

# Nutrition Topic Guide

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**HEART**  
HEALTH & EDUCATION ADVICE & RESOURCE TEAM

**MQSUN**



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## General introduction and overview

This Topic Guide has been compiled to provide an overview of undernutrition in the context of development. It covers the nature, scale and complex range of causes of undernutrition and summarises the evidence for what works to address the problem. The Guide covers direct nutrition interventions (or nutrition specific development as it is often termed), indirect interventions (nutrition sensitive), and the global coordination structures, governance and funding which are essential for an enabling environment within which undernutrition can be successfully reduced. The focus of this Guide is on undernutrition, defined as the outcome of insufficient (quantity and quality) of food intake (hunger) and repeated infectious diseases. Undernutrition includes being underweight for one's age, too short for one's age (stunted), underweight for one's height (wasted), and deficient in vitamins and minerals (micronutrient malnutrition). This review does not focus on the other component of malnutrition, which is overnutrition.

Where possible the evidence presented in this Topic Guide was taken from systematic reviews of high quality. Where no systematic reviews were available or appropriate, evidence was included from other sources, including primary and empirical studies, as well as theoretical and conceptual research, deemed to be of high quality. This judgement was reached based on various principles, including conceptual framing, openness, transparency, appropriateness and rigour, validity, reliability and cogency. The body of evidence that has been included is summarised for each section. This assessment is based on the quality, size, content and consistency of the studies included.

This document was originally written in May 2013 and updated in September 2013 to reflect the latest body of evidence.

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### 1) The nature of the problem

Undernutrition is one of the world's most serious but least addressed health problems. In developing countries nearly one-third of children are underweight or stunted (low height for their age). The human and economic costs are enormous, falling hardest on the very poor and on women and children. Undernutrition interacts with repeated bouts of infectious disease, causing an estimated 3.1 million preventable maternal and child deaths annually (Black et al, 2013), and its economic costs in terms of lost national productivity and economic growth are huge.

#### 1a) The scale of undernutrition

Child undernutrition is commonly measured by:

- Anthropometric measures, including a child's height relative to the median for their age (a measure of stunting or chronic malnutrition); its weight relative to height (a measure of wasting or acute malnutrition); its weight relative to the median for its age (underweight, a composite measure of stunting and/or wasting), and being born with a low birth weight (under 2.5kg).

- Deficiencies in vitamins and minerals (micronutrient malnutrition) such as vitamin A, iron and zinc.

### **Key messages**

- **Stunting** - Globally, an estimated 162 million children under-5 years of age, were stunted in 2012. Over 90 per cent of the world's stunted children live in Africa and Asia.
- **Underweight** – Globally, an estimated 99 million children under-5 years of age, were underweight in 2012. The prevalence of stunting and underweight among children under-5 years of age worldwide has decreased since 1990, however overall progress is insufficient and millions of children remain at risk.
- **Wasting** - Globally, an estimated 51 million children under-5 years of age, were wasted in 2011, a 10 per cent decrease from an estimated 58 million in 1990. 67 per cent of the world's wasted children live in Asia, most in south-central Asia. These children are at substantial increased risk of severe acute malnutrition (SAM) and death (UNICEF, WHO, World Bank, 2012).
- 45 per cent of all **child deaths** (<5 years) globally is attributed to nutritional disorders (stunting, wasting, micronutrient deficiencies and foetal growth restriction).

### **Body of evidence**

The evidence on the scale of the problem is based on statistics compiled by UNICEF and WHO which are systematic reviews. These are based on country level data and are widely regarded as being reliable sources. The evidence for the causes of malnutrition and progress towards MDG's is based on a systematic analysis of the available literature and data and the 2013 Lancet Series on Maternal and Child Nutrition.

### **Nutrition and the Millennium Development Goals**

Improving nutrition is essential for the achievement of the Millennium Development Goals (MDGs), many of which are dependent on good nutrition outcomes.

#### **MDG 1: Eradicate extreme poverty and hunger**

Reducing prevalence of underweight children under 5 years of age is an agreed target for MDG 1. Reducing undernutrition also increases economic growth.

#### **MDG 2: Achieve universal primary education**

Reducing undernutrition increases cognitive development and contributes to learning and school completion rates.

#### **MDG 3: Promote gender equality**

Promoting better nutrition practices contributes to empowering women and to reducing discrimination against girls in family feeding practices.

#### **MDG 4: Reduce child mortality**

Over 45 percent of deaths in children under 5 years of age are attributed to undernutrition as the underlying cause, directly, through acute malnutrition and more commonly through the many childhood diseases which become fatal in undernourished children.

**MDG 5: Improve maternal health**

Maternal undernutrition contributes to maternal mortality and other complications during pregnancy and childbirth. Maternal health can be improved through programmes of behaviour change and micronutrient supplementation.

**MDG 6: Combat HIV/AIDS, malaria and other diseases**

Undernutrition makes individuals more susceptible to disease, which in turn increases nutritional needs and weakens the capacity of the body to assimilate food. Nutritional care is therefore a key dimension of successful clinical treatment of HIV/AIDS patients.

**MDG 8: Global partnership for development**

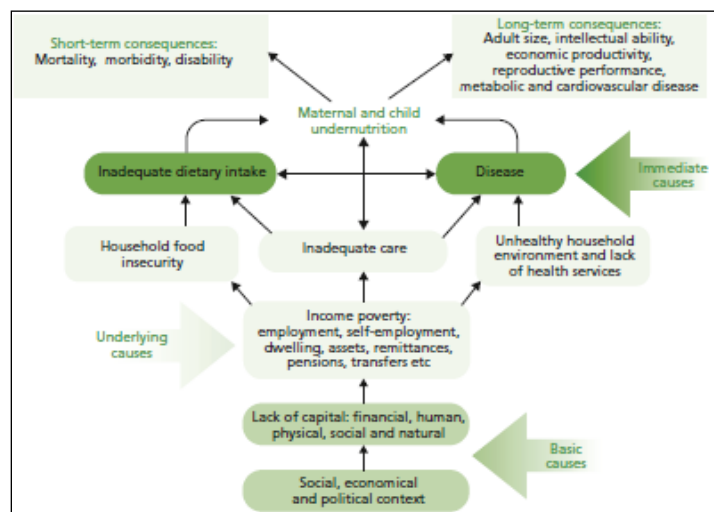
Addressing hunger and malnutrition around the world is a key element of, and argument for, the global partnership for development. This applies particularly for the least developed countries, where levels of undernutrition are highest.

While there has been good progress toward MDG 1c (to halve the proportion of people who suffer from hunger) in a number of regions (East Asia and the Pacific, Latin America and the Caribbean and Central and Eastern Europe) progress in South Asia, all regions of Africa, and the Middle East, has been insufficient and is not on track to meet the target by 2015 (UNICEF, 2012).

**The Causes of Undernutrition**

The causes of undernutrition are complex and span across sectors. Figure 1 illustrates the immediate, underlying and basic causes of undernutrition. Understanding this framework is important, as interventions at every level can have an impact on maternal and child nutrition outcomes.

**Figure 1. Causal framework of malnutrition (UNICEF 1990, reproduced in Black et al. 2008)**



## Annotated bibliography

**Black, R., Allen, L., Bhutta, Z.A., Caulfield, L., de Onis, M., Ezzati, M., Mathers, C. & Rivera, J. (2008) *Maternal and child undernutrition: global and regional exposures and health consequences*. *The Lancet* 371: 243–60**

This is the first paper of *The Lancet* 2008 special series on Maternal and Child Undernutrition and focuses on the magnitude of the problem and the short-term consequences of undernutrition in low- and middle-income countries. The paper used analyses of existing data to estimate the effects of the risks related to measures of undernutrition, as well as to suboptimum breastfeeding practices on mortality and disease. A second series has been published (Black et al. 2013) which updates the data presented in this paper, but the evidence on the causes and consequences of undernutrition is still relevant.

**Black, R. E., Victora, C. G., Walker, S. P., Bhutta, Z. A., Christian, P., de Onis, M., Ezzati, M., Grantham-McGregor, S., Katz, J., Martorell, R., & Uauy, R. Maternal and Child Nutrition Study Group. (2013) *Maternal and child undernutrition and overweight in low-income and middle-income countries*. *Lancet*. 382(9890):427-51.**

This is the first paper of The Lancet special series on Maternal and Child Nutrition (2013) which focuses on the magnitude of the problem and the short term consequences of undernutrition in low and middle income countries. This series is an update of the original series published in 2008 and revises, with extensive new data, the contribution undernutrition in its various forms makes to child mortality and morbidity. The overall finding is that 3.1 million children younger than 5 years die every year from undernutrition; a staggering 45 per cent of total child deaths.

Low body-mass index, indicative of maternal undernutrition, has declined in the past two decades but continues to be prevalent in Asia and Africa. Prevalence of stunting in children younger than 5 years has decreased slowly during the past two decades, but is higher in south Asia and sub-Saharan Africa and still affected 165 million children younger than 5 years in 2011; with wasting affected 52 million children. Deficiencies of vitamin A and zinc resulted in 157,000 and 116,000 child deaths respectively in 2011; deficiencies of iodine and iron, together with stunting, can contribute to children not reaching their developmental potential. Maternal undernutrition contributes to foetal growth restriction, which increases the risk of neonatal deaths and, for survivors, of stunting by 2 years of age. Suboptimum breastfeeding results in an increased risk for mortality in the first 2 years of life and over 800,000 deaths annually. The high present and future disease burden caused by malnutrition in women of reproductive age, pregnancy, and children in the first 2 years of life lead the authors to recommend that interventions be focused on these target groups.

**Stevens, G., Finucane, M., Paciorek, C., Flaxman, S., White, R., Donner, A. & Ezzati, M. (2012). *Trends in mild, moderate, and severe stunting and underweight, and progress towards MDG 1 in 141 developing countries: a systematic analysis of population representative data*. *The Lancet* 380:824–83**

This paper looks at child anthropometric data on a country by country basis and aims to estimate trends in the distribution of children's anthropometric status and assess progress towards MDG 1. The data was collated from population-representative data on height and weight-for-age Z score, from health and nutrition surveys, summary statistics from the WHO Global Database on Child Growth and Malnutrition, and summary statistics from reports of other national and international agencies.

The results show that in developing countries, prevalence of moderate-and-severe stunting declined from 47.2 to 29.9 per cent and underweight from 30.1 to 19.4 per cent. The largest absolute improvements were in Asia and the largest relative reductions in prevalence in southern and tropical Latin America. Anthropometric status worsened in sub-Saharan Africa until the late 1990s and improved thereafter. In 2011, 170 million children under 5 years were moderately, or severely stunted and 258 million were mildly, moderately, or severely underweight.

The authors conclude that developing countries as a whole have less than a 5 per cent chance of meeting the MDG 1 target; but 61 of these 141 countries have a 50–100 per cent chance.

**UNICEF, WHO, World Bank (2012) *Joint Child Malnutrition Estimates*. UNICEF, New York; WHO, Geneva; The World Bank, Washington, DC, USA.**

The United Nations Children’s Fund (UNICEF), World Health Organisation (WHO) and the World Bank jointly compiled this report from global and national data on child nutrition. The joint analysis dataset includes 639 nationally representative surveys from 142 countries/territories.

The report covers levels and trends of malnutrition globally, including stunting, wasting, under and overweight. The report is linked to the WHO global database on child growth and malnutrition ([www.who.int/nutgrowthdb](http://www.who.int/nutgrowthdb)), where UNICEF and WHO review survey data from the published and grey literature as well as reports from national authorities on a continual basis. This report outlines key facts and figures on the levels of child undernutrition by country and region and tracks progress towards Millennium Development Goal (MDG) indicators.

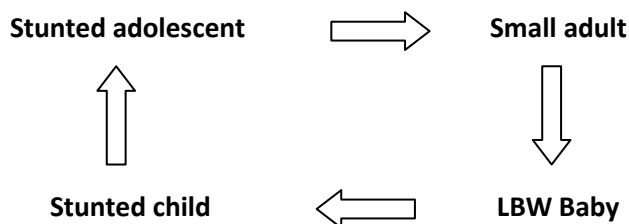
### **1b) The consequences of undernutrition**

Maternal and child undernutrition is highly prevalent in low and middle-income countries, resulting in substantial increases in mortality and overall disease burden. Undernutrition weakens the immune system, stunts physical growth and cognitive development and can have a lifelong and intergenerational effect on educational attainment and economic potential for individuals, families and whole nations. It has been estimated that co-exposure to a range of related factors which have undernutrition as their underlying cause (including a weakened immune system and susceptibility to infectious diseases such as malaria, diarrhoea and pneumonia) combined with the effects of growth restriction, micronutrient deficiencies, and suboptimum breastfeeding accounts for 45 per cent of all child deaths (Black et al. 2013). The consequences of stunting and cognitive development tend to be irreversible after the age of two, with the period from conception until a child’s second birthday becoming known as the 1,000 day ‘window of opportunity’ to prevent irreversible damage. Children who are undernourished in the first two years of life and who put on weight rapidly later in childhood and in adolescence are at high risk of chronic diseases related to nutrition for example, obesity.

Maternal undernutrition and the stress this causes upon the foetus *in utero* (in the womb) can increase the risk of intrauterine growth retardation (causing babies to be born Small-for-Gestational Age - SGA), and can have long lasting effects on the health of an individual throughout the life course, and longer term implications for chronic diseases including cardiovascular diseases and type II diabetes (Victoria et al. 2008). Micronutrient or protein deficiencies can also have serious effects during pregnancy. For example there is also evidence suggesting that iron deficiencies may have a negative effect on maternal health and maternal mortality.

Adolescent pregnancy (for which rates are exceptionally high in some developing countries) has been shown to have a significant impact on nutritional status of both the mother and the child. Adolescents are usually understood to be young people between the ages of ten and 19 years. Adolescent girls have a much higher risk of dying from maternal causes compared to women in their 20s and 30s. These risks increase greatly as maternal age decreases. Moreover, babies born to adolescents also face a significantly higher risk of death compared to babies born to older women. Poor adolescent nutrition combined with stunted growth, resulting in stunted mothers increases the likelihood of a child being born low birth weight (LBW) and being a stunted child. This intergenerational effect is illustrated below in figure 2.

**Figure 2. Negative intergenerational effects of undernutrition on growth**



**Key messages:**

- Poor foetal growth or stunting in the first two years of life leads to irreversible damage, including shorter adult height, lower attained schooling and reduced adult income.
- Children who are undernourished during the first two years of life are at high risk of chronic diseases.
- Maternal undernutrition has immediate and long term negative consequences for the offspring.
- Adolescent pregnancy greatly increases the risk of mortality to mother and child.

**Body of Evidence**

The evidence on the consequences of undernutrition presented here is based on the 2013 Lancet Series on Maternal and Child Nutrition which is a series of peer reviewed papers that review the body of evidence. The evidence is strong for the consequences of undernutrition outlined.

**Annotated bibliography**

**Black, R. E., Victora, C. G., Walker, S. P., Bhutta, Z. A., Christian, P., de Onis, M., Ezzati, M., Grantham-McGregor, S., Katz, J., Martorell, R., & Uauy, R. Maternal and Child Nutrition Study Group. (2013) *Maternal and child undernutrition and overweight in low-income and middle-income countries*. *Lancet*. 382(9890):427-51.**

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that 3.1 million children younger than 5 years die every year from undernutrition; a staggering 45 per cent of total child deaths.

Low body-mass index, indicative of maternal undernutrition, has declined in the past two decades but continues to be prevalent in Asia and Africa. Prevalence of stunting of linear growth of children younger than 5 years has decreased during the past two decades, but is higher in south Asia and sub-Saharan Africa. Deficiencies of vitamin A and zinc resulted in 157,000 and 116,000 child deaths respectively in 2011; deficiencies of iodine and iron, together with stunting, can contribute to children not reaching their developmental potential. Maternal undernutrition contributes to foetal growth restriction, which increases the risk of neonatal deaths and, for survivors, of stunting by 2 years of age. Suboptimum breastfeeding results in an increased risk for mortality in the first 2 years of life and over 800,000 deaths annually. The high present and future disease burden caused by malnutrition in women of reproductive age, pregnancy, and children in the first 2 years of life lead the authors to recommend that interventions be focused on these target groups.

**Victoria, C., Adair, L., Fall, C., Hallal, P., Martorell, R., Richter, L. & Singh Sachdev, H. (2008) *Maternal and child undernutrition: consequences for adult health and human capital*, Lancet, Vol. 371**

This paper addresses the potential long-term implications of undernutrition through a review of the associations between maternal and child undernutrition with human capital and risk of adult diseases in low and middle-income countries.

Data from Brazil, Guatemala, India, the Philippines, and South Africa was analysed. It was found that indices of maternal and child undernutrition were related to adult outcomes (height, schooling, income or assets, offspring birth weight, body-mass index, glucose concentrations, blood pressure).

The data provides strong evidence that adequate nutrition in utero and in the first two years of life is essential for formation of human capital. Undernourished children are more likely to become short adults, to have lower educational achievement, and to give birth to smaller infants. Undernutrition is also associated with lower economic status in adulthood. Height-for-age at two years is shown to be the best predictor of human capital in adulthood and undernutrition is shown to be associated with lower human capital. The authors conclude that damage suffered in early life leads to permanent impairment, and might also affect future generations. Its prevention will probably bring about important health, educational, and economic benefits.

### **1c) The benefits of scaling up undernutrition reduction**

Firstly and most importantly, undernutrition is preventable. Reducing undernutrition not only saves millions of lives, but investing in scaling up represents significant value for money in comparison with other development interventions. The Copenhagen Consensus, in which economists weigh the value for money of a number of potential development interventions – ranked three nutrition interventions in the top five development solutions in 2008, with vitamin A and zinc micronutrient supplements for children ranked first. In the 2012 update they ranked bundled micronutrient interventions to fight hunger and improve education as the top investment.

Recent analysis suggests the current total of deaths in children younger than 5 years can be reduced by 15 per cent if populations can access ten evidence-based nutrition interventions at 90 per cent coverage. These ten interventions are:

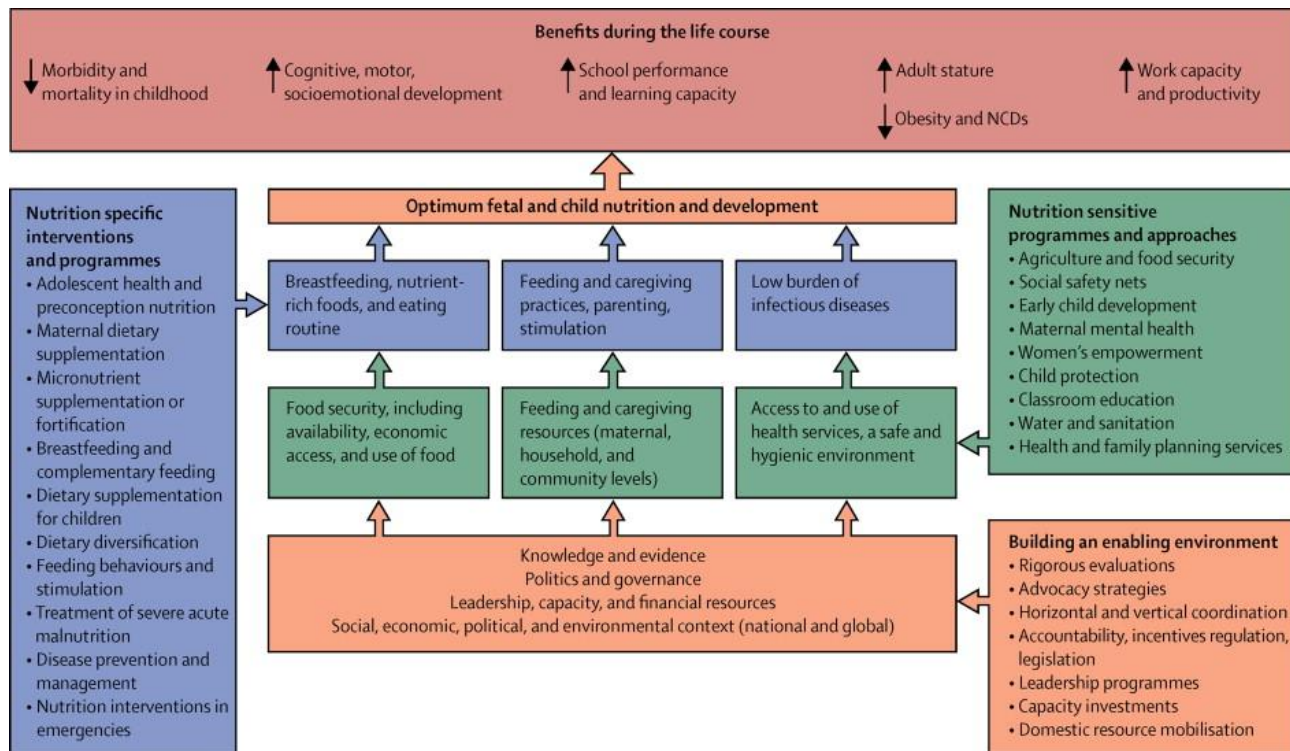
Folic acid, multiple micronutrient, calcium and balanced energy-protein supplementation for pregnant and women of reproductive age.

Promotion of exclusive breastfeeding, complimentary feeding, vitamin A supplementation, preventative zinc supplementation and management of moderate and severe acute malnutrition for infants and children.

The estimated total additional annual cost involved for scaling up access to these ten direct nutrition interventions in the 34 countries with the highest burden of undernutrition is \$9.6 billion per year.

The benefits of scaling up interventions to reduce undernutrition are usefully summarised in the new framework developed for The Lancet series 2013 (see Figure 3).

**Figure 3: Framework for actions to achieve optimum foetal and child nutrition and development**



This framework shows the means to optimum foetal and child growth and development, rather than the determinants of undernutrition as shown in the conceptual model developed by UNICEF (Fig. 1). This new framework shows the dietary, behavioural, and health determinants of optimum nutrition, growth, and development and how they are affected by underlying food security, caregiving resources, and environmental conditions, which are in turn shaped by economic and social conditions, national and global contexts, resources, and governance. The 2013 Series examines how these determinants can be changed to enhance growth and development through scaling up activities in three domains: nutrition specific, nutrition sensitive and through building an enabling environment. The framework shows the potential effects of nutrition-specific interventions which address the immediate causes of undernutrition and nutrition-sensitive interventions that address the underlying determinants of malnutrition, incorporating specific nutrition goals and actions. It also shows the ways that an enabling environment can be built to support interventions and programmes to enhance growth and development and their health consequences.

## Key messages:

- Effective interventions are available to reduce stunting, micronutrient deficiencies, and child deaths.
- Nearly 15 per cent of deaths in children under 5 could be reduced (1 million lives) if the ten interventions identified from the latest evidence are scaled up.
- These interventions, if scaled up to 90per cent coverage in the 34 highest burden countries, could reduce stunting by 20 per cent (33.5 million children) and reduce prevalence of severe wasting by 61.4per cent.
- Interventions with the greatest potential to reduce mortality in children under 5 years are: management of SAM, preventative zinc supplementation and promotion of breastfeeding.
- Improvement of complementary feeding through strategies such as counselling about nutrition for food-secure populations and nutrition counselling, food supplements, conditional cash transfers, or a combination of these, in food-insecure populations could substantially reduce stunting and related burden of disease.
- Interventions for maternal nutrition (supplements of iron folate, multiple micronutrients, calcium, and balanced energy and protein) can improve outcomes for maternal health and births, but few have been assessed at sufficient scale. Delivery mechanisms remain a logistical challenge to scale up.
- Although available interventions can make a clear difference in the short term, elimination of stunting will also require long-term investments to improve education, economic status, and empowerment of women.

## Body of Evidence

The benefits of scaling up nutrition are widely agreed upon and the body of evidence is strong. The evidence presented in this section is based on a review of the evidence published in *The Lancet* in 2008 and updated in 2013, a framework which bases its recommendations on two evidence reviews and a paper published by the Copenhagen Consensus 2012 which is a review of the evidence base to inform the prioritisation of investing in scaling up activities by an expert panel of economists.

## Annotated bibliography

**Bhutta, Z. A., Ahmed, T., Black, R. E., Cousens, S., Dewey, K., Giugliani, E., Haider, B.A., Kirkwood, B., Morris, S.S., Sachdev, H.P. & Shekar, M. (2008) *What works? Interventions for maternal and child undernutrition and survival*, *Lancet*, Feb 2, 371 (9610): 417-40**

In this paper, the authors summarise the evidence about interventions with proven effectiveness in addressing undernutrition. These actions span interventions directed at mothers, babies, and young children, and include direct nutrition interventions (e.g., provision of micronutrients) as well as indirect interventions such as behaviour change interventions directed at feeding practices and accompanied by supportive measures such as conditional cash transfers.

**Bhutta, Z. A., Das, J. K., Rizvi, A., Gaffey, M. F., Walker, N., Horton, S., Webb, P., Lartey, A., Black, R. E. (2013) *Lancet Nutrition Interventions Review Group; Maternal and Child Nutrition Study Group. Evidence-based***

***interventions for improvement of maternal and child nutrition: what can be done and at what cost? Lancet. 382(9890):452-77.***

Since the review of interventions in 2008, many have been implemented at scale and the evidence for effectiveness of nutrition interventions and delivery strategies has grown. This paper is a comprehensive update of direct interventions and assesses emerging new evidence for delivery platforms. Data is modelled to study the effect on lives saved and cost of scaling up these interventions in the 34 highest burden countries. The analysis suggests the current total of deaths in children younger than 5 years can be reduced by 15 per cent if populations can access ten evidence-based nutrition interventions at 90 per cent coverage.

These ten interventions are: Folic acid, multiple micronutrient, calcium and balanced energy-protein supplementation for pregnant and women of reproductive age; promotion of exclusive breastfeeding, complimentary feeding, vitamin A supplementation, preventative zinc supplementation and management of moderate and severe acute malnutrition for infants and children. The estimated total additional annual cost involved for scaling up access to these ten direct nutrition interventions in the 34 countries with the highest burden of undernutrition is \$9.6 billion per year.

Investing in these interventions to reduce maternal and child undernutrition, especially through community engagement and delivery strategies that can reach the segments of the population at greatest risk can make a great difference. The greatest progress can be made if these strategies are linked to nutrition-sensitive approaches—i.e., women's empowerment, agriculture, food systems, education, employment, social protection, and safety nets.

**Hoddinott, J., Rosegrant, M. & Torero, M. (2012) *Hunger and Malnutrition, Copenhagen Consensus 2012***

The Copenhagen Consensus is a project that establishes priorities for global welfare. It was set up in 2004 by gathering some of the world's greatest economists to improve prioritisation of the numerous problems the world faces and the process has been repeated every four years. The expert panel's task is to create a prioritised list of solutions to the ten greatest challenges, showing the most cost-effective investments. This is a way to identify the areas of spending which could achieve the most good, and to bring more attention to them. It is also a way of identifying areas where there isn't enough research, or where the benefits are not as big as might be assumed. The third Copenhagen Consensus 2012 Expert Panel found investments to reduce hunger and undernutrition to have powerful positive benefits, both intrinsically and instrumentally. In particular, bundled micronutrient interventions to fight hunger and improve education was found to be the most desirable of 16 investments worth making.

**Scaling Up Nutrition. A Framework for Action. 2010**

Scaling Up Nutrition (SUN) is a movement founded on the principle that all people have a right to food and good nutrition. It involves the commitment of governments, civil society, the United Nations, donors, businesses and researchers to improve nutrition in a collective effort.

The SUN movement created this framework document in 2010 in response to poor progress towards MDG 1. It outlines the social and economic consequences of undernutrition, the evidence and rationale for scaling up and recommends areas for prioritised action. The focus is on the evidence around the long-term and irreversible impact of undernutrition both on infant and child mortality and on longer term intellectual, physical and social development.

The framework draws heavily on the set of direct interventions outlined in The Lancet series 2008, and a later review by the World Bank in 2009 which examined the feasibility and cost-effectiveness and identified a more selective package of 13 highly cost-effective interventions. These interventions, it is stated “could protect the nutrition of vulnerable individuals and communities and benefit millions of people if incorporated into food security, agriculture, social protection, health and education programmes.” Emphasis is also placed on the need for multi-sectoral cooperation, in recognition that direct, nutrition-specific interventions need to be complimented by a broader approach that includes integrating nutrition in related sectors.

## 2) Direct (nutrition specific ) interventions

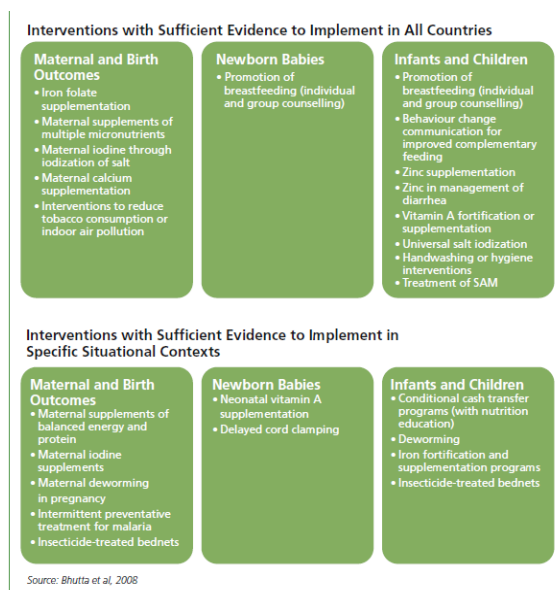
Nutrition specific interventions refer to those programmes and approaches which have a direct impact on nutritional outcomes, addressing the immediate causes of undernutrition i.e. inadequate food intake, poor feeding and care practices and high burden of infectious disease. There have been countless studies in different contexts looking at the effectiveness of nutrition interventions. The 2008 Lancet Series provided the first review of the evidence base to summarise ‘what works’ and this has been updated in 2013, reflecting the progress that has been made in implementing at scale providing a growing body of evidence of effectiveness for both nutrition specific interventions and their delivery platforms.

The 2008 Lancet paper categorised the effective interventions into the following two sections:

- 1) Interventions with an evidence base sufficiently strong to warrant the recommendation to implement in 36 of the world’s highest burden countries
- 2) Interventions those where the evidence was strong in specific contexts.

These interventions are focused on maternal and child health and are outlined in Figure 4.

**Fig 4. The Lancet 2008, Key Interventions**



Building from these interventions, the SUN framework for action (2010) identified a more selective package of 13 highly cost-effective interventions.

Most recently, The Lancet 2013 series includes an updated review of the evidence, including the evidence for effectiveness of nutrition interventions and delivery strategies. Ten interventions were identified, which if delivered at scale could reduce deaths in children younger than 5 years by 15 per cent. The ten interventions identified include providing folic acid, calcium, and balanced energy protein and micronutrient supplements to pregnant women; promoting breastfeeding and delivering appropriate complementary feeding to infants; providing vitamin A and zinc supplements to children up to the age of five; and using proven treatment strategies to manage moderate and severe malnutrition in children. The authors also evaluated delivery strategies and concluded that community based delivery strategies had much potential to improve nutrition and reduce deaths among the poorest sections of the population.

While these interventions were chosen for their proven ability to reduce illness and deaths in women and children in a cost-effective way, the authors also examined a much wider range of nutritional interventions, many of which have the potential to make a substantial difference in the fight against malnutrition

Table 1 below looks at the similarities and differences between the 13 interventions from SUN and the latest Lancet 2013 ten costed interventions.

**Table 1: Comparison of the 13 recommended interventions from SUN 2010, with the 10 interventions from 2013**

Intervention	Year of inclusion
Vitamin A supplementation/fortification	Both
Promotion of breastfeeding	Both (2013 stress exclusive BF)
Management of SAM	Both
Management of MAM	Both
Complimentary feeding	Both
Iodine through salt*	Both
Zinc management for diarrhoea	2008
Iron/ Folic acid supplementation	2008
De worming	2008
Iron fortification of staples	2008
Hand washing/Hygiene	2008
Multiple micronutrient powders	2008
Maternal multiple micronutrient supplementation	2013
balanced energy-protein supplementation	2013
Folic acid supplementation	2013
Calcium supplementation	2013
Preventative zinc supplementation	2013

\*Salt iodisation is included in The Lancet 2013 costing of interventions, but not in the full impact modelling

There are six interventions which feature in both (Vitamin A supplementation, promotion of breastfeeding, management of SAM and MAM, complementary feeding and in part salt iodisation).

There are six which were in the Sun list but are not in The Lancet 2013 (Zinc management for diarrhoea, iron and folic acid for pregnant women, deworming, iron fortification of staple foods, hand washing/hygiene and multiple micronutrient powders for children). Each missing intervention has a different reason for omission: hand washing / hygiene and therapeutic zinc for diarrhoea management are still fully endorsed by The Lancet authors and water and sanitation programmes in particular are widely considered as important in the fight against malnutrition but for categorisation reasons (they are about disease control) they were not listed in The Lancet 2013 list. Iron and Folic supplementation is now subsumed by maternal multiple micronutrient supplementation. Iron fortification of staples is listed as beyond scope of review. There are increasingly mixed views on the evidence of benefits for multiple micronutrient powders for children and deworming.

Five of The Lancet 2013 are new inclusions which did not feature in SUN (maternal multiple micronutrient supplementation, maternal balanced protein energy supplementation, folic acid supplementation, calcium supplementation and preventative zinc supplementation). These reflect new evidence and new understandings about the importance of maternal nutrition.

The following sections provide a brief review of the evidence for the interventions for each target group.

## **2a) Pregnant women and women of reproductive age**

The nutritional status of a woman before and during pregnancy is important for a healthy pregnancy outcome and during this time women often become more deficient in nutrients, with the need to provide nutrition for the baby too. Maternal malnutrition is a key contributor to poor foetal growth, LBW babies and short- and long-term infant morbidity and mortality.

The 2013 Lancet Series provides a comprehensive update of the evidence for the intervention identified in the previous series.

### **Key messages:**

- Interventions to address adolescent nutrition are critical to affect the period before first pregnancy
- Maternal supplementation with key micronutrients (iron folate, calcium and multiple micronutrients) are effective at improving maternal and birth outcomes
- Increasing iodine intake through iodized salt is an effective intervention and delivery mechanism.
- A package of 4 interventions to provide optimal nutrition during pregnancy (maternal multiple micronutrients, use of iodised salt, calcium, and balanced energy protein supplementation) is estimated to save 102,000 lives at a cost of \$571 per life year saved.

### **Body of Evidence**

The evidence for interventions to improve maternal and birth outcomes is strong for those interventions outlined above. This is based on The Lancet 2013 review and evidence from a systematic review and an evidence review.

## Annotated bibliography

**Bhutta, Z. A., Das, J. K., Rizvi, A., Gaffey, M. F., Walker, N., Horton, S., Webb, P., Lartey, A., Black, R. E. (2013) Lancet Nutrition Interventions Review Group; Maternal and Child Nutrition Study Group. Evidence-based interventions for improvement of maternal and child nutrition: what can be done and at what cost? The Lancet. 382(9890):452-77.**

Since the review of interventions in 2008, many have been implemented at scale and the evidence for effectiveness of nutrition interventions and delivery strategies has grown. This paper is a comprehensive update of direct interventions and assesses emerging new evidence for delivery platforms. Data is modelled to study the effect on lives saved and cost of scaling up these interventions in the 34 highest burden countries. The analysis suggests the current total of deaths in children younger than 5 years can be reduced by 15 per cent if populations can access ten evidence-based nutrition interventions at 90 per cent coverage.

These ten interventions are: Folic acid, multiple micronutrient, calcium and balanced energy-protein supplementation for pregnant and women of reproductive age; promotion of exclusive breastfeeding, complimentary feeding, vitamin A supplementation, preventative zinc supplementation and management of moderate and severe acute malnutrition for infants and children. The estimated total additional annual cost involved for scaling up access to these ten direct nutrition interventions in the 34 countries with the highest burden of undernutrition is \$9.6 billion per year.

Investing in these interventions to reduce maternal and child undernutrition, especially through community engagement and delivery strategies that can reach the segments of the population at greatest risk can make a great difference. The greatest progress can be made if these strategies are linked to nutrition-sensitive approaches—i.e., women's empowerment, agriculture, food systems, education, employment, social protection, and safety nets.

**Haider, B. & Bhutta, Z. (2012), Multiple-micronutrient supplementation for women during pregnancy, intervention review. The Cochrane library**

This review looks at the evidence for multiple micronutrient supplementation of pregnant women and the effect on birth outcomes. This paper was a key resource for the data for the updated Lancet series 2013 on this topic. Micronutrient deficiencies are known to interact and a greater effect may be achieved by multiple supplementation rather than single nutrient supplementation, although interactions may also lead to poor absorption of some of the nutrients.

Overall, the data in this review showed that multiple-micronutrient supplementation reduced the number of LBW and SGA babies when compared with iron and folic acid supplements, no supplementation or a placebo. The authors conclude that whilst multiple micronutrients have been found to have a significant beneficial impact on SGA and LBW babies, more evidence is required to guide a universal policy change and to suggest replacement of routine iron and folate supplementation with a multiple micronutrient supplement. They also suggest that future research should examine the effects on mortality and morbidity and assess the effects of different combinations and dosages of micronutrients.

Bhutta et al (2013) updated this review, to include a new trial which shows reduction in preterm births with no adverse effects and the authors conclude that overall, these findings support the potential replacement of iron-



folate supplements in pregnancy with multiple micronutrients in populations at risk of deficiency and agree that further evidence is needed to guide a universal policy change.

**Imdad, A., Bhutta, Z. A. (2012), *Maternal nutrition and birth outcomes: effect of balanced protein-energy supplementation*. Paediatric and Perinatal Epidemiology; 1**

This review summarises the evidence for the impact of maternal protein-energy supplementation on birth outcomes such as birth weight, size for gestational age and risk for stillbirth. The data shows a positive mean increase of 73g on birth weight, with the effect more pronounced in women who were undernourished. It also shows a 32 per cent decrease in the risk of LBW, 34 per cent reduction in the risk of SGA and 38 per cent decrease in the risk of still birth. The authors conclude that balanced protein-energy supplementation is an effective intervention to reduce the risk of LBW & SGA births, especially in undernourished mothers. This supports The Lancet 2008 recommendation that protein-energy supplementation is recommended in certain contexts, i.e. where the proportion of undernourished women is high.

## **2b) Newborn babies**

Infants who are not breastfed are at a far higher risk of infectious diseases like pneumonia and diarrhoea, and mortality than those who are breastfed. A mother's breast milk provides more than just essential nutrients for the newborn baby, but contains a unique mix of proteins, fats, sugars, enzymes and antibodies to develop the baby's immunity and help its digestive system to grow and function properly. The mother's first milk, called colostrum, is produced only in the first days after birth and contains a powerful and concentrated mix of these immune, growth and tissue repair factors. It is not only ensuring that more babies are breastfed that is important, but reducing the time delay from when breastfeeding is initiated. It is estimated that early initiation of breastfeeding (within the first hour of birth) could prevent 22 per cent of newborn deaths (Edmond et al. 2006).

Breastfeeding support was highlighted in The Lancet (Bhutta et al. 2008 and 2013) series as an effective intervention to increase breastfeeding rates, which in turn have a significant positive effect on child mortality and morbidity. Counselling and education for mothers on breastfeeding has been shown to be effective, while the forum through which this counselling is provided has been shown to be important (Sudfeld et al. 2012).

### **Key messages**

- Breastfeeding is rated as the single most effective intervention to improve neonatal mortality rates.
- Exclusive breastfeeding is when the infant only receives breast milk without any additional food or drink, not even water. Oral rehydration salts (ORS), drops and syrups (vitamins, minerals and medicines) are regarded as an exception to this. Babies who are not exclusively breastfed are at four times higher risk of death.
- Early initiation (within one hour of birth) of breastfeeding could reduce neonatal mortality by 44 per cent.
- Breastfeeding promotion and counselling through (both individual and group) improves rates of exclusive breastfeeding, but promotion programmes should also emphasize early initiation.

### **Body of Evidence**

There is a strong evidence base for the following interventions to improve nutritional status of newborn babies. This is based on a meta-analysis and a peer reviewed study.

### **Annotated bibliography**

**Bhutta, Z. A., Ahmed, T., Black, R. E., Cousens, S., Dewey, K., Giugliani, E., Haider, B.A., Kirkwood, B., Morris, S.S., Sachdev, H.P. & Shekar, M. (2008) *What works? Interventions for maternal and child undernutrition and survival*, The Lancet, Feb 2, 371 (9610): 417-40**

In this paper, the authors summarise the evidence about interventions with proven effectiveness in addressing undernutrition. These actions span interventions directed at mothers, babies, and young children, and include direct nutrition interventions (e.g., provision of micronutrients) as well as indirect interventions such as behaviour change interventions directed at feeding practices and accompanied by supportive measures such as conditional cash transfers.

**Bhutta, Z. A., Das, J. K., Rizvi, A., Gaffey, M. F., Walker, N., Horton, S., Webb, P., Lartey, A., Black, R. E. (2013) Lancet Nutrition Interventions Review Group; Maternal and Child Nutrition Study Group. *Evidence-based interventions for improvement of maternal and child nutrition: what can be done and at what cost?* The Lancet. 382(9890):452-77.**

Since the review of interventions in 2008, many have been implemented at scale and the evidence for effectiveness of nutrition interventions and delivery strategies has grown. This paper is a comprehensive update of direct interventions and assesses emerging new evidence for delivery platforms. Data is modelled to study the effect on lives saved and cost of scaling up these interventions in the 34 highest burden countries. The analysis suggests the current total of deaths in children younger than 5 years can be reduced by 15 per cent if populations can access ten evidence-based nutrition interventions at 90 per cent coverage.

These ten interventions are: Folic acid, multiple micronutrient, calcium and balanced energy-protein supplementation for pregnant and women of reproductive age; promotion of exclusive breastfeeding, complimentary feeding, vitamin A supplementation, preventative zinc supplementation and management of moderate and severe acute malnutrition for infants and children. The estimated total additional annual cost involved for scaling up access to these ten direct nutrition interventions in the 34 countries with the highest burden of undernutrition is \$9.6 billion per year.

Investing in these interventions to reduce maternal and child undernutrition, especially through community engagement and delivery strategies that can reach the segments of the population at greatest risk can make a great difference. The greatest progress can be made if these strategies are linked to nutrition-sensitive approaches—i.e., women's empowerment, agriculture, food systems, education, employment, social protection, and safety nets.

**Edmond, K. M., Zandoh, C., Quigley, M. A., Amenga-Etego, S., Owusu-Agyei, S. and Kirkwood, B. R., (2006) *Delayed breastfeeding initiation increases risk of neonatal mortality*, Pediatrics, 117(3):e380-6**

The objective of this paper was to assess the contribution of the timing of initiation of breastfeeding to any impact. Based on data from Ghana, the results show that the risk of neonatal death was four times higher in children who were not exclusively breastfed (given milk-based fluids or solids in addition to breast milk). Delay in initiation of breastfeeding, from one hour to seven days had an increasing risk of neonatal mortality. The

authors state that 16 per cent of neonatal deaths could be saved if all infants were breastfed from day one and 22 per cent saved if breastfeeding started within the first hour.

Promotion of early initiation of breastfeeding has the potential to make a major contribution to child survival and achieving MDG 4 and breastfeeding-promotion programs should emphasize early initiation as well as exclusive breastfeeding.

**Sudfeld, C. R, Fawzi, W. W., Lahariya, C. (2012) *Peer support and exclusive breastfeeding duration in low and middle-income countries: a systematic review and meta-analysis*. PLoS One; 7(9)**

This recent systematic review and meta-analysis examined the effect of peer support on duration of exclusive breastfeeding (EBF) in low and middle-income countries (LMICs). Eleven randomized controlled trials utilising peer support in LMIC were reviewed and assessed for quality. Peer support was shown to significantly decrease the risk of discontinuing exclusive breastfeeding compared to the control groups.

## **2c) Infants and children**

Breastfeeding remains the single most effective intervention to improve infant and young child nutrition. The WHO recommends six months of exclusive breastfeeding and up to two years of continued, partial breastfeeding. As discussed above, interventions to promote breastfeeding and increase rates of exclusive breastfeeding through individual or group counselling and education have been shown to be effective (Sudfeld et al. 2012).

When breast milk is no longer enough to meet the nutritional needs of the infant, complementary foods should be added to the diet of the child. In cases where the nutrient needs of the child are not being met through complimentary foods, fortification or supplementation with micronutrients, specifically zinc, vitamin A and iodine has been proven to be effective. The evidence base has tended to be strongest for supplementation with micronutrients, but fortification of staple foods, whether by the manufacturers (such as salt iodization) or at home fortification (often through micronutrient rich powders) is increasingly being shown to be an effective intervention for improving the micronutrient status (Bhutta et al. 2008).

The 2013 Lancet series (Bhutta et al. 2013) included a review of 16 trials and programmes that assessed the effect of nutrition education and provision of additional complementary foods. Studies of nutrition education in *food secure* populations showed a significant increase in height and weight and in *food insecure* populations significant effects on height for age, weight for age and stunting prevalence. The provision of complementary foods in *food insecure* populations was associated with significant gains in height for age and weight for age but did not show a significant effect on stunting prevalence.

One of the consequences of sub optimum infant and child feeding is acute malnutrition, estimated to affect 52 million children under five globally in 2011. Severe Acute Malnutrition (SAM) which refers to those children with a very low weight for height - below -3 z scores of the median WHO growth standards, poses the most immediate threat to child mortality. Treatment of SAM was identified in the 2008 Lancet Series as a key intervention to be implemented in all high burden countries. Approaches for treatment of acute malnutrition have evolved in recent years with a shift from facility based to community based care, an approach which includes the early detection of malnourished children and the use of specifically formulated therapeutic foods (WHO, WFP, UNSCN, UNICEF, 2007).

## Key messages

- Breastfeeding remains the most effective intervention for infant and young child nutrition.
- Promotion and counselling to improve rates and duration of exclusive breastfeeding is recommended.
- Appropriate complimentary feeding, including a sufficient intake of micronutrients is essential.
- Supplementation programmes for vitamin A and zinc are effective for improving micronutrient status of children and reducing incidence of some diseases and deaths.
- Fortification of foods with micronutrients has also been shown to be effective at improving micronutrient status of children.
- Treatment of SAM through the community based model using specially formulated therapeutic foods has been shown to be effective.

## Body of Evidence

The evidence for interventions to improve the nutritional status of infants and children is strong for those interventions outlined above. This is based on the Lancet review of the evidence base, a systematic review and a joint report from the WHO, WFP, UNSCN and UNICEF who review and present the evidence. We also present the evidence from three large randomised controlled trials which provide the most up to date emerging evidence, however it should be noted that the trials are all studies from single country settings and the findings should be interpreted with caution.

## Annotated Bibliography

**Awasthi S, Peto R, Read S, Clark S, Pande V, Bundy D; DEVTA (Deworming and Enhanced Vitamin A) team (2013) Vitamin A supplementation every 6 months with retinol in 1 million pre-school children in north India: DEVTA, a cluster-randomised trial. The Lancet, Apr 27; 381(9876):1469-77**

This trial presents the latest evidence on periodic Vitamin A supplementation and the effect on related eye health, disease and mortality. The trial is set in India and over the 5 year period for which it was conducted included 2 million children, aged between 1-6 years old. The methodology was rigorously designed, with children randomly allocated within clusters (neighbouring blocks) to receive either Vitamin A (as retinol in oil) every 6 months, Albendazole (a de-worming drug whose effects were assessed in a separate study), both or neither. The analysis compares those clusters receiving Vitamin A (both with and without Albendazole) with those clusters not receiving Vitamin A. The main outcome of interest was the effect on mortality, however data was also collected to look at serum retinol (a marker of Vitamin A deficiency), eye health, such as bitots spots and night blindness and other related diseases (measles and diarrhoea). The results showed a significant reduction in severe deficiency in the group receiving Vitamin A, and a reduction of 50% in eye problems. However, the main outcome of interest, mortality, showed no statistically significant reduction.

This finding came as a surprise as previous smaller trials have showed a reduction in mortality of anything up to 30%. The authors conclude that this finding does not necessarily prove that Vitamin A has no beneficial effect on mortality, but that possibly the benefits are less than previously believed.

**Awasthi S, Peto R, Read S, Richards SM, Pande V, Bundy D; DEVTA (Deworming and Enhanced Vitamin A) team (2013). *Population deworming every 6 months with Albendazole in 1 million pre-school children in north India: DEVTA, a cluster-randomised trial*. Lancet. 2013 Apr 27; 381(9876):1478-86.**

This trial presents the latest evidence on any effects of regular deworming on mortality in children. The trial is set in India and over the 5 year period for which it was conducted included 2 million children, aged between 1-6 years old. The methodology was rigorously designed, with children randomly allocated within clusters (neighbouring blocks) to receive either Albendazole (a de-worming drug), both or neither. The analysis compares those clusters receiving Albendazole with those receiving no deworming. The results showed that the treatment group had a significantly lower prevalence of nematode egg infestations (including hookworm), but the treatment showed no significant reduction in mortality. This finding does not rule out effects on mortality in other populations, but any such effects are generally likely to be small, so reduction in population mortality is unlikely to be a primary aim of deworming programmes.

**Bhutta, Z. A., Ahmed, T., Black, R. E., Cousens, S., Dewey, K., Giugliani, E., Haider, B.A., Kirkwood, B., Morris, S.S., Sachdev, H.P. & Shekar, M. (2008) *What works? Interventions for maternal and child undernutrition and survival*. The Lancet, Feb 2, 371 (9610): 417-40**

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approaches—i.e., women's empowerment, agriculture, food systems, education, employment, social protection, and safety nets.

**Imdad, A., Herzer, K., Mayo-Wilson, E., Yakoob, M. Y., & Bhutta, Z. A. (2010) *Vitamin A supplementation for preventing morbidity and mortality in children from 6 months to 5 years of age*. Cochrane Database of Systematic Reviews**

Vitamin A deficiency increases vulnerability to a range of illnesses including diarrhoea, measles, and respiratory infections. These are leading causes of mortality among children in low and middle income countries, where risk of infection and risk of mortality can be compounded by coexisting undernutrition. The bioavailability of vitamin A in fruit and vegetables is lower than once believed, and it is difficult for children to fulfil their daily requirements through plant foods alone. Consequently, vitamin A deficiency is common among children whose families cannot afford eggs and dairy products. This review studies the effects vitamin A supplementation in 43 randomised trials and shows that supplementation reduces all cause mortality by 24 per cent and diarrhoea related mortality by 28 per cent in children aged 6-59 months.

**Soofi, S. Cousens, S. Iqbal, S. et al. (2013). *Effect of provision of daily zinc and iron with several micronutrients on growth and morbidity among young children in Pakistan: a cluster-randomised trial*. The Lancet; 382**

This paper presents the results of a cluster randomised trial into the effects on morbidity of the provision of zinc, iron and micronutrients on young Pakistani children. Iron and other micronutrients in powder form are recommended as a strategy to prevent childhood nutritional anaemia and other micronutrient deficiencies. This study focuses on the effects of provision of two micronutrient powder formulations, with or without zinc, administered between 2008 and 2011. It was found that micronutrient powder administration was associated with lower risk of iron-deficiency anaemia at 18 months compared with the control group. Also compared with the control group, children receiving micronutrient powder without zinc gained an extra 0.31 cm between 6 and 18 months of age and children receiving micronutrient powder with zinc an extra 0.56 cm). Strong evidence was found of an increased proportion of days with diarrhoea and increased incidence of bloody diarrhoea) between 6 and 18 months in the two micronutrient powder groups, and reported chest indrawing. Incidence of fever or admission to hospital for diarrhoea, respiratory problems, or fever did not differ between the three groups. These results suggest that the use of micronutrient powders reduces iron-deficiency anaemia in young children, but that the excess burden of diarrhoea and respiratory morbidities associated with micronutrient powder use and the very small effect on growth recorded suggest that a careful assessment of risks and benefits must be done in populations with malnourished children and high diarrhoea burdens.

**Sudfeld, C. R., Fawzi, W. W., Lahariya, C. (2012) *Peer support and exclusive breastfeeding duration in low and middle-income countries: a systematic review and meta-analysis*. PLoS One; 7(9)**

This recent systematic review and meta-analysis examined the effect of peer support on duration of exclusive breastfeeding (EBF) in low and middle-income countries (LMICs). Eleven randomized controlled trials utilising peer support in LMIC were reviewed and assessed for quality. Peer support was shown to significantly decrease the risk of discontinuing exclusive breastfeeding compared to the control groups.

**Yakoob, M. Y., Theodoratou, E., Jabeen, A., et al. (2011) *Preventive zinc supplementation in developing countries: impact on mortality and morbidity due to diarrhoea, pneumonia and malaria*. BMC Public Health**

Zinc deficiency is common in children in developing countries and can contribute to decreased immunity and increased risk of infection. Preventive zinc supplementation in healthy children can reduce mortality due to common causes like diarrhoea, pneumonia and other respiratory infections and malaria. This review assessed 18 studies from developing countries and found that preventative zinc supplementation reduced the incidence of diarrhoea by 13 per cent and pneumonia by 19 per cent.

**WHO, WFP, UNSCN and UNICEF. (2007) *Community-based management of severe acute malnutrition*. WHO, WFP, UNSCN and UNICEF.**

SAM remains a major killer of children under five years of age. Until recently, treatment has been restricted to facility-based approaches, greatly limiting its coverage and impact. However, in recent years a community based approach has been developed which allows large numbers of children with SAM to be treated in their communities without being admitted to a health facility or a therapeutic feeding centre.

The community-based approach involves timely detection of SAM in the community and provision of treatment for those without medical complications with ready-to-use therapeutic foods or other nutrient-dense foods at home. If properly combined with a facility-based approach for those malnourished children with medical complications or below six months and implemented on a large scale, community-based management of SAM can prevent the deaths of hundreds of thousands of children.

**Gera, T. (2010), *Efficacy and safety of therapeutic nutrition products for home based therapeutic nutrition for severe acute malnutrition a systematic review*. Indian Pediatrics. 47(8): 709-18.**

The review assesses the efficacy and safety of home based management of SAM using therapeutic nutrition products or ready to use therapeutic foods (RUTF); and compares the efficacy of these products in comparison with F-100 (the standard facility based treatment) and home-based diet. The results indicate that systematic reviews and Randomised Controlled Trials (RCTs) showed RUTF to be at least as efficacious as F-100 in increasing weight and more effective in comparison to home based dietary therapies. Data from observational studies showed the energy intake with RUTF to be comparable to F-100 and two consensus statements supported the use of RUTF for home based management of uncomplicated SAM. The author concludes that use of therapeutic nutrition products for home based management of uncomplicated SAM appears to be safe and efficacious. However, most of the evidence on this promising strategy has emerged from observational studies conducted in emergency settings in Africa and so more evidence is needed on other contexts.

**Bahwere P, Mtimuni A, Sadler K, Banda T and Collins S, (2012), *Long term mortality after community and facility based treatment of severe acute malnutrition: analysis of data from Bangladesh, Kenya, Malawi and Niger*. Journal of Public Health and Epidemiology Vol. 4(8), pp. 215-225**

This paper brings together data from 4 countries, Bangladesh, Kenya, Malawi and Niger and reviews the data from four cohorts reporting on long term survival of children discharged from therapeutic feeding programmes. It demonstrates the improved long and short term survival of kids treated through the CMAM approach.

The mortality rate ratio (MRR) calculated by dividing the observed deaths after discharge from a therapeutic feeding programme, by expected deaths was used to compare survival of 1,670 children. Data showed that the survival of children who defaulted from the programmes was worse than that of those who were discharged cured. It also showed that children treated at home was better than those treated as inpatient. The study

suggests that Community-based Therapeutic Care should be included in the package of interventions with high potential for accelerating the progress towards reaching Millennium Developmental Goal four.

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### 3) Indirect (nutrition sensitive) interventions

The 1990 UNICEF framework (see figure 1) is particularly helpful in identifying the ways in which the basic and underlying determinants of undernutrition move beyond considerations of food and basic care practices, to wider considerations of household income and resources, the role of gender and other factors in the intra-household allocation of these resources, or wider environmental factors affecting health and sanitation. Furthermore, nutrition specific interventions that address the immediate causes of undernutrition have been estimated to be effective at addressing only 20% problem. Therefore interventions that tackle some of these underlying causes are thus an essential part of the response to tackle 80% of the problem. These nutrition sensitive approaches address the underlying factors that contribute to malnutrition, including hunger, poverty, gender inequality, and poor access to safe water and health services by integrating nutrition actions into other sectors. These include measures ranging from cash transfers (and other forms of social protection) to augment household resources; agricultural development to improve rural incomes and increase basic household food security; women's empowerment; wider health systems strengthening; and improved water and sanitation supply.

#### 3a) Agriculture

Agricultural interventions have long been thought to have an effect on nutrition. Hoddinott (2011) described six pathways commonly associated with agricultural production impacting on nutrition and health:

- i. **Changes to incomes:** When changes in agricultural production lead to increases in household income, the income can be used to purchase goods that affect health status.
- ii. **Changes in crops, farm practices, and markets:** Changes in agricultural production can result in the introduction of new foods into diets.
- iii. **Changes to crop varieties and production methods:** Changes in the types of crops that are grown or changes in production processes may make agricultural work either more or less physically intensive.
- iv. **Changes to the use of time:** Where changes increase the returns to time spent in agriculture, households may increase the amount of labour they devote to agricultural production (often particularly applicable in terms of women's time allocated to care).
- v. **Changes to savings:** Where changes in agricultural production result in higher incomes, individuals and households may choose to save some of these higher incomes in the form of assets that improve health.
- vi. **Changes in intra-household resource allocation:** Changes in agricultural production may result in changes in the allocation of resources within the household. If this change results in women earning greater income, then this may affect how households spend money, how food is allocated, and the types of assets that are accumulated. Holding all other factors constant, this may improve health and nutrition.



Despite the clear pathways, from the current evidence available, the effectiveness of agricultural interventions on nutrition is not clear. Data indicates the relationship is complex, producing either mixed results or demonstrating no impact (Masset et al. 2012). Part of the reason for lack of conclusive evidence can be explained by programmes not originally being designed to address nutrition outcomes or evidence collected for nutrition outcomes, and an over reliance on Randomised Controlled Trials (RCTs) as the gold standard of proof (Ruel & Alderman 2013). RCTs do not lend themselves to the assessment of health and nutrition effects resulting from agricultural programmes, are generally impossible to apply to the food system, except in small projects. The impact of agriculture on health and nutrition is difficult to assess with RCTs, partly because treatments cannot be randomised and because of the intrinsic length of the effect pathway (Pinstrup-Andersen 2013). Despite limited evidence surrounding the impact of agricultural interventions on nutrition, there is agreement between stakeholders on main principles that should be included in any programmes designed to improve them both. With regards to planning, it is recommended that explicit nutrition objectives are included in agricultural projects, programmes, and policies. Opportunities must be maximised by multisectoral coordination. Women play an important role, in terms of maximising impact of household income on nutrition, in their role as the main producers of domestic food in many countries and also with regards to targeting the most vulnerable groups. Effective and transparent monitoring and evaluation of interventions should take place to measure its impact on beneficiaries and enable learning of experience and sharing of knowledge (Herforth, 2012).

#### **Key messages**

- Evidence suggests that agricultural interventions may have a positive effect on the production of the agricultural goods, but not on households' total income.
- To improve nutrition through agriculture, access to rural markets must be improved. Also the legal rights of farmers must be recognised and protected.
- Improvements in agricultural programmes need to be matched by complementary actions in health, sanitation, other direct interventions for nutrition, and female empowerment
- Agricultural interventions were successful in promoting the consumption of foods rich in protein and micronutrients, but the effect on the overall diet of poor people remains unclear.
- No evidence was found of an effect on the absorption of iron, but some evidence exists of a positive effect on absorption of vitamin A.
- Biofortified vitamin A-rich orange sweet potatoes have been shown to be both effective for increasing maternal and child vitamin A intake and status. Very little evidence was found of a positive effect on the prevalence of stunting, wasting, and underweight among children aged under-5.
- Despite the lack of evidence demonstrating the impact of agricultural interventions on nutrition, most stakeholders are in agreement on main principles regarding good practice for programmes linking the two. Strong monitoring and evaluation of new programmes is needed to inform future programmes. Results from research are needed to fill the current gap in evidence available.
- Although evidence is lacking, food security is believed to improve as a result of agricultural programmes.

#### **Body of evidence**

The body of evidence for the impact of agriculture on nutrition is moderate. While the pathways linking nutrition and agriculture seem well established, the empirical data illustrating the impact of each is limited.

### **Annotated bibliography**

**Hoddinott, J. (2011), *Paper 2 agriculture, health and nutrition: toward conceptualizing the linkages. 2020 Conference: Leveraging Agriculture for Improving Nutrition and Health. February 10-12, New Delhi, India***

This conference brief sketches a framework that clarifies the channels through which agriculture affects health and nutrition and vice versa. Three components make up this framework: settings, resources and production processes. The presence of feedback loops within the framework illustrates the possibility that anything that affects agriculture can affect health and nutrition, and anything that affects health and nutrition can affect agriculture. Because there can be no presumption that these effects will be, on balance, beneficial or harmful, policymakers and programme planners need to be cognisant of the multiple pathways through which agriculture can affect health and nutrition.

**Masset, E., Haddad, L., Cornelius, A. & Isaza-Castro, J. (2012). Effectiveness of agricultural interventions that aim to improve nutritional status of children: systematic review. *British Medical Journal*; 344**

This systematic review focuses on the impact of agricultural interventions that aim to improve children's nutritional status by improving the incomes and the diet of the rural poor. Mixed results were found, with limited demonstrable impact of agricultural interventions on nutritional status. This was attributed to methodological weaknesses of the studies reviewed rather than to specific characteristics of interventions.

The results report that no data is available on participation rates or characteristics of participants in agricultural interventions. As a result, little is known about the impact of these interventions on specific vulnerable groups; the targeting efficiency of the interventions; and the characteristic of programme participants. Agricultural interventions appear to have a positive impact on the production of the food item promoted by the intervention. However, it is less clear whether these interventions have a positive impact on total household income.

There is considerable evidence that the interventions analysed are successful in promoting the consumption of specific food items such as vegetables, fish or milk. However, consumers can, for example, compensate for an increase in the consumption of fish with a reduction in the consumption of other protein rich food such as meat. The overall impact of the interventions on the diet of the poor remains unexplored. The impact of agricultural interventions on micronutrients is unclear. There is some evidence of a positive impact on vitamin A intake but no evidence of an impact on iron intake. Evaluations of biofortification interventions are positive, but the number of these evaluations is too small to provide conclusive answers. The studies reviewed report little or no impact of agricultural interventions on the nutritional status of children. This result confirms the results of previous systematic reviews on the same topic. However, unlike previous reviews, the authors attribute this result to the lack of statistical power of the studies reviewed rather than to the lack of efficacy of these interventions. The studies reviewed found a greater impact of the intervention on the prevalence of short term indicators of hunger (wasting and underweight) versus long-term indicators (stunting). However, this result could be a consequence of the short time frame adopted by the evaluations, which is not well suited to detect long term effects.

To conclude, this review found the effectiveness of agricultural interventions in improving the nutritional status of children in developing countries to not be clear from the available evidence.

**Herforth, A. (2012). *Guiding principles for linking agriculture and nutrition: synthesis from 10 development institutions*. FAO, Rome, Italy.**

This synthesis paper aims to provide a comprehensive list of current guidance, institutional strategies, and other publications released by international development institutions and inter-agency UN bodies on maximising nutrition impact through agriculture. It concludes that there is agreement on main principles regarding the link between agriculture and nutrition. It is noted that some stakeholders have voiced concern over the empirical evidence base underlying actions to increase nutrition impact from agriculture programs, but the fact that the majority of international development institutions independently recommend very similar approaches is itself a strong justification to increase action around these principles.

Twenty main messages come out of the synthesis on maximising nutrition impact through agriculture, which are categorised into the following three categories:

- **Planning**
  - Incorporate explicit nutrition objectives into agricultural projects, programmes and policies.
  - Assess the context to identify and build on existing efforts, knowledge and resources.
  - Do no harm.
  - Measure impact through monitoring and evaluation.
  - Maximise opportunities through multisectoral coordination.
  - Maximise impact of household income on nutrition, through increasing women's access to income-generating opportunities and discretionary control of income, and other mechanisms.
  - Increase equitable access to resources through policies and programmes.
  - Target the most vulnerable groups, including smallholder farmers, women, and poor/food insecure households.
  
- **'Doing' or main activities**
  - Diversify production and livelihoods for the improved food access and dietary diversification, natural resource management, and other purposes.
  - Increase production of nutrient-dense foods.
  - Reduce post-harvest losses and improve processing.
  - Increase market access and opportunities.
  - Reduce seasonality of food insecurity.
  - Empower women.
  - Incorporate nutrition education to improve consumption and nutrition effects of interventions.
  - Manage natural resources for improved productivity, resilience to shocks and adaptation to climate change, and increased equitable access to resources through soil, water and biodiversity conservation.
  
- **Supporting**
  - Improve policy coherence supportive to nutrition.
  - Improve good governance for nutrition.
  - Build capacity in ministries at national, district, and local levels, and increase nutrition staff.

- Communicate and continue to advocate for nutrition.

**Pinstrup-Andersen, P. (2013). *Nutrition-sensitive food systems: from rhetoric to action*. *The Lancet*; 382**

This paper provides comment on how improving the nutrition sensitivity of food systems has potential to realise outcomes, yet despite this knowledge there is still inaction. This may be because goals other than improved nutrition are pursued by strong economic and political interests in both the agricultural sector and the postharvest value chain. A second reason for lack of action to improve nutrition is that randomised controlled trials (RCTs) — the gold standard in health research — do not lend themselves to analysis of the food system except in small, projects. RCTs are yet to prove helpful for measuring health and nutrition effects resulting from agricultural and other food system. This maybe in part because the effect pathway is long.

**Ruel, M. & Alderman, H. (2013) *Nutrition-sensitive interventions and programmes: how can they help to accelerate progress in improving maternal and child nutrition?* *The Lancet*; 382: 536–51**

This paper presents a review of the evidence of nutritional effects of programmes that were focused on the four sectors of agriculture, social safety nets, early child development and schooling. Many of the programmes reviewed were not originally designed to improve nutrition yet have great potential to do so. Nutrition sensitive programmes can serve as delivery platforms for nutrition specific programmes, enhancing scale up and effectiveness. The main findings are as follows:

- Agriculture - The need for investments to boost agricultural production, keep prices low, and increase incomes is undisputable; targeted agricultural programmes can complement these investments by supporting livelihoods, enhancing access to diverse diets in poor populations, and fostering women's empowerment. However, evidence of the nutritional effect of agricultural programmes is inconclusive—except for vitamin A from biofortification of orange sweet potatoes—largely because of poor quality evaluations. The lack of evidence of impact was explained by weaknesses in programme goal, design, targeting and implementation and the lack of rigour in impact evaluations.
- Social safety nets – These currently provide cash or food transfers to a billion poor people and victims of shocks (e.g., natural disasters). Individual studies show some effects on younger children exposed for longer durations, but weaknesses in nutrition goals and actions, and poor service quality probably explain the scarcity of overall nutritional benefits.
- Early child development - Combined early child development and nutrition interventions show promising additive or synergistic effects on child development—and in some cases nutrition—and could lead to substantial gains in cost, efficiency, and effectiveness, but these programmes have yet to be tested at scale.
- Child nutrition - Parental schooling, in particular maternal education is associated with stunting. The effectiveness of emerging school nutrition education programmes needs to be tested, while the huge potential of schools as a delivery platform for other interventions to prevent and treat undernutrition is recognised.

### **3b) Social protection**

Social protection in this context refers to policy instruments used to address poverty and vulnerability, including social assistance, social insurance and efforts at social inclusion, as well as subsidies. Social protection

programmes may aim to improve food security by providing 'entitlement' to food by means of labour (public works programmes), trade (food price subsidies, grain reserve management), or transfers (school feeding, supplementary feeding, and cash transfers – both conditional and unconditional). Results from individual studies indicate some effects on younger children exposed for longer durations, but weaknesses in nutrition goals and actions, and poor service quality probably explain the scarcity of overall nutritional benefits. Before the benefits of these programmes in terms of improved maternal and child nutrition is realised, nutrition goals and the quality of services must be strengthened. Many of the programmes that are not originally designed to improve nutrition, have great potential to do so (Ruel & Alderman, 2013).

Cash transfers can be direct and predictable non-contributory cash payments that help poor and vulnerable households to 'even out' food consumption and income over the year. There is consistent evidence that households receiving cash transfers spend more on food, resulting in significant gains in children's weight and height in several countries (Arnold et al. 2011). However the latest evidence shows an absence of overall effect of both unconditional cash transfers and conditional cash transfers on child nutritional status globally (Ruel & Alderman, 2013). The gender of the recipient has also been shown to be an important factor, with programme designs often favouring women, with the aim of increasing their control over the intra-household allocation of resources, which has been shown to impact on child health and nutrition status. However, the programme design must be handled with care, with some studies reporting an increase in household violence when women are targeted as cash recipients (Richards et al. 2011).

Cash transfer programs are being used to meet a variety of needs in humanitarian and transitional settings. The relationship between cash transfer interventions in crisis contexts and malnutrition has received little attention, even though cash transfers can improve access to quantity and quality of food (Bailey & Hedlund, 2012)

School feeding programmes are a form of conditional transfer and can reduce hunger and stimulate learning. Over the past two decades, many governments and organisations have renewed efforts to develop more effective school-based health and nutrition programmes in low-income countries. There is a growing body of evidence linking children's health and education; and the impact of school health and nutrition. Evidence indicates that school feeding programmes have small effects on school-age children's anthropometry, particularly in low-income settings (Ruel & Alderman, 2013). Food for education programmes can provide iron and other key micronutrients, but these programmes are not designed to address the most critical nutritional constraints in low-income settings, simply because they are not targeted at the most vulnerable period in child development, which is between conception and 2 years of age (Alderman & Bundy, 2011).

School feeding programmes are designed to improve attendance, achievement, growth, and other health outcomes. Results from higher quality studies indicate that school feeding in low-income countries resulted in a weight gain of 0.39 kg over an average of 19 months. In lower quality studies weight gain was on average 0.71 kg over 11.3 months. For height, school feeding resulted in the greatest height gain for younger children. School feeding was found to increase average attendance between 4 to 6 days per year. Maths gains were consistently higher for children who were fed and in short-term studies, small improvements in some cognitive tasks were found. It can be concluded that school meals may have some small benefits for disadvantaged children, but further research is needed (Kristjansson et al. 2007).

Some evidence suggests that school feeding programmes may be an effective method of both improving nutritional status and reducing poverty. School feeding can use value chains to link agriculture and nutrition, with potential livelihood and income benefits for farmers and nutrition benefits for young children and their

families. School feeding may also assist with iron intake, which is particularly important for teenage girls (Ruel & Alderman, 2013).

### **Key messages**

- Social safety nets have the potential to improve the nutritional status of mothers and children. For this to happen nutrition goals and the quality of services need to be strengthened.
- School feeding programmes are popular but costly, and the evidence of their effectiveness is weak and there is no agreement on best practice for implementation.
- CCT programmes provide a potentially powerful delivery mechanism for improving child nutrition, but require clearer nutrition objectives and actions, as well as monitoring and evaluation if they are to meet their potential.
- CCTs are found to have positive impact on nutrition in certain settings but it is unclear how dependent their success is on the context in which they are implemented and how effective they would be if they were replicated in a different setting.
- Evidence shows an absence of overall effect of both unconditional cash transfers and conditional cash transfers on child nutritional status.
- Children who are fed at school attend school more frequently than those who are not fed.
- School meals may have small physical and psychosocial benefits for disadvantaged pupils.

### **Body of evidence**

There is a large body of high quality evidence on the various aspects of social protection, but limited evidence on the general concept. The evidence is based on reviews of the literature and suggests the various aspects of social protection have a positive impact on nutritional outcomes, but the impact of each aspect is not clear.

### **Annotated bibliography**

**Alderman, H. & Bundy, D. (2011). *School feeding programs and development: are we framing the question correctly?* The World Bank Research Observer**

This paper analyses the recent evidence from in-depth studies on school feeding programmes. It finds that while school feeding programmes can influence the education of school children and, to a lesser degree, augment nutrition for families of beneficiaries, they are best viewed as transfer programmes that can provide a social safety net and help promote human capital investments.

**Arnold, C., Conway, T. & Greenslade, M. (2011). *DFID cash transfers literature review*. Policy Division, DFID, London, UK**

This evidence paper analyses the existing literature focused on the impact of cash transfers on various development outcomes, including nutrition. While various methodologies are employed in the literature

reviewed, the evidence suggests that recipients of cash transfers spend more on food, resulting in significant gains in children's weight and height.

**Bailey S. & K. Hedlund. (2012) *The Impact of Cash Transfers on Nutrition in Emergency and Transitional Contexts: A review of evidence.* Humanitarian Policy Group.**

This paper reviews the evidence on the nutritional impact of cash transfers in emergency and transitional settings, where food insecurity is high due to economic barriers. Fifty-four evaluations and documents from humanitarian programmes since 2004 were reviewed. Only projects that had clear nutrition and nutrition-related outcomes (e.g. improvements in food security, care practices and health status) were included. The paper examines the pathways through which cash transfer interventions in humanitarian settings may affect nutrition. In theory, cash has the potential to address most, if not all the immediate and underlying causes of nutrition; when households have more money they can buy more food, spend more time on child care, take children to health centres and invest in agricultural production (and thus have more income and food). Where inadequate dietary intake and food insecurity is an access problem, meaning that the goods and services people need and prioritise are available but they cannot purchase them, cash is likely to be effective. Similarly, where care practices and health status are limited by economic constraints and loss of income, cash can address these constraints, at least temporarily. Where access is not the only constraint, complementary programmes are essential, and cash might not be an appropriate response.

The authors conclude that the evidence from humanitarian cash interventions makes a plausible case that cash transfers can, and in some cases do, impact nutrition by improving dietary intake and access to food. The evidence for cash improving caring practices is limited although there are a few documented positive indications, and overall there is very little evidence on the impact of cash transfers on disease. The authors feel that this is almost certainly due to the lack of cash-based interventions in the health sector. There is also evident potential, and a handful of promising examples, that cash can complement supplementary feeding programmes and outpatient therapeutic programmes. While it is not possible to say one way or another that cash is responsible for improved nutritional outcomes in emergency and transitional settings, cash clearly could have positive effects on nutrition in certain circumstances. Cash first and foremost improves access. The authors recommend that aid agencies and donors should consider cash as one possible tool in an integrated approach to address malnutrition.

**Kristjansson, B., Petticrew, M., MacDonald, B., Krasevec, J., Janzen, L., Greenhalgh, T., Wells, G. A., MacGowan, J., Farmer, A.P., Shea, B., Mayhew, A., Tugwell, P. & Welch, V. (2007). *School feeding for improving the physical and psychosocial health of disadvantaged students.* Cochrane Database of Systematic Reviews, Issue 1**

The objective of this systematic review was to determine the effectiveness of school feeding programmes in improving physical and psychosocial health for disadvantaged school pupils. Early malnutrition and/or micronutrient deficiencies can negatively affect many aspects of child health and development. School feeding programmes are designed to provide food to hungry children and to improve their physical, mental and psychosocial health. This review included eighteen studies; nine were performed in higher income countries and nine in lower income countries. In the highest quality studies (randomised controlled trials (RCTs) from low income countries, children who were fed at school gained an average of 0.39 kg more than controls over 19 months; in lower quality studies (controlled before and after trials – CBAs), the difference in gain was 0.71 kg over 11.3 months. Children who were fed at school attended school more frequently than those in control groups; this finding translated to an average increase of four to six days a year per child. For educational and

cognitive outcomes, children who were fed at school gained more than controls on maths achievement, and on some short-term cognitive tasks. Results from higher-income countries were mixed, but generally positive. For height, results from lower income countries were mixed; in RCTs, differences in gains were important only for younger children, but results from the CBAs were large and significant overall. Results for height from high-income countries were mixed, but generally positive. School meals may have small physical and psychosocial benefits for disadvantaged pupils.

**Richards, E. et al. (2011). *Gender influences in child survival, health and nutrition: a narrative review*. UNICEF**

There is increasing recognition in the field of international health and nutrition that gender inequities and dynamics are a major social determinant of health and nutrition outcomes. However, reviews of evidence to date have tended to concentrate on comparisons of health and nutrition outcomes, healthcare utilisation or coverage of services/programmes between boys and girls or women and men. This review of the literature and accompanying guidance document respond to a range of questions exploring more broadly the ways in which gender influences household dynamics in relation to aspects of young child health and nutrition.

The review covers micro-credit and cash transfer schemes, their design features in relation to gender and the outcomes, both positive and negative. The literature review and guidance document highlight the importance of considering three areas in health and nutrition work; women's status and bargaining power; gender divisions of labour; and gender norms, values and identities

**Ruel, M. and Alderman, H. (2013) *Nutrition-sensitive interventions and programmes: how can they help to accelerate progress in improving maternal and child nutrition?* Lancet; 382: 536–51**

This paper presents a review of the evidence of nutritional effects of programmes that were focused on the four sectors of agriculture, social safety nets, early child development and schooling. The main findings for social safety nets were that these currently provide cash or food transfers to a billion poor people and victims of shocks (e.g., natural disasters). Individual studies show some effects on younger children exposed for longer durations, but weaknesses in nutrition goals and actions, and poor service quality probably explain the scarcity of overall nutritional benefits. Combined early child development and nutrition interventions show promising additive or synergistic effects on child development—and in some cases nutrition—and could lead to substantial gains in cost, efficiency, and effectiveness, but these programmes have yet to be tested at scale. Parental schooling is strongly associated with child nutrition, and the effectiveness of emerging school nutrition education programmes needs to be tested.

### **3c) Water, sanitation and hygiene (WASH)**

A growing body of evidence has demonstrated the critical importance of water, sanitation and hygiene (WASH) for children for many reasons, including improved nutrition. Along with several other factors, poor hygiene and sanitation cause high levels of maternal and child undernutrition in developing countries (Ahmed et al. 2012). The total number of deaths caused directly and indirectly by malnutrition induced by unsafe water, inadequate sanitation and insufficient hygiene is estimated at 860,000 deaths per year in children under-5 years of age (Prüss-Üstün et al. 2008).

Diarrhoea is a major cause of death and disease, especially among young children in low-income countries. Many of the microbial agents associated with diarrhoea are transmitted via the faecal-oral route and are associated with exposure to human faeces. A review by Clasen et al. (2010) found that interventions to improve



excreta disposal are effective in preventing diarrhoeal disease, but that the quality of the evidence is generally poor and does not allow for quantification of any such effect. The authors acknowledge that the review does not address the potential contribution of improved excreta disposal to preventing important health threats associated with inadequate sanitation, including malnutrition. A review by Dangour et al. (2013) found that WASH interventions may result in a small benefit on the growth of children who are under five years old. However, the authors urge caution in using this conclusion, as it is based on data from relatively short-term studies of low methodological quality.

### **Key messages**

- 860,000 deaths per year in children under-5 years of age are caused directly and indirectly by malnutrition induced by unsafe water, inadequate sanitation and insufficient hygiene.
- Interventions to improve excreta disposal are effective in preventing diarrhoeal disease, and are likely to have a positive impact on nutritional status, but the potential effectiveness of excreta disposal on diarrhoea is not currently known.
- One tenth of the global disease burden is preventable by achievable improvements in the way we manage water, meaning improvements are crucial to improve nutritional status.
- WASH interventions may result in a small benefit on the growth of children who are under five years old

### **Body of evidence**

The body of evidence includes three systematic reviews and one unclassified paper. While it is suggested there is a likely link between improved hygiene and nutritional status, the evidence linking the two is weak.

### **Annotated bibliography**

**Ahmed, T., Hossain, M. & Istiaque Sanin, K. (2012), *Global burden of maternal and child undernutrition and micronutrient deficiencies*. *Annals of Nutrition and Metabolism* 61(1) 8–17**

Poverty, food insecurity, ignorance, lack of appropriate infant and young child feeding practices, heavy burden of infectious illnesses, and poor hygiene and sanitation are factors responsible for the high levels of maternal and child undernutrition in developing countries. These factors can be controlled or removed by scaling up direct nutrition interventions and eliminating the root conditions including female illiteracy, lack of livelihoods, lack of women's empowerment, and poor hygiene and sanitation.

**Clasen, T.F., Bostoen, K., Schmidt, W.P., Boisson, S., Fung, I.C.H., Jenkins, M.W., Scott, B., Sugden, S. & Cairncross, S. (2010) *Interventions to improve disposal of human excreta for preventing diarrhoea*. *Cochrane Database of Systematic Reviews*, Issue 6**

In low-income countries, diarrhoea among young children is a major cause of death and disease, and is often the result of exposure to human faeces. This review found that in low-income settings, among the estimated 2.6 billion people who lack basic sanitation. The evidence suggests that excreta disposal interventions are effective in preventing diarrhoeal diseases. However, major differences among the studies, including the conditions in which they were conducted and the types of interventions deployed, as well as methodological deficiencies in

the studies themselves, make it impossible to estimate with precision the protective effective of sanitation against diarrhoea.

**Dangour, A.D., Watson, L., Cumming, O., Boisson, S., Che, Y., Velleman, Y., Cavill, S., Allen, E. & Uauy, R. (2013), *Interventions to improve water quality and supply, sanitation and hygiene practices, and their effects on the nutritional status of children*. Cochrane Database of Systematic Reviews; 8**

In low-income countries an estimated 165 million children under the age of five years suffer from chronic undernutrition causing them to be short in height and 52 million children suffer from acute undernutrition causing them to be very thin. Poor growth in early life increases the risks of illness and death in childhood. The two immediate causes of childhood undernutrition are inadequate dietary intake and infectious diseases such as diarrhoea.

Water, sanitation and hygiene (WASH) interventions are frequently implemented to reduce infectious diseases; this review evaluates the effect that WASH interventions may have on nutrition outcomes in children. The review includes evidence from randomised and non-randomised interventions designed to (i) improve the microbiological quality of drinking water or protect the microbiological quality of water prior to consumption; (ii) introduce new or improved water supply or improve distribution; (iii) introduce or expand the coverage and use of facilities designed to improve sanitation; or (iv) promote handwashing with soap after defecation and disposal of child faeces, and prior to preparing and handling food, or a combination of these interventions, in children aged under 18 years.

The authors identified 14 studies of such interventions involving 22,241 children at baseline and nutrition outcome data for 9,469 children. Meta-analyses of the evidence from the cluster-randomised trials suggests that WASH interventions confer a small benefit on growth in children under five years of age. While potentially important, this conclusion is based on relatively short-term studies, none of which is of high methodological quality, and should therefore be treated with caution. There are several large, robust studies underway in low-income country settings that should provide evidence to inform these findings.

**Humphrey J (2009). *Child undernutrition, tropical enteropathy, toilets, and handwashing*. The Lancet 374: 1032–35**

This report suggests that a key cause of child undernutrition is a subclinical disorder of the small intestine known as tropical enteropathy, caused by faecal bacteria ingested in large quantities by young children living in conditions of poor sanitation and hygiene. The author proposed that the primary causal pathway from poor sanitation and hygiene to undernutrition is tropical enteropathy and not diarrhoea as is often assumed.

The author concludes that interventions focused on gut microbial populations and improved drinking water quality might be important, together with continued efforts to improve infant diets and that prevention of tropical enteropathy, which afflicts almost all children in the developing world, will be crucial to normalise child growth. Provision of toilets and promotion of handwashing after faecal contact could reduce or prevent tropical enteropathy and its adverse effects on growth.

**Prüss-Üstün, A., Bos, R., Gore, F. & Bartram, J. (2008). *Safer water, better health: costs, benefits and sustainability of interventions to protect and promote health*. World Health Organization, Geneva, Switzerland**

This document summarises the evidence and information related to water and health, encompassing drinking-water supply, sanitation, hygiene, and the development and management of water resources. It collects the ingredients that support policy decisions, namely the disease burden at stake, the effectiveness of interventions, their costs and impacts, and implications for financing. It finds that one tenth of the global disease burden is preventable by achievable improvements in the way we manage water. Cost-effective, resilient and sustainable solutions have proven to alleviate that burden. Water-related improvements are crucial to improve health and nutritional status in a sustainable way.

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## **4) Implementation, international architecture and the enabling environment**

This section gives an outline on the coordination structures that exist to address undernutrition. In addition, it considers how both governance and funding impacts on the challenge of addressing undernutrition.

### **4a) Coordination structures**

The global architecture of organisations and institutions focusing on tackling nutrition, and more specifically undernutrition, has changed over the years. So have the targets and frameworks that define their work. In May 2012, Ministers of Health attending the World Health Assembly (WHA) agreed a range of maternal, infant and young child-focused undernutrition targets to be achieved by 2025, including a target to reduce stunting by 40 per cent (WHO, 2012).

In 1977 the UN set up an Administrative Committee on Coordination (ACC) subcommittee on nutrition. With reform of the UN ACC this became the United Nations System Standing Committee on Nutrition (UNSCN). It acts as a forum, allowing the UN to harmonise nutrition policy. The UNSCN has a mandate to promote cooperation among UN agencies and stakeholders involved in nutrition. Its goal is to end malnutrition in the current generation. It works through improving advocacy, awareness and mobilising commitment for improved nutrition (UNSCN, 2013).

In response to a global food crisis, world leaders convened in Rome in 2009, at the UN Food and Agriculture Organization (FAO) Headquarters for the World Summit on Food Security. They unanimously adopted a declaration pledging renewed commitment to eradicate hunger from the face of the earth sustainably and at the earliest date. It was agreed to work to reverse the decline in domestic and international funding for agriculture and promote new investment in the sector, to improve governance of global food issues in partnership with relevant stakeholders from the public and private sector, and to proactively face the challenges of climate change to food security (FAO, 2013).

Scaling Up Nutrition (SUN) is a collective movement focused on improving nutrition. It involves actors from governments, civil society, the United Nations, donors, businesses and researchers to address malnutrition. It calls on country leaders and governments to develop and commit to policies which prioritise dealing with poor nutrition. Collaborating with partners is encouraged to implement programs with shared nutrition goals. SUN advocates for the mobilisation of resources to effectively scale up nutrition, with a core focus on empowering women. The movement was founded on the principle that all people have a right to food and good nutrition. SUN was started in September 2010, and the governments of 41 countries have committed to it as of September 2013 (SUN, 2013).

The SUN framework supports the specific nutrition interventions of support for exclusive breastfeeding up to 6 months of age and continued breastfeeding, together with appropriate and nutritious food, up to 2 years of age; the fortification of foods; micronutrient supplementation; and the treatment of severe acute malnutrition (SAM). It also supports the nutrition-sensitive approaches including agriculture, clean water and sanitation, education and employment, health care, support for resilience and women's empowerment (SUN, 2013).

In 2012, leaders of the world's wealthiest eight countries (the G8) and African leaders committed to the New Alliance for Food Security and Nutrition, a shared commitment to achieving global food security. The goals of the New Alliance are to increase responsible domestic and foreign private investments in African agriculture, take innovations that can enhance agricultural productivity to scale, and reduce the risk borne by vulnerable economies and communities. The significance of the critical role played by smallholder farmers, especially women, in transforming agriculture and building thriving economies is recognised. (Feed the future, 2012). The New Alliance has published a progress report that focuses on progress in implementing mutual commitments and issues and challenges emerging from the early stages of the initiative (The New Alliance for Food Security and Nutrition, 2013). The report identified the following key challenges and opportunities that will need to be addressed by the New Alliance in the future:

- Country-level leadership
- Facilitating a new type of dialogue
- Institutional 'pace' and capacity
- Joined-up government
- Access to finance
- Leveraging and focusing public investment
- Women's economic empowerment
- Learning how to work with smallholders at scale
- Engaging local and global civil society organisations (CSOs)

There are also several broad approaches and partnerships focused on improving nutrition, including the Renewed Efforts Against Child Hunger and undernutrition (REACH) initiative and 1,000 Days. REACH was established in 2008 as an approach that UN agencies adopt to better provide joint and coherent support to governments of countries with a high burden of child and maternal undernutrition. It aims to help them to accelerate the scaling up of food and nutrition actions. As of April 2013 it operates in 12 countries. The UN agencies involved in the consortium are the FAO, the UN Children's Fund (UNICEF), the World Food Programme (WFP), and the World Health Organization (WHO). The International Fund for Agricultural Development (IFAD) joined REACH later on with an advisory role (REACH, 2013).

At the United Nations Millennium Development Goals Summit in September 2010, the former U.S. Secretary of State Hillary Clinton and former Irish Foreign Minister Micheál Martin launched the 1,000 Days Partnership. The purpose of creating the partnership was to draw attention to the critical window of opportunity that exists during the first 1,000 days between a woman being pregnant and the child's second birthday. During this period, the impact of maternal and child undernutrition is potentially irreversible. The partnership promotes targeted action and investment in interventions during this period to scale up nutrition. Targeted action during this period can have a life-changing impact on a child's future and help break the cycle of poverty. The right nutrition during the 1,000 day window can have a profound impact on a child's ability to grow and learn. It can also shape a society's long-term health, stability and prosperity. The 1,000 Days partnership brings together a wide range of partners including NGOs, donors, and the private sector. The partnership transcends a variety of sectors

including health, agriculture and food security, water, sanitation and hygiene, economic development and gender equality. As an advocacy hub, the 1,000 Days initiative promotes action and investment in early nutrition through informing key stakeholders about the impact and cost-effectiveness of investing, engaging new stakeholders, and catalysing collaboration and partnership across sectors (Thousand Days, 2013).

### **Annotated bibliography**

#### **The New Alliance for Food Security and Nutrition, 2013. *Progress Report Summary*. DFID, London, UK**

This is the first annual progress report on the New Alliance. It draws on six country-level reviews from Burkina Faso, Cote d'Ivoire, Ethiopia, Ghana, Mozambique and Tanzania. This report covers implementation since the launch of the New Alliance in 2012. It focuses largely on progress in implementing mutual commitments and issues and challenges emerging from this early experience.

### **Relevant websites**

#### **Feed the future, 2012, G8 and Africa Leaders Announce Expansion and Progress of the New Alliance for Food Security and Nutrition. Accessed 12.04.2013**

<http://feedthefuture.gov/article/g8-and-africa-leaders-announce-expansion-and-progress-new-alliance-food-security-and>

Webpage detailing how the New Alliance, a commitment by G8 nations, African countries, and private sector partners to support agricultural development, aims to help lift 50 million people in sub-Saharan Africa out of poverty in the next 10 years.

#### **Food and Agriculture Organization (FAO) of the United Nations, 2013, World Summit on Food Security. Accessed 11.04.2013**

[http://www.fao.org/wsfs/world-summit/en/?no\\_cache=1](http://www.fao.org/wsfs/world-summit/en/?no_cache=1)

This webpage details the 2009 the World Summit on Food Security that was held in Rome.

#### **REACH, based at World Food Programme in Rome, Italy. Accessed 11.04.2013**

<http://www.reachpartnership.org/en/about-reach>

This webpage details REACH, the approach that UN agencies adopt to better provide joint and coherent support to governments of countries with a high burden of child and maternal undernutrition.

#### **Scaling Up Nutrition (SUN), 2013. Accessed 11.04.2013**

<http://scalingupnutrition.org/about>

This webpage details Scaling Up Nutrition (SUN), a movement founded on the principle that all people have a right to food and good nutrition.

#### **Thousand Days, 2013. Accessed 12.04.2013**

<http://www.thousanddays.org/about/>

This webpage details the 1,000 Days partnership, which promotes targeted action and investment to improve nutrition for mothers and children in the 1,000 days between a woman's pregnancy and her child's second birthday when better nutrition can have a life-changing impact on a child's future and help break the cycle of poverty.

**United Nations Standing Committee on Nutrition (UNSCN), 2013. Accessed 10.09.2013**

<http://www.unscn.org/en/home/>

This website details UNSCN, the food and nutrition policy harmonization forum of the United Nations.

**World Health Organization, 2012. *Global targets 2025: To improve maternal, infant and young child nutrition.***

**WHO,**

**Geneva,**

**Switzerland**

[http://www.who.int/nutrition/topics/nutrition\\_globaltargets2025/en/index.html](http://www.who.int/nutrition/topics/nutrition_globaltargets2025/en/index.html)

This webpage details the WHO's Member States endorsement of global targets for improving maternal, infant and young child nutrition and are committed to monitoring progress. The targets include a target to reduce stunting by 40 per cent. The targets are regarded as vital for identifying priority areas for action and catalysing global change.

#### **4b) Governance**

It is doubtful that the world will be able to feed its growing population in a nutritious way without a substantial scale up of political commitment (Haddad, 2013). In recent years, the context or the wider 'enabling environment' for undernutrition reduction at national level has drawn increasing interest. This is believed in part to be down to the recognition that systemic capacity constraints at the governance level need to be addressed if the burden of undernutrition is to be permanently and sustainably reduced.

At the Nutrition for Growth Event held in June 2013 and organised by the UK's Department for International Development, a compact was endorsed by 90 stakeholders made up of partners, businesses, scientific and civil society groups. All the signatories committed to:

- Improving the nutrition of 500 million pregnant women and young children.
- Reduce the number of under-fives who are stunted by a further 20 million.
- Save the lives of at least 1.7 million children by preventing stunting, increasing breastfeeding and better treatment of severe and acute malnutrition.
- Financial commitments by donors, philanthropy and CSOs included new commitments of up to £2.7 billion to tackle under-nutrition up to 2020.
- An estimated £12.5 billion for improved nutrition outcomes from nutrition sensitive investments in agriculture, social protection and water, sanitation and hygiene.
- A pledge from 27 businesses to improve the nutrition, and consequently the productivity and health, of over 927,000 members of their workforces in more than 80 countries.
- New partnerships between business and science to research new solutions and scale effective technologies.
- Commitments from 14 governments to scale up their national nutrition plans, and many announced targets for reductions in stunting. (DFID, 2013)

The **Hunger and Nutrition Commitment Index (HANCI)** is one result of the recent drive towards researching the enabling environment. It was launched in 2013. It ranks governments on their political commitment to tackling hunger and undernutrition and measures what is being achieved and which policies are failing in an effort to provide greater transparency and public accountability. It praises governments where due, and highlight areas for improvement. The HANCI findings support civil society to reinforce and stimulate additional commitment towards accelerating the reduction of hunger and undernutrition. It also assesses whether improving commitment levels lead to a reduction in hunger and undernutrition. An important finding was that economic growth has not necessarily led to a commitment from governments to tackle hunger and undernutrition and conversely low wealth or slow economic growth in a country does not necessarily imply low levels of political commitment. Significantly, within areas of high and growing hunger and undernutrition prevalence, some countries are clearly showing much greater political commitment to address these problems than others. There is also variation between relative commitment to hunger reduction and the relative commitment to nutrition (te Lintelo et al. 2013).

The research base on how to improve the enabling environment for nutrition is limited. However, the inclusion of a paper by Gillespie et al. (2013) that was focused solely on this topic in the 2013 Lancet Series on Maternal and Child Nutrition indicates its importance and relevance to the undernutrition agenda, reflecting the increase in political discourse on this topic. Commitments from many national governments, international organisations, and donors have increased, with momentum driving and being driven by The Scaling Up Nutrition movement. Harmonisation has increased among stakeholders, with regard to their understanding of the main causes of malnutrition and to the various options for addressing it. An enabling environment is vital for nutrition before the positive impact of policies and processes can be experienced by those that need improved nutrition the most. High quality and well-resourced nutrition interventions are vital. These can be bolstered by ensuring that programmes involving agriculture, social protection, and water and sanitation systems are aligned with nutrition goals. Sustained and effective political support to improve nutrition status must be based on knowledge and evidence, and reinforced through policies and governance. To be a success the resources must be available to gather and analyse the evidence, and to make, monitor and evaluate the policies.

A review of four recent principal research streams finds that all note the importance of visibility, commitment and accountability but do not provide much guidance how they should be attained, suggesting further research is needed (Haddad, 2013).

Previous work on the enabling environment found that capability, accountability and responsiveness are three key aspects of effective nutrition governance. Capability in this context refers to coordination between government ministries to improve diet, sanitation, health and education. Undernutrition is often invisible until it becomes highly acute. As such, citizens may need to generate public awareness and demand officials take accountability and deliver appropriate action. The window of opportunity for preventing irreversible damage from undernutrition is only 1,000 days, so a rapid government response is needed to address the needs of the most vulnerable in society (Haddad et al. 2012).

Political and system commitment can be generated through sustained efforts from policy entrepreneurs and nutrition champions. Research suggests that mid-level actors from ministries and external partners struggle to capitalise on windows of opportunity. Opportunities may be missed due to capacity constraints and differing opinions on what action to take. Ownership and responsibility may also be a limiting factor. If systematic capacity constraints remain unaddressed, the consequences on the ability to achieve the desired goals are likely to be negative (Pelletier et al. 2012).

## Key messages

- Strong leadership is key to reducing undernutrition through the promotion cooperation between sectors, organisations and stakeholders.
- Different levels of governance must be supported by appropriate structures for effective action to be successful.
- National and global commitment for improving nutrition is needed for change. Capacity to achieve change must be systematically strengthened.
- Sustainable funding sources will be vital to the success of interventions.
- Interventions that can be scaled-up should be prioritised.
- Investment in research, monitoring and advocacy will lead to results. Research in this context may include operational research of delivery, implementation, and scale-up of interventions, and contextual analyses about how to shape and sustain enabling environments.
- Strategic capacities must be strengthened as this will lead to commitment building, policy based balling and ultimately capacity building for nutrition focused operations.
- Economic growth does not automatically result in commitment from governments to tackle hunger and undernutrition and conversely low wealth or slow economic growth in a country does not necessarily imply low levels of political commitment.
- There is variance between the political commitment of different countries to address hunger and malnutrition. There is also variation between commitment to hunger reduction and the commitment to reducing undernutrition.
- Political commitment can be developed in a short time, but commitment must not be squandered—conversion to results needs a different set of strategies and skills
- Framing of undernutrition reduction as an apolitical issue is short sighted and self-defeating. Political calculations are at the basis of effective coordination between sectors, national and subnational levels, private sector engagement, resource mobilisation, and state accountability to its citizens.
- The private sector has substantial potential to contribute to improvements in nutrition, but efforts to realise this have to date been hindered by a scarcity of credible evidence and trust. Both these issues need substantial attention if the positive potential is to be realised.

## Body of evidence

The body of evidence for this section comes from a range of documents and study types with varying methodologies. The consensus is that strong governance is needed to reduce undernutrition, with predictable and stable funding sources being available to facilitate this. One study provides evidence that suggests economic growth does not automatically result in commitment from governments to tackle hunger and undernutrition. Further research is needed on the relationship between governance and nutrition.



## Annotated bibliography

### **DFID, (2013), Nutrition for Growth Commitments. Compact endorsed at Nutrition for Growth Event 2013, DFID, UK.**

On 8 June 2013 at a Nutrition for Growth Event, this compact was endorsed by 102 stakeholders (made up of partners, businesses, scientific and civil society groups) which commits to:

- Improve the nutrition of 500 million pregnant women and young children
- Reduce the number of under-fives who are stunted by a further 20 million
- Save the lives of at least 1.7 million children by preventing stunting, increasing breastfeeding and better treatment of severe and acute malnutrition

It also secured:

- Financial commitments by donors, philanthropy and CSOs included new commitments of up to £2.7 billion to tackle under-nutrition up to 2020
- An estimated £12.5 billion for improved nutrition outcomes from nutrition sensitive investments in agriculture, social protection and water, sanitation and hygiene
- A pledge from 27 businesses to improve the nutrition, and consequently the productivity and health, of over 927,000 members of their workforces in more than 80 countries
- New partnerships between business and science to research new solutions and scale effective technologies
- Commitments from 14 governments to scale up their national nutrition plans, and many announced targets for reductions in stunting.

The UK promised a total of £655m for nutrition specific programme spend, which includes a £375m core offer (a tripling of 2010 levels), and the remainder for leveraging others. It also committed on nutrition sensitive programmes. All of this means a step change for us on nutrition, with significant new money to scale up nutrition programmes both specific and nutrition-sensitive.

### **Gillespie, S., Haddad, L., Mannar, V., Menon, P. & Nisbett, N. (2013) *The politics of reducing malnutrition: building commitment and accelerating progress*. Lancet; 382: 552–69**

As part of The Lancet Series on Maternal and Child Nutrition, this paper focuses on nutrition and the enabling environment. It highlights how in the past 5 years, political discourse about the challenge of undernutrition has increased substantially at national and international levels and has led to stated commitments from many national governments, international organisations, and donors. The Scaling Up Nutrition movement has both driven, and been driven by, this developing momentum. Harmonisation has increased among stakeholders, with regard to their understanding of the main causes of malnutrition and to the various options for addressing it. The main challenges are to enhance and expand the quality and coverage of nutrition-specific interventions, and to maximise the nutrition sensitivity of more distal interventions, such as agriculture, social protection, and water and sanitation. A crucial third level of action exists but is largely neglected. The third level relates to the environments and processes that underpin and shape political and policy processes. This paper questions how enabling environments and processes are cultivated, sustained, and ultimately translated into results on the

ground. It considers the generation of high-level political momentum and seeks to establish what needs to happen to turn this momentum into results. The aim is to ensure that high-quality, well-resourced interventions for nutrition are available to those who need them, and that agriculture, social protection, and water and sanitation systems and programmes are proactively reoriented to support nutrition goals. The authors present a six-cell framework to discuss the ways in which three domains (knowledge and evidence, politics and governance, and capacity and resources) are pivotal to create and sustain political momentum, and to translate momentum into results in high-burden countries.

**Haddad, L., Acosta, A.M. & Fanzo, J. (2012). *Accelerating reductions in undernutrition: what can nutrition governance tell us?* In Focus Policy Briefing – Issue 22, IDS, Brighton, UK**

This briefing informs government leaders, policymakers and key stakeholders of the Scaling Up Nutrition movement, how they can better mobilise political commitment for undernutrition reduction and how they can facilitate cooperation across national and local institutions, and among nutritionists, civil society and the private sector. It is based on evidence from six countries (Bangladesh, Brazil, Ethiopia, India, Peru and Zambia). The following key recommendations are issued for ensuring successful governance and undernutrition reduction:

- Governments need strong executive leadership to promote effective intersectoral cooperation.
- Ensure the right structures are in place to support coordination among different levels of government.
- Provide predictable funding sources to sustain nutrition interventions.
- Investment in monitoring and advocacy.

**Haddad, L. (2013). *How can we build an enabling political environment to fight undernutrition?* *European Journal of Development Research* 25, 13–20**

This article outlines why political commitment is especially vital for undernutrition reduction compared with other development outcomes. It suggests some of the reasons for this lack of commitment and puts forward a number of approaches to be tested on how such commitment can be fostered as part of an overall enabling environment for undernutrition reduction. It provides a brief review of four relevant research streams. It concludes that while the evidence base is small, the consensus is that the importance of visibility, commitment and accountability are recognised, but guidance is lacking to indicate how to attain these desired features of the enabling environment.

**te Lintelo, D., Haddad, L., Laksham, R. & Gatellier, K. (2013). *The Hunger And Nutrition Commitment Index (HANCI 2012). Measuring the political commitment to reduce hunger and undernutrition in developing countries.* Institute of Development Studies, UK**

The Hunger and Nutrition Commitment Index (HANCI) ranks governments on their political commitment to tackling hunger and undernutrition. The index was created to provide greater transparency and public accountability by measuring what governments achieve, and where they fail, in addressing hunger and undernutrition. Guatemala (which was ranked first by the index) displayed substantial political commitment to reducing hunger and undernutrition, expressed through a range of efforts including:

- Ensuring high level of access to drinking water

- Ensuring good levels of access to improved sanitation
- Promoting complementary feeding practices, and ensuring over nine out of ten pregnant women are visited by a skilled health personnel at least once before delivery
- Investing substantially in health and having a separate nutrition budget line to make its spending accountable to all
- Putting in place a Zero Hunger Plan that aims to reduce chronic malnutrition in children less than 5 years of age by per cent in 2016
- Ensuring that public policy is informed by robust and up-to-date evidence on nutrition statuses
- Establishing a multi-sectoral and multi-stakeholder coordination mechanism that is regionally recognised as an example of good practice.

**Pelletier, D.L., Frongillo, E.A., Gervais, S., Hoey, L., Menon, P., Ngo, T., Stoltzfus, R.J., Ahmed, A.M. & Ahmed, T. (2012). Nutrition agenda setting, policy formulation and implementation: lessons from the Mainstreaming Nutrition Initiative. *Health Policy Plan 27 (1): 19-31***

This paper reports on the findings from studies in Bangladesh, Bolivia, Guatemala, Peru and Vietnam which sought to identify the challenges in the policy process and ways to overcome them, notably with respect to commitment, agenda setting, policy formulation and implementation. The key findings were as follows:

- Strengthening the full spectrum of policy activities is necessary if large-scale and sustained reductions in undernutrition are to be achieved.
- Within this policy spectrum, high priority should be given to strengthening strategic capacities because these are fundamental for advancing commitment-building, agenda setting, policy formulation, capacity-building for operations, and all other aspects of a long-term nutrition agenda at country level.
- These conclusions are especially relevant for major global initiatives currently under development that seek to address nutrition through country-led processes and convergence among multiple organisations.
- The extensive investments in documenting the efficacy of nutrition interventions are unlikely to produce sustainable reductions in undernutrition unless or until these weaknesses in the policy spectrum are better understood and addressed.

#### **4c) Funding**

Evidence suggests nutrition interventions have the potential to have a significant impact on health and education, preserving human capital. Yet the investment by national governments, non-government organisations and international donors is not currently enough to end undernutrition. Despite the proportion of Official Development Assistance (ODA) focused on basic nutrition increasing from 0.2% in 2004 to 0.4% in 2011, there is still a shortfall when the demand is considered. Basic nutrition ODA funding is still small when compared with emergency and development food aid. Appropriate levels of basic nutrition financing is needed as a key component in the battle to eradicate poverty. (Di Ciommo, 2013).

Between 2005 and 2009, 10 of the world's leading bilateral and multilateral donors contributed an average of US\$73 million per year to direct nutrition interventions which address the immediate determinants of undernutrition. This represents just a fraction of the estimated need and is dwarfed by investment in indirect nutrition interventions (US\$365 million), which address the underlying causes of undernutrition. Investments in aid to tackle the escalating challenge of undernutrition remain inadequate (Mutuma et al. 2012).

With a growing global population, the problem is likely to get worse without increased investment. In the current climate, there is increased competition for funding but also increased expectation to invest in the most cost effective interventions. Evidence suggests that a 15 % reduction in deaths in children younger than 5 years can be achieved if populations can access ten specific direct nutrition interventions at 90% coverage. The total additional annual cost to scale up access to these ten direct nutrition interventions in the 34 focus countries that have 90% of the world's children with stunted growth is estimated to be \$9.6 billion per year (Bhutta et al. 2013).

In some cases, nutrition aid is not being invested in countries with the highest rates of undernutrition and some donors frequently do not honour their commitments. In addition, there is a major lack of transparency in nutrition aid, highlighting the need for donors to be more accountable to their electorates (Mutuma et al. 2012). Improvement of the monitoring and evaluation of the nutrition financing activities of donors is required, to allow 'best practices' to be identified, understood and replicated. Accountability also needs to be improved. It is also suggested that efforts of those working in various sectors including donors, academia and civil society, are combined when dealing with the financing of scaling up nutrition to avoid a fragmented approach. If the current dearth of funds is ever to be overcome, long-term, sustainable and predictable funding will be needed for the full nutrition package which is aligned with complementary initiatives in health, food security and agriculture (Spratt, 2012).

As part of the SUN initiative, signatory countries are in the process of calculating the cost of scaling up nutrition in their respective countries. As many as 20 countries have currently collated costs from budgets and nutrition-related plans. Data on cost estimates of scaling up nutrition are needed to mobilise support and resources at a regional, national and international level. As more data is gathered, a better understanding will be gained of the resources needed to address undernutrition, which will be vital for policy and planning (SUN, 2013).

### **Key messages**

- Undernutrition imposes a significant global human and economic cost.
- Nutrition focused ODA has increased in the last decade, but is still small when compared with emergency and development food aid. Nutrition focused ODA currently does not meet demand.
- Investments in aid to tackle the escalating challenge of undernutrition remain inadequate and significant extra funding is needed to implement direct nutrition interventions that have demonstrated effectiveness.
- Micronutrient supplementation and fortification are found to be cost effective implementations and to work well even when capacities are constrained, making them a sensible option for further investment.
- An estimated \$9.6 billion per annum is needed to scale up 10 direct interventions to 90% coverage in 34 focus countries with the most significant stunting burden.

- There is a major lack of transparency in nutrition aid, highlighting the need for donors to be more accountable to their electorates.
- OECD needs to improve monitoring and evaluation of the nutrition financing activities of donors to allow 'best practices' to be identified, understood and replicated. Accountability also needs to be improved.
- Donors, academia and civil society need to work together to avoid a fragmented approach to solving undernutrition.
- Innovative financing to provide long-term, sustainable and predictable funding for the full nutrition package which is aligned with complementary initiatives in health, food security and agriculture is suggested.

### Body of evidence

There is a mixture of study types on the relationship between funding and nutrition. While there is some evidence available on various aspects, such as undernutrition imposing a significant global human and economic cost and the lack of transparency on data, it is clear more research is needed into the relationship between nutrition and funding.

### Relevant website

Scaling Up Nutrition (SUN), 2013. Accessed 10.09.2013  
<http://scalingupnutrition.org/about/financial-tracking-resource-mobilization>

This webpage details Scaling Up Nutrition (SUN), a movement founded on the principle that all people have a right to food and good nutrition. It details how financial tracking of nutrition programmes is vital for resource mobilisation.

### Annotated bibliography

**Bhutta, Z. A., Das, J. K., Rizvi, A., Gaffey, M. F., Walker, N., Horton, S., Webb, P., Lartey, A., Black, R. E. (2013). Lancet Nutrition Interventions Review Group; Maternal and Child Nutrition Study Group. Evidence-based interventions for improvement of maternal and child nutrition: what can be done and at what cost? Lancet. 382(9890):452-77.**

The analysis suggests the current total of deaths in children younger than 5 years can be reduced by 15 per cent if populations can access ten evidence-based nutrition interventions at 90 per cent coverage. The direct interventions are folic acid, multiple micronutrient, calcium and balanced energy-protein supplementation for pregnant and women of reproductive age, promotion of exclusive breastfeeding, complimentary feeding, vitamin A supplementation, preventative zinc supplementation and management of moderate and severe acute malnutrition for infants and children. To achieve this scaling up, an additional annual cost is \$9.6 billion per year.

**Di Ciommo, M. (2013). *The Aid Financing Landscape For Nutrition*. Development Initiatives, UK.**

This report focuses on aid commitments and finance flows for nutrition from donors. The results indicate that while the volume of aid for nutrition is increasing, there is still a deficit of funding when the scale of need is

considered. Only 0.4% of official development assistance went to assist basic nutrition. Distribution within countries is also an issue, with undernutrition continuing to be a major challenge for both low- and middle-income countries. Approximately 35% of all deaths among children under five can be attributed to undernutrition. It makes children more vulnerable to illnesses. It also has a negative impact on their future productivity if they survive, with earnings being about 10% less than average. The report concludes that investments in nutrition are a good way to eradicate of poverty.

**Horton, S., Shekar, M., McDonald, C., Mahal, A. & Krystene Brooks, J. (2010). *Scaling Up Nutrition, what will it cost?* World Bank**

Despite the evidence suggesting that nutrition interventions have the potential to have a positive impact in health and education and on preserving human capital in crises-stricken countries for generations to come, official development assistance for nutrition remains minimal. This report estimates the cost of scaling up a minimal package of 13 proven nutrition interventions from current coverage levels to full coverage of the target populations in the 36 countries with the highest burden of undernutrition. These countries account for 90 per cent of all children whose growth has been stunted by inadequate nutrition. Adding another 32 smaller high-burden countries with levels of stunting and/or underweight exceeding 20 per cent would increase these cost estimates by 6 per cent. It states that undernutrition imposes a staggering cost worldwide, both in human and economic terms. It is responsible for the deaths of more than 3.5 million children each year (more than one third of all deaths among children under 5) and the loss of billions of dollars in forgone productivity and avoidable health care spending. Individuals lose more than 10 per cent of lifetime earnings, and many countries lose at least 2–3 per cent of their gross domestic product to undernutrition. The current economic crisis and its potential impact on the poor make investing in child nutrition more urgent than ever to protect and strengthen human capital in the most vulnerable developing countries.

The 13 direct nutrition interventions selected for this costing exercise that have demonstrated effectiveness in many countries by reducing child mortality, improving nutrition outcomes, and protecting human capital are categorised into one of three groups: i) Behaviour change interventions; ii) Micronutrient and deworming interventions; and iii) Complementary and therapeutic feeding interventions. It was concluded that an additional US\$10.3 billion from domestic and donor resources for the proposed scale-up. Investments in micronutrient supplementation and fortification were found to have the lowest unit cost (a cost per child per year of about US\$5) and to have high cost-effectiveness (US\$10 per disability-adjusted life year for vitamin A supplementation, and US\$73 per disability-adjusted life year for therapeutic zinc supplementation) and high benefit cost ratios (8:1 for iron fortification of staples; 30:1 for salt iodization). These micronutrient interventions are also known to work well, even when capacities are constrained. Complementary feeding for children 6–23 months of age is more expensive, between US\$40 and US\$80 per child per year. Complementary feeding programs have had only a modest effect on deaths.

The most costly intervention per child is treatment of severe acute malnutrition (SAM), at US\$200 per child treated, which has a cost-per-death averted of US\$1,351, corresponding to around US\$41 per disability-adjusted life year saved. The reason this intervention is the last priority relates to weak national capacities and delivery systems, as well as the high cost and implementation difficulties of scaling it up. However, when the scale-up becomes tractable with enhanced capacities, this is a high-priority intervention to save lives. Conditional cash transfers can provide additional demand-side support to nutrition interventions, although research on them is currently lacking. Conditional cash transfers are not an alternative to nutrition interventions; rather they can be complementary. Transfers set up to be social safety nets for the poor, for example, can require the use of critical nutrition services, thereby increasing demand for them.

**Lake, A. (2012). *Investing in nutrition security is key to sustainable development. UNICEF Executive Director speech at G8: The Camp David Summit – Route 2012: The Road to Recovery*. Courtesy of the G8 Research Group at the Munk School of Global Affairs, University of Toronto accessed 16.04.2013**  
[http://www.unicef.org/media/media\\_62452.html](http://www.unicef.org/media/media_62452.html)

This speech focuses on addressing poor nutrition, with a specific focus on stunting. It states that the 2008 Copenhagen Consensus recommended priorities for confronting the top 10 global challenges, ranking the provision of young children with micronutrients as the most cost-effective way to advance global welfare. The author urges governments to invest in programmes to prevent stunting or risk diminishing the impact of other investments in education, health and child protection. It suggests that governments, international agencies and non-governmental organisations should work together to improve their collective ability to implement, as well as monitor, the results that these programmes are achieving, identify the barriers to progress and coordinate efforts to overcome them. This, in turn, maximises the effectiveness of aid dollars and budget allocations at a time when economic adversity makes every dollar count more than ever. Making nutrition a global priority and stunting a thing of the past is a cost-effective opportunity for a big global development win – an opportunity that nobody can afford to lose.

**Mutuma, S., Fremont, E. & Adebayo, A. (2012). *Aid for nutrition: Can investments to scale up nutrition actions be accurately tracked?* Action Against Hunger / ACF International**

Investments in aid to tackle the escalating challenge of undernutrition remain inadequate. This report calls for all major donors to disburse more overseas development assistance to programmes which treat undernutrition and address its underlying causes in countries where the need is greatest. It found that between 2005 and 2009, 10 of the world's leading bilateral and multilateral donors contributed an average of US\$73 million per year to direct nutrition interventions which address the immediate determinants of undernutrition. This represents just a fraction of the estimated need and is dwarfed by investment in indirect nutrition interventions (US\$365 million), which address the underlying causes of undernutrition.

The report also found that the nutrition aid that is being delivered is not being invested in countries with the highest rates of undernutrition and that some donors frequently do not honour their commitments. This paper assesses the transparency, quantity and effectiveness of nutrition funding which has been reported in the Organisation for Economic Cooperation and Development's Creditor Reporting System database and provides recommendations, including both general and donor-specific, on the actions needed to more adequately address undernutrition. It also found that there is a major lack of transparency in nutrition aid, highlighting the need for donors to be more accountable to their electorates.

**Spratt, S. (2012). *Aid for nutrition: Using innovative financing to end undernutrition*. Action Against Hunger / ACF International**

This report explores the future financing of nutrition interventions. It finds that if full and timely investment is made in these key interventions, then countries with high burdens of undernutrition stand a much greater chance of saving the lives of millions of children and providing them with the opportunity to lead full, healthy lives and furthering their own development. A number of financing options are proposed without one option being recommended in particular. Domestic and external donors and national governments are provided with proof that the costs of scaling up nutrition are not insurmountable. It discusses the implications of splitting the costs for scaling up nutrition between domestic and national sources and various innovative financing options.

The recommendations of this report are particularly targeted at the member countries and organisations of the Scaling Up Nutrition movement.

To conclude the following recommendations are made:

- Given the chronic underinvestment in proven, cost-effective, nutrition-specific interventions donors and national governments must scale up investments in nutrition in both development and humanitarian contexts.
- Donors should explore and trial innovative financing to provide long-term, sustainable and predictable funding for the full nutrition package which is aligned with complementary initiatives in health, food security and agriculture.
- The SUN signatory countries must demonstrate their commitment to scaling up nutrition by costing national nutrition plans by the end of 2012.
- The SUN Leadership, donors and SUN signatory countries should work together to develop a systematic, equitable and transparent mechanism for the sharing of costs between domestic and external sources so that countries receive adequate assistance in proportion to their needs.
- The OECD needs to improve monitoring and evaluation of the nutrition financing activities of donors to allow 'best practices' to be identified, understood and replicated.
- The OECD should align domestic and external reporting procedures in order to improve accountability for nutrition financing.
- Donors, academia and civil society should complement the extensive research on direct interventions with a similar process for indirect interventions that will address the underlying drivers of undernutrition in order to avoid tackling the issue with a fragmented approach.

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