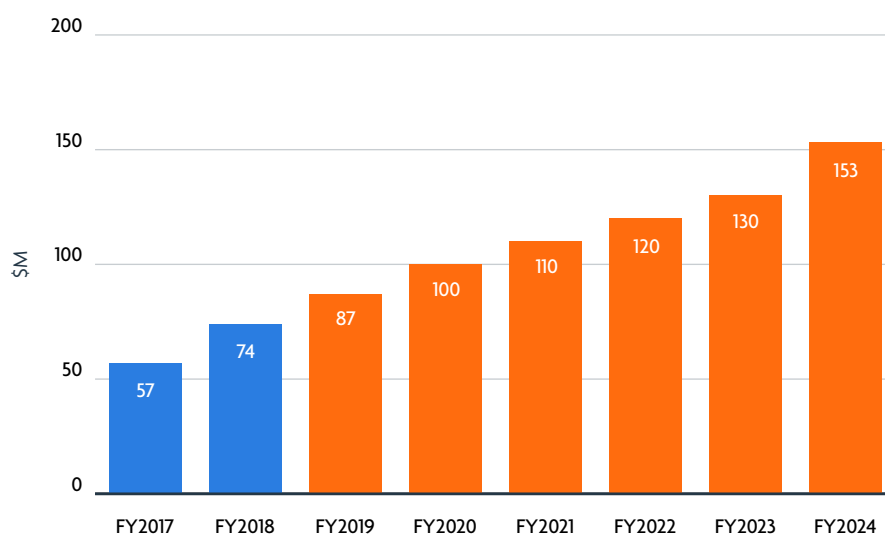


3.6 Resources Required

Over the next six years, we estimate that approximately 80 percent of the \$700 million Investment Case will be spent on maximizing coverage of high-impact, low-cost nutrition interventions. Approximately 10 percent will be spent on activities that will help leverage resources, delivery platforms and new technologies, and 10 percent will be spent on NI's activities to influence others through nutrition surveillance, demonstration projects, advocacy and technical assistance. This ratio will allow NI to minimize financial risks of its investments, ensuring continued – and in some cases expanded – high coverage in proven and high-impact nutrition interventions, and to continue to explore new opportunities and mechanisms to reach the most vulnerable and make even more significant contributions to improved nutrition.

NI expects to enter the new strategic period with \$140 million in hand; the balance of \$560 million will need to be raised through resource mobilization efforts. Program spending will increase gradually over the course of the six-year strategy, in keeping with our recent trajectory (see Figure 4).

FIGURE 4: PROJECTED EXPENDITURE BY FISCAL YEAR (\$M)



4. IMPACT

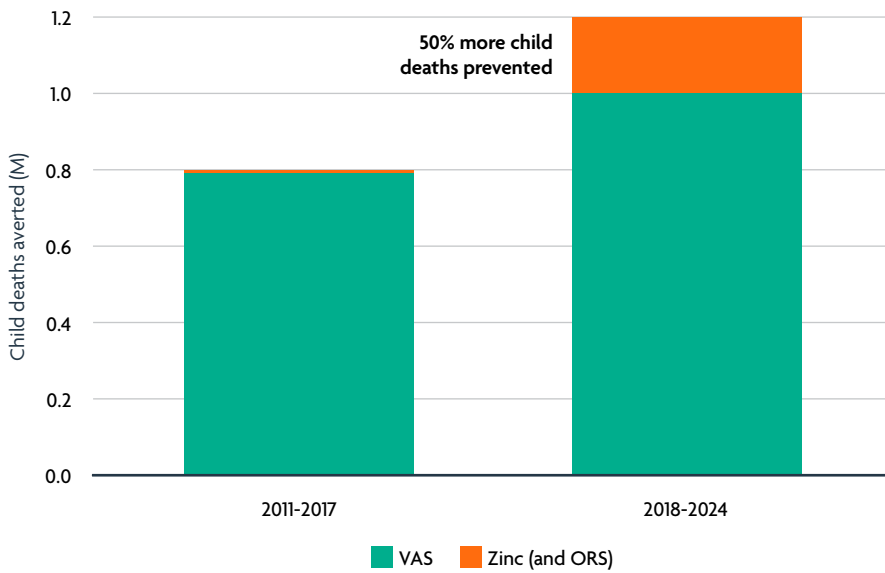
While NI's strategic framework and Investment Case are bold and ambitious, they are based on a solid appraisal of what can be achieved. Based on our 25-year track record, three years of testing and proving our key business models, and the recent strengthening of our internal systems and skills, NI is ready to steward and manage additional funding to multiply our impact. In addition to saving lives, NI's planned investments will also drive major benefits, especially for girls and women, such as improved educational outcomes and increased lifetime earnings. When taken together, the gains in health, education and human capital demonstrate that an investment in NI offers some of the greatest possible ROIs in development.

4.1 Health Impacts

1.2 million child deaths averted: Under-five child mortality has been declining over the past decade, but nearly all of the 5.5 million child deaths that still occur each year are preventable.¹ By maintaining our role as a global leader in VAS and expanding zinc/ORS treatment for diarrhoea, NI will continue to make major contributions to reducing preventable child deaths. Over the course of the coming six years, NI's activities will avert 1.2 million child deaths, a 50 percent increase compared to the previous five-year strategy during which 800,000 child deaths were averted.^{viii}

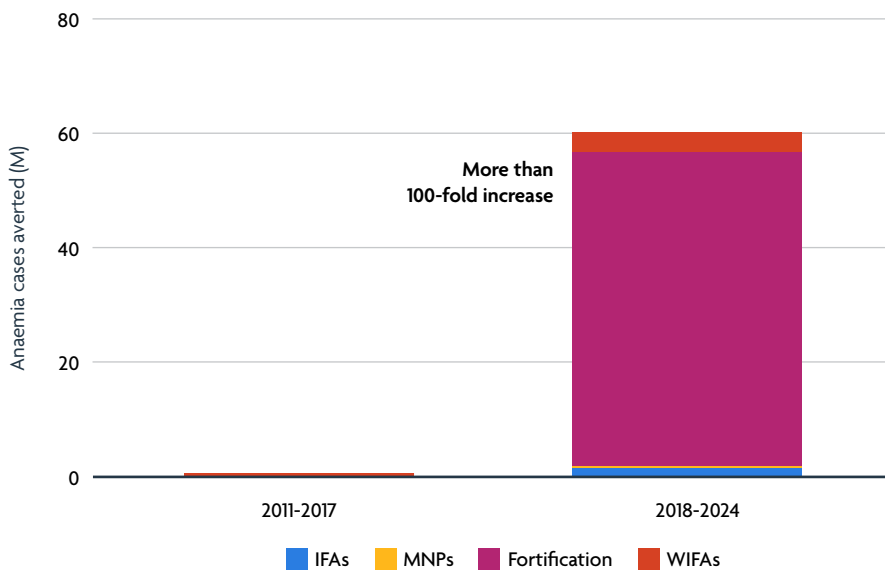
^{viii} NI previously planned and implemented five-year strategies. With 12 years until 2030, when the SDGs are to be achieved, NI has decided to plan and implement two six-year strategies.

FIGURE 5: CHILD DEATHS AVERTED



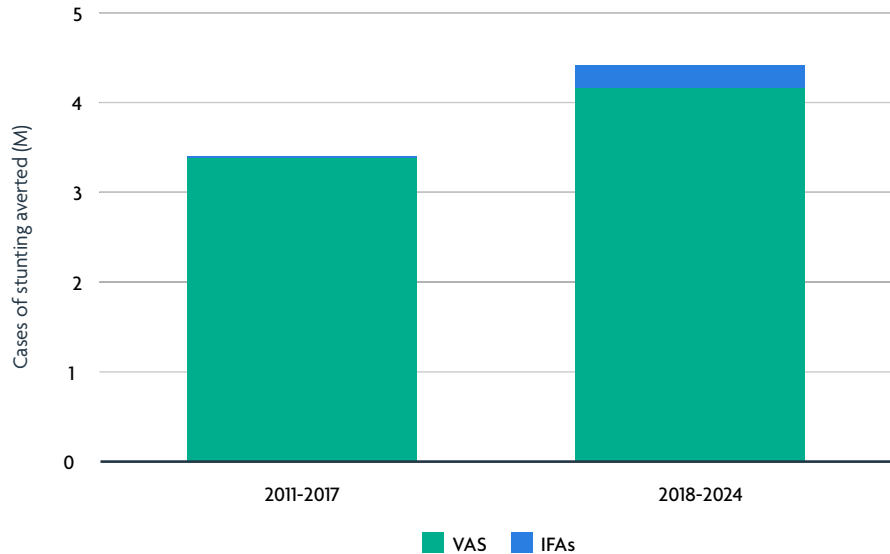
60 million cases of anaemia prevented: Up to 30 percent of women and 43 percent of children worldwide are anaemic,² leading to decreased educational performance, reduced work productivity, and reduced resistance to illness. The rates are even higher in the developing world. For example, the prevalence of anaemia among non-pregnant women is 38 percent in Sub-Saharan Africa and 49 percent in South Asia. One of the most significant impacts of NI's Investment Case will be in anaemia prevention. By fortifying staple foods such as wheat and maize, providing IFA supplementation to pregnant women, pioneering WIFAs for adolescent girls, and reaching under-five children through multiple micronutrient powders (MNPs), NI will prevent 31 million cases of anaemia among women and girls and an additional 29 million cases among men and boys. This is a massive increase compared to the 500,000 cases of anaemia averted over the past five-year period.

FIGURE 6: CASES OF ANAEMIA AVERTED



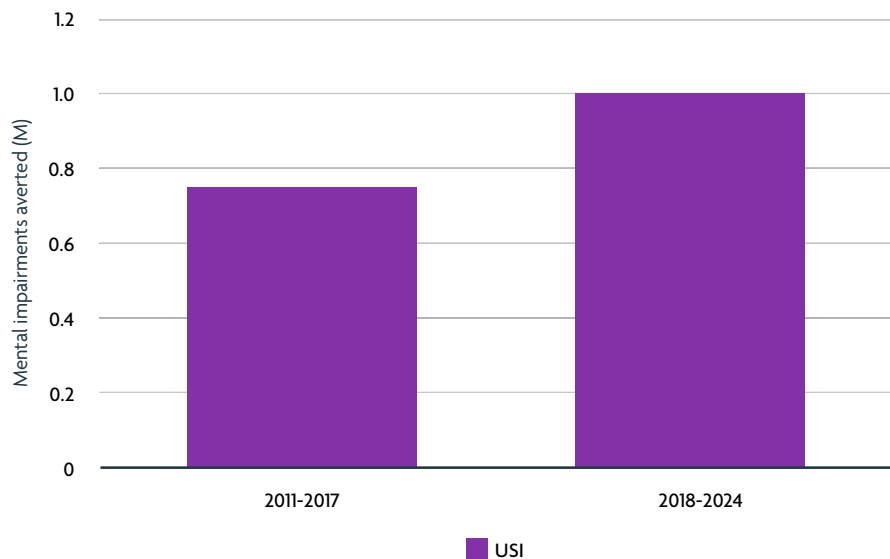
4.3 million stunting cases prevented: Stunting is the most serious consequence of chronic malnutrition. An irreversible condition, stunting leads to inferior cognitive and educational outcomes with lasting consequences on workforce productivity and reduced lifetime earnings. Progress in stunting reduction has been slow, particularly in South Asia. NI's VAS and IFA supplementation programs will result in 4.4 million fewer stunted children in the coming six years, representing a significant increase over the past strategic period in which 3.4 million cases of stunting were averted.

FIGURE 7: CASES OF STUNTING AVERTED



1 million mental impairments averted: NI's continued commitment to increasing access to iodized salt will help reduce the burden of mental impairments globally. Iodine deficiency in pregnant women is a significant cause of mental impairments in newborns, preventing these children from realizing their full potential. NI's investments in USI over the next six years will avert 1 million permanent mental impairments among children, maintaining (and slightly increasing) NI's impact on an annual basis compared to the previous five-year period, when 750,000 impairments were averted.^{ix}

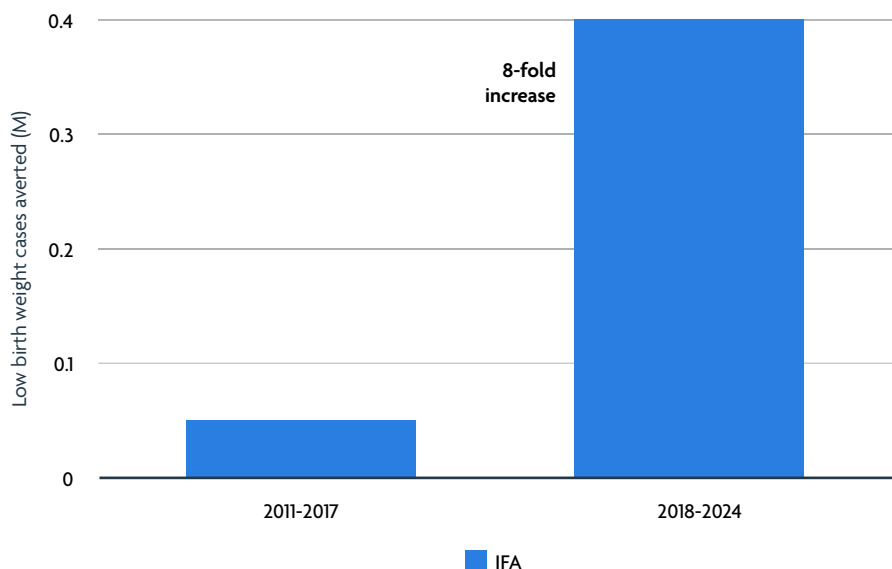
FIGURE 8: MENTAL IMPAIRMENTS AVERTED



^{ix} NI will protect a total of 64 million newborns from mental impairments.

400,000 low birth-weight cases averted: Up to 80 percent of neonatal deaths occur among low birth weight babies⁴ as do 20 percent of stunting cases.⁵ NI's programs to support IFA supplementation will prevent at least 400,000 cases of low birth weight, helping these children to have a healthier start to life. This is a nearly 10-fold increase over the past five-year period, in which approximately 50,000 cases of low birth weight were averted due to NI's activities.

FIGURE 9: CASES OF LOW BIRTH WEIGHT AVERTED



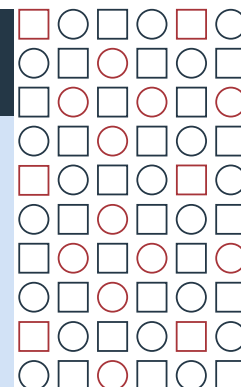
10,000 neural tube defects prevented: Although relatively rare, neural tube defects (NTDs) can have a devastating effect on babies and their families. Through our food fortification programs, NI will prevent 10,000 NTDs over the next six years.

4.2 Human Capital Impacts

The benefits of NI's interventions and programming extend well beyond saving lives and averting health morbidities. Children who are well-nourished are healthier and able to perform better and stay in school longer. They will grow up to have higher lifetime earnings for themselves and their families, which has cumulative economic benefits for the countries where they live.⁶⁻¹⁵

IMPROVING EDUCATION OUTCOMES BY DELIVERING NUTRITION INTERVENTIONS THROUGH SCHOOLS

Nutrition International reaches people through a variety of platforms and sectors, including the health system, private sector and social protection programs. NI is increasingly working with the education sector to deliver WIFAS and nutrition counselling to adolescent girls and boys. By delivering nutrition interventions in schools, improvements can be made in student's health (e.g. averting cases of anaemia) and educational outcomes. For adolescent girls in particular, investments in comprehensive sex education, reproductive health knowledge and related services, sanitary facilities, and iron supplementation are crucial to support school enrollment and retention. Iron supplementation has been found to increase attention, concentration and intelligence.^x



^x Bundy, D. A. P., N. de Silva, S. Horton, D. T. Jamison, and G. C. Patton 2018. *Optimizing Education Outcomes: High-Return Investments in School Health for Increased Participation and Learning*. Washington, DC: World Bank.

NI's largest contributions to increasing human capital will occur through high coverage of interventions that protect cognitive potential in infants and children, such as the promotion of exclusive breastfeeding, USI, and IFA supplementation. This coverage will improve learning ability, enable children to stay in school longer, and ultimately increase their lifetime earnings.⁵⁻¹⁴

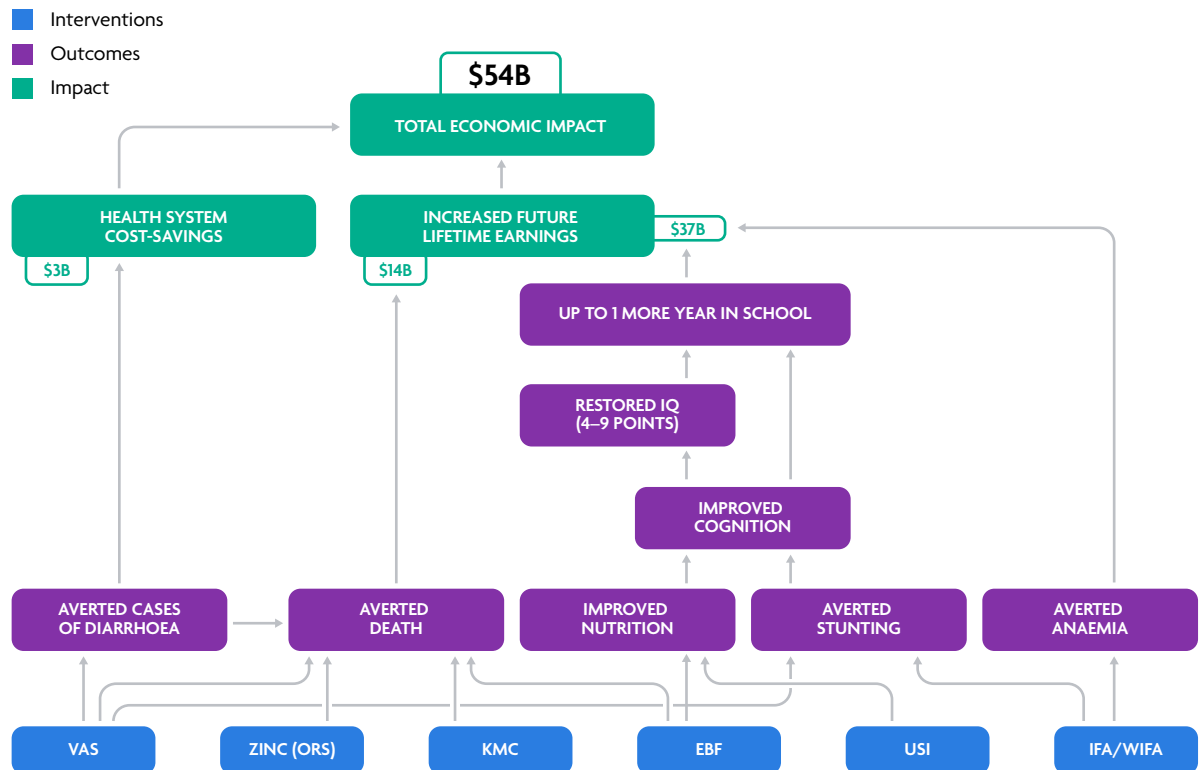
The estimated cumulative human capital and economic benefits emerging from NI's work include:^{xi}

- At least 10 million children who would otherwise have below-normal intelligence gaining an average of 8.5 IQ points each, allowing them to achieve their full potential due to salt iodization and exclusive breastfeeding counselling.
- The same 10 million children will also gain an extra year of education.
- Approximately \$54 billion in economic benefits will be generated by saving the lives of 1.2 million children and improving the lives of millions of children, girls and women.
- Included in this, approximately \$3 billion in cost-savings may be generated through the reduction in health treatment costs for diarrhoea due to the prevention of diarrhoea by VAS.

4.3 Overall Economic Benefits and Return on Investment

As shown in Figure 10, NI investments lead to gains in cognition and educational attainment through a number of pathways, which result in an increase of \$37 billion in estimated lifetime earnings for the women, adolescent girls and children due to productivity increases achieved through better health. When these are combined with the additional \$14 billion in estimated lifetime earning recovered as a result of the 1.2 million children's lives saved, our \$700 million Investment Case will generate approximately \$54 billion in economic gains, an ROI of \$28 for every \$1 invested.

FIGURE 10: PATHWAYS LINKING NI INTERVENTIONS* TO HUMAN CAPITAL AND ECONOMIC BENEFITS

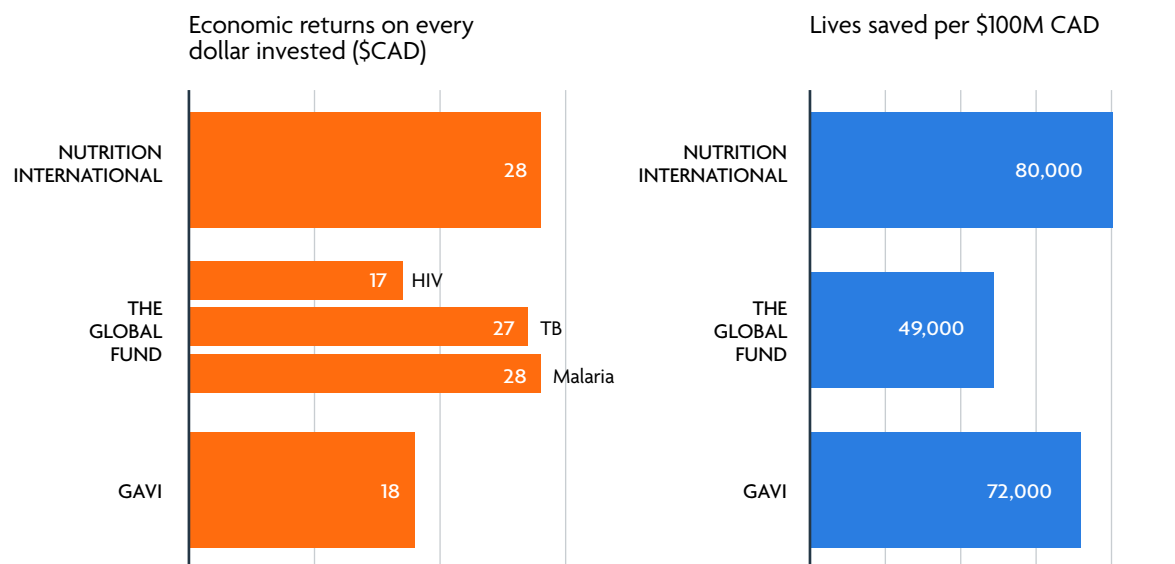


* VAS= Vitamin A Supplementation
 Zinc (ORS)= Zinc (Oral Rehydration Salts)
 KMC= Kangaroo Mother Care
 EBF= Exclusive Breastfeeding
 USI= Universal Salt Iodization
 IFA/WIFA= Iron Folic Acid Supplementation/Weekly Iron and Folic Acid Supplementation

^{xi} See Appendix C for a detailed list of all health and human capital impact pathways.

NI is one of the most cost-effective, highest impact life-saving organizations in the world. As shown in the table below, NI's projected cost per life saved and estimated return on investment, which estimates economic productivity gained from both averted disease and from averted death, compare favourably to similar estimates from large and efficient global health initiatives like Gavi and the Global Fund whose work is crucial to achieving the SDGs.

FIGURE 11: ROI COMPARISON¹⁶⁻²⁰



4.4 NI Improves Chances for Women and Girls to Reach Full Potential

Gender equality underpins all of NI's programming. Women and girls suffer from poorer nutritional outcomes than their male peers. Poor nutrition is one of the key barriers preventing women and girls from reaching their full potential. They shoulder a greater burden of disease for social and biological reasons, they are more likely to underperform in school, and as a result they have fewer opportunities to enter the workforce or are only eligible for the lowest paying jobs.

NI's investments in women and girls start at the beginning of the lifecycle, by averting 600,000 deaths among girls under five. NI will ensure its programs support girls throughout the course of their lives, such as helping at least 5 million adolescent girls perform better in school due to prevented anaemia (via WIFAS and fortification). Over their lifetime, the earning potential of these adolescent girls will increase significantly, which will fuel good nutrition for themselves, their future families, and increase their chances of escaping poverty.

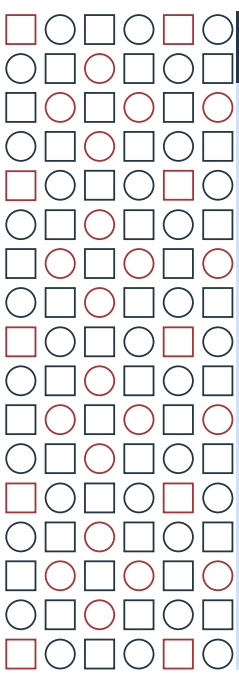
4.5 Bending the Anaemia Curve on a Global Scale

NI's ability to reach millions of people will make a real and measurable difference to end malnutrition. For example, the combined impact of NI's IFA programming and support to food fortification will make a 10 percent contribution towards reaching the SDG anaemia target^{xii} in all countries where NI works^{xiii} by 2024.^{xiv} Working with local governments and partners, NI will avert one in every seven cases of anaemia that need to be averted to reach the SDG goal in Bangladesh and one of every 10 cases to be averted in Ethiopia.

^{xii} Reduce anaemia cases by 50 percent by 2030

^{xiii} Except India, where the contribution is expected to be 2 percent, due to the size of the country's population

^{xiv} Averting 20 percent of the cases of iron-deficiency anaemia, which make up approximately half of all cases of anaemia.



PINKK: IMPROVING THE RESILIENCE OF COMMUNITIES AND FAMILIES IN SENEGAL

Kolda and Kédougou are two of Senegal's most impoverished regions, with the highest rates of chronic malnutrition. Forty percent of the population lives below the poverty line and more than half suffer from food insecurity. In these difficult circumstances, women and children are the hardest hit.

These conditions are not the result of a single factor and there is no single solution. To support the vulnerable people living in these regions, NI launched *Projet intégré de nutrition dans les régions de Kolda et de Kédougou* (PINKK) in 2015. PINKK combines the strengths of development organizations, financial institutions and government to help families and communities in these regions improve their resilience to food shocks, such as those caused by climate change.

PINKK is the result of collaboration between NI, World Vision, Cellule de lutte contre la malnutrition, and Développement international Desjardins to improve healthcare and nutrition practices and support communities – especially women – to cultivate their own nutrient-rich foods. We also support these women in the development of business models to sell these products, and work with local governments to strengthen and implement nutrition policies and programs.

With \$20 million in funding from Canada, PINKK aims to improve the lives of 165,000 women and children and reach half of all households in Kolda and Kédougou by 2020. By integrating solutions from different sectors, we can more effectively create positive and sustainable progress in these regions. And by giving women the tools they need, we can improve their resilience to food shocks and other crises.

4.6 Call for Long-term Investment

NI's ability to reduce malnutrition and save lives depends on predictable, long-term funding. Strengthening nutrition programs on the ground, developing new partnerships, and building stronger country policies and systems takes time and patience. Country leaders and implementing partners need to have confidence that NI's support will be reliable and sustained. For market-shaping, suppliers need to know that NI will be able to honour multi-year contracts. For effective nutrition policy advice, governments need to know that NI will be there over several years to support them. It is therefore vital to NI's strategic goals to have a fully funded Investment Case early in the six-year period.

4.7 Risks and Mitigation

While NI's Investment Case is grounded in experience, data, and an exhaustive exercise to model the multitude of ways of investing \$700 million, there are still several risks that NI will need to manage carefully.

One risk relates to possible security threats in several of the countries where it works. NI remains vigilant and prioritizes the safety of its staff above all else. Going forward, NI will monitor and continuously evaluate security situations, and make the necessary adjustments.

An additional risk is that NI will find it difficult to forge multi-sectoral nutrition partnerships with other organizations in areas like water and sanitation, education, and gender, either because these other sectors are under-funded or because other organizations prove reluctant to embrace the nutrition agenda. To address this risk, NI will continue to explore a wide range of partnerships, recognizing that some will not materialize, and will use its NLIFT budget to give financial incentives to other organizations to test new alliances.

5. CONCLUSION

The global community has committed to ending poverty and inequity by 2030 through the SDGs.

Good nutrition is essential to reaching these objectives.

A fully funded NI is critical to achieving the SDGs.

Few other development organizations have the capability to reach hundreds of millions of people or possess the proven track record of delivering critical nutrition interventions on a global scale. In addition to sustaining high coverage, NI's work is critical to helping countries build their technical knowledge and increase domestic resource mobilization to drive and sustain the fight against malnutrition. With \$700 million, NI will ensure that the world's children have access to essential, life-saving micronutrients including vitamin A, zinc and iodine; that women and girls are protected from anaemia; and that the next generation of children have the best chance to reach their fullest potential.

APPENDICES

APPENDIX A. TECHNICAL APPROACH OVERVIEW

The goal of modelling

NI set ambitious but achievable goals for our 2018-2024 strategic case, using a dynamic model that combined validated impact pathways and NI's own unit cost estimates. This model was used to determine the ultimate impact in terms of lives saved and malnutrition-related morbidities averted, when interventions, coverage, and country allocations were varied within a \$700 million envelope.

The goal of the model was to determine an optimized allocation of resources across NI's interventions and 10 countries of operation that generated the most impact, while maintaining a balance between cost-effectiveness, maintaining past progress, filling gaps and maintaining equity.

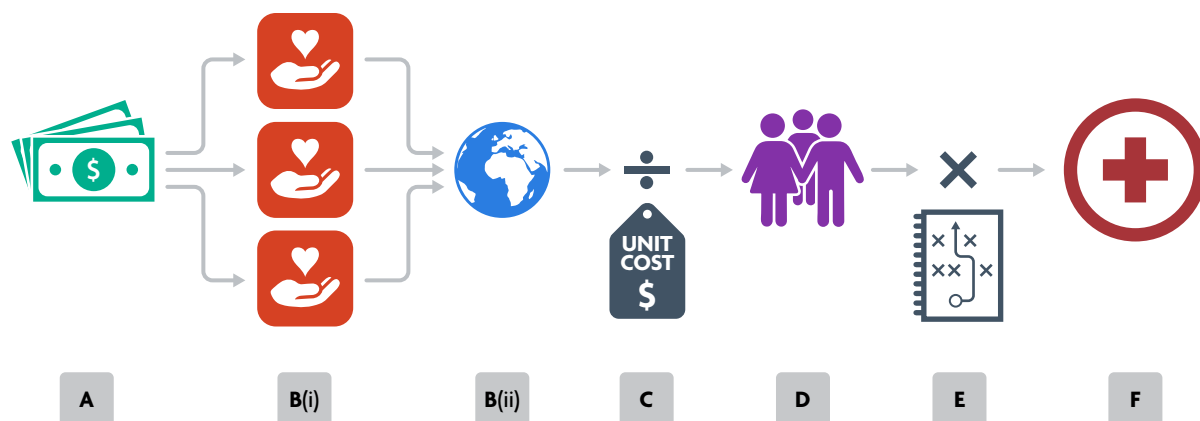
The framework

We designed a dynamic model that would test different ways to divide a budget of \$700 million among interventions and geographies, and show the associated impact under each scenario.

Model framework

Figure 12 shows a simplified framework that represents how NI modelled the results presented in this case.

FIGURE 12: MODEL FRAMEWORK



- A) **Funding envelope:** The main starting point of the model is the funding envelope. To support the current NI strategy and leverage the needed resources to execute our strategy, the overall funding goal for 2018-2024 was set at \$700 million.
- B) **Key levers:** The model allows this funding envelope to be allocated across the two main variables, intervention and geography.
- Intervention lever:** The intervention lever allows the funding envelope to be split among the 13 NI interventions including: USI; fortification; VAS; Zinc/ORS treatment for diarrhoea; IFAs; WIFAS; birth package; IYCN; NLIFT; and other research and pilot projects. See Appendix B for more information on NI interventions.
 - Country lever:** The second lever allows the allocated funding for each intervention to be varied between 10 NI countries: Bangladesh, Ethiopia India, Indonesia, Kenya, Nigeria, Pakistan, Philippines, Senegal, and Tanzania.

- C) **Unit cost:** After arriving at a hypothetical funding allocation for each intervention within each NI country, these allocations were divided by unit costs to estimate the reach of each intervention. These unit costs are based on unique NI program data and represent the “cost per additional person reached.” All program-level costs are captured in these values, including overhead, administrative costs, and loss to follow-up in intervention delivery.
- D) **Reach:** The funding allocations divided by the unit costs determined reach estimates. Reach totals were estimated for each intervention within each of the 10 countries. Net reach for NI’s overall portfolio was calculated by accounting for overlap between interventions.
- E) **Impact pathways:** Impact pathways were developed to determine the relationship between the number of people reached, and health and human capital outcomes. The health impact pathways were developed from NI monitoring and evaluation methodologies and existing published literature, such as the Lives Saved Tool, and were validated by the Bloomberg School of Public Health at Johns Hopkins University. Human capital impact pathways were developed through extensive literature review and in consultation with content-specific experts. Once developed, the human capital impact pathways were then validated by the content-specific experts and NI internal technical specialists. See Appendix C for more information on these impact pathways.
- F) **Impact:** Impact pathways translated reach into lives saved, anaemia cases averted, mental impairments averted, low birth weight cases averted, stunting cases averted, neural tube defects averted, economic losses averted, cost-savings due to reduced health care treatment costs, increased IQ points and education years gained. These outcomes were modelled for each country and then aggregated to arrive at summary global estimates.

Model design

The model was constructed in Microsoft Excel. The foundation of the model was built on existing NI internal planning tools which were adapted for the purposes of this endeavour.

Optimization Process

A defining feature of this Investment Case is the methodology used to arrive at an optimized utilization of the \$700 million resource envelope. The following steps outline this process:

- Preliminary results demonstrated that interventions associated with lives saved, anaemia cases averted and mental impairments averted had the greatest potential impact. These outcomes were prioritized based on scope of impact and ability to contribute to global goals, and were defined as the main outcomes to be optimized. All the interventions are expected to be synergistic towards improved health and wellbeing outcomes.
- To understand the upper boundaries of maximization for each of these outcomes, extreme scenarios were designed such as: “maximum lives saved” and “maximum anaemia cases averted.” These scenarios were designed by prioritizing funding allocations towards interventions that most related to these outcomes, such as zinc/ORS for lives saved and fortification for anaemia cases averted.
- An iterative process was then conducted with NI strategy and program staff to balance maximization aims and feasibility limitations on how many individuals could actually be reached or how fast an intervention could actually be scaled up. NI’s country offices provided information which helped determine the maximum capacity and potential for scale-up for each intervention in each country.
- The final scenario reflects NI’s strategy and represents the optimized distribution of funding across NI interventions and countries to maximize lives saved, anaemia cases averted and mental impairments averted.

APPENDIX B. SUMMARY OF NUTRITION INTERNATIONAL'S INTERVENTIONS

The following list summarizes NI's ongoing interventions that are included as a core part of the 2018–2024 strategy.

INTERVENTION	TARGET POPULATION	DESCRIPTION	DELIVERY PLATFORM
Birth package			
Kangaroo mother care	Newborns	Kangaroo mother care for low birth weight and preterm babies can reduce infant mortality and promote breastfeeding	Health facilities
Timely initiation of breastfeeding		Timely initiation of exclusive breastfeeding within 24 hours of birth reduces infant mortality by protecting against childhood infections and promoting success of exclusive breastfeeding	
Food fortification	All population groups	Food fortification is used to add nutrients to foods at a higher level than they naturally have in order to address population level deficiencies	Private sector
Infant and young child nutrition (IYCN)			
Multiple micronutrient powders (MNPs)	Children 6-59 months	MNPs are used to boost the nutrition quality of complementary foods, particularly in supplementing local foods with iron and other micronutrients	Health facilities, child health days, social protection programs
Exclusive breastfeeding promotion	Children 0-6 months	Exclusive breastfeeding counselling is provided to young moms Breastfeeding protects against pneumonia and diarrhoea	
Iron and folic acid supplementation for pregnant women (IFA)	Pregnant women	Iron and folic acid supplementation reduces the risk of anaemia in pregnancy and promotes improved nutritional outcomes in newborns	Health facilities, community health workers
Universal salt iodization (USI)	All population groups	Universal salt iodization involves ensuring that all salts used for cooking and household purposes, as well as processed foods and animal salts are adequately fortified with iodine to protect the population against iodine deficiency	Private sector
Vitamin A supplementation (VAS)	Children 6-59 months	Twice yearly supplementation with VAS contributes to an all-cause mortality reduction due to protecting against disease Twice yearly supplementation with VAS contributes to stunting reduction by reducing the number of times a child has diarrhoea	Campaign, health facilities, community outreach, early childhood development centres
Weekly iron folic acid supplementation (WIFAS)	Adolescent girls	WIFAS reduces the risk of anaemia in adolescent girls WHO recommends WIFAS to prevent anaemia in menstruating girls	Schools/ community outreach
Zinc supplementation and oral rehydration salts (ORS)	Children 6-59 months	Zinc deficiency is a leading risk factor for infectious diseases In combination with ORS, zinc is therapeutic for children recovering from diarrhoea	Health facilities, community outreach

APPENDIX C. IMPACT PATHWAYS

Impact pathways and underlying evidence used for modelling were peer-reviewed and substantiated by colleagues at Johns Hopkins University, members of the Lives Saved Tool (LiST) Team and other leading public health experts.

HEALTH PATHWAYS					
INTERVENTION	OUTCOME	TARGET POPULATION	EFFECT SIZE	IMPACT CALCULATION	REFERENCE (FULL SET IN APPENDIX F)
Birth package					
Kangaroo mother care (KMC)	Neonatal mortality	Pregnant women	Reduces neonatal mortality risk by 40% among low birth weight infants	$(\# \text{ reached with birth package}) * (\text{neonatal mortality rate}) * (\text{effect size})$	Conde-Agudelo A, Belizán JM, Diaz-Rossello J et al. (2011)
Timely initiated breastfeeding (TIBF)			Reduces neonatal mortality risk by 26%	$(\# \text{ reached with birth package}) * \text{neonatal mortality} * (1 - \text{prevalence of low birth rate}) * (\% \text{ of infant deaths due to infectious disease}) * (\text{effect size})$	Debes AK, Kohli A, Walker N, et al. (2013)
Food fortification	Anaemia	Women of reproductive age	Reduces anaemia risk by 24%	$(\# \text{ women reached by fortification}) * (\text{prevalence of anaemia in non-pregnant women}) * (\% \text{ of non-pregnant women who consume fortified foods}) * (\text{effect size})$	Debes AK, Kohli A, Walker N, et al. (2013)
Food fortification	NTDs	All	Reduces risk of NTDs by 46%	$(\# \text{ women of reproductive age reached}) * (\text{birth rate}) * (\text{prevalence of NTDs among live births}) * (\text{effect size})$	Blencowe H, Cousens S, Modell B, et al. (2010).
IFA	Anaemia	Pregnant women	Reduces risk of anaemia by 67%	$(\# \text{ pregnant women reached with IFA}) * (\text{prevalence of iron deficiency anaemia among pregnant women}) * (\text{effect size})$	Pena-Rosas JP, De-Regil LM, Garcia-Casal MN, et al. (2015).
IFA	Low birth weight	Pregnant women	Reduces low birth weight risk by 19%	$(\# \text{ pregnant women reached with IFA}) * (\text{prevalence of low birth weight among live births}) * (\text{effect size})$	Haider BA, Olofin I, Wang M, et al. (2013).
IFA	Stunting	Pregnant women	Reduces stunting risk by 65% in children that successfully averted low birth weight	$(\# \text{ pregnant women reached with IFA}) * (\text{prevalence of low birth weight among live births}) * (\text{effect size of IFA on low birth weight}) * (\text{effect size of low birth weight on stunting})$	Christian P. (2014).
IYCN Multiple micronutrient powders	Anaemia	Under-5 children	Reduces anaemia risk by 31%	$(\# \text{ reached with IYCN}) * (\text{prevalence of anaemia in under-5 children}) * (\text{effect size})$	De-Regil LM, Suchdev PS, Vist GE, et al. (2013).
IYCN Exclusive breastfeeding counselling	Infant mortality	0-6 months	Reduces infant mortality by 31%	$(\# \text{ reached with IYCN}) * (\text{infant mortality rate}) * (80\% \text{ of infant deaths in 0-6 months}) * (\text{effect size}) * (\% \text{ caregivers who change behaviour})$	Debes AK, Kohli A, Walker N, et al. (2013).

HEALTH PATHWAYS					
INTERVENTION	OUTCOME	TARGET POPULATION	EFFECT SIZE	IMPACT CALCULATION	REFERENCE (FULL SET IN APPENDIX F)
USI	Mental impairments	All	Reduces newborn mental impairment, as a result of maternal goitre, by approximately 3.4%	(# newborns reached with USI) * (Total Goiter Rate) * (proportion of infants born to mothers with goitre who are severely impaired)	Clugston et al. 1987. Burkhalter et al. 1994.
Vitamin A supplementation (VAS)	Under-5 mortality	Children 0-59 months	Reduces all-cause child mortality by up to 12%	Lower bound = (total deaths, 6-59 months) × (coverage) × (effect of VAS on cause-specific mortality, diarrhoea) × (proportion of deaths due to diarrhoea, %) Upper bound = (total deaths, 6-59 months) × (coverage) × (effect of VAS on all-cause mortality)	Imdad et al. 2011
Vitamin A supplementation (VAS)	Stunting	Children 6-59 months	Reduces incidence of diarrhoea by 15%; in turn, reduced diarrhoea incrementally reduces odds of child stunting (Odds of stunting per episode of diarrhoea: 1.025)	[[[# reached with 2-dose VAS) * (incidence of diarrhoea, 6-59 months) * (effect size on reducing diarrhoea)] / (incidence of diarrhoea, 6-59 months)] * (prevalence of stunting, u5 years) * [1-(1 / (incremental effect of diarrhoea on stunting) ^ (incidence of diarrhoea))	Mayo-Wilson E et al. BMJ 2011. Checkley W. et al. International Journal of Epi (2008)
WIFA	Anaemia	Adolescent girls	Reduces risk of anaemia by 27%	(# adolescents reached with WIFA) * (prevalence of anaemia in adolescent girls) * (effect size)	Fernandez-Gaxiola AC, De-Regil LM. (2011).
WIFA	NTDs	Adolescent girls	Reduces risk of NTDs by 46%	(# reached by WIFA) * (birth rate) * (prevalence of NTDs among live births) * (effect size)	Blencowe H, Cousens S, Modell B, et al. (2010).
Zinc + ORS	Under-5 mortality	Children 1-59 months	Zinc reduces risk of child mortality to diarrhoea by 23%, in addition to the effect of ORS (84%).	[[[# reached with zinc + ORS) * (mortality rate children 1-59 months due to diarrhoea) * effect size of zinc] + [[[# reached with zinc + ORS) * (mortality rate children 1-59 months) * (% deaths 1-59 months due to diarrhoea) – lives saved by zinc] * effect size of ORS]	Fischer Walker CL, Black RE. (2010); Munos M, Fischer Walker CL, Black RE. (2010).

The economic evaluation as part of the Investment Case followed, where possible, the Bill and Melinda Gates Foundation Methods for Economic Evaluation Project Reference Case (2014). The base case scenario of the economic analysis assumed a 3% discount rate on economic benefits and a long-term mean GDP per capita growth rate of 4% per year, which is equivalent to the historical LMIC mean GDP growth rate over the previous 20-30 years. Country-level data on labour share of income and labour force participation rate from the World Development Indicators database were also factored into the calculations of economic gains. Given that the proposed \$700M investment into Nutrition International's initiatives may not include the costs incurred by governments and other delivery partners, the return on investment (ROI) and number of lives saved per \$100M estimates used an estimate for the total societal cost of

implementing these interventions of \$1.9B in the calculations. The total societal cost of NI interventions was calculated by multiplying the projected reach of interventions by estimated country-level unit cost data for each intervention from Shekar et al. (2016) "Investment Framework for Nutrition" plus the NI unit cost. In general, these estimates may be conservative and sensitivity analysis conducted on the ROI estimates suggests that their return on investment is positive but subject to changes in economic growth rates, effectiveness of interventions, prevalence of disease, cost of delivery, and other key factors.

HUMAN CAPITAL AND ECONOMIC BENEFIT PATHWAYS					
INTERVENTION	OUTCOME	TARGET POPULATION	EFFECT SIZE	IMPACT CALCULATION	REFERENCE (FULL SET IN APPENDIX F)
IFA	Education years gained	Pregnant women	1.59 years of additional education for each child with averted stunting	Number of children with averted stunting gain 1.59 years of education	Galasso & Wagstaff (2017).
IFA	Future lifetime earnings saved	Pregnant women	Between 7.3%-18.5% of income gained each year for each additional year of education	Number of children with averted stunting * effect size * % income gained per additional year of education * discounted GDP per capita summed over working lifetime * % labour share of income * labour force participation rate	Montenegro, C. E., & Patrinos, H. A. (2014).
IYCN	Cases of non-EBF averted	Pregnant women	73% of pregnant women who are effectively counselled through IYCN will exclusively breastfeed for 6 months	Number of pregnant women reach with IYCN * Prevalence of non-EBF * effect size	Cai, X., Wardlaw, T., & Brown, D. W. (2012). Imdad, A., Yakoob, M. Y., & Bhutta, Z. A. (2011).
IYCN	IQ points gained	Pregnant women	3.76 IQ points gained for each child exclusively breastfed	Number of children who are exclusively breastfed will gain 3.76 IQ points	Victora, C. G., et al. (2015)
IYCN	Education years	Pregnant women	0.91 years of education for each child exclusively breastfed	Number of children who are exclusively breastfed will gain .91 years of education	Victora, C. G., et al. (2015)
IYCN	Future lifetime earnings saved	Pregnant women	Between 7.3%-18.5% of income gained each year for each additional year of education	Number of children who are exclusively breastfed * effect size * % income gained per additional year of education * discounted GDP per capita summed over working lifetime	Montenegro, C. E., & Patrinos, H. A. (2014).
IYCN	Cost of productivity from averted deaths	Pregnant women	GDP per capita	Net deaths averted * discounted GDP per capita summed over working lifetime * % of population that reaches 65	WHO Global Health Observatory data repository: Life expectancy data by country. 2015. WHO. Strengthening Primary Healthcare through Community Health Workers: Investment Case and Financing Recommendations. 2015.

HUMAN CAPITAL AND ECONOMIC BENEFIT PATHWAYS

INTERVENTION	OUTCOME	TARGET POPULATION	EFFECT SIZE	IMPACT CALCULATION	REFERENCE (FULL SET IN APPENDIX F)
USI	Cases of iodine deficiency averted	Birth cohort	Reduces risk of iodine deficiency by 60%	Number in birth cohort reached by USI * Prevalence of moderate to severe iodine deficiency * Impact of USI on iodine deficiency (1-RR) * % population affected by mental impairments	World Health Organization. Iodine status worldwide: WHO global database on iodine deficiency. 2004. Iodine Global Network. Global Scorecard of Iodine Nutrition in 2017 in the general population and in pregnant women (PW). Imdad, A., Yakoob, M. Y., & Bhutta, Z. A. (2011).
USI	IQ points gained	Birth cohort	8.18 IQ points gained for each child with averted iodine deficiency	Number of children with averted iodine deficiency will gain 8.18 IQ points	Aburto et al. (2014)
USI	Education years gained	Birth cohort	0.73 education years gained for each child with averted iodine deficiency	Number of children with averted iodine deficiency will gain 0.73 education years	Field E, Robles O, Torero M. (2009).
USI	Future lifetime earnings saved	Birth cohort	Between 7.3%-18.5% of income gained each year for each additional year of education	Number of children with averted iodine deficiency * effect size * % income gained per additional year of education * discounted GDP per capita summed over working lifetime * % labour share of income * labour force participation rate	Montenegro, C. E., & Patrinos, H. A. (2014).
WIFA, IFA, MNPs, Fortification	Future lifetime earnings saved	All women	Between 0.6%-2.3% of income is lost per year from anaemia	Averted anaemia cases * income lost per year from anaemia * GDP per capita for one year * % labour share of income * labour force participation rate	Horton, S., & Ross, J. (2003). The economics of iron deficiency. Food policy, 28(1), 51-75.
WIFA, Fortification	Cases of adolescent anaemia	Adolescents	-	Anaemia cases averted * % WRA population ages 15 to 19	Derived from WPP 2017
WIFA, Fortification	Future lifetime earnings saved	Adolescents	Between 0.6%-2.3% of income is lost per year from anaemia	Cases of adolescent anaemia * income lost per year from anaemia * GDP per capita for one year * % labour share of income * labour force participation rate	Horton, S., & Ross, J. (2003). The economics of iron deficiency. Food policy, 28(1), 51-75.
Birth Package	Cost of productivity from averted deaths	Pregnant women	GDP per capita	Neonatal deaths averted * discounted GDP per capita summed over working lifetime * % of population that reaches 65 * % labour share of income * labour force participation rate	WHO Global Health Observatory data repository: Life expectancy data by country. 2015. WHO. Strengthening Primary Healthcare through Community Health Workers: Investment Case and Financing Recommendations. 2015.

HUMAN CAPITAL AND ECONOMIC BENEFIT PATHWAYS

INTERVENTION	OUTCOME	TARGET POPULATION	EFFECT SIZE	IMPACT CALCULATION	REFERENCE (FULL SET IN APPENDIX F)
VAS	Net averted deaths	Children 0-59 months	-	Under 5 deaths averted (Yr1 + Yr2) + (2/9 * under 5 deaths averted) (Yr 3 +...+ YR X)	2/9 is assumption on number of net reached children
VAS	Education years gained	Children 0-59 months	1.59 years of additional education for each child with averted stunting	Number of children with averted stunting gain 1.59 years of education	Galasso & Wagstaff (2017).
VAS	Future lifetime earnings saved	Children 0-59 months	Between 7.3%-18.5% of income gained each year for each additional year of education	Number of children with averted stunting * effect size * % income gained per additional year of education * discounted GDP per capita summed over working lifetime * % labour share of income * labour force participation rate	Montenegro, C. E., & Patrinos, H. A. (2014).
VAS	Cost of productivity from averted deaths	Children 0-59 months	GDP per capita	Net averted deaths * discounted GDP per capita summed over working lifetime * % of population that reaches 65 * % labour share of income * labour force participation rate	WHO Global Health Observatory data repository: Life expectancy data by country. 2015. WHO. Strengthening Primary Healthcare through Community Health Workers: Investment Case and Financing Recommendations. 2015.
VAS	IQ points gained	Children 0-59 months	Effect size: 9 IQ points gained for each child stunting averted	Impact calculation: Number of children with stunting averted will gain 9 IQ points	Reference: Galasso and Wagstaff (2017).
VAS	Cost-savings of reduced health care treatment from diarrhoea prevention	Children 0-59 months	-	Number of cases of diarrhoea averted * portion of cases of diarrhoea that visited health facility for treatment * unit cost for treatment of diarrhoea at health facility	Siregar, Pitriyan & Walters (2018).
Zinc + ORS	Net averted deaths	Children 1-59 months	-	Under 5 deaths averted from Zinc + ORS * 15%	15% is assumption on number of net reached children
Zinc + ORS	Cost of productivity from averted deaths	Children 1-59 months	GDP per capita	Net deaths averted * discounted GDP per capita summed over working lifetime * % of population that reaches 65 * % labour share of income * labour force participation rate	WHO Global Health Observatory data repository: Life expectancy data by country. 2015. WHO. Strengthening Primary Healthcare through Community Health Workers: Investment Case and Financing Recommendations. 2015.

APPENDIX D. KEY NUTRITION INDICATORS FOR NUTRITION INTERNATIONAL CORE COUNTRIES

	NEONATAL MORTALITY (PER 1,000 LIVE BIRTHS)	INFANT MORTALITY RATE (PER 1,000 LIVE BIRTHS)	NUMBER OF DEATHS 1-4 YEARS (PER 100,000 INDIVIDUALS)	PREVALENCE OF ANAEMIA IN NON-PREGNANT WOMEN	PREVALENCE OF IRON-DEFICIENCY ANAEMIA AMONG PREGNANT WOMEN	MENTAL IMPAIRMENTS (PER 100 LIVE BIRTHS WITH NO USI)	PREVALENCE OF STUNTING AMONG UNDER-5 CHILDREN
Africa							
Sub-Saharan Africa	28.3	53.3	252.2	38.0%	20.4%	-	34.1%
Ethiopia	28.5	41.0	165.2	22.5%	12.2%	0.03	40.4%
Kenya	23.1	35.6	130.6	25.7%	14.9%	0.02	26.0%
Nigeria	34.7	66.9	336.9	48.6%	24.1%	0.04	32.9%
Senegal	20.6	33.6	181.0	49.8%	25.3%	0.04	19.4%
Tanzania	22.2	40.3	159.0	35.9%	22.0%	0.04	34.7%
Asia							
South Asia	29.2	38.8	72.3	49.4%	23.0%*	-	35.8%
Bangladesh	21.1	28.2	37.7	39.4%	23.6%	0.02	36.1%
India	26.4	34.6	69.3	51.3%	24.2%	0.02	38.7%
Pakistan	46.6	64.2	115.2	51.4%	22.4%	0.03	45.0%
East Asia & Pacific	9.1	13.6	36.4	24.9%	14.8%**	-	12.2%
Indonesia	14.1	22.2	39.1	27.3%	16.8%	0.02	36.4%
Philippines	12.9	22.5	53.4	15.1%	16.5%	0.02	30.3%
Reference	World Bank Development Indicators (2015)	World Bank Development Indicators (2016)	IHME (2016)	World Bank Development Indicators (2015)	Lives Saved Tool (2017); WHO global prevalence of anaemia report (2015)	NI GAC Report (2015)	Global Nutrition Report 2016

* The WHO report lists WHO regions while the other indicators use World Bank regions. Thus, this is the estimate for South East Asia.

** This estimate is technically for the Western Pacific region. These countries would fall into this region under WHO classification.

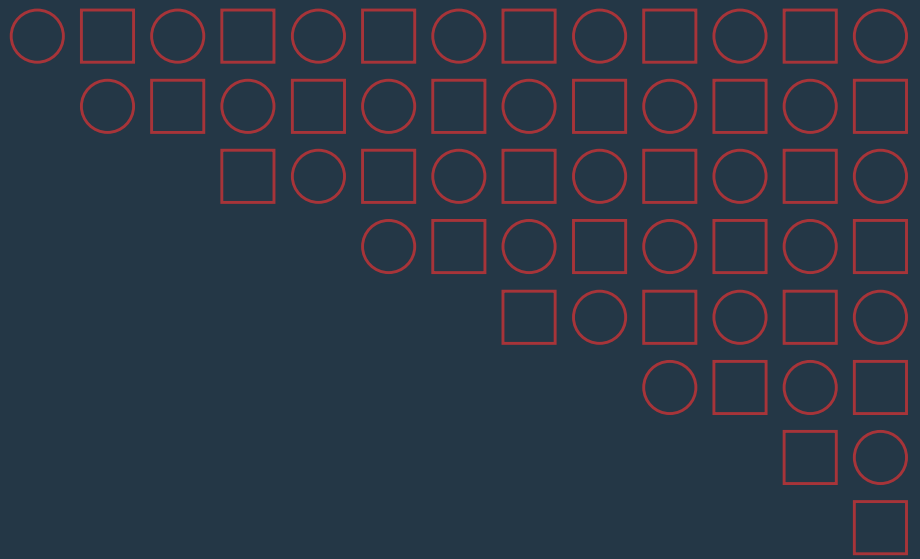
APPENDIX E. REFERENCES FROM NARRATIVE

1. UN Inter-agency Group for Child Mortality Estimation. Levels and Trends in Child Mortality Report 2017.
2. WHO. The global prevalence of anaemia in 2011. Geneva: World Health Organization; 2015.
3. World Bank. Development Indicators (2015). Accessed June 2017.
4. UNICEF. Improving child nutrition: the achievable imperative for global progress
5. Black RE, et al; the Maternal and Child Nutrition Study Group (2013). Maternal and child undernutrition and overweight in low-income and middle-income countries. *The Lancet*; 371:243–60. doi:10.1016/S0140-6736(13)60937-X
6. Horta BL, Victora CG. Long-term effects of breastfeeding: a systematic review. Geneva: World Health Organization, 2013.
7. Victora, C. G., et al. (2015). Association between breastfeeding and intelligence, educational attainment, and income at 30 years of age: a prospective birth cohort study from Brazil. *The Lancet Global Health*, 3(4), e199–e205.
8. Kramer MS, Aboud F, Mironova E, et al. Breastfeeding and child cognitive development: new evidence from a large randomized trial. *Arch Gen Psychiatry* 2008; 65: 578–84.
9. Lucas A, et al. (1992). Breast milk and subsequent intelligence quotient in children born preterm. *The Lancet*; 339: 261–64.
10. Mortensen, E. L., Michaelsen, K. F., Sanders, S. A., Reinisch, J. M. (2002). The association between duration of breastfeeding and adult intelligence. *Jama*, 287(18), 2365–2371.
11. Aburto, N. J, et al. World Health Organization. (2014). Effect and safety of salt iodization to prevent iodine deficiency disorders: a systematic review with meta-analyses.
12. Zimmermann, M. B., Jooste, P. L., Pandav, C. S. (2008). Iodine-deficiency disorders. *The Lancet*, 372(9645), 1251–1262.
13. Wang, Y. L., et al. (2009). Iodine status and thyroid function of pregnant, lactating women and infants (0–1 yr) residing in areas with an effective Universal Salt Iodization program. *Asia Pacific journal of clinical nutrition*, 18(1), 34–40.
14. Bates, C. J, et al. (1994). Breast milk as a source of vitamins, essential minerals and trace elements. *Pharmacology therapeutics*, 62(1–2), 193–220.
15. Walker, A. (2010). Breast milk as the gold standard for protective nutrients. *The Journal of pediatrics*, 156(2), S3–S7.
16. Investing in Immunisation through the Gavi Alliance, the Evidence Base, 2012
17. Kaiser Family Foundation. The U.S. & Gavi, the Vaccine Alliance. 2017.
18. Ozawa, S., et al. (2016). Return on investment from childhood immunization in low-and middle-income countries, 2011–20. *Health Affairs*, 35(2), 199–207.
19. Global Fund Investment Case, Fifth Replenishment 2017 Executive Summary. https://www.theglobalfund.org/media/1130/publication_investmentcase_summary_en.pdf?u=636486807190000000
20. Global Fund Investment Case, Fifth Replenishment 2017. https://www.theglobalfund.org/media/1510/publication_investmentcase_report_en.pdf

APPENDIX F. REFERENCES FROM APPENDICES

- Aburto et al. (2014). Effect and safety of salt iodization to prevent iodine deficiency disorders: a systematic review with meta-analyses. WHO.
- Blencowe, H., Cousens, S., Modell, B., & Lawn, J. (2010). Folic acid to reduce neonatal mortality from neural tube disorders. *International Journal of Epidemiology*, 39(SUPPL. 1). <https://doi.org/10.1093/ije/dyq028>
- Cai, X., Wardlaw, T., & Brown, D. W. (2012). Global trends in exclusive breastfeeding. *International breastfeeding journal*, 7(1), 12.
- Christian, P. (2014). Fetal growth restriction and preterm as determinants of child growth in the first two years and potential interventions. In Nestle Nutrition Institute Workshop Series(Vol. 78, pp. 81-91). S. Karger AG. <https://doi.org/10.1159/000354943>.
- Conde-Agudelo, A., Belizán, J. M., & Diaz-Rossello, J. (2011). Kangaroo mother care to reduce morbidity and mortality in low birthweight infants. In A. Conde-Agudelo (Ed.), *Cochrane Database of Systematic Reviews*. Chichester, UK: John Wiley & Sons, Ltd. <https://doi.org/10.1002/14651858.CD002771.pub2>
- Das, J. K., Salam, R. A., Kumar, R., & Bhutta, Z. A. (2013). Micronutrient fortification of food and its impact on woman and child health: a systematic review. *Systematic Reviews*, 2(1), 67. <https://doi.org/10.1186/2046-4053-2-67>
- De-Regil, L. M., Suchdev, P. S., Vist, G. E., Walleser, S., & Peña-Rosas, J. P. (2013). Home fortification of foods with multiple micronutrient powders for health and nutrition in children under two years of age (Review). *Evidence-Based Child Health: A Cochrane Review Journal*, 8(1), 112-201. <https://doi.org/10.1002/ebch.1895>
- Debes, A. K., Kohli, A., Walker, N., Edmond, K., & Mullany, L. C. (2013). Time to initiation of breastfeeding and neonatal mortality and morbidity: a systematic review. *BMC Public Health*, 13(Suppl 3), S19. <https://doi.org/10.1186/1471-2458-13-S3-S19>
- Fernández-Gaxiola, A. C., & De-Regil, L. M. (2011). Intermittent iron supplementation for reducing anaemia and its associated impairments in menstruating women. In L. M. De-Regil (Ed.), *Cochrane Database of Systematic Reviews*. Chichester, UK: John Wiley & Sons, Ltd. <https://doi.org/10.1002/14651858.CD009218.pub2>
- Field E, Robles O, Torero M. (2009). Iodine deficiency and schooling attainment. *Am Econ J: Appl Econ.*;1(4):140-69
- Fischer Walker, C. L., & Black, R. E. (2010). Zinc for the treatment of diarrhoea: Effect on diarrhoea morbidity, mortality and incidence of future episodes. *International Journal of Epidemiology*, 39(SUPPL. 1). <https://doi.org/10.1093/ije/dyq023>
- Galasso & Wagstaff. (2017). The economic costs of stunting and how to reduce them. The World Bank Group.
- Haider, B. A., Olofin, I., Wang, M., Spiegelman, D., Ezzati, M., & Fawzi, W. W. (2013). Anaemia, prenatal iron use, and risk of adverse pregnancy outcomes: systematic review and meta-analysis. *BMJ*, 346(jun21 3), f3443-f3443. <https://doi.org/10.1136/bmj.f3443>
- Institute for Health Metrics (IHME) (2017). Global Burden of Disease.
- Iodine Global Network. Global Scorecard of Iodine Nutrition in 2017 in the general population and in pregnant women (PW). IGN: Zurich, Switzerland. 2017. Accessed September 2017 Available at: http://www.ign.org/cm_data/IGN_Global_Scorecard_AllPop_and_PW_May2017.pdf
- Imdad, A., Yakoob, M. Y., & Bhutta, Z. A. (2011). Effect of breastfeeding promotion interventions on breastfeeding rates, with special focus on developing countries. *BMC public health*, 11(3), S24.

- Montenegro, C. E., & Patrinos, H. A. (2014). Comparable estimates of returns to schooling around the world.
- Munos, M. K., Fischer Walker, C. L., & Black, R. E. (2010). The effect of oral rehydration solution and recommended home fluids on diarrhoea mortality. *International Journal of Epidemiology*, 39(SUPPL. 1). <https://doi.org/10.1093/ije/dyq025>
- Peña-Rosas, J. P., et al. (2015). Daily oral iron supplementation during pregnancy. *Cochrane Database of Systematic Reviews*. John Wiley and Sons Ltd. <https://doi.org/10.1002/14651858.CD004736.pub5>
- Siregar, AYM., Pitriyan, P., & Walters, D. (2018). The annual cost of not breastfeeding in Indonesia: the economic burden of treating diarrhea and respiratory disease among children (< 24mo) due to not breastfeeding according to recommendation. *International Breastfeeding Journal*, 2018 Mar 2;13:10.
- Victoria, C. et al. (2015). Association between breastfeeding and intelligence, educational attainment, and income at 30 years of age: a prospective birth cohort study from Brazil. *The Lancet Global Health*, 3(4), e199-e205.
- World Bank. Development Indicators (2015). Accessed June 2017.
- World Bank Development Indicators (2016). Accessed June 2017.
- World Health Organization. Iodine status worldwide: WHO global database on iodine deficiency. 2004. Accessed September 2017. Available at: <http://apps.who.int/iris/bitstream/10665/43010/1/9241592001.pdf>;
- World Health Organization. The global prevalence of anemia in 2011. Geneva: World Health Organization; 2015.
- World Health Organization. Strengthening Primary Healthcare through Community Health Workers: Investment Case and Financing Recommendations. 2015



NUTRITION INTERNATIONAL

HEADQUARTERS

180 Elgin Street, Suite 1000
Ottawa, Ontario, Canada, K2P 2K3

Tel: +1 613.782.6800

Fax: +1 613.782.6838

Email: info@NutritionIntl.org

AFRICA REGIONAL OFFICE

Avenue 5, 1st Floor
Rose Avenue
Off Lenana Road
P.O Box 22296 – 00505
Nairobi, Kenya

Tel.: +254 20 375 5324

Email: africa@NutritionIntl.org

ASIA REGIONAL OFFICE

B-28, 2nd Floor
Qutab Institutional Area
New Delhi – 110016, India

Tel: + 91 11 4686 2000

Fax: + 91 11 4686 2048

Email: asia@NutritionIntl.org



www.NutritionIntl.org

