The Cost of HUNGER in AFRICA

Social and Economic Impact of Child Undernutrition in Egypt, Ethiopia, Swaziland and Uganda

Project Summary
Today, there are more stunted children in Africa than 20 years ago.

69 percent to 82 percent of all cases of child undernutrition are not properly treated.

Most of the health costs associated with undernutrition occur before the child turns one.

Between 7 percent to 16 percent of repetitions in school are associated with stunting.

Stunted children achieve 0.2 years to 1.2 years less in school education.

8 percent to 28 percent of all child mortality is associated with undernutrition.

Child mortality associated with undernutrition has reduced national workforces by 1 percent to 8.

40 percent to 67 percent of working-age populations suffered from stunting as children.

The annual costs associated with child undernutrition reach values equivalent to 1.9.

Eliminating stunting in Africa is a necessary step for inclusive development on the continent.

* Based on results from four first-phase countries
About the Study

The Cost of Hunger Study in Africa (COHA) is a project led by the African Union Commission (AUC) and the NEPAD Planning and Coordinating Agency, and supported by the UN Economic Commission for Africa (ECA), and the UN World Food Programme (WFP). COHA is a multi-country study aimed at estimating the economic and social impacts of child undernutrition in Africa.

This continent-wide initiative is being led by the African Union Commission Department of Social Affairs, within the framework of the Revised African Regional Nutrition Strategy (2005-2015), the objectives of the African Task Force on Food and Nutrition Development (ATFFND) and the principles of the AU/NEPAD’s CAADP Pillar 3.

In March 2012, the COHA Study was presented to African Ministers of Finance, Planning and Economic Development, who met in Addis Ababa, Ethiopia. The ministers issued Resolution 898 confirming the importance of the study and recommending it continue beyond the initial stage.

The core implementers of the study are national teams organized in each participating country, drawn from relevant governmental institutions such as the Ministry of Health, Ministry of Education, Ministry of Social Development, Ministry of Planning, Ministry of Finance, and the National Statistics Institution.

The COHA study is being carried out in 12 countries, namely: Botswana, Burkina Faso, Cameroon, Egypt, Ethiopia, Ghana, Kenya, Malawi, Mauritania, Rwanda, Swaziland and Uganda. The data in this document are the results collected from the COHA initiative in the four first-phase countries, Egypt, Ethiopia, Swaziland, and Uganda.

Support for COHA was provided by:

Conceptual Framework

The COHA model is used to estimate the additional cases of morbidities, mortalities, school repetitions, school dropouts, and reduced physical capacity that can be directly associated to a person’s undernutrition before the age of 5.

<table>
<thead>
<tr>
<th>Age Range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-5 years</td>
<td>Undernourished children are at higher risk for anaemia, diarrhoea, fever and respiratory infections. These additional cases of illness are costly to the health system and families. Undernourished children are at higher risk of dying.</td>
</tr>
<tr>
<td>6-18 years</td>
<td>Stunted children are at higher risk for repeating grades in school and dropping out of school. Additional instances of grade repetitions are costly to the education system and families.</td>
</tr>
<tr>
<td>15-64 years</td>
<td>If a child dropped out of school early and is working in he or she may be less productive, particularly in the non-manual labour market. If he or she is engaged in manual labour he/she has reduced physical capacity and tends to be less productive. People who are absent from the workforce due to undernutrition-related child mortalities represent lost economic productivity.</td>
</tr>
</tbody>
</table>

In order to estimate social impacts for a single year, the model focused on the current population, identifies the proportion of that population who were undernourished before the age of 5, and then estimated the associated negative impacts experienced by the population in the current year.

Estimates on health, education and productivity are based on the concept of the relative (or differential) risk experienced by individuals who suffer from undernutrition.

Using these risk factors, alongside with economic, demographic, nutritional, health, and educational data provided by each country team, the model then estimates the associated economic losses in health, education, and potential productivity in a single year.
A Methodology for Africa

With the support of experts and representatives from the National Implementation Teams (NITs) of the participating countries, a conceptual framework was adapted to the context of Africa. COHA is based on a model originally developed in Latin America by the Economic Commission for Latin America and the Caribbean (ECLAC). The process of adaptation was carried out in partnership with ECLAC, and endorsed by the African Task Force for Food and Nutrition Development.

This framework establishes clear linkages in the direct consequences associated with undernutrition, considering the particular structures of the labour market in the continent, as well as the limitations in data availability. The result allows the model to clearly define boundaries in the cost analysis both from a public and individual perspective, as well as define a clear differentiation with direct cost and opportunity costs in the results.

The COHA model utilizes a two-dimensional analysis to estimate the costs arising from the consequences of child undernutrition in health, education and productivity. The incidental retrospective dimension analyses the history of child undernutrition in the country in order to estimate the current economic and social consequences. To complement this analysis, a prospective dimension is used to project and generate scenarios for analysis.

**KEY TERMS AND CONCEPTS**

**Chronic hunger:** The status of people whose food intake regularly provides less than their minimum energy requirements leading to undernutrition.5

**Child undernutrition:** The result of prolonged low levels of food intake (hunger) and/or low absorption of food consumed. It is generally applied to energy or protein deficiency, but it may also relate to vitamin and mineral deficiencies. Anthropometric measurements (stunting, underweight and wasting) are the most widely used indicators of undernutrition.6

**Intrauterine growth restriction (IUGR):** An infant suffering from IUGR is defined as being below the 10% percentile of the recommended gender-specific birthweight for gestational age reference curves.7

**Low birth weight (LBW):** A new-born is considered to have low birth weight when he or she weighs less than 2,500 grams.8

**Malnutrition:** A broad term for a range of conditions that hinder good health caused by inadequate or unbalanced food intake or by poor absorption of the food consumed. It refers to both undernutrition (food deprivation) and obesity (excessive food intake in relation to energy requirements).9

**Stunting:** Reflects shortness-for-age; an indicator of chronic malnutrition, calculated by comparing the height-for-age of a child with a reference population of well-nourished and healthy children. The model uses it as the indicator to analyse the impact on educational performance and productivity.10

**Underweight:** Measured by comparing the weight-for-age of a child with a reference population of well-nourished and healthy children. The model utilizes it to analyse the impact of child undernutrition on health.11

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5All terms adapted for COHA based on sources indicated.
First-Phase Results

According to the initial results generated by the COHA study, the following equivalent losses are incurred by each country annually as a result of child undernutrition.

<table>
<thead>
<tr>
<th>Country</th>
<th>Underweight children</th>
<th>Annual additional morbidity episodes</th>
<th>Economic Cost</th>
<th>Proportion covered by the families</th>
</tr>
</thead>
<tbody>
<tr>
<td>Egypt</td>
<td>658,516</td>
<td>901,440</td>
<td>EGP1.1 billion</td>
<td>73%</td>
</tr>
<tr>
<td>Ethiopia</td>
<td>3.0 million</td>
<td>4.4 million</td>
<td>ETB1.8 billion</td>
<td>90%</td>
</tr>
<tr>
<td>Swaziland</td>
<td>9,645</td>
<td>25,446</td>
<td>SZL60.7 million</td>
<td>88%</td>
</tr>
<tr>
<td>Uganda</td>
<td>975,450</td>
<td>1.6 million</td>
<td>UGX525.8 billion</td>
<td>87%</td>
</tr>
</tbody>
</table>

Social and Economic Impact of Child Undernutrition in Health

When a child is undernourished, he or she will have an increased chance of experiencing specific health problems. Research shows that undernourished children under five are more likely to experience cases of anaemia, acute diarrheal syndrome (ADS), acute respiratory infection (ARI), and fever. The treatment of undernutrition and related illnesses is a critical, recurrent cost for the health system. Treating a severely underweight child for example, requires a comprehensive protocol that is often more costly than the monetary value and effort needed to prevent undernutrition, especially when other diseases are present. The chart below summarizes the total costs incurred to the county as a result of additional morbidities.
Research shows that undernourished children under five have an increased risk of dying. The costs associated with mortality are identified in losses to national productivity. If these children were able to reach adulthood, they could have contributed to the economy. The chart (above, right) highlights the number of children who died from causes associated to undernutrition and the percent of child mortalities that can be attributed to undernutrition.

**Social and Economic Impact of Child Undernutrition in Education**

**Impact of Undernutrition on Repetition**

There is no single cause for repetition and dropout; however, there is substantive research that shows that students who were stunted before the age of five will have reduced cognitive capacity and are more likely to underperform in school to repeat grades. The following graph illustrates the repetition rates for non-stunted children as compared to stunted children in each of the countries.

![Repetition Rates by Nutritional Status](chart)

Repetitions are costly both to the family of the student, as well as to the education system, as both need to invest resources for an additional year of schooling. The table below highlights the economic costs of additional repetitions associated to students’ childhood undernutrition. A more detailed analysis shows that the cost of a repetition in secondary school is significantly higher than in primary school; however, the majority of repetitions occur during primary school years.

<table>
<thead>
<tr>
<th>Country</th>
<th>Number of stunted children of school age</th>
<th>% of repetitions associated with stunting</th>
<th>Economic Cost</th>
<th>Proportion covered by the education system</th>
</tr>
</thead>
<tbody>
<tr>
<td>Egypt</td>
<td>7.9 million</td>
<td>10%</td>
<td>EGP271 million</td>
<td>49 million</td>
</tr>
<tr>
<td>Ethiopia</td>
<td>17.4 million</td>
<td>15.8%</td>
<td>ETB93 million</td>
<td>8 million</td>
</tr>
<tr>
<td>Swaziland</td>
<td>168,228</td>
<td>11.7%</td>
<td>SZL6 million</td>
<td>0.7 million</td>
</tr>
<tr>
<td>Uganda</td>
<td>5.8 million</td>
<td>7.3%</td>
<td>UGX20 billion</td>
<td>9.5 million</td>
</tr>
</tbody>
</table>

**Impact of Undernutrition on Retention**

Students who are undernourished are also more likely to drop out of school than those who experience healthy childhoods. The data from the first-phase countries illustrates that expected number of schooling years achieved by a student who was stunted is up to 1.2 years lower than the expected schooling for a student who was never undernourished. The graph below illustrates these levels of expected schooling achievement. As shown, countries with low overall schooling achievement also illustrate a higher differential achievement between children who were stunted and those who were never undernourished.

![Expected Schooling Years by Nutritional Status](chart)
The economic impact of school dropout is not however, incurred while a person is in school. Rather, the economic costs are incurred when the population is of working age, as people may be less productive, and earn less income, as a result of fewer years of schooling achieved. Thus, considerations of losses associated to lower schooling are described in the following section.

**Social and Economic Impact of Child Undernutrition in Productivity**

**Losses in Potential Productivity**

The model estimated that between 40 to 67 percent of the working-age population in the four countries were stunted as children. Research shows that adults who suffered from stunting as children are less productive than non-stunted workers and are less able to contribute to the economy.¹⁸

The impact of this lower productivity varies depending on particular labour structure of the country the type of economic achievement in which the individual is engaged. For people engaged in non-manual sectors, the lower educational levels achieved by the population affected by stunting is reflected in a lower income, associated to lower schooling.¹⁹ On the other hand, research shows that stunted workers engaged in manual activities tend to have less lean body mass²⁰ and are more likely to be less productive in manual activities than those who were never affected by growth retardation.²¹

As a result, the losses in productivity are classified in losses in potential productivity in the manual and non-manual activities, which are summarized in the table below.

<table>
<thead>
<tr>
<th>Country</th>
<th>Stunted population of working age (15-64)</th>
<th>Lost productivity in manual activities</th>
<th>Lost productivity in non-manual activities</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number</td>
<td>Estimated Prevalence</td>
<td>National Currency</td>
</tr>
<tr>
<td>Egypt</td>
<td>20 million</td>
<td>41%</td>
<td>EGP10.7 billion</td>
</tr>
<tr>
<td>Ethiopia</td>
<td>26 million</td>
<td>67%</td>
<td>ETB12.9 billion</td>
</tr>
<tr>
<td>Swaziland</td>
<td>270,188</td>
<td>40%</td>
<td>SZL126 million</td>
</tr>
<tr>
<td>Uganda</td>
<td>8 million</td>
<td>54%</td>
<td>UGX417 billion</td>
</tr>
</tbody>
</table>

**Losses in Productivity due to Working Hours Lost as a Result of Mortality**

As mentioned in the health section of this report, undernourished children have a higher risk of dying compared to children who are not underweight. In addition to the clear social problem associated with increased mortality, there is also a related economic cost. The COHA model estimates the proportion of child mortalities that are associated to undernutrition, and then estimates the potential productivity of those individuals, had they been part of the workforce (15-64) in 2009. The model uses current income data to estimate the this lost productivity in terms of both income and lost working hours. According to these estimations, countries lose up to 4.7 billion working hours as a result of these undernutrition-related mortalities. In many countries, this is the most significant productivity cost associated with undernutrition.

<table>
<thead>
<tr>
<th>Country</th>
<th>Total annual working hours lost</th>
<th>Cost in national currency</th>
<th>Cost in US$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Egypt</td>
<td>857 million</td>
<td>EGP5.4 billion</td>
<td>988 million</td>
</tr>
<tr>
<td>Ethiopia</td>
<td>4.7 billion</td>
<td>ETB40.1 billion</td>
<td>3.4 billion</td>
</tr>
<tr>
<td>Swaziland</td>
<td>37 million</td>
<td>SZL340 million</td>
<td>40 million</td>
</tr>
<tr>
<td>Uganda</td>
<td>943 million</td>
<td>UGX657 billion</td>
<td>317 million</td>
</tr>
</tbody>
</table>

**Scenarios**

The model generates a baseline, to be compared to the nutritional goals established in each country. These scenarios are constructed based on the estimated costs of the children born in each year, from 2009 to 2025 (net present value). While the previous sections calculated the costs incurred in a single year by historical undernutrition, these values represent the projected costs and savings generated by children born during and after 2009.

As presented in the following table, the potential economic benefits illustrate an opportunity to help build a case for increased investment in nutrition. With this information countries can have a benchmark for increasing investment, while at the same time, being able to compare this with the potential economic gains of reduced stunting rates.
Baseline Scenario. The Cost of Inaction. Progress in reduction of stunting and underweight child stops. In this scenario, the progress of reduction of the prevalence of undernutrition stops at the level achieved in 2009. Although highly unlikely, it serves as a basis for estimating the saving for other scenarios.

Scenario #1. Cutting by Half the Prevalence of Child Undernutrition by 2025. In this scenario, the prevalence of underweight and stunted children would be reduced to half of the value of the reference year of 2009.

Scenario #2. The ‘Goal’ Scenario. Reduce Stunting to 10% and Underweight children to 5%, by 2025. In this scenario, the prevalence of stunted children would be reduced to 10 percent and underweight children with less than five years, to 5%.

<table>
<thead>
<tr>
<th>Country</th>
<th>Scenario #1: Halving the Prevalence of Child Undernutrition by 2025</th>
<th>Scenario #2: The Goal Scenario: “10 and 5 by 2025”</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>% Annual reduction of stunting required</td>
<td>Total savings to be achieved</td>
</tr>
<tr>
<td>Egypt</td>
<td>0.9% EGP11.7 billion</td>
<td>EGP732 million (US$133 million)</td>
</tr>
<tr>
<td>Ethiopia</td>
<td>1.5% ETB71 billion</td>
<td>ETB4.4 billion (US$376 million)</td>
</tr>
<tr>
<td>Swaziland</td>
<td>0.9% SZL402 million</td>
<td>SZL25 million (US$3 million)</td>
</tr>
<tr>
<td>Uganda</td>
<td>1.1% UGX2.8 Trillion</td>
<td>UGX179 million (US$88 million)</td>
</tr>
</tbody>
</table>

Conclusions

The COHA study is an important step forward to better understand the role that child nutrition and human development can play as a catalyst, or as a constraint, in the social and economic transformation of Africa.

Health Sector

- Child undernutrition generates health costs equivalent to between 1 and 11 percent of the total public budget allocated to health. These costs are due to episodes directly associated with the incremental quantity and intensity of illnesses that affect underweight children and the protocols necessary for their treatment.
- In the larger proportion of these episodes, 69 to 82 percent, do not seek medical attention or are treated at home, increasing the risk for complications and evidencing an unmet demand for health care.

Eliminating the inequality in access to health care is a key element of the social transformation agenda in Africa which requires, as a precondition, a reduction of the rural/urban coverage gap. As health coverage expands to rural areas, there will be an increase of people seeking medical attention; this can potentially affect the efficiency of the system to provide proper care services. This study illustrates that a reduction of child undernutrition could facilitate the effectiveness of this expansion by reducing the incremental burden generated by the health requirements of underweight children.

Education Sector

- Children who were stunted experienced higher repetition rates in school ranging from 2 to 4.9 percent.
- Moreover, 7 to 16 percent of all grade repetitions in school are associated with the higher incidence of repetition among stunted children, the majority (90 percent), of which occurs in primary school.
- These numbers suggest that a reduction in stunting prevalence could support an improvement in school quality, as it would reduce preventable burdens to the education system.

Increasing the educational levels of a population, and maximizing the productive capacity of Africa’s population dividend, is a key element in increasing competitiveness and innovation on the continent. This represents a particular opportunity in sub-Saharan Africa where the population under 15 years is estimated to be 40 percent of the total population. Children and youth must be equipped with the skills necessary for competitive labour. Thus, underlying causes for low school performance and early dropout must be addressed. As there is no single cause for this phenomenon, a comprehensive strategy must be put in place that considers improving
the quality of education and the conditions required for school attendance. This study demonstrates that stunting is one barrier to attendance and retention that must be removed to effectively elevate educational levels and improve individuals’ labour opportunities in the future.

Labour Productivity

- 52 percent of the working age population in the analysed countries is currently stunted.
- This population has achieved, on average, lower school levels than those who did not experience growth retardation, ranging from 0.2 to 1.2 years of less schooling.
- The working-age population has been diminished by 1 to 8 percent due to child mortality associated with undernutrition.

On the continent, more than half of the population is expected to live in cities by 2035. An important component to prepare for this shift is to ensure that the workforce is ready to make a transition towards a more skilled labour, and economies are able to produce new jobs to reduce youth unemployment. By preventing child stunting, thus avoiding the associated loss in physical and cognitive capacity that hinders individual productivity, people can be provided with a more equal opportunity for success.

Potential Economic Benefits

- The model estimated that a reduction of the prevalence to half of the level by the year 2025 can generate annual average savings from US$3 million to US$ 376 million for the analysed countries.
- An additional scenario estimates that a reduction to 10 percent stunting and 5 percent underweight could yield annual average savings from US$ 4 million to US$ 784 million.

Evidence-Based Policy and South-South Collaboration

- COHA is an important example of how South-South collaboration can work to implement cost effective activities in development and knowledge sharing. It demonstrated that developing and implementing tools that are sensitive to the particular conditions of the continent is feasible.
- It illustrates the valuable role that data and government-endorsed research can play in shedding light on pertinent issues on the continent. Although the availability of uniform and readily-available data in Africa is limited, the COHA results have shown that analysis has the potential to bring the issue of child nutrition to the forefront of the development arena.

This economic benefit that would result from a decrease in morbidities, lower repetition rates and an increase in manual and non-manual productivity, presents an important economic argument for the incremental investments in child nutrition. This does not only impact those people affected by undernutrition, but the society as a whole.

Policy Recommendations

Stunting is a useful indicator to evaluate effective social policies

The causes of and solutions for chronic hunger are linked to social policies across numerous sectors. As such, stunting reduction will require interventions from the health, education, social protection, and social infrastructure perspectives. Stunting can be an effective indicator of success in larger social programmes.

A multi-causal problem requires a multi-sectoral response

The achievement of this aggressive goal cannot be reached from just the health sector. To have a decisive impact on improving child nutrition, a comprehensive multi-sectoral policy must be put in place, with strong political commitment and allocation of adequate resources for its implementation.

Efficient rural economies and effective social protection schemes are key drivers for the sustained reduction of child undernutrition
Fostering rural economies, by enhancing the productivity of agricultural activities and expanding the non-agricultural activities, are key elements accelerating the reduction rate of malnutrition. Efforts carried out by CAADP and the development of value chains of strategic agricultural commodities can be key elements to focus efforts on in the coming years. Additionally, it is important to consider the role of social protection programmes in reducing hunger and malnutrition, in order to achieve the appropriate combination of transfers and services that is adequate for each context.

**Sustainability requires strong national capacity**

To ensure sustainability of these actions, whenever possible, the role of international aid must be complementary to the efforts of national authorities. Furthermore, additional investments and further efforts have to be made in ensuring the strengthening of national capacity to address child undernutrition.

**Monitoring is needed for progress**

To measure short-term results in the prevention of stunting, a more systematic approach with shorter periodicity is recommended, such as two years between each assessment. Prevention of child undernutrition should target children before two years of age, as these measures would provide information to policymakers and practitioners on the effectiveness of social protection and nutrition programmes.

**Long-term commitment is necessary to achieve results**

The COHA initiative represents a valuable opportunity to place nutrition within a strategy to ensure Africa’s sustainable development. As the deadline for Millennium Development Goals nears, new priorities and targets will be set that will serve as a guide for development policies in years to come. It is recommended that the prioritization of the elimination of stunting be not only presented in the traditional forums, but also included in the wider discussions of development, as a concern for the economic transformation of Africa.

**Citations**

16. Ibid.
17. Based on income data from NITs.
19. Based on income data from NITs.
Reactions to the Cost of Hunger in Africa Study

“The Cost of Hunger Study provides us with the evidence-base for building a case for food security, communication, advocacy and policy discourse on nutrition. The study reveals that we can no longer afford to have high prevalence rates of under-nutrition and has given the justification for increasing investment in scaling up nutrition interventions and ensure availability of food and good nutrition.”

- Prime Minister Amama Mbabazi of Uganda

“We have national government on board, we have the African union on board, we have NEPAD, we have national governments on board as supporters…”

- Elisabeth Rasmusson, WFP Assistant Executive Director

“We [tend to] still look into handling this [nutrition] issue from the aspect of spending or charity work. This should be viewed as investment, not as extra cost of spending or charity work.”

- Egypt Ambassador to the African Union

“We are talking about demographic dividends. And I can’t think of a better way to starting to earn this dividend – and when we talk about preparing our youth, preparing, our children, [we should think] in terms of nutrition and getting them to the position to eventually become productive members of their community. We will use [COHA] to plan our post 2015 agenda and what we want to achieve.”

- Commissioner of Social Affairs, Mustapha Kaloko, AUC

“I think we have made the case in front of the ministers of finance, economic development and planning about the need for us to invest a lot in human capital. It is one of the tracks that will make this transformation possible. What we have not said enough is how we are going to go about developing human capital… human capital starts with children and if we don’t take care of them in terms of nutrition, the costs are very high. We always talk about returns on investments and the returns on this investment are underrated. This is a unique and important investment, but we need to make the case in much stronger terms. That’s why the research done in Africa and providing evidence based contribution is extremely important. And this study is already producing this with its reports.”

- Carlos Lopes, Executive Secretary of ECA

“I want to commend this project. It is an eye-opener, and it needs to be encouraged. We are grateful to be part of this important [study]. We know we don’t have the means to change it all overnight, but we are doing a lot.”

- Minister of Economic Planning and Development, Swaziland

“Like in Latin America, the analysis in Africa shows that —beyond the social and ethical dimensions— undernutrition and its consequences have a major impact on the economies, and this is a warning of how urgently action is needed. Moreover, this study is particularly relevant for ECLAC as a clear example of South-South cooperation and speaks to the importance of sharing experiences, analytical frameworks and methodologies between Africa and Latin America and the Caribbean.”

- Alicia Bárcena, Executive Secretary of ECLAC