AID FOR NUTRITION
Maximising the impact of nutrition-sensitive interventions
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PUBLISHER: Action Against Hunger | ACF International

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DESIGN: Wingfinger Graphics (www.wingfinger.org.uk)

COVER IMAGE: ACF Kenya, courtesy of Samuel Hauenstein Swan

ACKNOWLEDGEMENTS

The author would like to thank Lawrence Haddad for his expert comments and guidance, Samuel Hauenstein Swan and Hugh Lort-Phillips for their substantive inputs and patience, and Lisa Smith and Lawrence Haddad for allowing access to results and data from their forthcoming paper. He is also extremely grateful to Stuart Gillespie for his recommendations and for his insightful foreword.

The ACF production team would also like to thank the following ACF personnel for their inputs to the production of the report: Serge Breysse, Lily Frey, Maureen Gallagher, Anne-Dominique Israel, Julien Morel, Silke Pietzsch, Elise Rodriguez, Glen Tarman and Etienne du Vachat.

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Action Against Hunger’s mission is to save lives by eliminating hunger through the prevention, detection and treatment of undernutrition, especially during and after emergency situations of conflict, war and natural disaster. From crisis to sustainability, we tackle the underlying causes of undernutrition and its effects. By integrating our programmes with local and national systems we further ensure that short-term interventions become long-term solutions.

This report is the third report in Action Against Hunger’s Aid for Nutrition report series.

The first report, Aid for Nutrition: Can investments to scale up nutrition actions be accurately tracked?, was published in May 2012 and assesses the scale of investments made by major national and private donors to direct nutrition interventions in the 2005 to 2009 period.

The second report, Aid for Nutrition: Using innovative financing to end undernutrition?, was published in September 2012 and forecasts the investments needed to fund the full package of direct nutrition interventions between 2013 and 2020 and proposes financing mechanisms for donor and recipient governments to raise the additional funds.

Both reports are available at http://www.actionagainsthunger.org.uk/aidfornutrition

An update to the first report, Aid for Nutrition: Are we on track to meet the needs? 2010 and 2011, was published in June 2013 to update the figures from the first report.
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<th>Description</th>
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<tbody>
<tr>
<td>ACF</td>
<td>Action Against Hunger</td>
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<tr>
<td>BOP</td>
<td>Base (or bottom) of the pyramid</td>
</tr>
<tr>
<td>CBT</td>
<td>Cognitive behavioural therapies</td>
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<tr>
<td>CCT</td>
<td>Conditional cash transfer</td>
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<tr>
<td>DFID</td>
<td>UK Department for International Development</td>
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<tr>
<td>DHS</td>
<td>Demographic Health Survey</td>
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<td>ECD</td>
<td>Early Child Development</td>
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<td>FAO</td>
<td>Food and Agriculture Organisation</td>
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<td>GDP</td>
<td>Gross Domestic Product</td>
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<td>HANCI</td>
<td>Hunger and Nutrition Commitment Index</td>
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<tr>
<td>IKT</td>
<td>In-kind transfer</td>
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<tr>
<td>IPD</td>
<td>Individual Participant Data</td>
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<td>LIC</td>
<td>Lower income country</td>
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<tr>
<td>NGO</td>
<td>Non-governmental organisation</td>
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<td>NMR</td>
<td>Neonatal Mortality Rate</td>
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<tr>
<td>OR</td>
<td>Odds ratio</td>
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<td>R&amp;D</td>
<td>Research and Development</td>
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<td>Scaling Up Nutrition Movement</td>
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<td>Unconditional cash transfer</td>
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<td>WAZ</td>
<td>Weight-for-age Z score</td>
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<tr>
<td>WDI</td>
<td>World Development Indicator</td>
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This paper makes an important contribution in addressing the hitherto neglected issue of how priorities − within the range of potentially important nutrition-relevant actions − can be set. The priority-setting literature is relatively well-developed in health and economic sectors, but is quite thin for nutrition. It’s not clear why this is. Yes, there are still unanswered questions about the potential impact of different nutrition-sensitive interventions, but surely we need more real-world experience and evidence on how to apply the growing knowledge of effectiveness of individual interventions? Synergies between nutrition-specific and nutrition-sensitive interventions − and indeed between different types of nutrition-sensitive intervention − are likely. This, and the rising prominence of the Scaling Up Nutrition (SUN) Movement, which itself is driven by a coordinated multisectoral approach, necessitates the development of tools to help make better decisions on who does what, when and where.

To this end, the paper puts forward a clear stepwise approach for setting priorities for action among various nutrition-sensitive interventions. Four steps are suggested relating to intervention location, sector (which takes into account the main drivers, potential magnitude of impact as well as commitment and capacity to act), choice of impact pathways, and finally, the effectiveness of actual interventions. The recent *Lancet* Nutrition Series (2013) focused primarily on generating evidence to support the last step, but more complementary work also needs to be done on contextualizing and ground-proofing such evidence in real-world, large-scale settings. Questions of ‘how’ interventions are chosen and implemented in different contexts need more attention. In addition to facilitating coordination among a range of actors, the diagnostic framework described in this paper can help to optimize the use of evidence of ‘what works’ as and when it becomes available. It’s a very useful start and, as the author states, a work in progress to be built upon.

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After decades of neglect nutrition has finally risen up the development agenda. There is a growing understanding of its importance for all aspects of development, both at the individual and household level, and for national economic development. The 1,000 day period from a child’s conception until their second birthday is now recognised as a crucial time: if nutrition is insufficient during this period, the effects are likely to be severe and irreparable. On the other hand, if effective interventions can be made during this ‘window of opportunity’, the benefits will last a lifetime. Bodies such as the Copenhagen Consensus have demonstrated how relatively small investments could reap huge returns in terms of lives saved, and human potential fulfilled. For those concerned with improving the lives of people in developing countries, particularly the poorest and most disadvantaged, there can be few higher priorities than childhood nutrition.

GROWING EVIDENCE

The increased priority given to nutrition would not have happened without the robust body of evidence gathered and published in two series of papers in the Lancet (2008 and 2013). These have shown conclusively which interventions are likely to have the greatest impact on combatting undernutrition if implemented at scale. The next step was to generate estimates of what this would cost, a process begun in Horton et al (2010) that continues to be refined by bodies such as the World Bank and the Scaling Up Nutrition (SUN) Movement. And new resources have been committed. At the 2013 Nutrition for Growth event in London, governments, donors and NGOs committed more than US$4 billion of additional resources to tackle undernutrition between 2013 and 2020.

However, while things are clearly moving in the right direction, these and other commitments need to be turned into reality. Horton et al (2010) estimated that more than US$11 billion per year of additional resources are needed to fund 13 essential nutrition interventions at scale in the countries with the highest burdens of undernutrition. The first report in this series, Aid for Nutrition: Can investments to scale up nutrition actions be accurately tracked? (ACF 2012a), found that between 2005 and 2009 investments in these interventions by major donors accounted for just 1% of the need. The second report in the series, Aid for Nutrition: Using innovative financing to end undernutrition (Spratt 2012), forecasted how much donor and recipient governments and multilateral organisations would need to invest over the next 10 years to meet the required investments and suggested financing mechanisms which external donors could use to raise the necessary funds. This report focuses on nutrition-sensitive interventions. Part 1 presents evidence on how interventions in different ‘nutrition-sensitive’ sectors can have significant impacts on nutrition outcomes and Part 2 proposes a framework to help national governments, external donors and agencies to prioritise nutrition-sensitive interventions.

‘NUTRITION-SENSITIVE’ DEVELOPMENT

So far, limited progress has been made to understand the impact of nutrition-sensitive or indirect nutrition interventions to address the underlying and basic causes of undernutrition. The evidence base, costings and commitments for the 13 essential nutrition interventions all relate to nutrition-specific or direct nutrition interventions. While vitally important, these are only one part of the solution.

For example, while it is clear that the agricultural or water and sanitation sectors will have a strong impact on nutrition, little is understood of the impact interventions in these sectors will have on nutrition outcomes due to the lack of nutrition indicators. ‘Nutrition-sensitive’ interventions aim to do precisely that: modify interventions and programmes in areas such as agriculture, health and infrastructure in such a way that nutrition outcomes are improved.

Although the evidence in this area is patchy at best, we do have some ‘rules of thumb’ for intervention design.
First, across all important sectors, interventions that empower women are likely to have positive nutrition outcomes. Second, as described above, we know that interventions should largely focus on the 1,000 day window. Finally, efforts should be prioritised on populations most affected or at most risk from undernutrition, which are often the poorest and most disadvantaged.

Beyond this, we have reasonable evidence on the effectiveness of nutrition-sensitive interventions in a limited number of areas, but more often than not the evidence is either partial or lacking entirely. Numerous large-scale research projects are underway to address these gaps, but these will take time to produce results – years in most cases. The question, therefore, is what should be done now in the face of this uncertainty.

THE WAY FORWARD

One option is to simply wait until consolidated evidence of the impact of interventions is in place. This is problematic for three reasons. First, we know that the impact of nutrition-specific interventions will be greater if they are complemented by appropriate nutrition-sensitive interventions. Given the efforts that are being made to generate the resources to scale up nutrition-specific interventions, it is vital that these are deployed to maximum effect. Second, for the gains made by the scaling up of nutrition-specific interventions to be sustained, it is imperative that the underlying determinants are also addressed. If not, the same level of nutrition-specific interventions will need to be maintained, year after year, just to stand still; it seems unlikely that the priority currently accorded to nutrition could be sustained in these conditions.

Finally, even if the full scale-up of nutrition-specific interventions could be achieved, this would only partially resolve the problem. In their costing work, Horton et al (2010) estimate that implementing the full package of nutrition-specific interventions would reduce the incidence of stunting by 20%, severe acute malnutrition by 50% and underweight by 20-30%. While these would be huge achievements, it cannot be acceptable to stop there, as many millions of children would still be afflicted by these conditions. To resolve this problem in its entirety nutrition-specific and sensitive interventions need to be working in unison.

A second option is to continue with the current tendency of different actors funding different interventions, according to their preferences, but in a relatively uncoordinated way. While this will undoubtedly help, the questions are whether improvements could be made and whether the evidence that does exist can help maximise the effectiveness of interventions. Of course different actors will have different perceptions of how the effectiveness of interventions can be 'maximised'. For some, the goal will be to maximise the total reduction in undernutrition at the global level, regardless of where this happens. Others may have a national or regional focus, seeking to maximise the impact of interventions in a particular location. While others, such as ACF, focus their efforts on the poorest, or 'hardest to reach', and so will seek to maximise the effectiveness of interventions for these sections of society. In each case, however, achieving the greatest impacts will not happen automatically, but will require a systematic and strategic deployment of resources.

DIAGNOSTIC FRAMEWORK

This paper develops a mechanism which would support a third option. Based on a thorough review of the literature and available evidence, this paper proposes a diagnostic framework to prioritise the interventions which are most likely to have the greatest impact on nutrition outcomes. As well as helping different stakeholders to maximise the effectiveness of their interventions, the diagnostic framework performs another important function: by making the best use of the evidence that does exist, it clearly identifies the gaps in this evidence base.
There are four steps in the diagnostic framework, with a set of criteria in each case. Step 1 is the initial choice of location for the intervention. The criteria developed to inform this choice vary according to the priorities of the decision-maker. As described above, the goal may be to maximise impact in different ways, and the criteria have been designed flexibly to reflect this. Step 2 is the choice of sector, where the criteria combine importance for nutrition outcomes with the greatest potential for impact. As well as these factors, some external donors and agencies may want to prioritise countries with strong capacity and a high commitment to nutrition. Others may consider this less important than reaching the poorest and most vulnerable. Again, the criteria proposed are flexible enough to accommodate these differences. Step 3 entails the choice of ‘pathways’ within each sector. When considering interventions in agriculture, for example, there are a number of different ways that agriculture affects nutrition outcomes. Here the criteria combine importance for nutrition in that particular context (e.g. subsistence versus cash crop farming), with potential for the greatest impact by focusing on groups that could benefit the most. Finally, in Step 4 specific interventions are chosen based on evidence of their effectiveness (including cost effectiveness) and country-specific capacity with respect to implementation.

This framework is very much a starting point of what should be an ongoing combined research effort. In the coming years, more evidence will accumulate on which nutrition-sensitive interventions are most effective, for which groups and under what conditions. Already it is clear that country context is extremely important: interventions that appear to work well in some environments do less well in others. Improving understanding of what the crucial factors are in each case is essential, and this can only be done with a deep and rich understanding of local conditions.

In terms of the types of evidence that are required, there is a need for rigour, but also for plurality. Building on the work of Smith and Haddad (2000; 2013) more regional and cross-country regression work would help to further identify which sectors are most important in which settings. At the country level, microeconomic studies are sorely lacking, but these need to be complemented by other forms of evidence, which draw upon the experience of practitioners on the ground, as well as the accumulated knowledge of local people. Finally, to ensure that the impact of interventions is equitable, all pilots and studies need to actively assess impacts on different groups in society, and feed the results directly into programme design.

RECOMMENDATIONS:

• Current efforts must be maintained and recent commitments met to implement nutrition-specific interventions at scale and nutrition-specific interventions must be complemented with nutrition-sensitive interventions to amplify their impact.

• Nutrition-sensitive interventions must incorporate additional nutrition outcomes which should be monitored on an ongoing basis to fill gaps in evidence.

• National governments, external donors and other nutrition actors, especially those who are signatories of the SUN Movement, should improve their understanding of how cross-sectoral linkages can improve nutrition outcomes and reach out to complementary sectors to implement nutrition-sensitive interventions.

• All nutrition actors should further cooperate to develop a consistent approach to prioritising interventions, and coordinate their activities so that they complement each other, thus achieving greater impacts than any one actor could achieve alone.
Following the Lancet series in 2008 and the subsequent costing work by the World Bank, there is now a solid evidence base for nutrition-specific interventions and the extent to which they are funded. Although uncertainties remain, we have a relatively good understanding of which interventions will have the greatest impact, and how much it will cost to scale these up.

In 1990 UNICEF developed a conceptual framework to map out the causes of undernutrition (Figure 1). There are three levels to this framework. First, the immediate causes of inadequate dietary intake and disease, which are addressed by nutrition-specific interventions. These causes do not exist in a vacuum, however: they are shaped by underlying causes including inadequate access to food, inadequate health services and unhealthy environment, and inadequate education. These, in turn, are driven by basic causes such as political and ideological factors, economic structure, and potential resources.
care for women and children and insufficient health services and unhealthy environment: 'food, care, and health' in the UNICEF lexicon. At the third level, these factors are in turn shaped by basic causes such as weak social and economic structures, political systems and cultural norms.

Nutrition-specific interventions are designed to address the immediate causes of undernutrition in three ways:

- by increasing the availability of nutrition-rich food;
- by encouraging the most effective maternal and child-care practices;
- by treating moderate and acute malnutrition.

While the measures costed in Horton et al (2010) were chosen because of their effectiveness, there are limits to what they can achieve. If implemented in full the incidence of stunting could be reduced by 20%, severe acute malnutrition by 50%, and underweight by 20-30%. These would be huge achievements, saving the lives of 1.1 million children in the 36 high burden countries. But most children who are stunted and underweight today, would still be so even if the interventions were implemented in full. While 1.1 million children’s lives could be saved, millions more would still die (ibid).

This is why the focus is turning towards complementing nutrition-specific interventions with nutrition-sensitive interventions, which target the underlying causes of undernutrition. Whether households have sufficient nutritious food, undertake good care practices, and have access to facilities and services needed for good health depends on many factors. Some sectors, such as agriculture, education (including pre-school), social safety nets, healthcare, and water and sanitation, are particularly important. Nutrition-sensitive interventions aim to influence the way these sectors function so that nutrition outcomes are improved.
As well as the immediate and underlying causes of undernutrition, the UNICEF framework describes the ‘basic causes’ of undernutrition. These are the economic, political and cultural foundations of a country that shape important aspects of daily life such as the way resources are distributed and used.

Therefore there is a large set of potential intervention points that could be described as nutrition-sensitive. The aim of this paper is to guide decision makers on which interventions to prioritise, and under what conditions. Interventions cost money, and despite the increase in attention now being paid to tackling undernutrition, money remains a scarce resource. Prioritisation is therefore essential if the maximum impact is to be achieved.

Progress on nutrition-specific interventions is ongoing, with US$4.1 billion of new donor commitments between 2013 and 2020 announced at the Nutrition for Growth event ahead of the G8 summit in June 2013. What is clear, however, is that the effectiveness of nutrition-specific interventions will be increased and made more sustainable by progress on the underlying causes of undernutrition.

A key problem is a lack of hard evidence. In some cases, there is good evidence on which nutrition-sensitive interventions work best. In most it is patchy, while in a few important areas there is very little evidence at all. What should be the response to this situation? One clear priority is to improve the evidence-base, but this will take time – many years or even decades in some cases. The question is what to do in the interim.

There are three main options. First, to do nothing until there is clear evidence upon which to act. Second, to try to do everything at once, without any sense of which things are more important and why. Or third, to proceed carefully, make the best use of the available evidence, highlight the most important gaps to be filled, and prioritise the interventions that are likely to have the greatest impact on nutrition outcomes, based on the current state of knowledge. The aim of this paper is to develop a diagnostic framework to support the third of those options.

The paper is structured in two parts. After defining the terms to be used, Part 1 reviews the evidence-base on nutrition-sensitive sectors. In the light of this, Part 2 develops a diagnostic framework for selecting nutrition-sensitive interventions which would be likely to have the greatest impact on nutrition outcomes in a particular area or country and provides suggestions of how this framework for ‘nutrition diagnostics’ could be completed and improved.

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1 Horton et al (2010)
2 ACF (2012a)
3 Spratt (2012)
4 For this report, (child) undernutrition refers to the two main types of the condition: (i) acute malnutrition, also known as ‘wasting’ and (ii) chronic malnutrition, also known as ‘stunting’.
   Wasting occurs when a child suffers from a sudden and extreme loss of weight or oedema as a result of a lack of food intake and/or the body’s inability to absorb nutrients due to illness. Typically the condition manifests itself in the 6-59 months age group. There are different levels of severity of wasting, technically known as Severe and Moderate Acute Malnutrition (SAM and MAM).
   Stunting on the other hand, might be the outcome of a lasting lack of both quantity and quality of nutrients in the early development of a child’s life (especially the first 24 months of life) or as the consequence of low birth weight. Stunting might also occur as a result of a number of Acute Malnutrition episodes during consecutive hunger periods. Micronutrient deficiencies (such as the lack of vitamins, minerals, proteins among others) also increase the risk of contracting illnesses and further loss of weight.
5 See Ruel et al, (2013) for the most recent review of the evidence base.
PART 1: REVIEW OF NUTRITION-SENSITIVE SECTORS, PATHWAYS AND INTERVENTIONS

1.1 DEFINITION OF ‘NUTRITION-SENSITIVE’ TERMINOLOGY

Before reviewing the literature on nutrition-sensitive sectors, we should first define what we mean by nutrition-sensitive development. While a variety of definitions exist, they all describe the aim of addressing the underlying causes of undernutrition by intervening in key sectors. The Scaling Up Nutrition (SUN) Movement’s definition is representative of this:

“Nutrition-sensitive development seeks to promote adequate nutrition as the goal of national development policies in agriculture, food security, social protection, health, and education programs.”

In a recent paper in the Lancet, Ruel et al (2013) define nutrition-sensitive interventions as:

“Interventions or programmes that address the underlying determinants of fetal and child nutrition and development – food security; adequate caregiving resources at the maternal, household and community levels; and access to health services and a safe and hygienic environment – and incorporate specific nutrition goals and actions.”

While both definitions identify the same sectors to focus upon, Ruel et al also require a nutrition-sensitive intervention to have ‘specific nutrition goals and actions’. This is important, as there is a risk that any intervention in an important sector is labelled as ‘nutrition-sensitive’, potentially undermining the push to generate additional resources. Being explicit about what change to nutrition outcomes is expected and why, and monitoring the process carefully, is the best way of avoiding this risk.

There are three necessary characteristics of a nutrition-sensitive intervention. First, rather than being simply an intervention in a sector that has implications for nutrition, the intervention should make a conscious attempt to improve particular nutrition outcomes.

Second, the expected nutrition impact should be additional to what would have occurred with a standard intervention, and an evidence-based theory of change, setting out the causal chain from intervention to impact, should provide a clear rationale for this. Third, the impact of the intervention needs to be monitored on an ongoing basis through the creation of relevant indicators, explicitly linked to the theory of change.

Incorporating these features, for the purpose of this report the definition of a nutrition-sensitive intervention is as follows:

Nutrition-sensitive interventions consciously modify policy in key sectors so as to improve nutrition outcomes. Drawing on the best available evidence, interventions specify clearly the route from intervention to impact, and develop indicators to monitor progress along this pathway.

The remainder of Part 1 reviews the evidence on the following sectors: agriculture, early child development/education, health and family planning, water and sanitation, and social safety nets. In each case the main pathways to nutrition outcomes are identified, and the effectiveness of nutrition-sensitive interventions along these pathways assessed. In both cases, the ‘enabling factors’ that determine the strength of the potential impact and the effectiveness of the potential intervention are considered. Hereafter ‘intervention’ should be taken to mean ‘nutrition-sensitive intervention’.

1.2 AGRICULTURE

It may seem obvious to say that there are close links between agricultural production and nutritional status. However in reality the relationship is complex. Adequate production of food in a country does not necessarily mean that access to food is guaranteed for all. To reap the full benefits of agriculture and for it to contribute to assuring the nutritional status of children, food security must exist. Furthermore
agriculture must deliver a stable supply of food that is sufficient in terms of quantity (i.e. calories), and quality including diversity of micronutrients (vitamins and minerals) and of macronutrients (proteins, lipids and carbohydrates).

### 1.2.1 Agriculture / Food Security pathways and interventions

The World Bank (2007) identifies five pathways from agriculture to nutrition: first, there is the quantity and diversity of food produced for a household’s own consumption; second, the purchasing power of income generated through the sale of agricultural produce; third, the real income effects of lower food prices resulting from improvements in agricultural productivity; fourth, the impact of empowering women in the agricultural sector; and fifth, indirect effects through agriculture’s impact on GDP and poverty. These can be reorganised (and augmented) as follows:

- **Subsistence production pathways** (as above).
- **Food price pathways** As well as income effects on farmers and farm workers, and the impact of lower food prices resulting from increased productivity, we also include the impact on food prices of changes in global and local market conditions. These may cause prices to rise or fall, but also to become more or less volatile, affecting both producers and consumers (Hauenstein Swan and Stevenson, 2013).
- **Gender pathways** (as above)
- **Indirect pathways** The relationship between growth and disposable incomes is strongly affected by how pro-poor growth is, but also by existing levels of inequality. As we focus on the underlying – as opposed to basic – determinants of nutrition outcomes, we will not address indirect pathways in Part 1. Basic determinants will be considered as part of the nutrition diagnostic framework developed in Part 2.

Evidence on the effectiveness of interventions in agriculture is patchy. While there is a good understanding of which pathways matter, and some idea of the relative importance of these, less is known about which interventions are most effective for nutrition.

### 1.2.2 Subsistence production pathways

There are two pathways to nutrition outcomes under this heading. First, the level of production accessible to household members will determine the quantity of food that is available in terms of calories. Second, the mix of foodstuffs will determine the quality of the diet. A focus on staple foods raises calories, but more fruit, vegetables, dairy products, meat and fish provides a more varied mixture of micronutrients and macronutrients and may also make the consumption of staples more palatable, raising total calorie intake (World Bank, 2007).

As well as the level and mix of foods produced, biofortification of staples can raise their nutritional value. While this may become an important means of improving nutrition outcomes in time, there are limitations; while biofortification could supply up to half of the required essential nutrients outside the 1,000 day window, it is not sufficient to meet the high-intensity nutritional needs of pregnant and lactating women, or infants (Ruel et al., 2013).

What **enabling factors** are required for the potential of these pathways to be realised?

First and most fundamentally, initial resource endowments (land, labour, capital) will strongly influence a farmer’s ability to produce sufficient nutritious food for the household (World Bank, 2007). The relative importance of these assets will vary depending on the type of farming undertaken. Pastoralists and agro-pastoralists, who also cultivate food through subsistence agriculture, will have a different set of resource endowments.

Footnotes for Part 1 are on page 30
Second, the relative status of women within the household has a significant impact on how food is distributed among family members, particularly children, and how much time women have to care for children (Wiggins and Keats, 2013).

Third, the extent to which additional income generated by the sale of surplus food is spent on nutritious food, as well as on things like water and sanitation, will also affect nutrition outcomes.

Fourth, the energy expended in the production of food, and the health of farm workers (particularly landless farm labourers) is also important. Energy inputs need to exceed energy expended, which may be difficult in some situations involving very hard labour. Farm workers may also be exposed to various health hazards in the course of their work. In both cases, the nutritional value of food will be reduced (ibid).

**1.2.3 Subsistence production interventions**

Although a sufficient quantity of food is a precondition for good nutrition outcomes, a greater problem is a lack of quality. Globally, twice as many people suffer from vitamin and mineral deficiency than from undernourishment (Wiggins and Keats, op cit). One set of interventions to increase quality is to encourage the establishment of home gardens, where a diverse mix of fruit and vegetables are grown year round. The ‘homestead food production’ model has been in place for some decades now, allowing a body of evidence to accrue. Reviewing this literature, Ruel et al (2013) find that:

‘‘...key conclusions were largely consistent across all reviews: little evidence of effectiveness of homestead food production programmes on maternal or child nutritional status (anthropometry or micronutrient status), with the possible exception of vitamin A status. For child anthropometry, a few studies reported an effect on at least one indicator, but effects were generally small. Another four-study meta-analysis for vitamin A status, however, reports a small overall difference in serum retinol between intervention and control areas.’’

Although limited evidence of nutrition impacts was found, the studies did find improvements in some proxy indicators such as ‘household and child production and consumption; maternal and child intake of target foods and micronutrients; and dietary diversity’ (ibid). In this regard, the main enabling factor for successful intervention is, again, the empowerment of women:

‘‘...nutritional effect is more likely when agriculture interventions target women and include women’s empowerment activities, such as improvement in their knowledge and skills through behaviour-change communications or promotion of their increased control over income from the sale of targeted commodities.’’

(Ruel et al, op cit)

It is for this reason that the homestead food production model, which has been implemented by many organisations including ACF, explicitly aims to empower women.7 As well as working with women, interventions are more likely to work when part of a package that also addresses women’s access to credit and other support services (Wiggins and Keats, 2013).

The biofortification of staple foods has the potential to increase the micronutrient content of diets, improving outcomes. Early indications from field trials in Mozambique and Uganda with vitamin A enriched orange sweet potato show high rates of farmer adoption and vitamin A intake. Child vitamin A status in Uganda has also risen. While only one crop has so far been assessed the signs are encouraging,8 and trials of other crops are due to conclude in 2018 (Bouiz et al, 2011). However as pointed out earlier, biofortification of staple foods cannot address the intensive nutrition needs of mothers and their babies in the 1,000 day window.
The main **enabling factors** for successful biofortification interventions are uptake and the presence of other nutrition-supporting factors. More specifically, it may be unrealistic to expect significant improvements in nutrition via agriculture without progress in areas such as health care, and water and sanitation.

### 1.2.4 Food prices pathways

There are two primary pathways in relation to food prices. First, there is the income generated by the sale of agricultural products, and second, there is the food bought for consumption in local markets. In terms of potential impact, these pathways move in opposite directions. For the farmer selling produce, high prices mean more income, and greater potential to purchase nutritious food. However for the net consumer (including many small-holder farmers across Asia, Africa and Central America), higher prices reduce the quantity of food that can be purchased. The net impact, therefore, depends on the extent to which households are net sellers or buyers of agricultural produce, and this needs to be assessed on a case-by-case basis (ACF 2013).

To take a view on the direction of impact, therefore, it is crucial to understand what determines food prices. At the simplest level supply and demand impact food prices: increased agricultural output raises supply and, other things being equal, reduces prices. Other things are not equal, however. From the 1960s world food production has grown at a faster rate than population growth, putting downward pressure on prices. In recent years, in contrast, prices have risen substantially (Wiggins and Keats, *op cit*). One explanatory factor is increased demand from fast growing emerging...
economies such as China. Another is reduction in supply due to the use of crops for biofuels, and the conversion of agricultural land for different uses. Yet another suggested cause is the impact of financial speculation in food commodity markets (Spratt, 2013).

What are the most important enabling factors for the effects of food price rises to feed through into higher incomes and better nutrition? For farmers, producing and then selling the ‘right’ produce, is clearly key:

“Technology becomes more important relative to the household’s resource endowment, and the selection of crops to be grown is based principally on their tradability and the price they are expected to command in local markets... The same technologies that enable export also enable import, and the variety of food sources available to consumers is likely to expand, making possible more complex and higher quality diets. Intensification of staple food production, and opportunities for livestock, fish and fruit and vegetable production, can also generate employment for landless or land-poor individuals.” (World Bank, 2007)

As in the previous example, increased incomes resulting from higher prices need to be spent on nutritious food for positive impacts to result. Heads of households and caregivers need to choose to buy more nutritious foods. For net food consumers, this is also the case with falling food prices. Lower food prices create the potential for families to purchase more nutritious foods. However they also free income which could be diverted to other uses. Again, the relative status of women is likely to be an important determining factor (Engle, 1993; Schady, 2010).

Another enabling factor is that global and local food markets need to function relatively well, so that increases in food production result in lower food prices or that farmers specialising in particular cash crops are able to obtain a fair price (Hoddinot et al, 2012).

Effective local markets may also serve as a buffer against global food price volatility (Fraser, 2012).

1.2.5 Food prices interventions

An important way of increasing the supply of affordable food, and thus lowering food prices, is through research and development (R&D) to raise productivity. On this point, Hoddinot et al (2012) estimate that an additional US$40 billion investment in agricultural R&D could increase yield growth rates for crops (by 0.4 of a percentage point) and livestock (by 0.2 of a percentage point), and raise global growth rates by 0.25 of a percentage point. The result would be a reduction in the number of ‘hungry people’ by 210 million, and of underweight children by 10 million. The authors estimate that the benefit to cost ratio would be in the order of 50 to 1 (ibid).

A number of other interventions to reduce food prices have been suggested, but not yet costed or modelled for impact. The role of biofuels has sparked extensive debate, with a recent FAO report concluding that the price effects are significant, and that governments should reassess their biofuels targets (HLPE, 2013). Another recent report by the UK Parliament’s International Development Committee (IDC 2013) is more specific: the report estimates that the European Union’s biofuel targets could raise the price of maize and wheat by 22% and 13% respectively. Other commentators have suggested the introduction of controls on the level and form of financial speculation in food commodity markets, ranging from limits on the proportion of the market that can be held by any individual actor, to a cap on the total weight of financial speculation in any food commodity market (UNCTAD, 2011; Spratt, 2013).

For this intervention, the primary enabling factor to reform is political will and the ability to resist lobbying from organisations with vested interests. For increasing R&D expenditure there is a relatively clear-cut case, with the main constraint being who will
foot the bill. Reforming biofuel targets carries more political difficulty, and any attempts to place curbs on the activities of financial actors invariably meets fierce resistance and lobbying.

As well as these global market issues, some research has looked at the potential impact of reforms to local food markets from the perspective of farmers with produce to sell. For example, Hoddinot et al (op cit) explore the role of improved information availability resulting from the increased use of mobile phones by farmers. Suggesting costs at a little under US$4 per farmer, the authors estimate a benefit to cost ratio of up to 8 to 1, as better information flows enable farmers to time their sales and secure better prices at market.

Hauenstein Swan and Stevenson (2013) also emphasise the need to improve local level surveillance and early warning systems to convey the impact of food price rises, and drops, at household level. The impact of food price volatility varies depending on income groups and on the proportion of household income spent on food. Better surveillance and more accurate information would enable actors to target support more effectively at households with the greatest needs. The information gathered through these improved systems would also enable support to be delivered at the most appropriate times of year. Changes in food prices are inherently seasonal in nature – action on the ground must therefore be delivered with seasonality in mind. Political will and coordination between sectors at national level are prerequisites for these changes to happen.

1.2.6 Gender pathways

Women perform a range of roles in agriculture:

“They are farmers, unpaid workers on family farms, paid or unpaid agricultural labourers on other farms and agricultural enterprises, food processors and vendors, home gardeners, cooks, and carers for children and the elderly. Moreover, due to their specific roles in food production, many women are the repositories of knowledge about cultivation, processing, and preservation of nutritious and locally adapted crop varieties.” (ActionAid, 2012)

Although the potential of women to contribute to better nutrition outcomes for children is well understood, it is rarely realised. Despite their centrality to agriculture, women’s work is often unpaid and undervalued. They tend to be excluded from decision-making over the use of household resources. Women have limited access to land, credit, and extension services, and their role as primary carers of children is affected by time constraints due to agricultural work, and responsibilities such as fetching water (ibid).

The key enabling factor is the empowerment of women, economically and socially. Tackling gender inequality and empowering women farmers can improve food security and nutrition through both improved food production and better use of food and income (Wijeratna 2013). On the economic side, supporting women’s property rights and improving access to credit and ‘women-friendly’ extension services, for example, are important (Wiggins and Keats, 2013). Improvements in infrastructure facilities such as water supplies and transport links can create more space for child-care. Improving the relative status of women is key. In a study in rural India, Imai et al (2012) find that more education is associated with lower levels of stunting in children, and suggest that education improves women’s ’negotiating power’, which may increase their influence over household resources.

1.2.7 Gender interventions

There is now a convincing body of evidence that women are disproportionately likely to use income under their control to support family welfare in areas such as food, education and child nutrition (Quisumbing et al, 1995; FAO, 2006). The first problem in fulfilling this potential is that women in many developing countries are often
excluded from decisions over the use of household resources. The second problem is more agriculture-specific. Despite accounting for a large proportion of agricultural labour – in Africa, women account for 70% of agricultural and 80% of food processing labour – it is far more difficult for women to move from subsistence to commercial agriculture, which would generate income they could then control. As well as cultural and social barriers, women access a tiny fraction of agricultural credit and extension services.

The FAO (2011) identifies a series of agricultural gender gaps that need to be addressed:

- **The gap in access to land**

  “Women have not always benefited from general land distribution and titling efforts, however, and in some cases have seen their customary rights eroded as formal rights have been extended to male heads of household.” (FAO, 2011: 46)

  In many countries, inheritance is the primary means by which ownership of land is transmitted, but women may be barred from inheriting property, or be discriminated against under customary land rights regimes. Eliminating legal discrimination and reforming customary practices are therefore important actions to take to empower women. Education is also important, both of women – so they are aware of their rights – and of officials involved in the processing of land rights (ibid)

- **The gap in rural labour markets**

  “...In most rural areas women undertake most of the work related to child care, food preparation and other household responsibilities such as collecting fuel and water. Women are also heavily involved in unpaid agricultural production. When all household activities are taken into account, women generally work longer hours than men. Women face multiple trade-offs in the allocation of their time and, without policies and investment in labour-saving technologies, labour market participation is often not an option – even when the opportunities are available.” (ibid: 49)

  A set of interventions are required to address these issues. First, the introduction of labour-saving devices and improvements in transport infrastructure has the potential to free up time. Closing the education gap is also important. Women are more likely to be illiterate (UN, 2009). Addressing this is important if the gender gap is to be closed and if women’s access to credit and extension services is to be improved. Providing employment directly – through public works programmes, for example – can also be an important source of income. Perhaps most fundamentally, implementing women’s rights and ensuring their voices are heard, is a precondition for progress across a range of areas (FAO, 2011).

- **The financial services gap**

  “Women’s access to financial services is conditioned by their legal, social and economic position within the community and household. Some of the interventions required to close the gender gap in access to financial services are similar to those needed for other asset categories. For example, giving women equal rights to enter into financial contracts is a crucial first step in countries where legal and customary restrictions prevent women from opening savings accounts, taking loans or buying insurance policies in their own right. Microfinance programmes have been highly effective in overcoming the barriers faced by women in accessing formal credit markets.” (FAO, op cit: 51)

  Interventions include: developing financial literacy; designing products that are suitable for women;12 and ensuring that financial institutions (both public and private) do not discriminate between men and women.
1.3 EARLY CHILD DEVELOPMENT AND EDUCATION

There are strong links between early child development (ECD) and education, and between both and nutrition outcomes. Undernutrition impedes children’s development across a range of dimensions, including their educational prospects. At the same time, greater access to education by women and girls has positive impacts on child nutrition. Breaking this cycle requires targeted interventions, some of which are reviewed here.

1.3.1 Early child development pathways

Early child development (ECD) interventions focus on the crucial 0–5 age range, which has a large influence on life prospects. Interventions aim to ensure that the cognitive, social and physical potential of all children is realised.

“Early childhood is a critical stage of development that forms the foundation for children’s future well-being and learning. Research has shown that half of a person’s intelligence potential is developed by age four, and that early childhood interventions can have a lasting effect on intellectual capacity, personality, and social behaviour.”

(UNICEF, 2008)

Nutrition and ECD are intimately related, with improvements in one likely to be strongly supportive of the other.

“Stunting and impaired cognitive development share several of the same risk factors, including deficiencies in protein, energy, and some micronutrients, intrauterine growth retardation, and social and economic conditions, such as maternal depression and poverty.”

(Ruel et al, 2013)

Given these shared risk factors, there is also considerable overlap in timing: many crucial aspects of cognitive development take place during the 1,000 day nutrition window. As a result, there is a strong case for using ECD interventions to also deliver nutrition interventions, and vice versa. Given this, in addition to political will and investment, the most important enabling factors relate to coordination between different actors involved in ECD, as well as the logistics of implementation.

1.3.2 Early child development interventions

A range of ECD interventions are used. Some work with children directly, providing stimulation and monitoring progress. Others work with parents to improve parenting skills and equip them with the resources they need. ECD interventions can be delivered through home visits or in group sessions at health clinics or other venues.

“...key interventions can protect children from both nutritional and developmental risks; these include core maternal and child nutrition interventions, psychosocial stimulation and responsive parenting, and interventions to alleviate poverty, food insecurity, maternal depression, and gender inequity.”

(Engle, 2011)

The effectiveness of combining ECD and nutrition interventions has been tested in a number of rigorous assessments. Based on a project in Bangladesh, Nahar (2010) finds:

“...[the] addition of stimulation and home visits to standard nutrition and health care for severely malnourished children improved development outcomes and weight-for-age Z scores (WAZ).”

Also based on a study in Bangladesh, Aboud (2011) reports that a trial:
“...which added responsive parenting (including feeding) to an informal nutrition and child development education programme, showed benefits on several feeding and parenting behaviours, child self-feeding, and development outcomes; addition of iron-fortified micronutrient powders to the intervention improved weight gain and WAZ.”

Walker (2005) looks specifically at the additive effect of combining child stimulation and food supplements to stunted children of 9–24 months in Jamaica. While additional impacts on cognitive development were found, this was not so for growth. Also, although additive cognitive effects were not sustained past adolescence, the group that received stimulation retained improved outcomes in terms of social behaviour and education.

The benefits of ECD are well understood. Engle (2011b) reports benefit to cost ratios of seven interventions in developed countries ranging from 1.8-17.0 to 1. The most effective patterns of intervention are also relatively clear. For children under 3, combining home visits with centre-based work is more effective than either, though ensuring equal access for poorer households, who often face multiple barriers, is essential if widening inequalities of outcome are to be avoided (Guerrero and Rogers 2013). Engle (2011b) provides the following summary of the characteristics of successful child development programmes:

- **Integration of health, nutrition, education, social, and economic development, and collaboration between governmental agencies and civil society.**
- **A focus on disadvantaged children.**
- **Sufficient intensity and duration and include direct contact with children from early in life.**
- **Parents and families as partners with teachers or caregivers in supporting children’s development.**
- **Provide opportunities for children to initiate and instigate their own learning and exploration of their surroundings with age-appropriate activities.**
- **Blend traditional child-rearing practices and cultural beliefs with evidence-based approaches.**
- **Provide early child development staff with systematic in-service training, supportive and continuous supervision, observational methods to monitor children’s development, practice, and good theoretical and learning material support.”**

While more work is needed to integrate nutrition interventions with ECD programmes, it is clear that significant scope for synergies exists. Ensuring that these are translated into better nutrition outcomes will be the next step. The first **enabling factor** is therefore to improve understanding of how positive nutrition impacts can be maximised through ECD programmes. This requires, however, that there are sufficient well designed and resourced ECD programmes in the first place. As Engle (2011b) points out, investment on ECD is far below what is needed, and this is particularly the case in poorer countries, and for the poorest households within countries. Addressing this is thus a precondition for improving nutrition outcomes via this pathway.

### 1.3.3 Education pathways

While there are well established links between the education level of parents and child nutrition, the relative importance of the different pathways is less understood. One that is relatively straightforward is income: more educated people tend to have higher incomes, and families with higher incomes are less likely to experience problems with child nutrition as they are in a better position to access the different elements to ensure good nutrition. For the other
potential pathways, Ruel et al (op cit) describe five options:

“Schooling might:

• transmit information about health and nutrition directly;

• teach numeracy and literacy, thereby assisting caregivers in acquiring information and possibly nutrition knowledge;

• expose individuals to new environments, making them receptive to modern medicine;

• impart self-confidence, which enhances women’s roles in decision making, and their interactions with health-care professionals;

• provide women with the opportunity to form social networks, which can be of particular importance in isolated rural areas.”

Where the goal is simply to increase access to good quality education, it may not matter which of these pathways is the most important, as the positive impacts on nutrition resulting from increased parental education may still result. Where there are efforts to adapt curriculums to improve nutrition outcomes in specific contexts, however, the relative importance of different pathways does matter. For enabling factors, therefore, sufficient resources to deliver good quality education at scale which can be adapted to specific contexts is obviously important. For more focused approaches, increasing understanding of what matters most may be a precondition for effective interventions.

1.3.4 Education interventions

Parental education matters for child nutrition, with mothers’ education being particularly important:

“...the risk of stunting is significantly lower among mothers with at least some primary schooling (odds ratio [OR] 0.89, 95% CI 0.85–0.93), and even lower (p<0.001) among mothers with some secondary schooling (0.75, 0.71–0.79). Paternal education at both the primary and secondary levels also reduced the risk of stunting although the respective ORs (0.96, 0.93–1.01; and 0.85, 0.81–0.89) are smaller than for maternal schooling.”

(Ruel et al, 2013)

Perhaps the most important educational intervention is therefore the expansion of access to primary and secondary education, particularly amongst girls. On this there has been considerable progress. Between 1950 and 2010, average years of schooling in developing countries increased from 2.60 to 7.62 for boys, and from 1.50 to 6.64 for girls. The same period saw the girl to boy ratio improve from 57.7% to 85.9%, and most countries have now reached broad parity in terms of enrolment. Despite this, there remains much to do: only a fifth of adolescent girls in sub-Saharan Africa, and two fifths of girls in South Asia, are enrolled in secondary schools (ibid).

There is a straightforward case for expanding education. As well as the nutritional benefits described above, the returns to education in terms of higher incomes are substantial, with multi-generational benefits. For 42 developing countries, Psacharopoulos (2002) finds average private returns to primary educations of 31%, secondary education 21%, and tertiary education 23%.13

As well as increasing girls’ access to education in a general sense, an important question is whether nutrition education could be explicitly introduced into school curriculums and, if so, how. While there are some examples of this,14 no assessment has been made of its impacts.

Enabling factors are twofold. First, the resources to continue to expand access to primary and secondary education, particularly for girls. Second, a better understanding of how to improve outcomes through incorporating nutrition education in curriculums.
1.4 HEALTH AND FAMILY PLANNING

Many aspects of health that relate to nutrition are addressed under nutrition-specific interventions. In this section we consider the less direct aspects of health that influence nutrition outcomes and are therefore of relevance for nutrition-sensitive interventions.

Women’s empowerment in general, and girls’ education in particular, are important. Interventions to expand educational opportunities for girls would therefore be supportive of nutrition-sensitive interventions in this area, as is the case more generally.

1.4.1 Health and family planning pathways and interventions

While all aspects of health are potentially relevant for nutrition, here we focus on two important pathways which have been strongly linked with nutrition outcomes: family planning and maternal mental health.

1.4.2 Family planning pathways

It has long been known that increasing the intervals between births has positive effects on mortality rates (Haaga, 1995). A systematic review on birth spacing and nutrition outcomes found that longer birth intervals are associated with lower risks of undernutrition in some populations, but not all. Where longer birth intervals are present, however, the effect is large, with levels of stunting reducing by 10% to 50% once a minimum time had elapsed (Dewey and Cohen, 2007). As well as too short an interval (i.e. less than 6 months), long birth intervals are associated with increased risks of preterm births, low birthweight, and neonatal deaths (Conde-Agudelo et al, 2012). Spacing of 18-24 months may be optimal.

Short intervals between births do not allow women to replenish their nutritional reserves and they can also lead to neglect of children and put additional stress on household food consumption. This is also a problem with adolescents more generally:

“Young girls who are not physically mature might enter pregnancy with depleted nutrition reserves and anaemia. Adolescent pregnancy is associated with a 50% increased risk of stillbirths and neonatal deaths, and increased risk of preterm birth, low birthweight, and asphyxia. Adolescents are especially prone to complications of labour and delivery, such as obstructed and prolonged labour, vesico-vaginal fistulae, and infectious morbidity.”

(Bhutta et al, 2013)

1.4.3 Family planning interventions

As well as general schooling, specific educational inputs on family planning can be effective on birth spacing:

“Evidence suggests that programmes for adolescent mothers can reduce repeat adolescent pregnancies by 37%.”

(Bhutta et al, 2013: 4)

For enabling factors, interventions to reduce repeat adolescent pregnancies work best when they form part of home visits, which teach parenting skills and facilitate access to education. It is not just about education, however: helping young mothers with employment is also an important factor (ibid). Involving men in the interventions and improving access to services may also help to tackle the problem more directly.

1.4.4 Maternal mental health pathways

Maternal mental health is a robust predictor of negative child nutrition outcomes:

“Our analysis revealed a positive and significant association between maternal depression or depressive symptoms and impaired child growth in developing countries. Our meta-analysis of 17 studies, based on adjusted estimates when possible, showed that the children of depressed mothers were at an increased risk of both underweight and stunting: the
combined OR [odds ratio] was approximately 1:4. This finding emerged after combining the results of studies that had very different designs, came from a wide range of locations and included children of different ages.” (Surkan et al, 2011)

Many factors are associated with maternal depression in developed countries: poverty, domestic violence, marital conflict or a lack of control over economic resources (Wachs et al, 2009). There is no reason to think that these do not also apply in developing countries, and are likely to be more acute in some areas.

1.4.5 Maternal mental health interventions
Increasing realisation of the importance of maternal mental health for child development has prompted the trial of different approaches to address the issue. Two are reviewed here. The first employed participatory approaches, while the second used cognitive behavioural therapies (CBT). In the first case, Tripathy et al (2011) conclude that:

“Women’s groups led by peer facilitators reduced NMR [neonatal mortality rate] and moderate maternal depression at low cost in... rural populations of eastern India.”

While the study found no impact on severe depression, a difference in moderate depression was found. The costs of the intervention were also reported to be low,
although cost effectiveness data were not presented separately for the depression results.

While nutrition-related outcomes were not monitored as part of this study, this was not the case with the CBT interventions. Although no impacts on infant growth were found, Rahman et al (2008) describe other benefits that did result:

“...infants had less episodes of diarrhoea and were more likely to be immunised than those in the control group; mothers were more likely to use contraception (birth spacing is an important factor in reducing infant morbidity), and both parents reported spending more time playing with their infants. In a poor rural community with little access to mental health care, integration of a cognitive behaviour therapy-based intervention into the routine work of community health workers more than halved the rate of depression in prenatally depressed women compared with those receiving enhanced routine care.”

As suggested in the quote above, an important enabling factor for nutrition-sensitive interventions in this area is that they are integrated into a package of social support interventions and do not need to be implemented on a standalone basis (Surkan et al, 2011). As well as being positive for outreach, this also has positive cost implications.

### 1.5 WATER AND SANITATION

As well as the quantity and quality of food, a child’s nutrition-related outcomes are fundamentally affected by his or her health status. More specifically, the WHO estimates that half of all undernutrition cases are associated with diarrhoea or intestinal worms, resulting from drinking unsafe water, inadequate sanitation or poor hygiene (WaterAid, 2013).

#### 1.5.1 Water and sanitation pathways

There are three main pathways from WASH to nutrition outcomes: lack of access to safe water; lack of access to adequate sanitation; and poor hygiene practices. The WHO (2011) describes in more detail how these are linked to the determinants of undernutrition:

“Lack of access to safe, clean drinking-water and basic sanitation, as well as poor hygiene cause nearly 90% of all deaths from diarrhoea, mainly in children... in developing countries 1.1 billion people still defecate in the open, and hand washing with soap is practised, on average, after only 17% of toilet uses... Diarrhoea most often results from the ingestion of pathogens from faeces that have not been disposed of properly, or from the lack of hygiene... Repeated episodes of diarrhoea lead to great loss of nutrients and fluids, causing overall weakness and dehydration... Water, sanitation and hygiene interventions also prevent intestinal parasitic infections alongside diarrhoea, and these infections also have synergistic effects with malnutrition.”

For enabling factors, therefore, sufficient public investment in safe water and sanitation is clearly a precondition, but behavioural practices are also important:

“While water, sanitation and hygiene interventions are potentially highly efficient, their effectiveness in part depends on behaviour change and context. The installation and functioning of water and sanitation facilities need to be accompanied by the transfer of knowledge on how to use them, together with sustainable behaviour change. Maintenance and periodic replacement of existing services/facilities, and hygiene promotion are also necessary to achieve improvements.”

(ibid)

Low-income countries are most affected by a lack of access to safe water and sanitation. This is also the
case with the lowest income groups within countries. The effectiveness of WASH interventions in addressing diarrhoea, therefore, is likely to be greatest amongst these groups (WHO, 2011).

1.5.2 Water and sanitation interventions

Although there is a solid evidence base linking WASH interventions to improvements in diarrhoea and parasitic infections, the same cannot be said with respect to nutrition. An important step in filling this gap was the publication of a systematic review of evidence on this subject in August 2013, coordinated by the London School of Hygiene and Tropical Medicine (Dangour et al., 2013). The review examined randomised (including cluster-randomised), quasi-randomised and non-randomised controlled trials, controlled cohort or cross-sectional studies and historically controlled studies, which assessed the impact of WASH interventions on weight and height-for-age outcomes among children under 18.

More precisely, the review examined interventions that were 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;

(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.”

(Dangour et al., 2013)

Fourteen studies, involving 22,241 children, met these methodological and content criteria. Of these: three studies examined interventions to improve water quality; one assessed a sanitation intervention; three studies looked at interventions to improve hygiene; three more examined combined water quality and hygiene interventions; one study reported on a dual intervention on water quantity and sanitation; one study reported on a combined water quality, quantity and hygiene intervention; another assessed an intervention including water quantity (supply), sanitation and hygiene; finally, one of the studies reported on an intervention that included all four of the WASH intervention types.
The results were decidedly mixed: of the fourteen studies, only four found any significant effect compared with the control group. In a repeat cross-sectional study among 370 households in Bangladesh, Ahmed (1993) found a hygiene promotion intervention significantly reduced the percentage of very underweight children under the age of 24 months. Employing a similar approach, Huttly (1990) found that in Nigerian villages that received a water quantity, quality and hygiene education intervention, the percentage of children under 3 who were thin declined significantly. Using controlled before and after techniques of 2,476 children under 3 in Ethiopia, Fenn (2012) found a water quantity, sanitation and hygiene intervention significantly improved height-for-age. Finally, Schlesinger (1983) used a longitudinal study among 209 children under 4 years in Chile to assess the impact of a sanitation and water supply intervention. While the percentage of underweight children was unchanged in the area of intervention, the percentage of underweight children increased significantly in the control group where the intervention was not used.

As well as reviewing the results of these studies, Dangour et al (2013) employed an Individual Participant Data (IPD) meta-analysis on the data. This is a specific type of systematic review, which involves acquiring the original data, combining it and re-estimating the results. IPD approaches are considered the ‘gold standard’ of systematic reviews, due to the reliability and robustness of the results (Stewart and Tierney 2002).

“There is suggestive evidence from cluster-randomised controlled trials of a small benefit of WASH interventions on measures of growth in childhood. The evidence from the five cluster-randomised controlled trials included in meta-analysis relates to water quality (SODIS and disinfection by bleach and flocculent disinfectant), hygiene (handwashing with soap), and an intervention including a combination of water quality (flocculent disinfectant) and hygiene (handwashing with soap).”

Three of the cluster-randomised controlled trials tested solar disinfection of drinking water and the findings of these trials have generated research interest (Arnold 2012; Hunter 2012). There is no evidence of the effect of other WASH interventions on nutritional outcomes in children and a major gap in the literature concerns the effect of water supply and sanitation interventions on nutrition outcomes.” (Dangour et al 2013)

Thus, while some evidence was found on water quality and hygiene, this was not the case with water supply or sanitation. The absence of evidence does not mean evidence of absence, however. Only one study that looked at sanitation alone met the inclusion criteria, and this was from 1968. As pointed out in the preceding quote, this represents a pressing and urgent gap in the evidence base. A number of large-scale studies in low-income countries are currently underway, however, so this gap may be filled in the near future.

As well as these general findings, the IPD approach uncovered different impacts in different society groups. For example, with respect to weight-for-height, the IPD findings suggest that WASH interventions may be more effective for girls. Turning to weight-for-age, the analysis found that WASH interventions had greater impacts on children over the age of 3, while height-for-age outcomes are more sensitive to WASH interventions in children aged 2 or under.

These examples therefore indicate which types of WASH interventions have worked in particular contexts – although knowledge is extremely limited in some areas, notably sanitation. As well as filling these gaps there is the question of the type of evidence. Studies of this kind are good at telling us what works under certain conditions, but less good at telling us why things worked. If the goal is to replicate success, more evidence is needed to explain why similar interventions work in some areas but not others. As well as the design of interventions, local conditions are clearly central to this. Uncovering the relative importance of
different factors in this regard will require different research approaches, particularly comparative, case-study work at the national and sub-national level.

1.6 SOCIAL SAFETY NETS

Interventions under this heading are aimed at increasing the resources available to households to enable them to ensure better nutrition. There are three forms of transfer. The first is unconditional cash transfers (UCTs), which – as the name suggests – sees direct transfer of cash to target populations. The second, related approach is conditional cash transfers (CCTs), where restrictions may be imposed on the use that can be made of finance, or – more often – where the transfer is conditional on certain actions by the recipient such as attending educational or health facilities, or ensuring children attend school. The use of cash transfers is now very common:

“Between 0.75 and 1.0 billion people in low-income and middle-income countries currently receive cash support. Although many transfer programmes reach only a small share of the vulnerable population, some have extensive coverage, such as Ethiopia’s Productive Safety Net Programme, which reaches 10% of the country’s population, and transfer programmes in Brazil and Mexico that reach 25%, and in Ecuador 40%, of their populations. The generosity of transfers varies widely, ranging from transfers that increase total income marginally to those that boost income by up to a third for the poorest recipients.”

(Ruel et al, op cit)

The third form is in-kind transfers (IKTs), where food is provided directly.

1.6.1 Social safety net pathways

The pathways from transfers to nutrition are clear. Additional resources alleviate budget constraints, allowing households to purchase more nutritious food and access other goods and services which are essential for good nutrition. Also the behavioural requirements that households may need to take to access the transfer may have a positive impact on nutritional status. Food transfers, in contrast, simply provide additional food directly. The enabling factors in each case differ.

For UCTs, the enabling factors are threefold: first, that there is sufficient nutritious food, or good quality health services, available to buy or access; second, that recipients of the transfer spend enough of it on these goods and services; and third, that the programme is well targeted to those that need it. For CCTs, the risk that money will not be spent as hoped is minimised, but the other two enabling factors remain.

For IKTs, the issue of targeting remains relevant. As well as reaching the right sections of the population, however, another question is whether the transfer is delivered at the right time to achieve the best nutrition outcome – i.e. within the 1,000 day window. Finally, it is essential that in-kind products are of appropriate quantity and quality.

1.6.2 Social safety net interventions

Unconditional and conditional cash transfers

“One of the strongest and most consistent findings regarding the impact of cash transfer programmes is their contribution to reducing hunger and food insecurity. Regardless of the form of transfer, households receiving transfers average significantly higher spending on and consumption of food. The impact of cash transfers on hunger has been most pronounced in LICs [lower income countries] where poverty is generally more severe. In these settings, households receiving additional income are particularly likely to prioritise spending on improving the quantity and/or quality of food consumed.”

(DFID, 2011: 20)
The fact that poor households tend to spend extra income on food helps explain why there is little difference in the nutrition impact of conditional or unconditional cash transfers (Manley et al, 2012). Although nutrition effects are small on average, they increase under certain conditions, most notably when infant mortality rates are high and health facilities limited (ibid), conditions that are common in LICs. In this regard, unconditional cash transfers (UCTs) have been used most frequently in sub-Saharan Africa (Davis, 2012). A number of commentators have pointed out that conditional cash transfers (CCTs) – where attendance of health clinics may be one of the conditions of receiving the cash, for example – require a minimum level of infrastructure, and may therefore be more suited to middle-income countries (World Bank, 2011).

“...on average roughly half the value of transfers is expected to be spent on food, one third on household expenses, and the remainder on health, education and savings and investment. A synthesis of findings from surveys in sub-Saharan Africa found that the primary use of cash transfers was to purchase food in six out of the seven programmes reviewed” (DFID, 2012: 36)

Given this, applying conditions to cash transfers may not create much additional benefit. This matters, as the cost of monitoring CCTs is significant. It is also the case that setting up and maintaining CCT systems requires a minimum level of institutional capacity, which may be difficult to achieve in some LIC settings.

The literature is unanimous that the most important enabling factor to achieve positive outcomes is that cash transfers are targeted at women. As we have seen, women are more likely than men to direct household resources towards family welfare, particularly of children, and this holds with cash transfers as in other areas (Schady, 2010).

The majority of evidence on CCTs comes from Latin America, where they have been used and assessed to a significant degree:

“Although conditional cash transfers are implemented worldwide, experimental evidence of effectiveness comes mostly from Latin America. In addition to their positive effects on poverty reduction, household food consumption, and dietary diversity, almost all programmes assessed increased the use of preventive and curative health and nutrition services. The Mexico, Brazil, and Nicaragua programmes also showed improvements in women’s control over additional resources, enhanced self-esteem, heightened knowledge and awareness of
health and nutrition, and increased opportunities for women to strengthen their social networks.”
(Ruel et al, 2013)

As suggested in this quote, channelling cash transfers to women may also be positive for empowerment. This is likely to be positive for nutrition outcomes, potentially creating an additional impact. Given this, it is interesting to note evidence that cash transfers may also have positive effects on child development outcomes, which has been associated with women’s empowerment effects (Lia et al, 2012).

While there is evidence of positive effects, however, they are small:

“Only a few conditional cash transfer studies show effects on anthropometry, and these effects are shown in the youngest or poorest children.”
(Behrman and Hoddinot, 2005)

Impact evidence is similarly limited for micronutrient effects, only a limited number of studies have explored these outcomes to date (Leroy et al, 2009).

Although the evidence is mixed, it supports the view that cash transfers can have positive impacts on nutrition outcomes, particularly in low-income countries. Evidence to support the positive role of conditionality is less clear, with some suggesting that it is the supply of information that is valuable rather than the conditions themselves, and this could be achieved more easily without developing an expensive system of monitoring and enforcement.

There is also a strong case to not use conditions in LICs. Health facilities may be insufficient to absorb an uptake in demand, and the institutional capacity to monitor the system may be lacking. Furthermore, the poor are especially likely to use extra income for food in LICs, thus reducing the need for conditions. In richer countries, with better health facilities and more capacity, these constraints are less important, and there may be a stronger case for conditions. On these questions, more research is needed on which aspects of cash transfer programmes are likely to create the greatest nutrition impacts, and under what circumstances.

**In-kind transfers**

There are three main types of in-kind transfer:

Firstly, there is high-profile emergency food aid, which accounts for 67% of total food aid. Although not a long-term solution to the problem, emergency food aid can play an important role at preventing major deteriorations in child nutrition, particularly where food for young children is fortified (Giles, 2010).

The second type is where food transfers are targeted directly at particular communities. To be effective, the most important factor here is that the targeting is accurate, and that food only goes to those that need it. If this is not the case, the interventions can lead to increased obesity, as was the case with a programme in Mexico (Leroy, 2010). Where IKTs are targeted carefully, or used in settings where undernutrition is endemic, this risk can be avoided, as was the case in Haiti, for example (Ruel, op cit)

The final type of in-kind transfer is school feeding programmes. Although these will not affect outcomes relating to the 1,000 day window, there is some evidence of impacts on school-age children’s anthropometry, particularly in low-income settings (Kristjansson et al, 2007), and particularly when combined with interventions such as deworming. There may also be positive effects on the younger siblings of school-age children:

“Randomised controlled trials in Burkina Faso and Uganda showed [positive] effects on weight among pre-schoolaged boys (ie, <5 years) whose siblings received school meals or take-home rations compared with a control group.”
(Kazianga, 2008)
As well as undernutrition, school feeding programmes may also be effective in combating problems with obesity. Brazil and China have redesigned their school feeding programmes with this in mind (Doak, 2002).

To be effective, IKT programmes need: a) clarity on what the goal is – e.g. tackling undernutrition due to insufficient calories or micronutrients, b) a clear rationale for why IKTs are the best way to address this; and c) effective targeting of relevant populations. For enabling factors, therefore, a better understanding of the relative merits of different transfer programmes is required, as is good quality data on the nutritional status of different groups within society.

Having reviewed the evidence on the most important pathways, the second part of this paper turns to what should be done, in the light of this evidence, to improve nutrition outcomes.

6 “Food security exists when all people, at all times, have physical and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life” (World Food Summit 1996)
7 For details see: http://www.hki.org/reducing-malnutrition/homestead-food-production/
8 Despite this, there is a need for caution. To date, only pilots have taken place, so the relative effectiveness of biofortification at scale on the nutritional status of a population remains to be proven. Accessibility will also be important. The extent to which biofortified foods are delivered on a commercial basis will have a strong impact on the ability of the poor to access them, regardless of their potential effectiveness.
9 While it is intuitive that rising food prices would benefit developing countries farmers, this cannot be assumed. Most Kenyan farm households are net buyers of grain, for example (Mguyen, 2010). The question is important when considering the poverty impacts of food prices, as developing countries farmers are often poorer than non-farmers (Askoy Dikmelik 2008). As well as having fewer resources to purchase food, the poorest spend three-quarters of their incomes on staple foods (Cranfield et al., 2007). Even quite small price changes are therefore likely to have large effects. It can also be true that farm households are net sellers of food, so that incomes may rise as a result of higher commodity prices (Hertel et al., 2004). In a study in Vietnam, Tanzania and Guatemala, poor rural farm households were often net buyers of individual crops, but only the very poorest were net buyers of all foods (Rios et al., 2008). Rising food prices would therefore hit the most vulnerable hardest. Looking at the 2005–2007 period, Martin (2008) concludes that: “While there were a few cases where higher commodity prices lowered rural poverty, in most cases poverty—even rural poverty—increased, and the sample average poverty impact was clearly adverse.”
10 See the High Level Panel of Experts on Food Security and Nutrition (HLPE, 2011) for a good review of these issues.
11 As well as the impact of food price levels, price volatility can have significant impacts on malnutrition. See ACF (2013) for a recent analysis of this issue.
12 The issue of designing financial products that are suitable for the poor has recently received more attention. See Spratt (forthcoming) for example. To date, less work has been done on designing financial products, and bundles of products, that meet women’s needs.
13 The corresponding figures for social returns to education are 22%, 15%, and 11%.
14 See Nederveen (2013) for a recent survey.
16 Guzman (1968).
17 Ahmed (1993); Langford (2011); Luby (2004).
21 Fenn (2012).
23 For details on this approach, see http://ipdmamg.cochrane.org/about-ipd-meta-analyses
PART 2: A DIAGNOSTIC FRAMEWORK FOR SELECTING NUTRITION-SENSITIVE INTERVENTIONS

2.1 INTRODUCTION

As demonstrated in Part 1, there is a good understanding of which sectors are the most important for nutrition outcomes, and a growing understanding of the different channels through which impacts emerge. There is also a reasonable grasp of how country contexts affect these channels amongst actors seeking positive change. While evidence exists on the effectiveness of some nutrition-sensitive interventions, this is the exception not the norm. In many cases, it is known that a channel is important, but which actual interventions are likely to be most effective is less clear. Or, the type of intervention that is required may be known, but not how this should be designed and delivered to achieve the best results.

While the design of interventions in different areas is closely linked to the local population and context, there are some ‘rules of thumb’ with respect to design issues: first, interventions should largely focus on the 1,000 day window; second, they should target the populations most affected or at risk from undernutrition; and third, interventions should generally seek to empower, or at the very least not disempower, women.

The question is what to do under these conditions? Trials of some interventions are not due to be completed for 5 to 10 years, and in many other areas the necessary research has not yet begun. It could be 2030 before all the evidence needed has been collected, but every year millions die unnecessarily, and millions more have their life chances irreparably damaged. Doing nothing therefore cannot be an option.

One option would be to marshal all available resources and deploy them across all of the sectors identified in this report, with the choice on allocation being left to the preferences of particular donors and governments. The question is: is there a better option?

If there was no information at all on the relative importance of different sectors, or the different pathways within each sector, then this approach would make sense. This is not the case, however, which suggests that actions can be taken, even when evidence is limited. The aim of Part 2 of this paper is to develop a framework for thinking through these questions, and so increasing the chances that interventions will have more positive nutrition outcomes.

It should be noted that developing country governments, donor governments and external agencies will have different priorities when it comes to nutrition-sensitive interventions, and the framework must be flexible enough to accommodate this. For example, some external donors and agencies will take a global view, seeking to achieve the greatest impact on nutrition outcomes, with location less important. Others have a geographical focus, and thus seek to maximise the effectiveness of interventions within a particular region or country. Others still may prioritise certain groups within society. For example ACF is a needs-driven organisation with a primary focus on targeting the most vulnerable groups, especially women, the elderly and children. As we shall see, these different priorities necessitate different decision-making criteria in some parts of the framework.

As shown in Figure 2.1, there are four steps in the framework, moving from the general to the specific.

**STEP 1** is the choice of location for the intervention and applies primarily to external donors and agencies.

**STEP 2** is the initial sector allocation.

**STEP 3** entails prioritising between the different pathways within each sector, as well as the determinants along these pathways.

**STEP 4** considers the choice of the specific interventions that are likely to have the greatest impact. At each stage, criteria for decision-making are proposed, and research gaps identified.
When considering where to allocate nutrition-sensitive investments, different criteria will be appropriate for different actors, depending on their objectives. For actors that limit their aid to particular regions or countries, these choices are not relevant. At the other extreme, where the goal of the actor is to maximise impact at the global level, three broad criteria should apply. First, countries with the highest burdens of undernutrition (measured in absolute numbers of undernourished people) should be targeted. Second, by focusing on countries with the greatest commitment to improve nutrition outcomes, donors and external agencies will stand a better chance of their interventions succeeding. Third, countries should be targeted where trends in basic conditions are likely to enhance the impact of nutrition-sensitive interventions, thus amplifying improvements in nutrition outcomes. We shall elaborate on what these conditions are later in Part 2.

While these criteria will be appropriate for some actors, many will have a more focused remit. For many NGOs, for example, the priority is to target the poorest and most disadvantaged in society. In these circumstances, different criteria should apply. First, rather than targeting countries with the highest absolute numbers or prevalence of undernourished people, it may be more appropriate to focus on the poorest countries with a very high prevalence of undernutrition, even if the country is relatively small.

Second, there is no reason to assume that the 'hardest to reach' will be in countries with high commitments to nutrition. Indeed, it may be more likely that the opposite is the case. To be able to work effectively, however, there must be some domestic support for interventions, so a second criteria is that countries should score favourably on the Hunger and Nutrition Commitment Index developed by the Institute for Development Studies (see page 35).

### 2.2.1 Measuring undernutrition

When deciding where to target their nutrition-sensitive interventions, external donors and agencies need to consider the two main types of growth failure associated with undernutrition:

- wasting (or thinness)
- stunting (or shortness).

**Wasting**, also known as acute malnutrition, occurs as a result of recent rapid weight loss or a failure to gain weight within a relatively short period of time. However it is not limited to rapid onset emergencies and frequently occurs in situations of chronic or recurring poverty and food insecurity (Devereux 2008). Wasting occurs more commonly in infants and younger children, often during the stage in a child’s growth when complementary foods are being introduced and when they are more susceptible to infectious diseases. Large parts of the Horn of Africa, the Sahel and South Asia experience a prevalence of wasting of more than 15% on a year round basis. Based on WHO-recommended thresholds, this means that large
population groups in these regions have been in critical situations, involving huge numbers of people, for much of the past two decades. Populations which experience high levels of wasting on a regular basis need immediate life-saving assistance, but also long-term programmes such as social safety nets and adequate public services to ensure that they can access the underlying determinants of good nutrition. Therefore levels of wasting above emergency thresholds are not unique to emergencies and must be addressed as part of the development agenda (Young 2006). Table 2.2.1A shows the numbers and prevalence of global acute malnutrition (which includes moderate acute malnutrition and severe acute malnutrition) in the 10 countries with the highest burdens of global acute malnutrition.

**Stunting**, also known as chronic malnutrition, is a failure to grow in stature, and occurs as a result of long-term nutrient deficiencies and/or chronic illness. It can also be an outcome of repeated episodes of acute illness or acute malnutrition. Because it negatively and often irreversibly affects organ growth, stunting is strongly linked to cognitive impairment. Table 2.2.1B shows the numbers and prevalence of chronic malnutrition in the 10 countries with the highest burdens of stunting.

Both stunting and wasting must be considered when targeting nutrition-sensitive interventions as both require sustained and scaled up resources. It is

### TABLE 2.2.1A: GLOBAL ACUTE MALNUTRITION IN CHILDREN UNDER 5 – NUMBERS AND PREVALENCE (UNICEF 2013)

<table>
<thead>
<tr>
<th>Countries</th>
<th>Number (000s)</th>
<th>Prevalence (% of under 5s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>India</td>
<td>25,461</td>
<td>20</td>
</tr>
<tr>
<td>Nigeria</td>
<td>3,783</td>
<td>14</td>
</tr>
<tr>
<td>Pakistan</td>
<td>3,339</td>
<td>15</td>
</tr>
<tr>
<td>Indonesia</td>
<td>2,820</td>
<td>13</td>
</tr>
<tr>
<td>Bangladesh</td>
<td>2,251</td>
<td>16</td>
</tr>
<tr>
<td>China</td>
<td>1,891</td>
<td>3</td>
</tr>
<tr>
<td>Ethiopia</td>
<td>1,156</td>
<td>10</td>
</tr>
<tr>
<td>Democratic Republic of Congo</td>
<td>1,024</td>
<td>9</td>
</tr>
<tr>
<td>Sudan</td>
<td>817</td>
<td>16</td>
</tr>
<tr>
<td>Philippines</td>
<td>769</td>
<td>7</td>
</tr>
</tbody>
</table>

### TABLE 2.2.1B: UNDER 5 CHILD CHRONIC MALNUTRITION: NUMBERS AND PREVALENCE (2010)

<table>
<thead>
<tr>
<th>Countries</th>
<th>Numbers (000s)</th>
<th>Countries</th>
<th>Prevalence (% of &lt;5)</th>
</tr>
</thead>
<tbody>
<tr>
<td>India</td>
<td>61,303</td>
<td>Burundi</td>
<td>60.40</td>
</tr>
<tr>
<td>Nigeria</td>
<td>10,893</td>
<td>Afghanistan</td>
<td>59.30</td>
</tr>
<tr>
<td>Pakistan</td>
<td>8,888</td>
<td>Yemen, Republic</td>
<td>57.70</td>
</tr>
<tr>
<td>Indonesia</td>
<td>7,682</td>
<td>Timor-Leste</td>
<td>56.07</td>
</tr>
<tr>
<td>Bangladesh</td>
<td>6,353</td>
<td>Niger</td>
<td>54.50</td>
</tr>
<tr>
<td>Ethiopia</td>
<td>6,049</td>
<td>Ethiopia</td>
<td>54.05</td>
</tr>
<tr>
<td>Democratic Republic of Congo</td>
<td>5,426</td>
<td>Nepal</td>
<td>53.20</td>
</tr>
<tr>
<td>Philippines</td>
<td>3,635</td>
<td>Malawi</td>
<td>52.03</td>
</tr>
<tr>
<td>Tanzania</td>
<td>3,404</td>
<td>Madagascar</td>
<td>51.00</td>
</tr>
<tr>
<td>Afghanistan</td>
<td>3,289</td>
<td>Guatemala</td>
<td>50.77</td>
</tr>
</tbody>
</table>

Source: Horton et al. (2010)
therefore for the agency or government in question to decide itself how relevant each measure is to the population it is setting out to help.

The next question is whether the priority should be given to absolute numbers of stunted or wasted children or prevalence. As the tables on page 33 show, choosing between absolute numbers and prevalence rates would lead to very different country allocations, especially when stunting is considered. To date, the policy focus has largely been on absolute numbers. The *Lancet* (2008) series identified 36 high burden countries in terms of numbers of stunted children, which collectively accounted for 90% of the global burden (see Annex 2). The costings undertaken by Horton *et al* (2010) relate to this group. At the same time a further 32 high prevalence countries were identified. These were smaller countries with a prevalence of stunting greater than 20%.

ACF has selected a list of 15 countries in which to prioritise its activities (Annex 2). This list was established by selecting the countries with the highest caseloads of stunted children (taken from the list of 36 High Burden Countries identified in the *Lancet* (2008)) and with high prevalences of wasting in children under five (taken from UNICEF (2011)).

It should be remembered that this framework is designed to help with the allocation of nutrition-sensitive rather than nutrition-specific interventions. In the latter case, the goal is improved nutrition, which explains the focus on the 36 high burden countries that account for most of the global burden. Nutrition-sensitive interventions, in contrast, effectively ‘piggyback’ on other development programmes, which are likely to have been selected for other reasons such as rates of poverty. Given the fairly high correlation between poverty and undernutrition, this should result in nutrition-sensitive interventions being implemented in the countries that need them most. However, some countries have higher rates of stunting than would be expected given their income levels, and vice versa. The correlation is thus not perfect.

For agencies seeking to target the poorest and most disadvantaged groups, the criteria described to date, combined with some degree of domestic support – as evidenced by the country being a signatory of the SUN Movement, for example – may be sufficient. For others

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*Figure 2.2.2: The Hunger and Nutrition Commitment Index in 2012*

![Image of the Hunger and Nutrition Commitment Index in 2012](image_url)
that are seeking to maximise the total, global impact of their interventions, two further considerations are relevant.

2.2.2 Country commitment

As well as the burden of undernutrition, a determinant of the potential impact of nutrition-sensitive interventions is the level of political commitment to address this issue. Where this is high, the impact of any intervention is likely to be greater than in countries where commitment is very low. However how can this commitment be measured? A recent approach to this question has been developed by the Institute for Development Studies (IDS). The Hunger and Nutrition Commitment Index (HANCI) is described as follows:

“Hunger and undernutrition are not the same thing and the policies and programmes needed to address them differ... The new index therefore measures performance on hunger and nutrition separately. It compares 45 countries’ performance on a total of 22 indicators of political commitment to reduce either hunger or undernutrition. These indicators span three areas of government: Policies and programmes designed to tackle undernutrition or hunger; legal frameworks, such as people’s rights to food and social security; and levels of public spending on agriculture and health.”

The first set of results for 2012 are captured in map form on page 34. It is interesting to note the range of commitment levels for countries that are similar in many respects. In Africa in particular, it is striking that countries with very low commitment are adjacent to those with high commitment.

High commitment does not equate to good nutrition outcomes. The top performing country in the index is Guatemala, which also has very high child stunting rates at 48%. Therefore when considering the countries in which to implement nutrition-sensitive interventions, a combination of high burden of undernutrition and high commitment to address it would create some of the conditions needed to achieve high impact.

Based on evidence from five countries, ACF also identified six success factors which should facilitate a reduction in child undernutrition (ACF 2011). The five countries – Brazil, Peru, Mozambique, Malawi and Bangladesh – all successfully reduced persistently high rates of undernutrition over a number of years. The research identified the following six factors in varying degrees in all five countries:

- strong political will
- civil society participation and ownership
- a multi-sectoral approach
- institutional coordination
- a multi-phase approach
- continuity of sustainable financial investment

If the six factors are adopted by national and regional level institutions and if mechanisms are given the necessary support to be effective, nutrition-sensitive interventions are more likely to be successful.

2.2.3 Trends in basic conditions

As shown in Figure 2.1, nutrition outcomes are shaped by three levels of determinant: immediate; underlying; and basic. Our focus in this paper is largely on underlying determinants, but when deciding where to allocate investment to maximise impact, trends in basic determinants need to be taken into account.

Incomes affect nutrition outcomes. Smith and Haddad (2000) estimate that an increase of US$202 per capita in developing countries would reduce the prevalence of child undernutrition by 1 percentage point. In ongoing work to update to this paper, Smith and Haddad (forthcoming) estimate that a 10% increase in per capita incomes would reduce stunting levels by 7.8%.

This compares with the lower estimates by Ruel...
and Alderman (2013) of 5.9% and the World Bank (2013) of 4.5%. What these estimates suggest is that, other things being equal, implementing an intervention in a fast growing economy is likely to achieve greater impacts than the same intervention in a country that is growing more slowly. This is far from guaranteed, of course. To achieve a greater impact, the ‘proceeds of growth’ would need to be invested in the underlying determinants of undernutrition such as education or water and sanitation.

As well as the way in which resources are invested (through government spending, for example), how they are distributed through society is also likely to make a difference. A study by Save the Children (2011) finds that in the 36 high burden countries, higher inequality is associated with higher levels of child stunting. More specifically, the study finds that raising the incomes of the bottom income quintile in these countries would lead to a significant reduction in stunting levels. Again, therefore, we have a basic factor (levels of equality) that may influence the effectiveness of nutrition-sensitive interventions.

Another basic determinant of nutrition assessed in the literature is the extent to which countries are democracies. Although the effect sizes are smaller, they are still important, as argued in Smith and Haddad (2000: 90)

“While, relatively speaking, democracy is not a very strong force in reducing child malnutrition in developing countries, in an absolute sense, improving it would make a big difference. If the democracy index were raised to its desired level (of 7), it is estimated that the prevalence of child malnutrition in the developing countries would fall by 5.5 percentage points. The numbers of children who are malnourished would be reduced by 29.4 million.”

Smith and Haddad (forthcoming) again find a relatively weak democracy effect, but this does not appear to hold in Latin America and the Caribbean and sub-Saharan Africa. This suggests that democracy is not empirically associated with better nutrition outcomes in these regions, but is in other developing regions. Another finding is that higher urbanisation rates are associated with better outcomes in all developing regions except for sub-Saharan Africa (ibid). Finally, exploring the impact of a range of governance indicators, Smith and Haddad (forthcoming) find that political stability and absence of violence and government effectiveness have significant impacts on nutrition, but that the rule of law, control of corruption and voice and accountability do not.

When considering the choice of country to maximise the impact of nutrition-sensitive interventions, the following criteria should therefore be considered:

- High burden or high prevalence of undernutrition (stunting and / or wasting)
- High political commitment to addressing undernutrition
- Relatively strong economic growth
- Relatively low (or improving) levels of inequality
- Relatively good governance (in specific areas)
- Democratic structures (or progress in this direction)

Where the goal is to target the poorest, most disadvantaged and ‘hardest to reach’, the following criteria are more appropriate:

- Low income countries/least developed countries
- Countries with the highest prevalence of stunting and wasting
- High score on the Hunger and Nutrition Commitment Index
Having considered the location for an intervention, the next step is to decide which sector(s) to prioritise. Differences resulting from the remits of different donors, agencies and government ministries are less relevant once the choice of location has been made. Indeed, there is likely to be complementarity in most cases: focusing on the poorest groups, and trying to maximise impact with respect to nutrition outcomes, for example, will tend to lead to the same interventions. Generally, scope for impact is greatest amongst the poorest and most disadvantaged groups in society, as this is where problems of undernutrition are usually most acute. Annex 1 provides an example of Step 2 in three sample countries.

As with Step 1, we have two sets of criteria.

- Where the goal is to **maximise impact for the poorest and most disadvantaged**, two questions need to be asked to decide which sector to prioritise: What is the current status of these sectors within the country – or, put differently, how much scope is there for progress in each sector (which will determine how much impact could potentially be achieved)? How important are the different sectors with respect to nutrition outcomes, particularly for the poorest groups?

- Where the goal is to **maximise total impact**, two additional questions should be asked: To what extent is the relevant government committed to making progress in this sector, including for nutrition outcomes? Does the capacity exist at the sectoral level to ensure interventions are implemented effectively?

While, in many contexts, adequate evidence does not exist to answer these questions at this stage, some evidence can be used. As described in Part 1 of this report, there is broad consensus of which sectors matter most for nutrition. The sectors reviewed included agriculture, early child development and education, health and family planning, water and sanitation, and social safety nets. Women’s empowerment was also a component of each of these sectors. We can relate these to the three categories of underlying causes of undernutrition in the UNICEF framework: food, care and health.

As shown in table 2.3A, some sectors appear under more than one category. Social protection, for example may provide additional finance so that more nutritious food can be purchased (UCT), or provide that food directly as an in-kind transfer (IKT). Similarly, more finance may allow access to better water and sanitation or other health facilities (UCT), while conditional transfers may require recipients to attend educational sessions on care practices (CCT). Given its importance across each of these dimensions, women’s empowerment features under all three categories.

What do we know about the relative importance of these sectors?

<table>
<thead>
<tr>
<th>Food</th>
<th>Care</th>
<th>Health</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agriculture</td>
<td>Health and family planning</td>
<td>Water and sanitation</td>
</tr>
<tr>
<td>Social protection (UCT/IKT)</td>
<td>ECD and education</td>
<td>Social projection (UCT)</td>
</tr>
<tr>
<td>Women’s empowerment</td>
<td>Social protection (CCT)</td>
<td>Women’s empowerment</td>
</tr>
<tr>
<td></td>
<td>Women’s empowerment</td>
<td></td>
</tr>
</tbody>
</table>

TABLE 2.3A NUTRITION-SENSITIVE SECTORS

Footnotes for Part 2 are on page 47
A number of studies have performed large-scale cross-country regressions to test this. Table 2.3B report some of Smith and Haddad’s (2000) results.

The four variables can be translated into the three UNICEF categories as shown in the first row. The elasticity row gives the percentage reduction in the prevalence of child undernutrition from a 1% increase in the variable. From this we can see that improvement in the female to male life expectancy ratio would have by far the largest effect: a 1% improvement in this ratio would be expected to reduce the prevalence of child undernutrition by 3.1%. However, a 1% change in this ratio is not directly comparable to a 1% change in the other variables, such as access to water, for example. To address this, the next row gives the developing country range for each variable, which are bounded between the lowest point for any developing country over the period in question (1970–1995) and the highest point, or 100% if this is more reasonable.

The next row describes how much each variable would have to increase to reduce undernutrition prevalence by 1 percentage point, with the final column transforming this into a percentage of the range. This gives the most accurate assessment of the relative strength of the different variables. Here we can see that, in order to achieve a 1 percentage point reduction on undernutrition, there would have to be a 13.2% increase of access to safe water across its range. In contrast, the same impact could be achieved by a 4.6% increase in female secondary school enrolment, or a 4.9% increase in per capita dietary energy supply. Looked at in this way, we can now see that a quite large improvement in the female to male life expectancy ratio (9.3%) would be needed to achieve this same impact.

Headey (2011) performs a similar exercise – though using somewhat different variables – and finds that:

“The strongest relationships hold for four variables:

1. a poverty proxy (ownership of at least one asset)
2. a health proxy (medically attended births)
3. a female education proxy (women’s secondary and tertiary education)
4. a family planning proxy (fertility rates).

<table>
<thead>
<tr>
<th>TABLE 2.3B STRENGTH OF EFFECTS ON CHILD UNDERNUTRITION (UNDERWEIGHT)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Variables</strong></td>
</tr>
<tr>
<td>---------------------------------------------------------------</td>
</tr>
<tr>
<td>Elasticity (percentage reduction in the prevalence of undernutrition from a 1% increase in the variable)</td>
</tr>
<tr>
<td>Developing country range</td>
</tr>
<tr>
<td>Increase in variable needed to reduce prevalence of malnutrition by percentage point</td>
</tr>
<tr>
<td>Previous row as % developing country range</td>
</tr>
</tbody>
</table>

Source: Smith and Haddad (2000)
Infrastructure variables—such as improved water, sanitation, and electricity access—show weak relationships, although they could still be important as parts of an overall development strategy that includes a focus on malnutrition.”

In both cases, therefore, infrastructure effects are relatively weak and female education effects strong. Income and poverty levels, though measured in very different ways, are strong determinants in both cases. Headey (op cit) concludes that:

“The four strongest variables neatly capture several different determinants of malnutrition and may be good proxies for broader socioeconomic dimensions that are relevant to nutrition outcomes, such as gender empowerment (female education and fertility rates), birth spacing and age at marriage (fertility rates), and overall health access (medically attended births).”

Smith and Haddad (2013) updated these estimates and applied them to stunting, as well as adding a variable for dietary quality, which is the percentage of the diet comprised of non-staple products. The results are shown in table 2.3C.

When all developing countries are considered, the strongest effects are for the food security variables, female secondary school enrolment, and access to

### TABLE 2.3C: PERCENTAGE POINT REDUCTION IN STUNTING FROM A 10 PERCENTAGE-POINT INCREASE IN VARIOUS DETERMINANTS OVER THEIR RANGE

<table>
<thead>
<tr>
<th></th>
<th>Food security</th>
<th>Care environment</th>
<th>Health environment</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Dietary quality</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>All</td>
<td>1.15</td>
<td>1.24</td>
<td>1.27</td>
</tr>
<tr>
<td>% All</td>
<td>18.08</td>
<td>19.50</td>
<td>19.97</td>
</tr>
<tr>
<td>% South Asia</td>
<td></td>
<td></td>
<td>35.31</td>
</tr>
<tr>
<td><strong>Source:</strong></td>
<td>Smith and Haddad (Forthcoming)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

In table 2.3D, the percentage determinants are below their desirable levels in different regions (0–100 scale).

### TABLE 2.3D: THE PERCENTAGE DETERMINANTS ARE BELOW THEIR DESIRABLE LEVELS IN DIFFERENT REGIONS (0–100 SCALE)

<table>
<thead>
<tr>
<th></th>
<th>South Asia</th>
<th>Sub-Saharan Africa</th>
<th>East Asia</th>
<th>Near East and North Africa</th>
<th>Latin America and Caribbean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Access to safe water</td>
<td>-20.3</td>
<td>-51.2</td>
<td>-33.5</td>
<td>-18.5</td>
<td>-22.7</td>
</tr>
<tr>
<td>Female secondary school enrolment</td>
<td>-65.9</td>
<td>-81</td>
<td>-40.2</td>
<td>-42.1</td>
<td>-43.5</td>
</tr>
<tr>
<td>Female to male life expectancy ratio</td>
<td>-58.9</td>
<td>-35.2</td>
<td>-37.4</td>
<td>-42.8</td>
<td>-1.9</td>
</tr>
<tr>
<td>Per capita dietary energy supply</td>
<td>-46.5</td>
<td>-60.2</td>
<td>-23.8</td>
<td>4.5</td>
<td>-20.2</td>
</tr>
</tbody>
</table>

**Source:** Smith and Haddad (2000)
sanitation. The female to male life expectancy impact is the weakest, except when South Asia is looked at alone, when this variable becomes by far the most important. In percentage terms for all developing countries, we see food security accounting for 37.6\% of the impact, the care environment for 32.4\% and the health environment for 30\%. Looking at South Asia alone, however, the female to male life expectancy ratio accounts for more than 35\% of the total impact.

This finding reflects the very low levels of women’s empowerment in South Asia, and so the large potential to achieve major impacts by making improvements in this area. This point also holds more generally, as illustrated in Table 2.3D.

Compared to a level that might be considered acceptable, or desirable, the female to male life expectancy ratio in South Asia was almost 60\% lower than it should be. This is almost twice as much as most of the other regions considered. In contrast, access to safe water in South Asia was only 20\% below the desired level, whereas the corresponding figure for sub-Saharan Africa is more than 50\%. For each region, the two areas with the worst status are highlighted. Female secondary school enrolment is a common factor across all regions, though this has improved significantly since these figures were generated in 2000. Beyond this there is considerable variety.

In practice, it is not really a question of choosing one sector over others. Due to the multiple causes of undernutrition, the importance of multisectoral approaches to improving nutrition is universally accepted (ACF 2011). The World Bank (2013) suggests three reasons why a multisectoral approach is important.

First, because working in a complementary way across sectors can increase impacts. For example:

“Nutrition problems such as iron deficiency anaemia require direct interventions like iron-folic acid supplements and deworming. The gains from these direct interventions can be further enhanced and sustained by improving water-supply and hygiene, and reducing reinfection. Improved hygiene and water supply not only helps to break the cycle of disease and malnutrition, it allows mothers to spend more time on the care of their children, thereby improving children’s nutrition.”

(World Bank, 2013)

Second, to ‘sustain the gains’ from nutrition interventions, it is necessary to work across the range of sectors that influence outcomes: this is precisely what nutrition-sensitive interventions aim to do. Third, a multisectoral approach facilitates policy coherence across different departments and initiatives, enabling focus on nutrition to be maintained.

Although it is essential to approach nutrition in this way, in practical terms it still comes down to specific interventions in particular sectors, even if these are complemented by interventions elsewhere. For the World Bank this is not only inevitable, but desirable:

<table>
<thead>
<tr>
<th>TABLE 2.3D REGIONAL SECTORAL PRIORITIES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regions</td>
</tr>
<tr>
<td>------------------------------------</td>
</tr>
<tr>
<td>South Asia</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Sub-Saharan Africa</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>East Asia</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Near East and North Africa</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Latin America and Caribbean</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

Source: Smith and Haddad (2000)
“While there is a strong case for acting across several sectors to improve nutrition outcomes, little evidence exists demonstrating the success of multisectoral projects improving nutrition outcomes. Experience and evidence suggest that while it is perfectly logical to think and plan multisectorally, actions must follow sector by sector, tailored to the specific context, objectives, and operating environment of each sector.”

(World Bank, 2013)

If the aim is to ‘think multisectorally, but act sectorally’ as the World Bank suggests, the question is which sectors should take priority and under what conditions?

Drawn from Smith and Haddad (2000), Table 2.3E suggests some priorities in this respect. As discussed above, this is based upon a) the relative strength of the different sectors, and b) the regional potential for ‘catch-up’ and impact in each case.

The study is based on data from some time ago, and so would need to be updated. Also, in reality, interventions occur at the national (or sub-national) level, not regionally. For this approach to be operational, this data would need to be gathered at the national, or state/province levels. In each case, when the goal is to maximise total impact, the suggested criteria would be:

- Estimate gap between current and desired levels in each sector for the chosen location.
- Weight these estimates by the strength of the potential impact.
- Examine disaggregated HANCI indicators to assess strength of commitment at the sector level.
- Estimate relative capacity (perhaps using a capacity audit across sectors27) and identify sectors with greatest capacity.
- Prioritise sector(s) with high potential impact, high levels of commitment and (relatively) high levels of capacity.
- Look for complementary interventions in other priority sectors.

Another issue, which does not receive the attention that it should, is capacity. A major obstacle to improving nutrition outcomes is the capacity to deliver these on the ground. The final criteria for prioritising sectors, therefore, is to consider where capacity constraints are least acute, as this is likely to be a success factor for interventions.

Where the objective is to focus on particular groups, such as the poorest and most disadvantaged, the criteria relating to the levels of political commitment and capacity would not apply. Beyond these two modifications, however, the criteria would be the same.

2.4 PATHWAY AND DETERMINANT ALLOCATION

Having prioritised sectors, the next step is to examine the potential pathways for intervention. Returning to the sectors reviewed in Part 1, these are described in table 2.4 on page 43.

As well as the pathways associated with each sector, Table 2.4 describes the factors that may influence nutrition outcomes for each pathway. Again, it is not a matter of choosing one determinant from this potential set – all may play a role. The aim is to identify and prioritise the most important determinants, and therefore establish a basis for policy choice.

What criteria should be employed to prioritise the pathways to take?
Cross-country regressions are of no use in this task, which is a country-specific empirical question. The first task therefore is to prioritise pathways for a particular sector.

To do this decision-makers need to examine the economic and social structure of the location in question. If they are prioritising agriculture, for example, should they focus more on subsistence farmers, on farmers selling to market, or on consumers buying agricultural outputs?

There are two questions which decision-makers would need to answer:

- How important are different forms of farming in the economic structure of the economy? (for example, what proportion of the rural population is engaged primarily in subsistence farming?).
- Does the distribution of undernutrition in the population indicate which is more important? (for example, is undernutrition a greater problem among subsistence farmers compared with those producing cash crops?).

Having prioritised the most important pathways, they can then be more specific, and turn to the determinants listed in table 2.4. This can be thought of as Step 3b. In section 2.2.3 we discussed how the conditions in different countries differ in broad areas – the level of ‘women’s empowerment’, for example. Decision-makers now apply this lens at the level of determinant. If they focus on agriculture, and have prioritised the subsistence pathway as particularly important, is the problem that there is insufficient food being produced in terms of quantity, or is the primary problem one of a lack of diversity? Again, this is an empirical question, which can be assessed by measuring the gap between the level of these determinants in the location where they are working and what would be considered a desirable level.
### TABLE 2.4: SECTORS, PATHWAYS, DETERMINANTS AND NUTRITION-SENSITIVE INTERVENTIONS

<table>
<thead>
<tr>
<th>STEP 1: Geographical location</th>
<th>STEP 2: Sectoral allocation</th>
<th>STEP 3: Pathway and determinant allocation</th>
<th>STEP 4: Intervention allocation</th>
</tr>
</thead>
<tbody>
<tr>
<td>For external donors and agencies, target country chosen depending on burden of undernutrition, political commitment of country and trends in basic conditions</td>
<td>Agriculture</td>
<td>Subsistence production</td>
<td>Insufficient calories: Increase land availability; Use higher yielding crop varieties</td>
</tr>
<tr>
<td></td>
<td>Gender</td>
<td>Food supply and prices</td>
<td>Insufficient diversity: Homestead food production; Biofortification</td>
</tr>
<tr>
<td></td>
<td>Early Child Development and education</td>
<td>Early child development</td>
<td>Affordable nutritious food unavailable: Improve local markets; Encourage supply of BOP nutrition</td>
</tr>
<tr>
<td></td>
<td>Education</td>
<td>Maternal depression</td>
<td>Food prices too high (net buyers): Increase food supply; Increase income (cash transfers)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Birth spacing</td>
<td>Food prices too low (net sellers): Diversity crops produced; Increase income (cash transfers)</td>
</tr>
<tr>
<td></td>
<td>Water and sanitation</td>
<td>Water</td>
<td>Insufficient assets and income: Reform property rights; Reform and enforce equal pay</td>
</tr>
<tr>
<td></td>
<td>Sanitation</td>
<td>Sanitation</td>
<td>Insufficient control over resources: Increase women’s education</td>
</tr>
<tr>
<td></td>
<td>Social safety nets</td>
<td>Income</td>
<td>Insufficient time for childcare: Increase women’s education; Supply labour saving devices; Improve infrastructure</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Income and information</td>
<td>Insufficient access to credit: Increase supply of rural finance; Educate financial institutions</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Income and services</td>
<td>Insufficient access to extension services: Increase supply of rural extension services; Educate extension providers</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Food security</td>
<td>ECD not addressing nutrition: Modify ECD programmes</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Insufficient ECD programmes: Expand reach of ECD programmes</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Girl’s completion too low (primary and secondary): Increase supply of rural schools; Improve transport infrastructure</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Curriculum not nutrition-sensitive: Modify curriculums</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Poor childcare: Provide maternal support services</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Birth intervals too short/long: Provide maternal support services; Increase women’s education</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Lack of safe water supply: Increase affordable access to water; Improve quality of water supply</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Lack of adequate sanitation facilities: Increase affordable access; Improve quality of sanitation facilities</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Incomes too low: Provide unconditional cash transfer</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Incomes too low and knowledge lacking: Provide conditional cash transfer</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Incomes too low and services lacking: Provide conditional cash transfer</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Insufficient quantity/quality of food: Provide in-kind transfers; Provide unconditional cash transfer</td>
</tr>
</tbody>
</table>
To summarise, the criteria for Step 3 (and 3b) are:

- Assess structure of economy and society to prioritise pathways;
- Analyse distribution of undernutrition to prioritise pathways;
- Assess historical importance of pathways for nutrition at country level;
- Within prioritised pathways, estimate the gap between the determinant levels and desirable levels;
- Identify priority determinants.

### 2.5 Intervention Allocation

Having prioritised the determinants of nutrition outcomes, the next step is to choose between the possible interventions to address this problem. Table 2.4 links pathways, to determinants, to possible nutrition-sensitive interventions to address these determinants.

In Part 1, evidence was presented on the effectiveness of these interventions. As discussed, this remains very patchy in most cases. While the steps in this diagnostic framework can provide relatively clear answers on which issues to prioritise in any given location, the evidence on the effectiveness of possible interventions will often be lacking.

This is not a reason for inaction, however, as some knowledge does exist. While the precise pathways may not be clear, we do know that women with primary level schooling are less likely to have stunted children (odds ratio: 0.89) for example. This effect increases when some secondary school education has been obtained (0.75) (Ruel et al, 2013).

Therefore in areas where girls’ access to primary and secondary education is well below desirable levels, it seems highly likely that addressing this would improve nutrition outcomes. It is also the case, however, that these aggregate results mask a wide range of effect sizes in different countries, suggesting that it is not just the quantity of education that matters, but its quality. It is not essential to know the precise channels of impact to know that increasing girl’s access to high quality education is likely to have a significant impact on child undernutrition.

Looking at the problem of insufficient dietary diversity, some evidence exists which suggests that home garden approaches improve intermediate outcomes (Wijeratna 2013) but not on child anthropometry. More research may be needed, therefore, to better understand how target outcomes could be improved, or whether other approaches are required. In contrast, trials on the effectiveness of biofortification have resulted in positive impacts on child nutrition, but have shown that biofortification alone is insufficient for the high-intensity inputs needed for pregnant women, lactating mothers and infants (Ruel et al, 2013). So while biofortification of this kind may provide a very important source of micronutrients, it cannot be relied upon to address nutrition needs in the 1,000 day window (although it could be a useful complement to other interventions). This might change, however, were crops to become more intensively biofortified (Saltzman et al, 2012).

In some areas we can be more precise. Where the problem is one of insufficient food supply leading to high prices, evidence suggests that investing in R&D to boost agricultural yields would have very positive effects, and the benefit-to-cost ratios of investing would be in the region of 50 to 1 (Hoddinot et al, 2012). However it is essential for the results to be accessible to farmers, especially female farmers, for the benefits to be realised.

A final point to consider is equity. Evidence is lacking on how interventions affect different groups within society. For agencies that specifically focus on the...
poorest or ‘hardest to reach’ sectors of the population, any interventions need to be accessible to, and effective within, these groups.

Over the coming years these evidence gaps will be filled. NGOs have an important role to play in this regard as they can pilot interventions and gather evidence on their impacts in different contexts. As evidence builds up, the following set of criteria could be applied when deciding which interventions to use:

- Impact of intervention (total)
- Distributional assessment of impact (i.e. impact on different groups, particularly the poorest, most disadvantaged, and ‘hardest to reach’)
- Cost effectiveness of intervention
- Capacity.

Given the need to extract the maximum benefit from scarce resources, it is also essential to use the most cost-effective interventions. By ‘effective’, the intervention needs to be effective for all groups in society, regardless of income, gender, ethnicity or location.

Finally, the actual ability to design and implement any intervention will be strongly affected by in-country capacity, and this is likely to vary across different potential interventions significantly, affecting their potential effectiveness. Our final decision-making criteria, therefore, is to lean towards intervention options where capacity is greatest. ACF has published comprehensive guidelines on how interventions in practice can be made more nutrition-sensitive. Using these guidelines, existing and new interventions can better address their intended nutrition goals (ACF 2012b).

As long as evidence remains limited, and in some cases non-existent, the first of the two criteria above cannot be applied. Without this evidence, decision-makers should therefore take the option where capacity is greatest and is likely to lead to the best outcomes.

### 2.6 NUTRITION DIAGNOSTICS AND EVIDENCE GAPS

This paper has proposed a four-step diagnostic framework for prioritising, and ultimately selecting, nutrition-sensitive interventions that are likely to have the greatest impact on nutrition outcomes, depending on the local contexts that pertain. These steps, and the suggested criteria for decision-making in each case, are described in figure 2.6. The criteria in the top half of the diagram are applicable for actors seeking to maximise impact in particular locations or amongst particular groups, such as the poorest. Additional criteria are contained in the bottom half of the table, which apply to actors whose goal is to maximise total impact, in terms of the global burden of undernutrition.

In each case, the criteria upon which decisions are to be made require evidence. In some cases, much or all of this evidence is available. In other cases, there is little or none. Looking at each of the steps in Figure 2.6, we can see that – broadly speaking – the evidence gaps grow moving through the steps. Or put another way, as the questions become more specific, the available evidence becomes more scarce.

For Step 1, most of the evidence needed to select locations for interventions is available, regardless of whether the focus is on total global impact or impact among particular groups. One area where further work would be welcome is in deepening and refining our understanding of the relative importance of the basic causes of undernutrition. Smith and Haddad (2000; forthcoming) have provided a solid foundation to build upon in this regard.

For Step 2, the evidence gaps are a little larger. Again more regional and country level regressions similar to those carried out by Smith and Haddad are needed to

Footnotes for Part 2 are on page 47
Figure 2.6: Nutrition-sensitive diagnostic framework: steps and decision criteria

**Step 1: Geographical allocation**
- 1.1 High burden or prevalence of undernutrition (Evidence: Demographic and Health Surveys [DHS])

**Step 2: Sectoral allocation**
- 2.1 High scope for future impact, measured as gap between current and desired levels at the sector level e.g. supply of sanitation facilities (Evidence: DHS; WDI; WHO)
- 2.2 Evidence of high sector impact in the past (Evidence: regional and country estimates derived from regressions a la Smith and Haddad, 2000; forthcoming)

**Step 3: Pathway and determinant allocation**
- 3.1 High scope for future impact. Select pathways of most importance in country, and with greatest potential to scale up impacts e.g. the relative importance of subsistence vs. cash crops farmers, and the prevalence of undernutrition in each (Evidence: WDI; FAO; micro-economic country studies [DHS])
- 3.2 High explanatory power of determinants within priority pathways to enhance impact (Evidence: country specific micro studies)
- 3.3 Large gap between current and desired level of determinants within priority pathways e.g. if subsistence agriculture is prioritised, assess gap between current and desired quantity vs. diversity of food (Evidence: DHS; WDI; country-specific micro studies)

**Step 4: Intervention allocation**
- 4.1 High potential impact of intervention (Evidence: Systematic reviews of impact studies a la The Lancet; individual impact studies)
- 4.2 Most cost effective interventions (Evidence: Impact studies; comparative cost effectiveness studies)
- 4.3 Sufficient capacity to deliver intervention (Evidence: in-country capacity audits at level of intervention)

**Decision criteria (and sources of evidence)**

1.1 High burden or prevalence of undernutrition (Evidence: Demographic and Health Surveys [DHS])

2.1 High scope for future impact, measured as gap between current and desired levels at the sector level e.g. supply of sanitation facilities (Evidence: DHS; WDI; WHO)

2.2 Evidence of high sector impact in the past (Evidence: regional and country estimates derived from regressions a la Smith and Haddad, 2000; forthcoming)

3.1 High scope for future impact. Select pathways of most importance in country, and with greatest potential to scale up impacts e.g. the relative importance of subsistence vs. cash crops farmers, and the prevalence of undernutrition in each (Evidence: WDI; FAO; micro-economic country studies [DHS])

3.2 High explanatory power of determinants within priority pathways to enhance impact (Evidence: country specific micro studies)

3.3 Large gap between current and desired level of determinants within priority pathways e.g. if subsistence agriculture is prioritised, assess gap between current and desired quantity vs. diversity of food (Evidence: DHS; WDI; country-specific micro studies)

4.1 High potential impact of intervention (Evidence: Systematic reviews of impact studies a la The Lancet; individual impact studies)

4.2 Most cost effective interventions (Evidence: Impact studies; comparative cost effectiveness studies)

4.3 Sufficient capacity to deliver intervention (Evidence: in-country capacity audits at level of intervention)

**Additional criteria for actors seeking to maximise total impact**

1.2 High total political commitment to nutrition (Evidence: Hunger and Nutrition Commitment Index [HANCI]) [DHS])

2.3 High political commitment to improving nutrition outcomes via sector (Evidence: disaggregated HANCI)

1.3 Improving basic supporting conditions in key areas (Evidence: cross-country regressions; World Development Indicators [WDI]; Demographic and Health Surveys [DHS])

2.4 Relatively high capacity in chosen sector (Evidence: in-country capacity audits by sector)

4.3 Sufficient capacity to deliver intervention (Evidence: in-country capacity audits at level of intervention)

**Evidence gaps**
- Few evidence gaps
- Moderate evidence gaps
- Large evidence gaps

Footnotes for Part 2 are on page 47
improve our understanding of the relative importance of different sectors in different regions and countries. Also, there is no evidence at all on in-country capacity with respect to nutrition at the sectoral level. The suggested ‘capacity audits’ would be one way of filling this gap.

For Step 3, the focus moves very much to the country level. For descriptive data on economic and social structures and the distribution of undernutrition rates, the evidence is largely in place, if somewhat dispersed. When considering the relative importance of different pathways and determinants, however, more work needs to be done. Detailed country-specific microeconomic studies would be needed to fill this gap.

For Step 4, robust evidence on the impact of interventions on nutrition outcomes and on their cost effectiveness is needed. In many cases this work is ongoing, but it is somewhat patchy. To do proper cost effectiveness studies, ideally evidence on all potential interventions is needed. The task here, therefore, is to identify promising interventions where impact studies are not yet underway and fill these gaps. Little evidence exists on how interventions affect different groups in society, particularly the poorest. Distributional analyses of this kind should be built into all pilot studies and trials, with the results used to modify interventions and ensure equity of outcome. Finally, there is little evidence on the capacities required to implement many of the interventions, or the status of these capacities in different countries.

Ideally, these evidence gaps would be filled as quickly as possible across the board. In reality, however, some degree of sequencing is likely, which will require prioritisation.

The implementation of a multi-phase approach, to address both immediate and longer term needs, is fundamental if the fight against undernutrition is to be won. In countries which have had relative success in bringing down rates of undernutrition, a combination of both short and long-term approaches (including both prevention and treatment) appears to be effective. In these countries, long-term initiatives, such as the enhancement of food production and improving access to employment for the most vulnerable, have been complemented by short-term approaches, such as the improvement of health services for mothers and children and ensuring access to safe water and better sanitation (ACF 2011).

On this issue, the sequential nature of this diagnostic framework provides some guidance on the order that evidence would be required. This would need to be combined with an assessment of how long the different forms of evidence would take to acquire. In some cases, this would take years to complete; in others, much less time.

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24 The correlation is far from perfect. As described in UNICEF (2013) undernutrition remains a significant problem even amongst higher income groups in many developing countries.
25 While Smith and Haddad (2000) took underweight as their dependent variable, Smith and Haddad (forthcoming) use stunting rates.
26 For Smith and Haddad (2013) their higher estimates result from the fact that they control for endogeneity, unlike the other studies cited.
27 Thanks to Lawrence Haddad for this suggestion.
Progress on tackling child undernutrition in recent years is undisputed. In the last five years, compelling evidence has been produced on which interventions are needed at household and community level and at national level to tackle the immediate causes of foetal and child undernutrition. As shown in two of the reports in the Aid for Nutrition series (ACF 2011 and 2013), however, between 2005 and 2011 donor governments and multilateral agencies invested just a fraction of the funds needed to bring these interventions to scale.

Recent developments give some cause for optimism. For example, the commitments made by stakeholders – including by developing country governments who have demonstrated their own commitments to scale up nutrition – at the Nutrition for Growth event in 2013 and the growth of the Scaling Up Nutrition Movement, have galvanised action and provided momentum.

Despite this, much of the progress that has been made has focused on treating and preventing the immediate determinants of undernutrition by investing in 'nutrition-specific interventions'. This is not enough. As argued in the recently published Lancet series on Maternal and Child Nutrition:

“Acceleration of progress in nutrition will require effective, large-scale nutrition-sensitive programmes that address key underlying determinants of nutrition and enhance the coverage and effectiveness of nutrition-specific interventions.”

(Ruel et al, 2013)

Rather than being limited to the relatively small number of sectors which are implicated in the delivery of nutrition-specific interventions, nutrition-sensitive interventions involve a much wider scope of sectors. Furthermore, instead of being dedicated programmes and projects to specifically improve nutrition outcomes, they instead aim to improve the 'nutrition-sensitivity' of existing programmes in sectors such as agriculture, early child development, social protection and primary and secondary education by making a conscious attempt to improve nutrition outcomes. To achieve this, a nutrition-sensitive programme should incorporate additional nutrition outcomes which should be monitored on an ongoing basis.

The diagnostic framework proposed in this paper aims to help decision makers prioritise which countries (if relevant), sectors, pathways and interventions to invest in to make them 'more' nutrition-sensitive. Due to the lack of evidence on the effectiveness of different nutrition-sensitive interventions to improve nutrition outcomes in different contexts, the framework is far from complete. However it may present a useful starting point. As well as providing a tool to aid prioritisation and decision-making now,
the framework should become increasingly useful over time, as understanding of these issues develops, and the evidence gaps identified are progressively filled.

For those familiar with the approach, this framework proposed has similarities with the 'growth diagnostics' approach developed by economists Ricardo Hausmann, Dani Rodrik and Andres Velasco.

“What we propose... is to develop a framework for growth diagnostics – that is, a strategy for figuring out the policy priorities. The strategy is aimed at identifying the most binding constraints on economic activity, and hence the set of policies that, once targeted on these constraints at any point in time, is likely to provide the biggest bang for the reform buck...We start by asking what keeps growth low. Is it inadequate returns to investment, inadequate private appropriability of the returns, or inadequate access to finance? If it is a case of low returns, is that due to insufficient investment in complementary factors of production (such as human capital or infrastructure)? Or is it due to poor access to imported technologies? If it is a case of poor appropriability, is it due to high taxation, poor property rights and contract enforcement, labor-capital conflicts, or learning and coordination externalities? If it is a case of poor finance, are the problems with domestic financial markets or external ones?”

(Hausmann et al, 2005)

Above, the authors’ aim is to improve economic growth outcomes. The aim of this report and this framework is to improve nutrition outcomes. In both cases, many factors will influence these outcomes, but they are not equally important. Also, in both cases, local conditions will exert a strong influence on which is the most important obstacle to remove, or gap to fill. For Hausmann et al. (ibid.) the factors identified by their ‘growth diagnostics’ framework are the ‘binding constraints’ on growth, which – if alleviated – will deliver the largest potential boost to growth. From our perspective, we are seeking the ‘binding constraint’ on improving nutrition, which will also deliver the ‘greatest bang for the reform buck’.

For future developments we recommend that:

- Current efforts must be maintained and recent commitments met to implement nutrition-specific interventions at scale and nutrition-specific interventions must be complemented with nutrition-sensitive interventions to amplify their impact.
- Nutrition-sensitive interventions must incorporate additional nutrition outcomes which should be monitored on an ongoing basis to fill gaps in evidence.
- National governments, external donors and other nutrition actors, especially those who are signatories of the SUN Movement, should improve their understanding of how cross-sectoral linkages can improve nutrition outcomes and reach out to complementary sectors to implement nutrition-sensitive interventions.
- All nutrition actors should further cooperate to develop a consistent approach to prioritising interventions, and coordinate their activities so that they complement each other, thus achieving greater impacts than any one actor could achieve alone.
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AID FOR NUTRITION


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Step 2 of the diagnostic framework entails prioritising the sectors upon which to focus in a particular country. For this example, the goal is to maximise impact on the poorest, or ‘hardest to reach’ populations.

Let us assume that Step 1 has been undertaken and three countries have been selected: Bangladesh, Chad and Liberia. These are all low-income countries with relatively high prevalences of stunting and wasting. Stunting rates in 2010 were

- 41.3% in Bangladesh
- 39% in Chad
- 35.7% in Liberia.

When the objective of the nutrition-sensitive interventions is to maximise impact on the populations most in need in a country, there are two decision-making criteria. First, there should be high scope for future impact, measured as the gap between current and desired levels by sector. Second, the selected sectors should have demonstrated high impact on nutrition outcomes in the past.

Chart 1 illustrates country differences in each of the six areas covered in Smith and Haddad (forthcoming). In each case, the variable is the percentage difference between the country levels (as of 2010) and desirable, or target levels - the higher the bar, therefore, the greater the gap. As we can see, there are significant differences between the countries. In Bangladesh, for

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**ANNEX 1: STEP 2 OF THE DIAGNOSTIC FRAMEWORK IN 3 SAMPLE COUNTRIES**

Thanks to Lisa Smith and Lawrence Haddad for providing the country-level data for these examples.

The rationale each desired level is outlined in the main body of the paper.
example, this measurement indicates that diversity of food supply is the greatest problem at more than 70% less than the target level. On the other hand, for Chad both access to sanitation and female secondary school enrolment are around 85% below levels that might be considered acceptable. For Liberia these two factors are again the most pressing, although access to sanitation (more than 80%) is a somewhat more acute issue than female secondary school enrolment (60%).

As well as the desired level in each case, another useful measure is to see how countries compare with the developing country average.

The bars in Chart 2 show the gap for each country compared to the average developing country level. The line shows the gap between these developing country averages and the target level. Looking at the line first, we can see that – on average – developing countries have the largest gaps with respect to a) access to sanitation, b) diversity of diet, and c) female secondary school enrolment. These are the areas where most progress is needed.

When looking at the individual countries, we can see that Bangladesh performs better that the developing country average on access to sanitation – however, as seen in chart 1, access is still more than 40% lower than the desired level. Access to sanitation is clearly a major problem in both Chad and Liberia. However the developing country average is well below the target level of 100% access, and both countries are well below the average.

The next criteria to consider is the potential for interventions in these sectors to have a positive effect on nutrition outcomes. Chart 3, from Smith and Haddad (forthcoming) illustrates this for all developing countries. Based on existing evidence, this shows that improvements in female secondary school enrolment rates caused the greatest reduction in stunting, followed by increased diversity of food and
greater quantities of available food. The lowest impact came from women’s empowerment (measured as the female/male life expectancy ratio).

This highlights an important point. To be effective, the choice of sector should reflect the context of the country rather than developing country averages. For developing countries as a whole, a ten percentage point improvement in the female/male life expectancy ratio is associated with a 0.8 percentage point reduction in stunting. For South Asia, however, the same change in women’s empowerment was associated with a 3 percentage point reduction in stunting - by far the strongest effect for this region. Therefore different factors will be more or less important for different countries, so Step 2 of the diagnostic framework should be based on country-specific evidence. However, as described in Part 2 of the report, there is a need for substantial research to source this information.

The two tables below combine the rankings of ‘Gap to target’ (demonstrating the scope for future impact) and ‘Sector importance’ (demonstrating sectors that have had high impact on nutrition outcomes in the past) with 6 representing the largest gap and most important sector. These are then combined in the

<table>
<thead>
<tr>
<th></th>
<th>Gap to target</th>
<th>Sector importance</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Access to safe water</td>
<td>3</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>Access to sanitation</td>
<td>4</td>
<td>2</td>
<td>6</td>
</tr>
<tr>
<td>Female secondary school enrolment</td>
<td>5</td>
<td>5</td>
<td>10</td>
</tr>
<tr>
<td>Female/male life expectancy</td>
<td>1</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>Per capita dietary energy supply</td>
<td>2</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>% dietary energy from non-staples</td>
<td>6</td>
<td>4</td>
<td>10</td>
</tr>
</tbody>
</table>

Source: Smith and Haddad (forthcoming)
right-hand column to indicate the sectors which should be prioritised.

The first table suggests that for Bangladesh, the priorities should be to increase the diversity of food, raise female secondary school enrolment rates and empower women. The second table suggests that in Chad, while female secondary school enrolment and the diversity of food supplies remain very important, access to sanitation should be a priority.

These examples are for illustrative purposes only. More research is needed to identify the relative importance of sectors in different countries. Also, these examples use the categories from Smith and Haddad (forthcoming). However other variables may be preferred in some areas. Accurately capturing the level of female empowerment is particularly difficult as a number of different variables may be being used.

The final point relates to timing, or more accurately sequencing. Well crafted interventions in these areas will all improve nutrition outcomes to some extent. These outcomes will not happen over the same timeframes, however. Raising female school enrolment rates, for example, would take the best part of a generation to feed through to nutrition outcomes. Depending on the nature of the intervention, achieving changes to women’s empowerment may also take a sustained period of time. In contrast, well designed and delivered WASH interventions, and those relating to the quantity and quality of food supply, would have relatively quick impacts on child nutrition outcomes. However this does not mean that ‘quick wins’ should be prioritised at the expense of longer-term interventions - clearly the sustainability of any improvements will be significantly enhanced if progress is made in areas such as women’s empowerment. It is therefore important to take these different timeframes into account for the purposes of monitoring and evaluation if for no other reason.

<table>
<thead>
<tr>
<th></th>
<th>Gap to target</th>
<th>Sector importance</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Access to safe water</td>
<td>3</td>
<td>2</td>
<td>5</td>
</tr>
<tr>
<td>Access to sanitation</td>
<td>6</td>
<td>3</td>
<td>9</td>
</tr>
<tr>
<td>Female secondary school enrolment</td>
<td>5</td>
<td>6</td>
<td>11</td>
</tr>
<tr>
<td>Female/male life expectancy</td>
<td>1</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Per capita dietary energy supply</td>
<td>2</td>
<td>4</td>
<td>6</td>
</tr>
<tr>
<td>% dietary energy from non-staples</td>
<td>4</td>
<td>5</td>
<td>9</td>
</tr>
</tbody>
</table>
The ACF list of 15 high-priority countries was established by selecting countries which had the highest caseloads of stunted children (taken from the list of 36 High Burden Countries identified in the *Lancet* (2008)) along with a high prevalence (≥10%) of wasting in children under 5 (taken from UNICEF\(^3\)). The countries were then ranked according to the caseloads of stunted children. The 15 high-priority countries are highlighted in red in the table below:

<table>
<thead>
<tr>
<th>COUNTRIES</th>
<th>CHILDHOOD WASTING PREVALENCE (%)(^3)</th>
<th>CHILDHOOD STUNTING PREVALENCE (%)(^3)</th>
<th>NUMBER OF CHILDREN UNDER FIVE SUFFERING FROM STUNTING (THOUSANDS)</th>
<th>BURDEN OF STUNTING (% OF NUMBER OF STUNTED CHILDREN WORLDWIDE TOTAL)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 India</td>
<td>20</td>
<td>51.0</td>
<td>61,206</td>
<td>34%</td>
</tr>
<tr>
<td>2 Indonesia</td>
<td>14</td>
<td>45.3</td>
<td>9,772</td>
<td>5%</td>
</tr>
<tr>
<td>3 Nigeria</td>
<td>11</td>
<td>43.0</td>
<td>9,571</td>
<td>5%</td>
</tr>
<tr>
<td>4 Bangladesh</td>
<td>17</td>
<td>50.5</td>
<td>8,787</td>
<td>5%</td>
</tr>
<tr>
<td>5 Pakistan</td>
<td>14</td>
<td>41.5</td>
<td>8,763</td>
<td>5%</td>
</tr>
<tr>
<td>6 Ethiopia</td>
<td>12</td>
<td>57.4</td>
<td>7,498</td>
<td>4%</td>
</tr>
<tr>
<td>7 Democratic Republic of the Congo</td>
<td>10</td>
<td>44.4</td>
<td>4,977</td>
<td>3%</td>
</tr>
<tr>
<td>8 Philippines</td>
<td>7</td>
<td>37.8</td>
<td>3,730</td>
<td>2%</td>
</tr>
<tr>
<td>9 Việt Nam</td>
<td>NR</td>
<td>42.4</td>
<td>3,375</td>
<td>2%</td>
</tr>
<tr>
<td>10 Afghanistan</td>
<td>9</td>
<td>53.6</td>
<td>2,967</td>
<td>2%</td>
</tr>
<tr>
<td>11 United Republic of Tanzania</td>
<td>4</td>
<td>48.3</td>
<td>2,920</td>
<td>2%</td>
</tr>
<tr>
<td>12 Uganda</td>
<td>6</td>
<td>44.8</td>
<td>2,675</td>
<td>1%</td>
</tr>
<tr>
<td>13 Sudan</td>
<td>16</td>
<td>47.6</td>
<td>2,483</td>
<td>1%</td>
</tr>
<tr>
<td>14 Yemen</td>
<td>15</td>
<td>59.3</td>
<td>2,175</td>
<td>1%</td>
</tr>
<tr>
<td>15 Nepal</td>
<td>13</td>
<td>57.1</td>
<td>2,078</td>
<td>1%</td>
</tr>
<tr>
<td>16 Kenya</td>
<td>7</td>
<td>35.8</td>
<td>2,054</td>
<td>1%</td>
</tr>
<tr>
<td>17 Myanmar</td>
<td>11</td>
<td>40.6</td>
<td>1,891</td>
<td>1%</td>
</tr>
<tr>
<td>18 Egypt</td>
<td>7</td>
<td>20.3</td>
<td>1,813</td>
<td>1%</td>
</tr>
<tr>
<td>19 Madagascar</td>
<td>13</td>
<td>55.5</td>
<td>1,724</td>
<td>1%</td>
</tr>
<tr>
<td>20 South Africa</td>
<td>0</td>
<td>30.9</td>
<td>1,616</td>
<td>1%</td>
</tr>
<tr>
<td>21 Mozambique</td>
<td>NR</td>
<td>47.0</td>
<td>1,547</td>
<td>1%</td>
</tr>
<tr>
<td>22 Niger</td>
<td>12</td>
<td>54.2</td>
<td>1,545</td>
<td>1%</td>
</tr>
<tr>
<td>23 Angola</td>
<td>8</td>
<td>30.8</td>
<td>1,511</td>
<td>1%</td>
</tr>
<tr>
<td>24 Turkey</td>
<td>1</td>
<td>20.5</td>
<td>1,479</td>
<td>1%</td>
</tr>
<tr>
<td>25 Malawi</td>
<td>4</td>
<td>54.6</td>
<td>1,278</td>
<td>1%</td>
</tr>
</tbody>
</table>

Footnotes for Annex 2 are on page 60
### AID FOR NUTRITION

<table>
<thead>
<tr>
<th>COUNTRIES</th>
<th>CHILDHOOD WASTING PREVALENCE (%)&lt;sup&gt;31&lt;/sup&gt;</th>
<th>CHILDHOOD STUNTING PREVALENCE (%)&lt;sup&gt;32&lt;/sup&gt;</th>
<th>NUMBER OF CHILDREN UNDER FIVE SUFFERING FROM STUNTING (THOUSANDS)</th>
<th>BURDEN OF STUNTING (% OF NUMBER OF STUNTED CHILDREN OF WORLDWIDE TOTAL)</th>
</tr>
</thead>
<tbody>
<tr>
<td>26 Iraq</td>
<td>6</td>
<td>28.3</td>
<td>1,223</td>
<td>1%</td>
</tr>
<tr>
<td>27 Guatemala</td>
<td>NR</td>
<td>59.9</td>
<td>1,210</td>
<td>1%</td>
</tr>
<tr>
<td>28 Mali</td>
<td>15</td>
<td>42.7</td>
<td>1,111</td>
<td>1%</td>
</tr>
<tr>
<td>29 Ghana</td>
<td>9</td>
<td>35.6</td>
<td>1,104</td>
<td>1%</td>
</tr>
<tr>
<td>30 Burkina Faso</td>
<td>11</td>
<td>43.1</td>
<td>1,060</td>
<td>1%</td>
</tr>
<tr>
<td>31 Zambia</td>
<td>5</td>
<td>52.5</td>
<td>1,056</td>
<td>1%</td>
</tr>
<tr>
<td>32 Peru</td>
<td>1</td>
<td>31.3</td>
<td>938</td>
<td>1%</td>
</tr>
<tr>
<td>33 Cambodia</td>
<td>9</td>
<td>49.1</td>
<td>901</td>
<td>1%</td>
</tr>
<tr>
<td>34 Cameroon</td>
<td>7</td>
<td>35.4</td>
<td>868</td>
<td>0%</td>
</tr>
<tr>
<td>35 Côte d’Ivoire</td>
<td>8</td>
<td>31.1</td>
<td>863</td>
<td>0%</td>
</tr>
<tr>
<td>36 Burundi</td>
<td>NR</td>
<td>63.1</td>
<td>837</td>
<td>0%</td>
</tr>
<tr>
<td>32 other countries</td>
<td>&lt;20</td>
<td></td>
<td>17,845</td>
<td>10%</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td></td>
<td></td>
<td><strong>178,451</strong></td>
<td><strong>100%</strong></td>
</tr>
<tr>
<td>Total 36 HBC</td>
<td></td>
<td></td>
<td><strong>44,064</strong></td>
<td><strong>90%</strong></td>
</tr>
<tr>
<td>Total ACF 15 HBC</td>
<td></td>
<td></td>
<td><strong>48,880</strong></td>
<td><strong>70%</strong></td>
</tr>
</tbody>
</table>

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