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Social and Economic Impact of Child Undernutrition in Kenya





THE COST OF
HUNGER
IN AFRICA

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SOCIAL AND ECONOMIC IMPACT
OF CHILD UNDERNUTRITION

KENYA

Social and Economic Effects of Child Undernutrition
Kenya Country Report

November 2019

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Table of Contents

Foreword	i
Preface	iii
Acknowledgements	iv
Abbreviations and Acronyms	vi
Executive Summary	viii
Section I: The Cost of Hunger in Africa: Introduction	16
A. Why is it important?	17
B. Objectives of cost of hunger study in Kenya	18
C. Guiding principles of COHA	18
D. Policy environment in Kenya	21
Section II: Socio-Economic and Nutrition Situation	24
A. Kenyan context	25
B. Health	27
C. Education	29
D. Labour market and productivity	32
Section III: Conceptual Framework and Methodology	36
A. Conceptual framework	36
B. Methodological aspects	38
C. Estimating the cost of hunger	39
D. Data and data sources	41
Section IV: Effects and Costs of Child Undernutrition	44
A. Social and economic cost of child undernutrition in the health sector	44
B. Social and economic cost of child undernutrition in the education sector	47
C. Social and economic cost of child undernutrition in productivity	50
Section V: Analysis of Scenarios	58
Section VI: Conclusion and Recommendations	64
A. Conclusion	64
References	69
Annexes	75
Annex 1. Glossary of Terms	75
Annex 2: Technical note on methods and assumptions	78
Annex 3: Overview of the COHA model	84
Annex 4: Brief Description of COHA Data Collection Process in Kenya	86

List of Tables

Table 2.1: Estimated prevalence and number of stunted children under five years of age by United Nations region, 1990, 2010 and 2018	24
Table 2.2: Number of underweight people, by region, 1990 to 2018 (in % and millions)	24
Table 2.3: Socio-economic Indicators, 2000-2018	26
Table 2.4: Social investment indicators, 2000-2018	27
Table 2.5: Population and child undernutrition in Kenya, 2014	27
Table 2.6: Number of child mortalities associated with undernutrition in Kenya, 2014	29
Table 2.7: 2014 internal efficiency indicators for primary and secondary education ('000)	31
Table 2.8: Annual average income related to productive work, non-manual intensive activities ('000), 2015/16	33
Table 4.1: Morbidities for children under-five associated with underweight, by pathology, 2014	44
Table 4.2: Impact of undernutrition on child mortality, adjusted by survival rate, 1950-2014 (in number of mortalities)	45
Table 4.3: Health costs of undernutrition-related pathologies, 2014	46
Table 4.4: Costs of grade repetitions associated with stunting (in millions of Ksh)	50
Table 4.5: Reduced income in non-manual activities due to stunting, 2014	53
Table 4.6: Losses in potential productivity in manual labour due to stunting, 2014	53
Table 4.7: Losses in potential productivity due to mortality associated with undernutrition, 2014	54
Table 5.1: Estimated total costs of child undernutrition, by scenario, 2014 (in millions of Ksh)	60
Table 5.2: Estimated savings for each scenario, 2014 (millions of Ksh)	61

List of Figures

Figure 2.1: Trends in real GDP growth, 2004-2018 (in percentages)	25
Figure 2.2: Trends in nutrition status of children, 1993-2014 (in percentages)	28
Figure 2.3: Number of child mortalities associated with child undernutrition	28
Figure 2.4: Prevalence of underweight by counties, 2014	29
Figure 2.5: Gross enrolment versus number of passes by grade in 2014	29
Figure 2.6: Primary gross enrolment rate (GER) and net enrolment rate (NER) , 2009-2018	30
Figure 2.7: Secondary school gross and net enrolment rates (%), 2009-2018	31
Figure 2.8: Distribution of manual and non-manual workers	32
Figure 2.9: Annual average income related to productive work, manual intensive activities (Ksh '000)	33
Figure 3.1: Causes of undernutrition	36
Figure 3.2: Consequences of undernutrition	37
Figure 3.3: Dimensions of analysis by population age and year when effects occur (Change 2009 to 2014)	39
Figure 4.1: Working age population affected by childhood stunting, by age (in millions of people)	45
Figure 4.2: Distribution of private and public costs (in percentages and millions of Ksh)	47
Figure 4.3: Repetition rates in education by nutritional status, 2014 (%)	48
Figure 4.4: Grade repetition of stunted children, by grade, 2014 (number)	48
Figure 4.5: Grade achievement by nutritional status, 2014 (%)	49
Figure 4.6: Distribution of costs in education (in percentages and millions of Ksh)	50
Figure 4.7: Manual and non-manual labour distribution by age, 2014 (%)	51
Figure 4.8: Average schooling years for stunted and non-stunted population (in years of education)	52
Figure 4.9: Distribution of losses in productivity (in percentage and million Ksh)	54
Figure 5.1: Trends of estimated costs of child undernutrition, 2014-2030 (in millions Ksh)	59

Foreword

Access to good nutrition plays a fundamental role in stimulating economic growth and development. A healthy population means a productive economy. This is mainstreamed in the Kenya Constitution (2010) which provides for Kenyans' right to be free from hunger and to have adequate food of acceptable quality; to the highest attainable standard of health, which includes the right to health care services, including reproductive health care; to accessible and adequate housing with reasonable standards of sanitation; and education; and provide children the right to basic nutrition, shelter and health care. In order to realize the rights, the country is implementing the Kenya Vision 2030, through medium term plans (MTPs), the current one being the Third Medium Term Plan (MTP III) (2018-2022). The MTP III builds on the achievements of the first and second MTPs and prioritizes implementation of the "Big Four" agenda on Food and Nutrition Security, Affordable Universal Health Care, Affordable Housing and Manufacturing.

Despite the Government's efforts towards addressing malnutrition, child undernutrition is one of the major challenges facing the country. According to the 2014 Kenya Demographic and Health Survey (KDHS), the national prevalence of stunting was 26 per cent, underweight at 11 per cent and wasting was estimated at 4 per cent. The Government has continued to undertake necessary actions towards reducing child malnutrition. According to the Kenya Vision 2030, the government targets to reduce stunting to 14.7 per cent (43.4% reduction) and underweight to 8.4 per cent (23.6% reduction) by 2030.

Globally, evidence shows that the consequences of chronic malnutrition are irreversible. This further reinforces the need to take urgent actions to curb the challenge. Kenya is cognizant of the dire consequences of malnutrition. Undernourished children have lower resistance to infection and are more likely to die of common childhood illnesses such as diarrhea, and lower respiratory-tract infections. In addition, undernourished children are at risk of suffering from cognitive and physical impairment, which lowers their educational attainment and impact on quality of life. Further, stunted workers are less productive in manual and non-manual activities compared to non-stunted workers, thus reducing their contribution to the national economy.

The Cost of Hunger in Africa (COHA) Kenya study provides the impetus for evidence-based research in informing and providing the foundation and rationale for implementation of multi-sectoral strategies geared towards reduction of child undernutrition in Kenya. The COHA Kenya study and its findings come at an opportune time when the Government is focusing on universal health coverage, and targeting 100 per cent food and nutrition security under the "Big Four" agenda and 100 per cent transition from primary to secondary education.

However, the success in elimination of child malnutrition in Kenya will largely depend on successful partnership and strategic investments in nutrition actions by the national and county governments, development partners, private sector and other non-state actors. Such a partnership, supported by the Government, can leverage on coordinated effort given the limited financial resources.

Finally, we want to thank the COHA Kenya National Implementation Team (NIT) for successfully conducting the study and providing practical policy recommendations geared towards eliminating child malnutrition. In addition, much appreciation goes to the COHA Technical experts from the World Food Programme (WFP) Africa Office and the Kenya Institute for Public Policy Research and Analysis (KIPPRA) for their commitment and provision

of technical expertise during the study process. We extend our gratitude to development partners including the World Food Programme (WFP), Nutrition and Health Program plus, United Nations Children's Fund (UNICEF) and Nutrition International-Kenya for their support.

A handwritten signature in black ink, appearing to read 'Ukur Yatani', written over a faint horizontal line.

HON. (AMB.) UKUR YATANI
Cabinet Secretary,
The National Treasury & Planning

Preface

Child undernutrition is one of the major challenges facing the world today, with the African continent facing the highest prevalence of child undernutrition. In a bid to curb the challenge, the African Ministers of Finance, Planning and Economic Development made a declaration, commonly known as Resolution 898, which underscored the importance of undertaking the COHA Study in African Countries in 2012.

In 2014, the African Heads of State and Government made a commitment commonly known as the “**Malabo Declaration**” on Nutrition Security for Inclusive Economic Growth and Sustainable Development in Africa, where they called on governments to scale up implementation of the COHA study continent-wide.

The Kenya Constitution 2010 guarantees every citizen the right to be free from hunger and to have adequate food of acceptable quality and every child the right to basic nutrition. Additionally, national development policies and strategies, including the “Big Four” agenda gives prominence to reducing child undernutrition. Kenya is also party to several international development blueprints, including the global Sustainable Development Goals (SDGs) which endeavour to address child undernutrition by 2030.

Notwithstanding the initiatives, child undernutrition remains a persistent threat to the lives of Kenyan children, particularly those under five years. Evidence shows that malnutrition in childhood and pregnancy has many adverse consequences for child survival and long-term well-being. This results to far-reaching consequences for human capital, labour productivity, and is a major obstacle in the attainment of the overall goal of economic development. Cognizant of the burden of child undernutrition in terms of monetary loss and loss in the Gross Domestic Product (GDP) and well-being of Kenyan citizens, the Government committed to undertake a study to estimate the economic and social effects of child undernutrition, the COHA Kenya chapter. The study was undertaken by Government Ministries, Departments and Agencies (MDAs) including the National Treasury and Planning, the Kenya Institute for Public Policy Research and Analysis (KIPPRA), Ministry of Health, Ministry of Education, Ministry of Labour and Social Protection, and the State Department for Crop Development and Agricultural Research in collaboration with various development partners, including World Food Programme (WFP), United Nations Children’s Fund (UNICEF), Nutrition and Health Program plus and Nutrition International (NI). The Council of Governors representing the County Governments also participated in the study.

The specific objectives of undertaking the COHA Kenya study included estimating the social and economic effects of child undernutrition, estimate the cost of undernutrition in the economy, and recommending actions to inform human capital development that will help bolster implementation of Kenya’s “Big Four” agenda and Vision 2030. The findings of the study give policy insights that will be key in the development, revision of key strategies and policies geared towards reducing child undernutrition in Kenya.



JULIUS MUIA, PhD, EBS
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The Cost of Hunger in Africa (COHA) Kenya Report on estimating the economic and social effects of child undernutrition has been prepared collaboratively by Government Ministries, Departments and Agencies, and development partners. It was prepared in line with Resolution 898 in which African Ministers of Finance, Planning and Economic Development reaffirmed the importance of undertaking the COHA study in African countries.

This initiative was made possible by the institutional leadership provided to this project by H.E. Moussa Faki Mahamat, Chairperson of the African Union Commission (AUC); Dr Ibrahim Mayaki, Executive Secretary, NEPAD; Ms Alicia Barcena, Executive Secretary, ECLAC; and H.E. Mr David Beasley, Executive Director, WFP. The implementation of the agreement was coordinated by H.E. Mrs Amira Elfadil Mohammed Elfadil, Commissioner for Social Affairs to the African Union (AU), and Ms Angelline Rudakubana, Director of WFP Africa Office. The design and implementation of the COHA study was undertaken by a joint steering committee led by Dr Margareth Agama-Anyetei from AUC Department of Social Affairs, and Ms Magdalena Moshi from WFP Africa Office.

The National Treasury and Planning took lead in the coordination and implementation of the Kenya study in collaboration with KIPPRA, Ministry of Health, Ministry of Education, Ministry of Labour and Social Protection, State Department for Crop Development and Agricultural Research, World Food Programme (WFP), United Nations Children's Fund (UNICEF), United States Agency for International Development (USAID), and Nutrition International (NI). The COHA Technical Experts from WFP Africa office and KIPPRA played a key role in providing technical support to the Study.

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Abbreviations and Acronyms

ACGSD	African Centre for Gender and Social Development
ACS	African Centre for Statistics
ADFNS	Africa Day for Food and Nutrition
ADS	Acute Diarrheal Syndrome
AfDB	African Development Bank
ALN	African Leaders for Nutrition
ARI	Acute Respiratory Infection
ARNS	Africa Regional Nutrition Strategy
ATYS-VMD	Africa Ten Year Strategy for the Reduction of Vitamin and Mineral Deficiencies
AU	African Union
AUC	African Union Commission
AUDA	African Union Development Agency
CAADP	The Comprehensive Africa Agriculture Development Programme
COHA	Cost of Hunger in Africa
COMESA	Common Market for Eastern and Southern Africa
CPER	Comprehensive Public Expenditure Review
DHS	Demographic and Health Survey
DRNCD	Diet-Related Non-Communicable Diseases
ECCAS	Economic Community of Central African States
ECLAC	Economic Commission for Latin America and the Caribbean
EDND	Economic Development and NEPAD Division/UNECA
FAFS	Framework for African Food Security
FAO	Food and Agriculture Organization
FDSE	Free Day Secondary Education
GDP	Gross Domestic Product
GER	Gross Enrolment Rate
GNI	Gross National Income
HINI	High Impact Nutrition Interventions
ICU	Intensive Care unit
IFAD	International Fund for Agricultural Development
IGAD	Intergovernmental Authority for Development
ILO	International Labour Organization
ISIC	International Standard Industrial Classification
IUGR	Intra Uterine Growth Retardation
KDHS	Kenya Demographic and Health Survey
KEMRI	Kenya Medical Research Institute
KIHBS	Kenya Integrated Household Budget Survey
KIPPRA	Kenya Institute for Public Policy Research and Analysis

vii Abbreviations and Acronyms

KNAP	Kenya Nutrition Action Plan
KNBS	Kenya National Bureau of Statistics
KSh	Kenya Shillings
LBW	Low Birth Weight
MDAs	Ministries, Departments and Agencies
MDGs	Millennium Development Goals
MENA	Middle East and North Africa
MOE	Ministry of Education
MOH	Ministry of Health
MTP III	Third Medium Term Plan (2018-2022)
NCHS	National Centre for Health Statistics
NEPAD	The New Partnership for Africa's Development
NER	Net Enrolment Rate
NGO	Non-Governmental Organization
NHP Plus	Nutrition and Health Programme Plus
NI	Nutrition International
NIT	National Implementation Team
NPCA	NEPAD Planning and Coordinating Agency
OECD	Organization for Economic Cooperation and Development
P4P	Purchase for Progress
PANI	Pan-African Nutrition Initiative
PSS	Public Social Spending
REACH	Renewed Efforts Against Child Hunger
SADC	Southern African Development Community
SDGs	Sustainable Development Goals
SUN	Scaling Up Nutrition
UHC	Universal Health Coverage
UNECA	United Nations Economic Commission for Africa
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNICEF	United Nations Children's Fund
USAID	United States Agency for International Development
US\$	United States Dollar
WAP	Working Age Population
WFP	World Food Programme
WHO	World Health Organization

Executive Summary

The Cost of Hunger in Africa (COHA) is an African Union Commission (AUC)-led initiative through which countries can estimate the social and economic impact of child undernutrition in a given year. Twenty-three (23) African countries have to date embarked on the COHA study and Kenya is among them. So far, seventeen (17) countries have completed and launched the study.

The COHA study shows that undernutrition among children is not only a social issue, but also affects the whole economy, because countries are losing significant sums of money and output as a result of current and past cases of child undernutrition. It is with this background that in March 2012, a regional COHA study was presented to African Ministers of Finance, Planning and Economic Development, in Addis Ababa, Ethiopia. From this meeting, the Ministers issued a resolution confirming the importance of the study and recommended that the COHA study be replicated across African countries.

The COHA study in Kenya was led by the National Treasury and Planning, with support from the Kenya Institute for Public Policy Research and Analysis (KIPPRA); Kenya National Bureau of Statistics (KNBS); Ministry of Health (MoH); Ministry of Education (MoE); Ministry of Labour and Social Protection; Ministry of Agriculture Livestock and Fisheries; Kenya Medical Research Institute (KEMRI); development partners, namely: World Food Programme (WFP)-Kenya; United Nations Children Fund (UNICEF); Nutrition and Health Program plus and Nutrition International (NI), Kenya. At regional level, the COHA project is led by the African Union Commission (AUC) with technical leadership from World Food Programme - Africa Office (WFP).

Methodology

The methodology used adopted the COHA model which estimates additional cases of morbidity², mortality³, school repetition, school dropout and reduced physical capacity that can be directly associated with undernutrition in children under the age of five. To estimate these social and economic effects for a single year, the model focused on the current¹ population, identifies the percentage of that population who were undernourished before the age of five, and then estimates the associated impacts experienced by the population in the study year. Using this information and economic data provided by the National Implementation Team (NIT), the model then estimated the associated economic losses incurred by the economy in health, education, and in potential productivity in the year of study.

The data for the Kenya study was collected from national data sources, which include: Kenya Demographic Health Survey 2014, 2014 Basic Education Statistical Booklet, Economic Surveys, Statistical Abstracts, Kenya Integrated Household Survey 2015/2016, Labour Force Basic Report 2018, Central Bank of Kenya, primary data collected from Mbagathi Hospital-Nairobi, and relevant international sources. The report outlines the social and economic costs of child undernutrition affecting health, education, labour and economic productivity.

1. The model set 2014 as the base year, given the availability of data for that year and in order to insure the continuity of the study. As it is the most recent possible study year, it is referred to as "current" in this report.

2. Morbidity; the number of cases of any disease in an area.

3. Mortality; the number of deaths in an area.

Kenya has made progress in reducing stunting in children. However, stunting rates remain high. In 2014, it was estimated that 12.9 million of the working age population (15-64 years) suffered from growth retardation before reaching five years. This represented 41.4 per cent of the entire working age population who were in a disadvantaged position compared to those who were not undernourished as children. Further, the study confirmed that undernutrition can also be associated with low progression in the education system, with only 3 out of every 10 learners enrolled in grade 1 progressing (pass level) to Form Four. This can be attributed to lower cognitive ability.

Trends in child undernutrition: Kenya has made significant progress in reducing child malnutrition. Stunting reduced from 35.3 per cent in 2008-09 to 26 per cent (1.8 million) in 2014. Underweight reduced from 16.1 per cent in 2008-09 to 11 per cent (767,927) children in 2014, and wasting reduced from 6.1 per cent to 4 per cent (290,000 Children) in 2014. However, there is need for continuous concerted efforts to further reduce the levels of child undernutrition.

Social and economic effects on health: Based on the differential probability analysis undertaken using KDHS data in Kenya, the study confirms the hypothesis that undernourished children are more susceptible to recurring illness. Underweight children under 5 years had an increased risk of diarrhoea (increased risk equal to 4.1 percentage points), and an increased risk of fever and malaria (increased risk equal to 1.8 percentage points).

The study estimated that in 2014, out of the 2.4 million incremental episodes of illness related to undernutrition, 2.1 million were associated with higher risk of children being underweight. The estimated cost for underweight was Ksh 13.1 billion or US\$ 148.51 million. In addition, morbidities related to low birth weight were estimated at 52,194 episodes, with associated cost at approximately Ksh 4.8 billion or US\$ 54.1 million. Further, the study estimated 176,277 episodes associated with acute respiratory infections (ARI), acute diarrhoea syndrome (ADS), fever and malaria with associated cost of Ksh 808.5 million or US\$ 9.2 million. Most of these costs were associated with treatment protocol for management of undernutrition among children.

Overall, the economic impact of undernutrition in health-related aspects was equivalent to 0.34 per cent of GDP in 2014, which was equivalent to Ksh 18.6 billion or US\$ 211.8 million.

Social and economic effects on education: Stunting has an impact on grade repetition, performance and school dropouts. This can be attributed to low cognitive ability. In 2014, it was estimated that only 16.9 per cent of stunted working age people completed primary school compared to 62.2 per cent of the non-stunted. Further, 17.5 per cent of repetitions were associated with stunting. Overall grade repetition rate was 4.4 per cent, with stunted children having a higher-grade repetition rate at 6.7 per cent than non-stunted children at 2.8 per cent. Due to stunting, an additional 94,708 cases of grade repetition occurred. This was at a cost of Ksh 3.2 billion or US\$ 36.8 million to the education system and the families and 0.06 per cent of GDP. Overall 56.8 per cent of the costs were born by private budget and the rest by the public education system.

Social and economic effects to productivity: Stunting effects on productivity are discussed based on effects attributed to mortality due to child undernutrition and effects attributed to lowered productivity as a result of child undernutrition. Persons in the working age population suffered from stunting as children are less productive than the non-stunted population and were less able to contribute to the economy. It was estimated that 41.4 per cent (12.9 million) of the working age population in 2014 was stunted as children. 65.8 per cent (20.3

million) of the working age population were engaged in manual activities, of whom 41.2 per cent (8.4 million) of this population were stunted as children. The results further indicate that 34.2 per cent of the working age population engaged in non-manual activities, out of whom 14.4 per cent (4.5 million) suffered from childhood stunting. The losses on productivity from the manual and non-manual labour associated with childhood stunting were estimated to be Ksh 96.7 billion (US\$ 1,099.5) and Ksh 66.6 billion (US\$ 757.9 million) equivalent to 1.8 and 1.23 per cent of GDP in 2014, respectively.

It was further estimated that the country lost 3.8 per cent (1.2 million) of working age from the workforce in 2014 due to child mortality associated with undernutrition. Taking into account the productive levels of the population, by age and sector, the model estimated that in 2014, economic losses (measured by working hours lost due to undernutrition-related child mortality) was Ksh 188.8 billion or US\$ 2.1 billion. As a result, productivity loss was estimated at Ksh 352 billion or 6.5 per cent of GDP.

Overall, results of the total effect of health, education and productivity show that Ksh 373.9 billion or US\$ 4.2 billion was lost in the year 2014 in Kenya as a result of child undernutrition. This was equivalent to 6.9 per cent of GDP in 2014.

Analysis of Scenarios for Potential Savings

In addition to calculating retrospective cost for 2014, the model also projected potential savings in future, based on different scenarios for reducing child undernutrition in Kenya. These scenarios are constructed based on the estimated net present value of the costs associated with undernutrition of children born each year from 2014 to 2025. The methodology follows each group of children and, based on each scenario, estimates a progressive path towards its achievement.

Scenario	Baseline: The Cost of Inaction by 2025	Scenario #1. Halving the Prevalence of Child Undernutrition by 2025	Scenario #2. The 'Malabo Goal' Scenario: "10% and 5% by 2025" ²	Scenario #3. The 'Goal' Scenario: Kenya Vision 2030 "14.7% and 8.4% by 2030"
Description	Prevalence of stunted and underweight children stops at the level recorded in 2014 (26% and 11%, respectively)	Prevalence of stunted children would be reduced to half of 2014 to 13% and underweight to 5.5%	Prevalence of stunted children is reduced to 10% and underweight children of less than five years of age to 5% by 2025	Prevalence of stunted children is reduced to 14.7% and underweight children of less than five years of age to 8.4% by 2030
Implications	No increase or decrease in percentage points, but an increase in total number of stunted children and higher burden on the society	A constant annual reduction of 1.2% points in the prevalence of stunting is required	A constant annual reduction of 1.5% points in the prevalence of stunting is required	A constant annual reduction of 1.02% points in the prevalence of stunting is required
Estimated Change in Period	Cost increase of up to 4.26% by 2025 compared to the values in 2014	Cost decrease of up to 49% by 2025 compared to the values in 2014	Cost decrease of up to 65% by 2025 compared to the values in 2014	Cost decrease of up to 40.7% by 2030 compared to the values in 2014
Annual Average Savings	None	Ksh 39.7 billion US\$ 451.81 million	Ksh 57.4 billion US\$ 653.35 million	Ksh 33.2 billion US\$ 548.6 million

2. It is one of the commitments by the Heads of State and Government at the African Union Summit in Malabo, Equatorial Guinea in June 2014. The Malabo Declaration is a remarkable set of concrete health goals to be attained by 2025.

The findings of the COHA study in Kenya reaffirmed the results of similar studies in Africa, Latin America and the Caribbean that undernutrition in children has significant impacts on the economy. The country is estimated to have lost an equivalent of about Ksh 373.9 Billion in 2014, which represented 6.9 per cent of GDP in 2014. Productivity related losses contributed the largest costs at 6.5 per cent of GDP followed by health and education at 0.34 per cent and 0.06 per cent, respectively.

Recommendations

The economic impact associated with underweight and stunting in children is quite significant, with far reaching effects on economic productivity, health and education.

Child undernutrition increases the risk of morbidity and mortality; affects school attendance, performance, grade repetition; and overall economic productivity in the long term.

In recognition of ongoing efforts, there is need to eradicate undernutrition through enhanced implementation of multi-sectoral programmes, multi-sectoral coordination, resource mobilization and effective monitoring of nutrition initiatives.

A. Health sector

- (i) Enhance budgetary allocation at the national level for nutrition interventions.
- (ii) The Ministry of Health should strengthen the implementation of the nutrition component within the community health strategy, with emphasis on addressing health sector determinants of maternal and child undernutrition, enhancing the monitoring of child growth and supporting sustainable change in behaviours towards improved maternal and child nutrition.
- (iii) The Government should exempt taxes on essential nutrition commodities such as Micro Nutrient Powder, Ready to Use Therapeutic Foods, fortification premixes and Fortified Blended Foods besides giving subsidies to these foods. This will make the products affordable, thereby reducing the cost of treatment and prevention of malnutrition. In addition, it will enable schools to incorporate commodities such as the Micro Nutrient powders used in the prevention of malnutrition within the school feeding programme.
- (iv) The products (Micro Nutrient Powder, Ready to Use Therapeutic Foods and Fortified Blended Foods) used in the treatment and prevention of malnutrition should be included in the essential drugs list.

B. Education sector

- (i) The Ministry of Education (MoE) and Ministry of Health (MoH) should disseminate and implement comprehensive school health and nutrition programme as stipulated in the Kenya School Health Policy and Guidelines, 2018. There is need to increase funds allocation towards implementation of the comprehensive health and nutrition package by the national and county governments.
- (ii) Undertake a detailed analysis of per unit cost to feed a school going child. This will provide guidance to programmes both from government and development partners on how much is needed to adequately offer nutritious meals in schools to implement the national school meals programme.

- (iii) In collaboration with the Ministry of Health, review the existing school meals programme and develop guidelines to stipulate adequate and nutritious school meal that meet both the macro and micro nutrient needs while factoring in regional contexts and disparities.
- (iv) Early Childhood Development and Education (ECDE) and childcare facility regulations need to be developed to ensure that children under their care are handled properly as required to avoid contraction of communicable diseases, avoid injuries, and avoid malnutrition.
- (v) County governments should have budget lines for the ECDE feeding programme to ensure that children have adequate and appropriate meals.
- (vi) Hygiene and nutrition should be integrated in the teacher training curriculum in teacher training colleges.

C. Labour and productivity

- (i) Nutrition should be integrated as targeting component in social protection programmes for the highly vulnerable populations.
- (ii) Nutrition-sensitive interventions should be mainstreamed among public and private institutions, Ministries, Departments and Agencies' work plans and programmes at both national and county levels of government.

D. Cross cutting recommendations

1) Implementation and Coordination

- (i) Elevate the Division of Nutrition and Dietetics in the organogram of Ministry of Health to enable it to effectively coordinate the implementation of multi-sectoral nutrition action plan.
- (ii) Develop and implementation plan to actualize the COHA study recommendations.
- (iii) Establish the National Food and Nutrition Security Council in the Office of the President as stipulated in the National Food and Nutrition Security Policy Implementation Framework (2017-2022).

2) Resource Mobilization

- (i) The government should allocate adequate budget to address food and nutrition security.
- (ii) Develop and implement frameworks to facilitate tracking of finances towards nutrition interventions and services at national and county levels.
- (iii) Revise the Standard Chart of Accounts to provide a budget code for nutrition that will allow counties and national government to allocate funds that go directly to address the problem of malnutrition in the country..
- (iv) Establish an affirmative action that requires all social sectors to allocate budgets and spend on actions that ensure sustainable food and nutrition security.

3) Research, Monitoring and Evaluation

- (i) Establish a common multi-sectoral committee based at the National Food and Nutrition Security Council at the Office of the President for tracking food and nutrition indicators.
- (ii) Monitor and evaluate the set targets and ensure accountability in the implementation of actions/interventions spelt out in various frameworks.
- (iii) Undertake a study to define the minimal resources to be allocated per child towards nutrition enhancement.
- (iv) Undertake further analysis on the cost of hunger attributed to maternal undernutrition.
- (v) Model the cost of hunger over several other years i.e. over and beyond the study year for the present COHA study.
- (vi) Conduct county specific COHA studies/analysis.
- (vii) Document success stories and best practices on addressing malnutrition for replication and scaling up.

4) Advocacy

- (i) Strengthen political commitment towards prioritizing nutrition at national and county level.
- (ii) Advocate for food and nutrition as a key developmental agenda across sectors such as agriculture, water, irrigation, and infrastructural development.
- (iii) Advocate for food security and nutrition as a thematic area during the preparation of Medium-Term Plans and annual budgets.
- (iv) Develop an advocacy plan based on the COHA findings and other finance related studies/analysis from Kenya, targeting key stakeholders.



Section

The Cost of Hunger in Africa



The Cost of Hunger in Africa

Introduction

The Cost of Hunger in Africa (COHA) study is a continental initiative commissioned and led by the African Union Commission (AUC), and New Partnership for Africa's Development (NEPAD), now African Union Development Agency (AUDA), and implemented by the World Food Programme (WFP) with support from Economic Commission for Latin America and the Caribbean (ECLAC). The COHA study, which is implemented within the framework of the revised African Regional Nutrition Strategy (2015-2025) envisions to estimate the economic and social impact of child undernutrition in each African country. The study also shows the possible economic returns that can be gained when appropriate investments in nutrition are undertaken.

The COHA study seeks to fill the gap in the narrative towards social and economic transformation of Africa. The study resonates from pillar 3 of the Comprehensive Africa Agriculture Development Programme (CAADP) on *increasing food supply and reducing hunger across the region by increasing smallholder productivity and improving responses to food emergencies*. The pillar recognizes the role hunger plays in undermining people's health, their ability to study and productivity at work.

During the 4th joint African Union and Economic Commission for Africa Conference of Ministers of Finance, Planning and Economic Development, held in March 2012, a declaration on COHA (Resolution 898) confirming the importance of the study and recommending its expansion beyond the pilot phase was issued. The Ministers underscored the importance of the study and recommended its continuation beyond the initial stage. Subsequently, in 2014, African Heads of State and Government, during their meeting in Malabo, made a commitment, the '*Malabo Declaration*' on Nutrition Security for Inclusive Economic Growth and Sustainable Development in Africa (Assembly/AU/Decl.4 (XXIII)) where they called on governments to scale up implementation of the COHA study continent-wide.

So far, seventeen (17) countries in Africa have conducted the COHA study. These include Burkina Faso, Chad, Democratic Republic of Congo, Egypt, Ethiopia, Ghana, Lesotho, Madagascar, Malawi, Mali, Mauritania, Mozambique, Niger, Rwanda, Swaziland, Uganda and Zimbabwe. Other six (6) countries are in the process of carrying out the COHA study, including Kenya, Guinea Bissau, Sudan, Burundi, Cote d'Ivoire and Namibia.

In Kenya, the COHA study aims to reinforce the commitment to achieve the Kenya Vision 2030 through the third Medium Term Plan (MTP III) which mainstreams the "Big Four" agenda, specifically on food and nutrition security, and universal health coverage. The study findings catalyse efforts towards social and economic transformation and human development for Kenya; implementation of SDG 1 to 4 (end poverty in all its forms everywhere; end hunger, achieve food security and improved nutrition, and promote sustainable agriculture; ensure healthy lives and promote well-being for all at all ages; ensure inclusive and equitable quality education and promote life-long learning opportunities for all). The COHA study in Kenya, like other countries where the study has been implemented, provides the foundation and rationale for implementation of these strategies, increased investment, coordination and efficiency in nutrition programmes.

Stunting affects one in every four children under five years of age in Kenya. Its consequences include: poor health, poor cognitive development, underdeveloped human capital, and loss in productivity. The study thus helps to flag

out an urgent call for action and will be critical in facilitating dialogue between the relevant government ministries, departments and agencies; United Nations agencies; donors; and international institutions.

A. Why is it important?

Over the past decade, African countries have experienced remarkable economic performance that has made the continent increasingly attractive for global investment and trade. The pace of real GDP growth on the continent has doubled in the last decade, and six (6) of the world's fastest growing economies are in Africa³. Despite this, the continent still displays some of the highest rates of child undernutrition in the world.

The study gave cognisance to the fact that human capital is the foundation of social and economic development, as articulated in the SDGs, African Agenda 2063, and Kenya Vision 2030. Improved nutritional status of people has a direct impact on economic performance through increased productivity and enhanced national comparative advantage. For Africa to maximize its present and future economic prospects, there is an urgent need for sustainable, cost-effective interventions that address the nutritional situation of the most vulnerable members of its society.

Undernutrition is a major contributor to child mortality and leads to a significant loss in human and economic potential. As noted by the African Heads of States and Government in 2014, food security without improved nutrition will not deliver the desired socio-economic outcomes. Therefore, reducing child undernutrition has direct impact on increasing child survival (Black et al., 200).

The World Bank estimates that undernourished children are at risk of losing about 10 per cent of their lifetime earning potential, thus affecting national productivity. A panel of expert economists at the Copenhagen Consensus Conference concluded that tackling malnutrition should be the top priority for policy makers and philanthropists⁴. During this conference, Nobel laureate economist Vernon Smith stated that: "One of the most compelling investments is to get nutrients to the world's undernourished. The benefits from doing so – in terms of increased health, schooling, and productivity – are tremendous." Improving the nutritional status of children is therefore a priority that needs urgent policy attention to accelerate socio-economic progress and development in Africa. However, despite the compelling economic value of nutrition interventions, investments with apparent short-term returns are prioritized in social budgets. Therefore, efforts need to be scaled up to sensitize the general population, policy makers and development partners on the high costs of undernutrition in order to strengthen national and international commitments and ensure that young children in Africa are well nourished and grow healthy.

Positioning nutrition interventions as a top priority for development and poverty reduction is often difficult, partly due to lack of credible data on both short- and long-term returns. Indeed, there is not enough country-specific evidence to demonstrate how improved nutrition can have a direct impact on school performance, and thereby improving opportunities in the labour market and physical work. In addition, nutrition is often regarded as a health issue, disregarding the ripple social and economic effects it has on other areas of development.

Despite the challenges, there are interventions at the national, regional and global levels to address the issues of undernutrition and hunger. At the regional level, these efforts include initiatives such as the African Regional Nutrition Strategy (ARNS), the Comprehensive Africa Agriculture Development Programme (CAADP), especially

³ World Economic Outlook Database October 2012. www.imf.org/external/pubs/ft/weo/2012/02/weodata/index.aspx.

⁴ Copenhagen Consensus (2012). Top Economists Identify the Smartest Investments for Policy-Makers and Philanthropists. 14 May 2012. www.copenhagenconsensus.com/Default.aspx?ID=1637.

CAADP Pillar III that focuses on reducing hunger and improving food and nutrition security, the Pan-African Nutrition Initiative (PANI), the Framework for African Food Security, the Africa Ten-Year Strategy for the Reduction of Vitamin and Mineral Deficiencies (ATYS-VMD), the Africa Day for Food and Nutrition Security (ADFNS), the continental nutrition accountability scorecard and the Africa Day for School Feeding.

At the global level, some of the initiatives include: Renewed Efforts Against Child Hunger (REACH), Purchase for Progress (P4P), Scaling Up Nutrition (SUN), Feed the Future, the “1,000 Days” partnership, and the Abuja Food Security Summit of 2006. All these efforts are designed to reduce hunger, malnutrition and vulnerability in a bid to achieve the Sustainable Development Goals.

The African Union, and the New Partnership for Africa’s Development (NEPAD) Planning and Coordinating Agency (NPCA), the United Nations Economic Commission for Africa (UNECA), and the World Food Programme (WFP) combined their efforts to conduct the Cost of Hunger Study on the Social and Economic Impact of Child Undernutrition in Africa (African Union, 2011)⁵.

This study is built on a model developed by the United Nations Economic Commission for Latin America and the Caribbean (ECLAC). Through a South-South cooperation agreement, ECLAC has supported the adaptation of the model to the African context and continues to support the implementation of the study.

B. Objectives of cost of hunger study in Kenya

This study aimed at generating evidence to inform key decision-makers and the general public about the cost that Kenya is already paying for not addressing the problem of child undernutrition.

Specifically, the study:

- (i) Estimated the social and economic effects of child undernutrition in the health, education and labour sectors;
- (ii) Estimated the cost of undernutrition to the economy; and
- (iii) Recommended actions to inform and support human capital gains that will help catalyse implementation of Kenya’s “Big Four” agenda, Vision 2030 and related sectoral policies.

The results provide compelling evidence to guide policy dialogue and increase advocacy around the importance of preventing child undernutrition. Ultimately, the study provides policy recommendations to inform strategic government interventions to effectively combat child undernutrition, specifically during the first 1,000 days of life when most of the damage occurs.

C. Guiding principles of COHA

Throughout the adaptation, implementation and utilization of the COHA model, four guiding principles were developed. With the overall goal of improving the nutritional situation in Africa, these principles allowed the team to approach the study in a holistic manner, considering the necessary steps for its implementation. The four guiding principles are described below:

5. African Regional Nutrition Strategy (2005-2015). Objectives I-III: I. To increase awareness among governments of the region, regional and international development partners and the [international] community on the nature and magnitude of nutrition problems in Africa and their implications for the development of the continent and advocate for additional resources for nutrition. II. To advocate for renewed focus, attention, commitment and a redoubling of efforts by member states, in the wake of the worsening nutrition status of vulnerable groups. III. To stimulate action at the national and regional level that lead to improved nutrition outcomes, by providing guidance on strategic areas of focus.

(i) National ownership of the process

One of the guiding principles in the development of the COHA study was to engage regional experts and policy makers as the main actors of the process. To achieve this, a feasibility workshop was carried out in the early stages of the process, bringing together practitioners across various sectors to analyse the challenges ahead and jointly produce a roadmap. Representatives from the 12 initial countries and major partners met to assess the process ahead and provided key recommendations for adoption of the ECLAC model. Some of these elements included capacity building, strong communication strategies and synergies with other on-going costing initiatives.

As a result of this feasibility workshop, National Implementation Teams (NITs) were established in each of the countries, and an initial training on the model and data requirements was carried out. A key milestone of the adaptation process was a regional technical meeting held in Entebbe, Uganda, where NITs presented a series of specific recommendations to the process based on the constraints and lessons learned.

This feedback allowed the Regional Secretariat to develop a final roadmap for methodological adoption, adjusted the data collection instruments and developed a final proposal for the COHA model for Africa.

(ii) Building national capacity to advocate for child nutrition

A second guiding principle for the COHA was to ensure that national capacity is strengthened during implementation of the study. Similar costing initiatives have had limited impact due, in part, to lack of national ownership and limited understanding by the stakeholders of the technical aspects of the study. These elements hinder the national stakeholders' capacities to effectively communicate the results, which could limit the policy impact of the study.

The main implementing actors of COHA in each country were therefore specialists from key government institutions, academics and practitioners, often led by the Ministry of Economy and/or Planning or the Ministry of Health. Once the Kenya NIT team of specialists was established, a training workshop was held to review all technical aspects of the model, formed a task force for data collection and developed an initial communication strategy. In this workshop, a work plan was developed by the NIT that served as a guideline for future activities in the country.

The Regional Secretariat supported the capacity building process of the NIT by holding regular teleconferences with representatives from the team and by providing technical assistance in the analysis of data and initial results. The national ownership of the study was emphasized by creating a NIT-led approach and by relying on nationally-validated information. Once a country report was drafted, a national validation workshop of the results was held by the NIT and specific advocacy documents were prepared for key stakeholders.

One of the advantages of this process was the integration of the COHA by the NIT within their national nutritional strategies. This was possible as the actors participating in the study were the same professionals shaping national nutritional strategies. This ensured alignment within the processes and maximized the potential contribution and sustainability of the initiative.

(iii) Engagement of COHA with global nutrition initiatives and movements.

The third guiding principle for the COHA was to enhance collaboration with partners and global initiatives to maximize synergies. To achieve this, strong efforts were made to link the COHA with relevant initiatives that contribute to reducing child undernutrition. The Scaling-Up Nutrition (SUN) Movement was launched in 2010 and included selected countries with high burden of malnutrition.

The SUN movement purposes to unite all stakeholders – peoples, governments, civil society, the United Nations, donors, businesses and scientists – in a collective effort to improve nutrition. The Movement recognizes that good nutrition in the first 1,000 days from conception of a child is an essential requirement and right for each citizen to stay healthy, learn, earn, and achieve his or her lifetime potential. The SUN Movement is founded on the compelling evidence that investment in nutrition yields major economic returns.

COHA studies contribute to Scaling Up Nutrition (SUN) Movement by presenting strong arguments for investing in child nutrition in specific country contexts. By doing so, countries have developed the capacity to generate change in the nutritional situation of their populations.

Another important global actor in the nutrition context is the Renewed Efforts Against Child Hunger (REACH) initiative. This joint initiative proposed by WFP, WHO, UNICEF and FAO provides technical assistance to national governments in developing plans and strategies to scale up nutrition investments. An important part of their advocacy actions at the country level includes engaging non-traditional actors in discussions on nutrition to mainstream nutrition in their planning and activities. The COHA also represents an opportunity for joint collaboration, as it provides strong evidence on the consequences of stunting in educational performance, the loss of working hours, and loss in productivity by the working age population – thus helping to position nutrition in the wider development agenda. REACH facilitators are also typically members of the NIT in each country where REACH is present.

The African Leaders for Nutrition (ALN) initiative is another platform for high-level political engagement to advance nutrition in Africa. It is led by a group of ALN Champions, comprising current and former Heads of State, finance ministers and eminent leaders with the power to catalyse and sustain high-level political leadership and commitment to end malnutrition in Africa. The Assembly of Heads of State and Governments of the African Union (AU) at the 30th Ordinary AU Summit held in Addis Ababa, Ethiopia, on 31 January 2018, endorsed the ALN initiative. The initiative aims to influence and generate innovative investments towards nutrition and food security that will build a foundation for productive human capital in Africa. It has a special focus on the first 1,000 days of a child's life and the grey matter infrastructure, that is, brain power. On 11th February 2019, during the 32nd Ordinary Session of the Assembly of the Head of States and Governments, in Addis Ababa Ethiopia, the African Union Commission, the African Development Bank and global partners launched the Continental Nutrition Accountability Scorecard to raise awareness and reinforce commitments by African governments to help end malnutrition. The nutrition accountability scorecard offers an opportunity to lay a solid foundation to aid African leaders to act strategically and deliberately in implementing policies and investing in nutrition programmes that tackle malnutrition in our respective countries.

(iv) Strategic advocacy for change

The fourth guiding principle of the COHA was to ensure that the results reach key stakeholders with the capacity to make a change. The communication strategy of the COHA was a basic component of the project. As a result, strong efforts were carried out by each NIT to reach decision-makers with the appropriate information to increase their interest and understand the consequences of child undernutrition. In this regard, a six-step approach was developed. Briefly, the approach follows the following steps:

- (i) Familiarizing the team with the problems contributing to undernutrition and proven nutrition interventions;
- (ii) Identifying and categorizing key actors;
- (iii) Developing objectives for each actor;

- (iv) Producing information materials and brief stakeholders;
- (v) Adapting results and presenting them to target decision-makers; and following up and providing support; and
- (vi) Providing each NIT with detailed information on the process.

Additionally, the NIT held communication and advocacy sessions at each of the technical workshops to discuss the implementation of the six-step approach.

D. Policy environment in Kenya

The over-arching direction for nutrition sector planning in Kenya was guided by the Vision 2030, which is the long-term development plan for the country, aiming at creating “a globally competitive and prosperous country with a high quality of life by the year 2030”; and the overall global health and nutrition agenda. These are entrenched within the Constitution of Kenya 2010 under the Bill of rights as follows:

- (i) Article 43 (1) (a) - the right of every Kenyan to have the highest attainable standard of health, which includes the right to health care services, including reproductive health care;
- (ii) Article 43 (1) (c) - the right of every Kenyan to be free from hunger and a right to adequate food of acceptable quality;
- (iii) Article 43 (1) (f) – every person has the right to education;
- (iv) Article 53 (1) (c) - the right of every child to basic nutrition, shelter and health care; and
- (v) Article 21 - establishes the progressive realization of social and economic rights and obligates the State to “observe, respect, protect, promote, and fulfil the rights and fundamental freedoms in the Bill of Rights.”

Another high-level policy directive is the “Big Four” agenda, which is the focus of the government for the next five years, where Universal Health Coverage (UHC), Food, and Nutrition Security form part of the four pillars. Nutrition-related actions in the UHC (2018-2022) include: investing in preventive and promotive services; increased budgetary allocation to public health programmes and nutrition; supervision and monitoring of rational use of commodities; and commitment to work with enabler ministries for nutrition.

The National Food and Nutrition Security Policy (2012) outlines the government’s commitment in ensuring that all Kenyans throughout their life cycle enjoy at all times safe food in sufficient quantity and quality to satisfy their nutritional needs for optimal health. Interventions in nutrition are guided by the Kenya Nutrition Action Plan (KNAP). As an example, according to KNAP, 2018-2022, it is estimated that tackling malnutrition could cost Ksh 38.4 billion in the next 5 years. Scaling up the interventions to 100 per cent coverage in all counties in Kenya would cost Ksh 6.7 billion or US\$ 76 million annually (World Bank and UNICEF, 2016), in addition to recurrent spending, and the investments are expected to increase productivity by Ksh 40.2 billion or US\$ 457 million over the productive life of beneficiaries.



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Section

Socio-Economic and Nutrition Situation



Socio-Economic and Nutrition Situation

There has been tremendous progress in reducing the rate of stunting (low height for age) over the past 28 years (from 1990 to 2018) (UNICEF-WHO-World Bank (2019)). In Africa, the reported rate of stunted children has decreased from 42.1 per cent in 1990 to 30 per cent in 2018 (Table 2.1). Nevertheless, the absolute number of stunted children increased from 46.4 million to 58.8 million over the same period (UNICEF-WHO-World Bank, 2019). Southern Africa has the least proportion at 1.9 million, representing 28.7 per cent while the largest proportion of stunted children, 24 million, are in Eastern Africa, representing more than 40.7 per cent of all stunted children on the continent.

TABLE 2.1: ESTIMATED PREVALENCE AND NUMBER OF STUNTED CHILDREN UNDER FIVE YEARS OF AGE BY UNITED NATIONS REGION, 1990, 2010 AND 2018

Region	Prevalence estimate (%)			Number (millions)		
	1990	2010	2018	1990	2010	2018
Africa	42.5	33.6	30.0	46.4	56.0	58.8
Eastern	51.9	39.7	35.2	19.2	23.5	24.0
Middle	45.2	35.4	32.1	5.9	8.6	9.4
Northern	28.4	19.8	18.3	6.1	4.8	5.0
Southern	35.5	30.7	29.3	2.1	2.0	2.0
Western	41.3	28.9	29.2	13.2	17.2	18.5

Source: UNICEF-WHO-World Bank (2019)

The rising number of food insecure and undernourished people continues to pose serious challenges in Africa. Over the past few years, the increase in global food prices, followed by the economic and financial crisis, have pushed more people into poverty, vulnerability and hunger. Even though the number of undernourished people has fallen globally by 13.2 per cent from 1 billion to 868 million in the last 20 years, Africa has fallen back, reporting an increase in the absolute number of underweight children from 32.4 million to 36.9 million (Table 2.2) (FAO, WFP and IFAD, 2012). Africa's share in the world's undernourished population decreased from 35.5 per cent in 1990 to 23.5 per cent in 2014. However, its relatively poor performance calls for stronger efforts to improve food security and nutrition in the continent (FAO, WFP and IFAD, 2012).

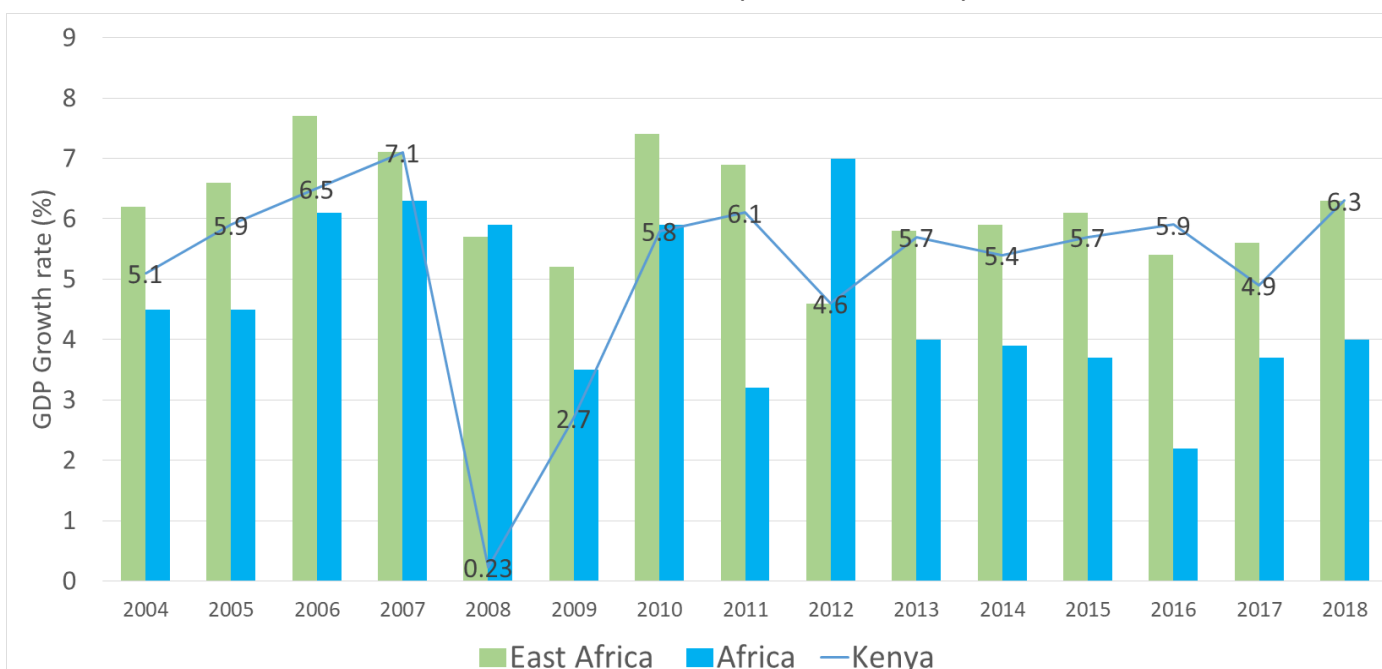
TABLE 2.2: NUMBER OF UNDERWEIGHT PEOPLE, BY REGION, 1990 TO 2018 (IN % AND MILLIONS)

Region	Prevalence in % 1990	Number in million	Prevalence in % 2018	Number in million
Africa	23.2	25.6	15.0	29.4
Asia	32.1	128.0	16.4	59.0
Latin America & Caribbean	7.6	4.3	2.7	1.4
Oceania	17.9	0.2	18.5	0.3

Source: United Nations Children's Fund, World Health Organization, World Bank. UNICEF-WHO-World Bank Joint Child Malnutrition Estimate.

From the economic context, the African region has shown relatively strong growth in her GDP in the last 14 years, with the highest growth of 7 per cent recorded in 2007. The lowest growth performance was in 2008, mainly attributed to the global financial crisis. However, since 2010, the average annual GDP growth exceeded 4.5 per cent (Figure 2.1).

FIGURE 2.1:TRENDS IN REAL GDP GROWTH, 2004-2018 (IN PERCENTAGES)



Source: World Economic Outlook Database October 2004-2018

A. Kenyan context

Kenya is located in Eastern Africa and has a population of 47.8 million people (KNBS 2018). Since independence, Kenya has made significant political, structural and economic reforms that have largely driven sustained economic growth, social development and political gains, with devolution being the biggest gain from the promulgation of the 2010 Constitution. This has promoted greater investments at the grassroots, strengthened accountability and public service delivery at local levels. Kenya’s Gross Domestic Product (GDP) has grown considerably in the last decade and was estimated at Ksh 5,402.6 billion or US\$ 61.4 billion (2014)⁶ with a GDP per capita of approximately Ksh 125,756 or US\$ 1,430. In 2018, the GDP and GDP per capita were estimated at Ksh 8,904.9 billion or (US\$ 87.9 billion) and Ksh 186,297 or US\$ 1,839, respectively. The GNI per capita was US\$ 1,427.5 in 2018.

Kenya’s GDP growth has been relatively high in the last decade, with the exception of a growth rate of 0.23 per cent in 2008 caused by, among other factors, the post-election violence of 2007/08 (Figure 2.1). There were, however, high levels of inequality (with a GINI index of 50.8 using 2015/16 data) and food insecurity (with a Global Hunger Index categorized at “serious”), which presented important challenges for the country’s development. Nevertheless, Kenya was one of the ten countries with most improved food security between 1990 and 2017, according to the Global Hunger Index.

6. Exchange rate in 2014 – KSh 87.92 = 1US\$

Despite recent improvements, poverty remains a persistent challenge for Kenyans. In 2015/16, approximately 45.1 per cent of the population was living on less than US\$ 2 a day, and 36.1 per cent living on less than US\$ 1.25 a day (Government of Kenya, 2018). The incidence of poverty is higher in rural areas, estimated at 40 per cent, where approximately 80 per cent of the population lives, compared to 22.1 per cent in urban areas. This illustrates a higher burden of poverty among rural communities. On the other hand, Kenya reported unemployment rate⁷ of 7.4 per cent in 2015/16 among labour force aged 15-64 years, while unemployment rate among the youth aged 18-34 years was 11.4 per cent (KNBS 2016) (Table 2.3).

The country has reported an expansion in the last decade, with average growth rates higher than those reported for Sub-Saharan Africa. The Kenya Economic Survey 2018 estimated Kenya's GDP growth rate at 4.9 per cent in 2017, and this is projected to achieve 7.0 per cent growth by 2022 Medium Term Plan (MTP III) with a target of 10 per cent growth rate in 2030.

TABLE 2.3: SOCIO-ECONOMIC INDICATORS, 2000-2018

	2000- 2004	2005- 2009	2010- 2014	2015- 2018
GDP, total in billions of [Ksh](Average)	768.1	2,684.1	3,466.3	4,180.3
GNI per capita (atlas method current US\$)	408	702	1,074	1,427.5
Population below the national line (% of the population)	...	46.1	...	36.1
GINI Index	...	44.5	...	41.6
Unemployment (ILO), % of total labour force	7.6	11.2	12.0	11.6
Unemployment, youth total (ILO) (% of total labour force ages 16-24)	13.6	20.9	23.0	22.4
Population growth (annual %)	2.2	2.7	2.7	2.6
Life expectancy at birth, total (years)	41.9	58.7	64.7	67.1

World Bank (2018), World Bank Database

The proportion of public spending in the social sector in Kenya is higher than the average Sub-Sahara Africa region spending for the period 2015 to 2018. Public spending in education was estimated at 21.5 per cent, which ranked higher than the regional average of 15.6 per cent. However, the health expenditures were lower at 7 per cent of GDP compared to 9.5 per cent for the rest of the region and the Abuja Declaration target of 15 per cent (Table 2.4).

⁷ Unemployment rate refers to the prevalence of proportion of the population who were not engaged in any economic activity divided by the total number of individuals not in the labour force aged 15 to 64 years.

TABLE 2.4: SOCIAL INVESTMENT INDICATORS, 2000-2018

	Kenya				Sub-Saharan Africa
	2000 - 2004	2005 – 2009	2010 - 2014	2015 - 2018	2015 – 2018
Public spending on education, total (% of gov. exp.)	20.0	22.2	23.9	21.5	15.6
Public spending on education, total (% of GDP)	6.1	6.0	5.4	5.0	4.0
Health expenditure per capita (current US\$)	19.2	32.8	61.0	83.7	78.0
Health expenditure, total (% of GDP)	4.5	4.2	5.2	6.2	5.2
Health expenditure, public (% of government expenditure)	8.8	7.1	6.2	7.0	9.5

World Bank (2018), World Bank Database

B. Health

The current levels of child undernutrition illustrate the continuing challenges for reduction of child hunger. Statistics show that stunting affects 1 in every 4 children under five years. Out of 7.22 million children under five years, nearly 1.8 million children were stunted (26%); 290,000 children were wasted (4%); 767,927 children (11%) were underweight (KDHS 2014). Table 2.5 provides additional information on stunting, underweight and low birth weight.

TABLE 2.5: POPULATION AND CHILD UNDERNUTRITION IN KENYA, 2014

Age groups	Low Birth Weight			Underweight		Stunting	
	Population size (2014) ^{a/}	Population affected (2014)	Prevalence (2014) ^{b/}	Population affected (2014)	Underweight prevalence (2014) ^{b/}	Population affected (2014)	Stunting prevalence (2014) ^{b/}
New-born (IUGR) ^a		116,726	8.0%				
0-11 months	1,459,074			91,139	6.2%	181,429	12.4%
12-23 months	1,439,544			164,828	11.5%	446,259	31.0%
24-59 months	4,173,593			511,961	12.3%	1,192,514	28.6%
Total	7,072,211	116,726	8.0%	767,927	11.0%	1,820,201	26.0%

Source: Estimated based on KDHS surveys 2014/9 and demographic projections

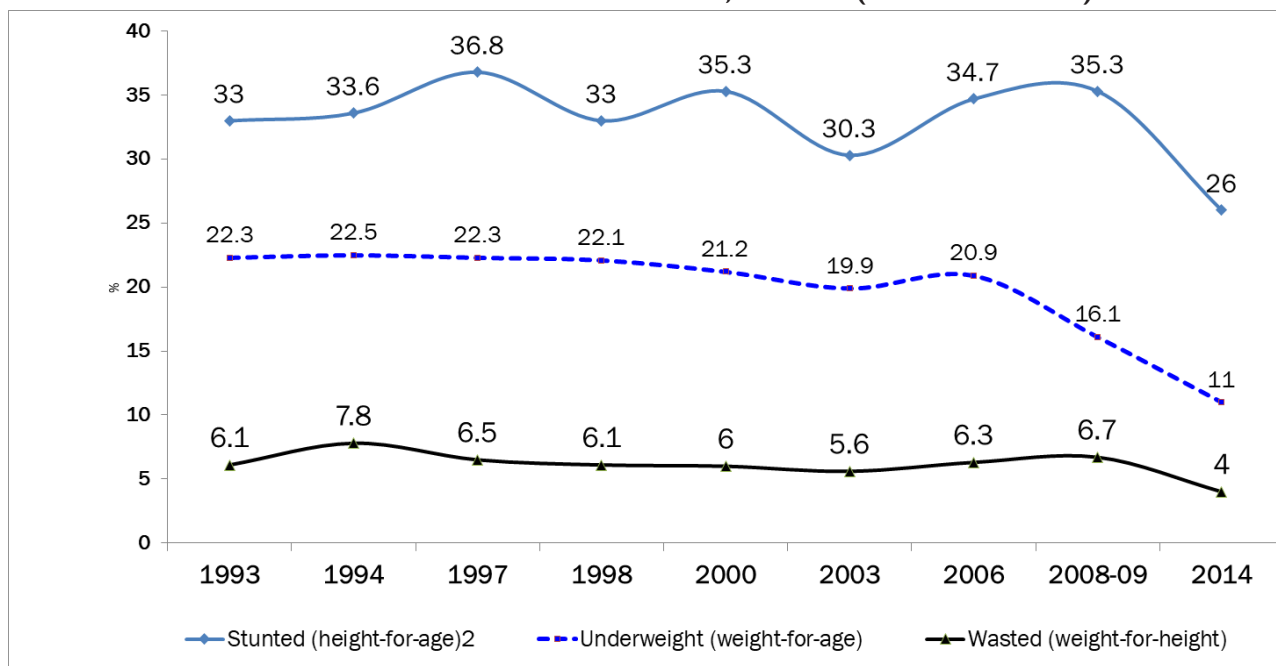
a./ In a given year, the new-born population is the same as the 0-11 month's age group

b/ Estimated on the basis of the equation of De Onis et al (2003)

However, Kenya is facing the triple burden of malnutrition characterized by coexistence of: (i) undernutrition as manifested by stunting, wasting, underweight; (ii) micronutrient deficiencies; (iii) overweight and obesity including diet-related non-communicable diseases (DRNCD). Even so, successive KDHS data indicates an overall improvement in the nutrition status of children in Kenya (Figure 2.2).

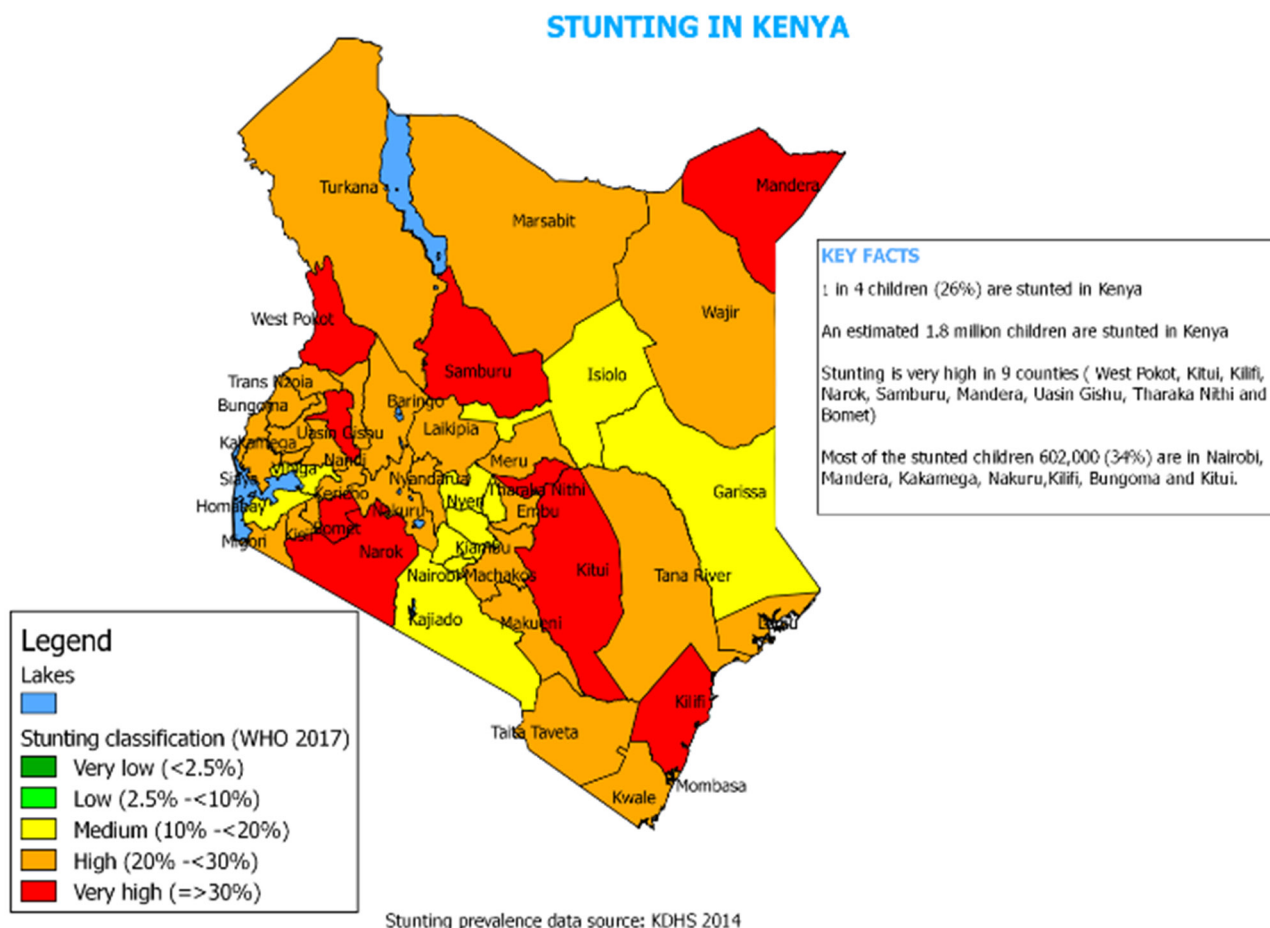
However, there are disparities across the counties as shown in Figure 2.3 and Figure 2.4. Therefore, there is need to accelerate the ongoing efforts to achieve the Africa Region Nutrition Targets, the World Health assembly global nutrition target by 2025 and SDG targets by 2030.

FIGURE 2.2: TRENDS IN NUTRITION STATUS OF CHILDREN, 1993-2014 (IN PERCENTAGES)



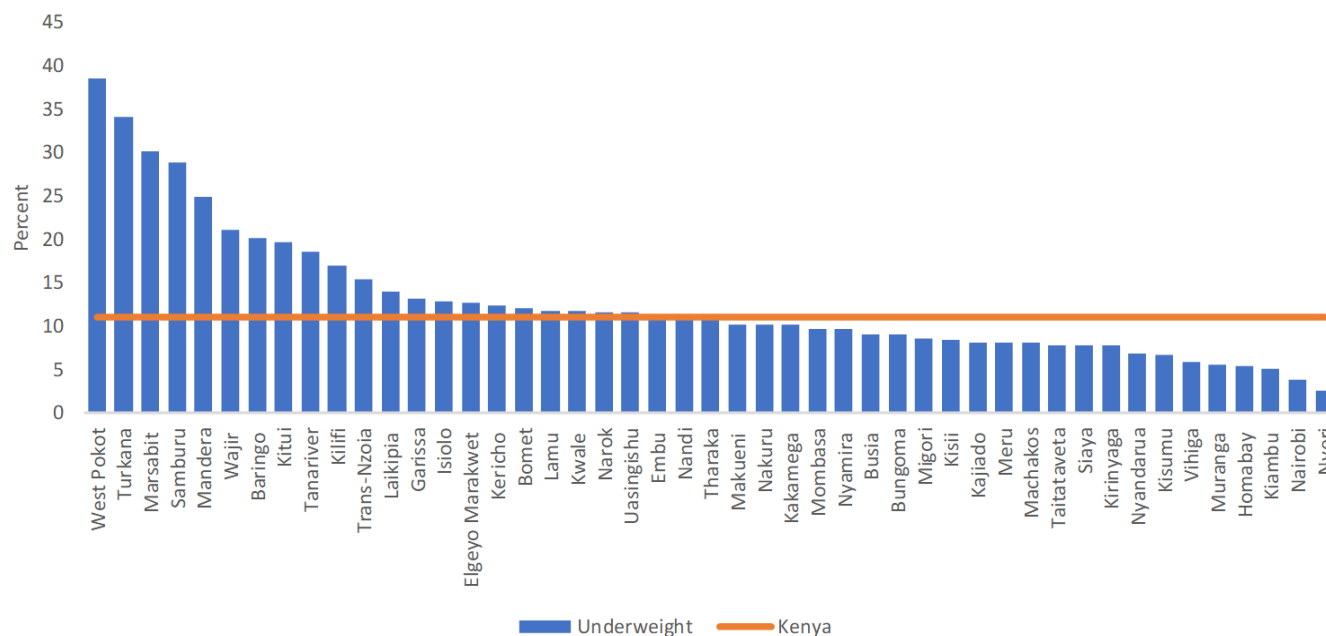
Source: Government of Kenya (Various), KDHS 1993, 1998, 2003, 2008/9 and 2014) and WHO (1994, 1997, 2000, 2006)

FIGURE 2.3: NUMBER OF CHILD MORTALITIES ASSOCIATED WITH CHILD UNDERNUTRITION



Source: Estimated based on Government of Kenya (2014)

FIGURE 2.4: PREVALENCE OF UNDERWEIGHT BY COUNTIES, 2014



Source: Estimated based on Government of Kenya (2014), KDHS. *The Kenya average prevalence was 11 per cent

TABLE 2.6: NUMBER OF CHILD MORTALITIES ASSOCIATED WITH UNDERNUTRITION IN KENYA, 2014

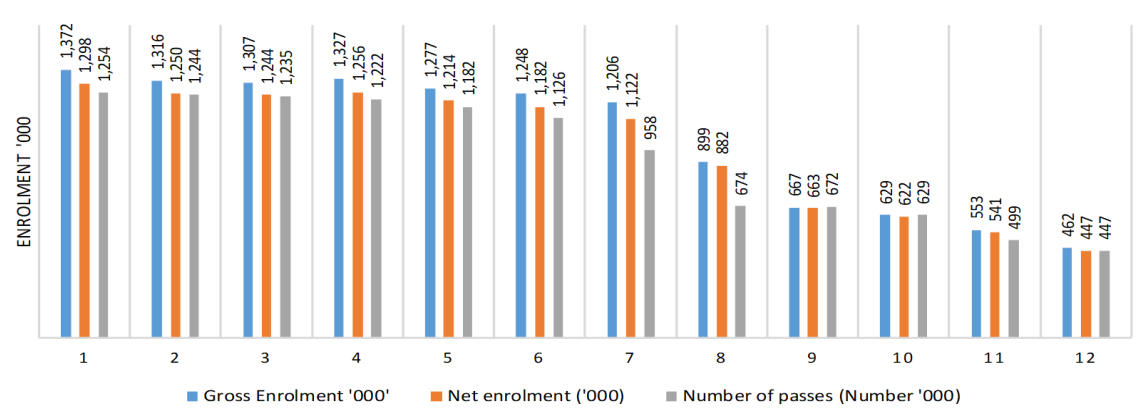
Period	Number of child mortalities associated with undernutrition
1948-1997	1,190,440
1998-2007	380,635
2008-2014	192,397
Total	1,763,471

Source: Model estimate based on Life Tables from UNPD

C. Education

Undernutrition is also associated with low progression in the education system. Only 3 out of every 10 learners enrolled in grade 1 progressed to Form Four (Figure 2.5).

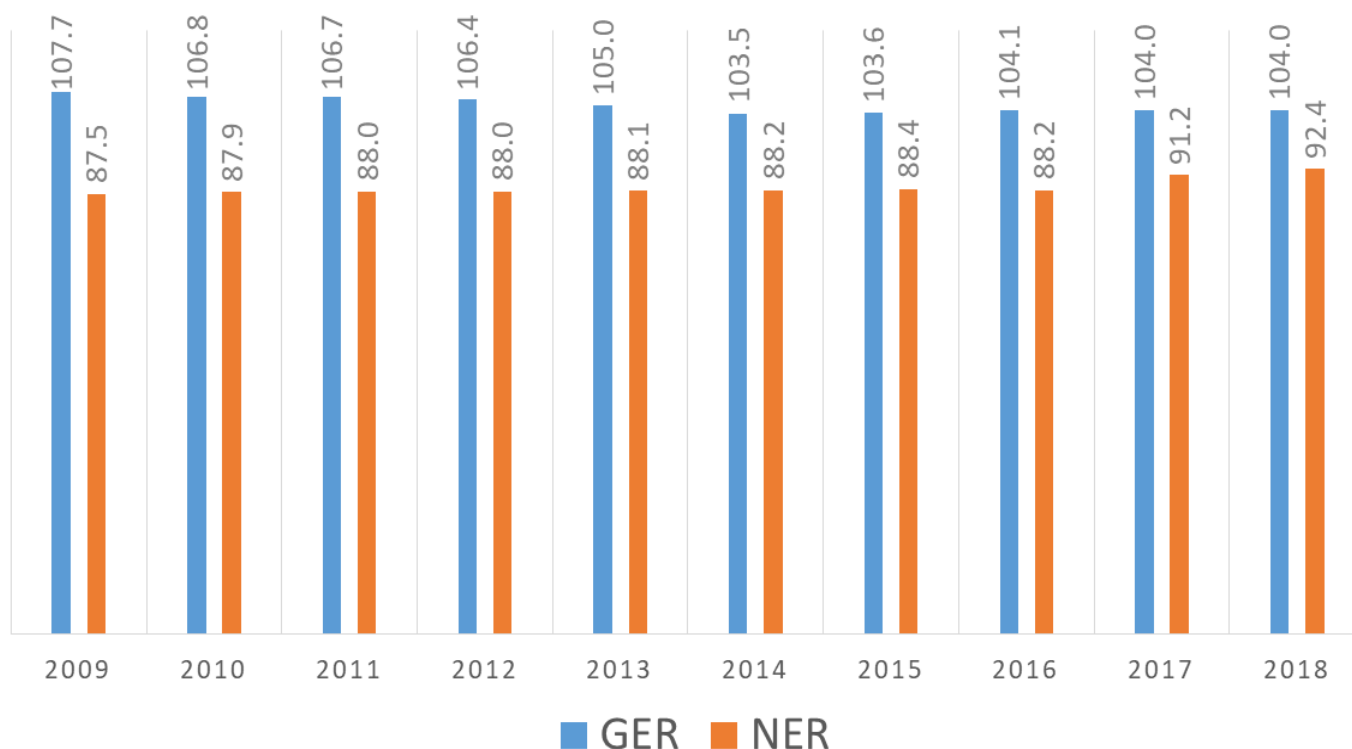
FIGURE 2.5: GROSS ENROLMENT VERSUS NUMBER OF PASSES BY GRADE IN 2014



Source: Government of Kenya (2019), Economic Survey

The promotion for primary level remains within the range of 90 per cent for classes 1 to 5 and drops to below 90 per cent for classes 6, 7 and 8.

FIGURE 2.6: PRIMARY GROSS ENROLMENT RATE⁹ (GER) AND NET ENROLMENT RATE¹⁰ (NER), 2009-2018



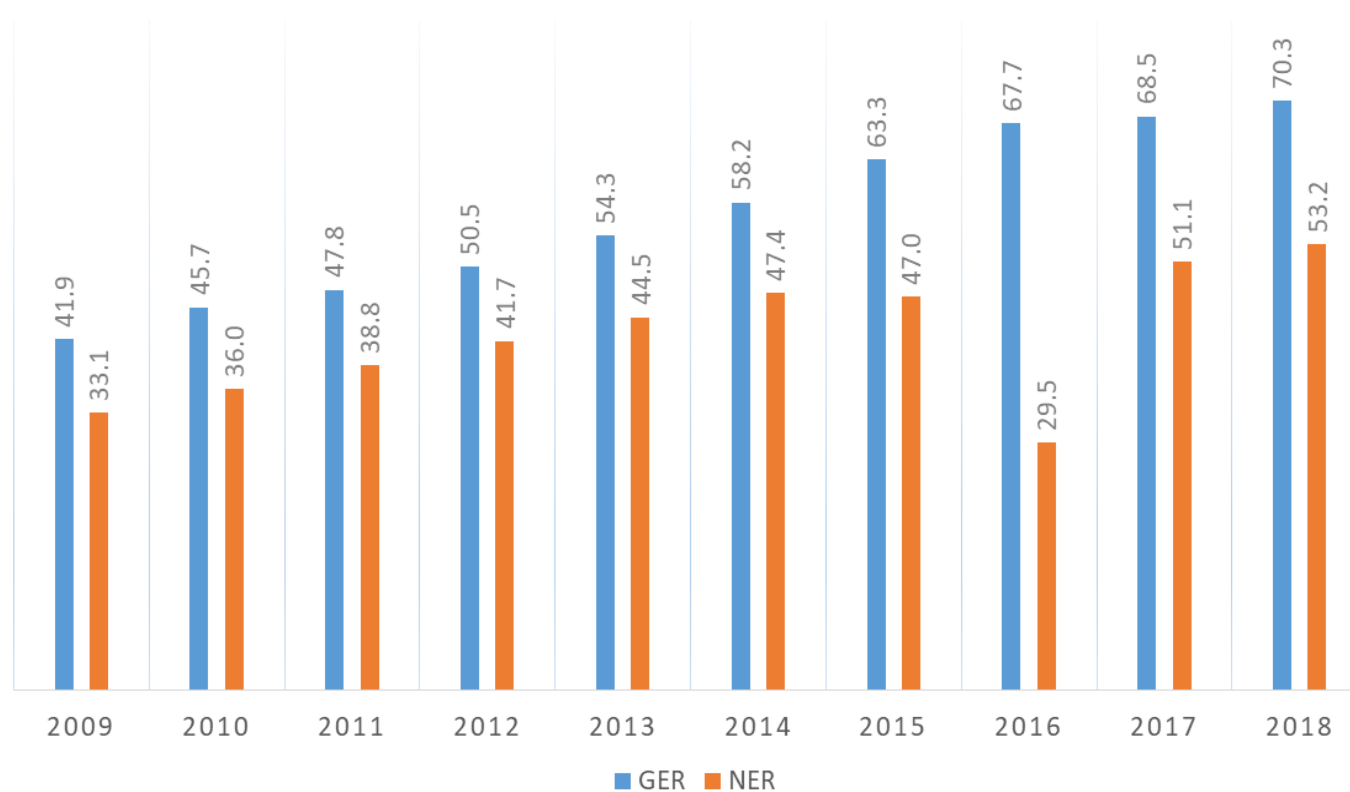
Source: Government of Kenya (2019), Economic Survey

At the primary level, the GER registered more than 100 per cent over the period under review. The GER greater than 100 per cent indicates existence of over-age and under-age children enrolled in primary schools. The GER decreased by 4.2 percentage points between 2009 and 2018. The decrease of GER over the period may be the result of reduction of repeaters and reduction of over-age students within the primary school level. The gap between the primary GER and NER has declined between 2009 and 2018 (Figure 2.6). In 2009, the gap was 20.2 percentage points while in 2014 it was 15.3 percentage points and in 2018, the gap was 11.6 percentage points. This indicates that over the period, the number of under-age and over-age pupils enrolled at primary school has been declining. The decline in GER and increase in NER indicates a positive trend, implying that the Government's policies on repetition and promotion have impacted positively on access to education. The total enrolment in primary schools grew by 1.3 per cent to 10.5 million in 2018. Boys' enrolment in Standard 1 rose by 1.4 per cent to 716,100 in 2018 while that of girls increased by 1.5 per cent to 674,100 in 2018. The survival rate at Standard 8 for all pupils stood at 76.9 per cent in 2018. The GER for primary schools stagnated between 2017 and 2018, whereas the NER increased by 1.2 percentage points to 92.4 per cent in 2018 (Government of Kenya, 2019).

9. GER is the total enrolment in a specific level of education, regardless of age, expressed as a percentage of the eligible school-age population corresponding to the same level of education in a given school year.

10. NER is the enrolment of the official age group for a given level of education expressed as a percentage of the corresponding population.

FIGURE 2.7: SECONDARY SCHOOL GROSS AND NET ENROLMENT RATES (%), 2009-2018



Source: Government of Kenya (2019), Economic Survey

At the secondary school level, there has been an upward trend for the GER and NER having recorded 16.4 and 14.3 percentage points increase, respectively, between 2009 and 2014. The GER increased from 54.3 per cent in 2013 to 58.2 per cent in 2014 and 70.3 per cent in 2018. Significant improvement was also registered in the NER which increased from 44.5 per cent in 2013 to 47.4 per cent in 2014 and 53.2 per cent in 2018 (Figure 2.7). The upward trend in NER can partly be attributed to implementation of the Free Day Secondary Education (FDSE) and infrastructure.

Internal efficiency indicators for primary and secondary school, including promotion rate, repetition rate and dropout rate for the year 2014 are presented in Table 2.7. Further data presented in Table 2.7 shows that promotion rate for girls is higher than that of boys across all classes except class 8.

TABLE 2.7: 2014 INTERNAL EFFICIENCY INDICATORS FOR PRIMARY AND SECONDARY EDUCATION ('000)

Grade	Primary								Secondary			
	1	2	3	4	5	6	7	8	9	10	11	12
Number of dropouts	43.9	6.6	9.1	34.5	31.9	56.2	164.0	207.6	0.0	0.0	41.4	0.0
Number of population repeating grades (millions)	74.7	65.1	63.0	70.2	62.9	66.4	83.5	16.8	3.8	6.7	11.6	14.7

Source: Basic Education Statistical Booklet, 2014

The repetition rates ranged between 2 per cent and 7.8 per cent, with class seven recording the highest while class eight recorded the lowest. Analysis shows that girls posted lower repetition compared to boys across all classes. High dropout rates were observed in the last two classes of the primary cycle, with Class Seven recording 13.6 per cent and Class Eight recording 23.1 per cent.

At secondary school level, promotion rates were relatively high with Form One recording the highest and Form Three the lowest (100.7% and 90.1%, respectively). The promotion rates above 100 per cent are attributed to re-entry policy for girls at Form One and Two.

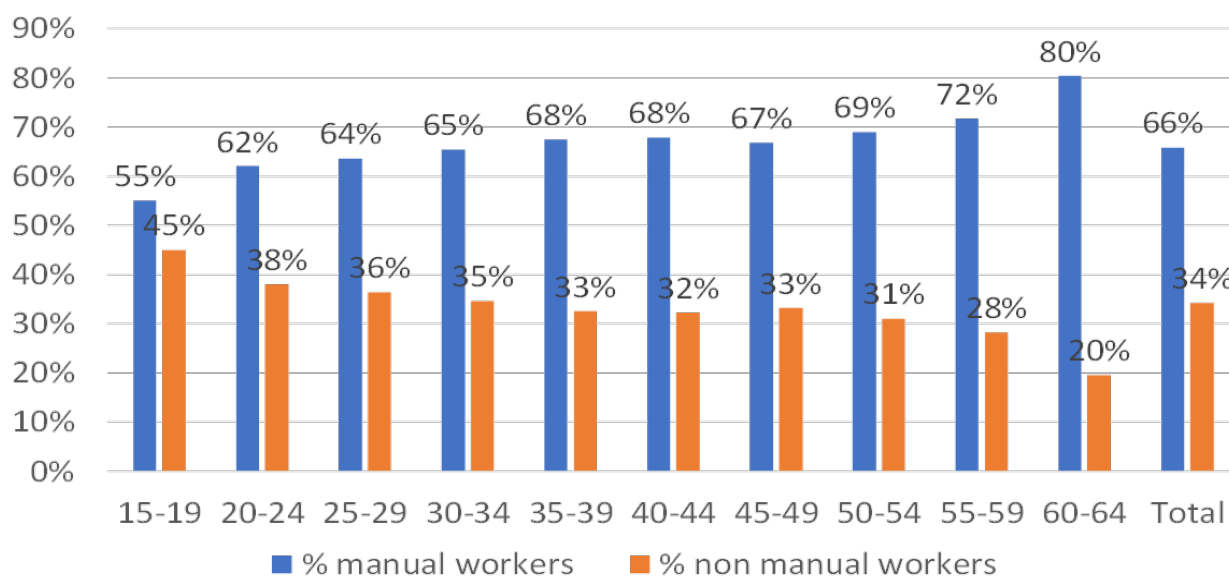
The repetition rates range between 0.6 per cent and 3.2 per cent with Form Four recording the highest while Form One recorded the lowest. Male students remain more vulnerable to drop out across all classes of secondary schools compared to female counterparts. The data shows low dropout rates in Form One and Two, implying that the number of students re-joining the system having left at some point is greater than the number exiting in 2014. Some of this repetition can be attributed to poor cognitive development.

D. Labour market and productivity

Manual activities include agriculture, forestry and fishing; mining and quarrying; manufacturing; construction; electricity, gas, steam and air conditioning supply; water supply, sewerage, waste management and remediation activities. The rest of the International Standard Industrial Classification (ISIC) activities are non-manual and include wholesale and retail trade; transport; education; and arts. As shown in Figure 2.9 through to 2.11, most of the workers are engaged in manual activities. This observation is consistent with the large informal sector (mainly manual) that dominated economic activities in Kenya.

Overall, about 66 per cent of all workers were estimated to be engaged in manual activities relative to 34 per cent in non-manual activities. The proportion of individuals engaged in manual activities rises with the age cohort (Figure 2.8).

FIGURE 2.8: DISTRIBUTION OF MANUAL AND NON-MANUAL WORKERS



Source: Authors' computations based on Government of Kenya (2018), KIHBS 2015/16

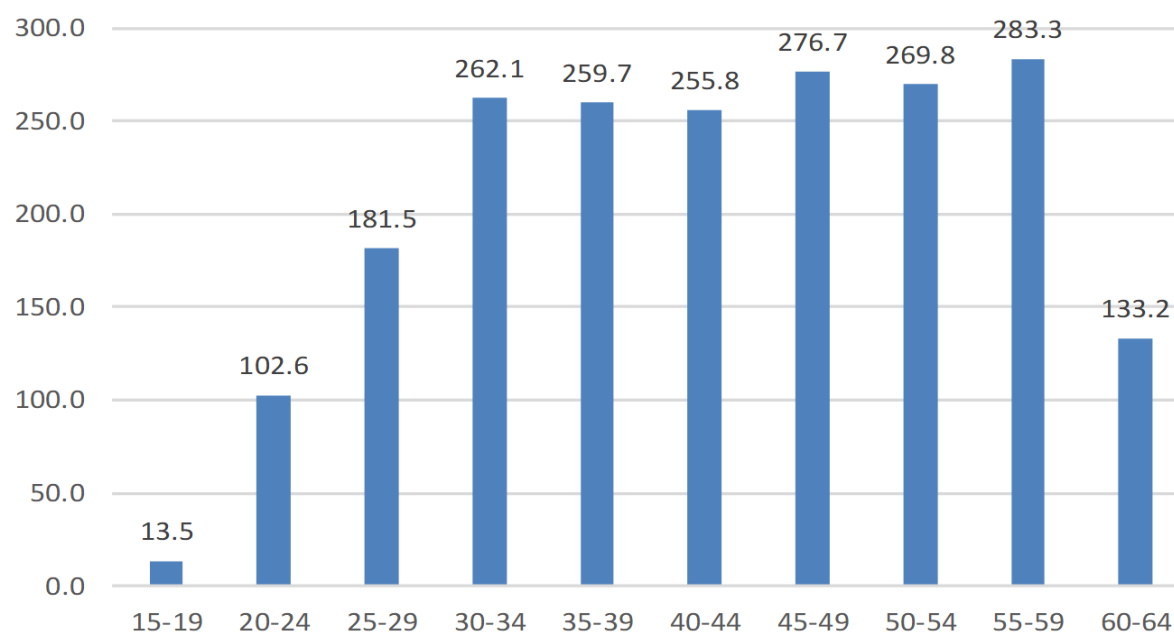
Figure 2.9 summarises the relationship between level of education and income. The broad observation is that income increases with the level of education, with a substantial rise in income levels for individuals with 12 or greater years of schooling.

Table 2.8: Annual average income related to productive work, non-manual intensive activities ('000), 2015/16

Complete years of schooling	0	1	2	3	4	5	6	7	8	9	10	11	12
15-19	11.55	23.23	10.08	12.67	15.25	17.83	20.41	23.00	25.58	28.16	15.96	15.96	15.96
20-24	11.55	23.23	42.60	43.52	43.69	44.23	44.77	45.31	45.85	46.39	56.77	67.14	77.52
25-29	11.55	61.06	72.20	73.11	74.02	74.93	75.85	76.76	77.67	78.58	93.88	109.17	124.47
30-34	11.55	61.06	94.92	95.57	96.21	96.85	97.49	98.14	98.78	99.42	123.20	146.98	170.76
35-39	11.55	61.06	74.16	83.93	93.70	103.46	113.23	123.00	132.77	142.53	156.90	171.27	185.64
40-44	11.55	61.06	79.55	85.87	92.19	98.52	104.84	111.16	117.49	123.81	152.85	181.90	210.95
45-49	11.55	61.06	88.34	109.85	131.36	152.88	174.39	195.90	217.42	238.93	243.92	248.92	253.92
50-54	11.55	61.06	90.21	103.03	115.85	128.68	141.50	154.32	167.14	179.96	198.40	216.84	235.28
55-59	89.38	67.03	79.95	83.02	86.08	89.15	92.22	95.29	98.36	101.43	165.45	229.47	293.49
60-64	89.38	167.58	73.17	73.17	73.17	73.17	73.17	73.17	73.17	101.43	142.04	182.64	223.25
Average	27.12	64.74	70.52	76.37	82.15	87.97	93.79	99.60	105.42	114.06	134.94	157.03	179.12

Source: Authors' computations based on Government of Kenya (2018), KIHBS 2015/16

For manual activities, the average annual income seems to increase for the lower cohorts aged 15 to 19 through ages 30 to 34. Annual average incomes generally stabilize for the age cohorts 30-34 through 55-59 before declining for the cohort aged 60-64 years (Figure 2.9). This is consistent with what is expected, as the lower cohorts would still be pursuing education and/or training rather than maximizing hours of work. On the other hand, the older cohort (60-64 years) may not be suitable for some of the manual activities that require exertion of energy. Overall, 51.6 per cent of the labour force had only attained primary education (Government of Kenya 2018).

FIGURE 2.9: ANNUAL AVERAGE INCOME RELATED TO PRODUCTIVE WORK, MANUAL INTENSIVE ACTIVITIES (KSH '000)

Source: Authors' computations based on Government of Kenya (2018), KIHBS 2015/16



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Section

Conceptual Framework and Methodology



Conceptual Framework and Methodology

This section describes the conceptual framework and methodology for estimating cost of hunger in Kenya. The conceptual framework and methodology presented here are adapted from the Operational Manual for Analysing the Social and Economic Impact of Child Undernutrition in Latin America (ECLAC, 2007).

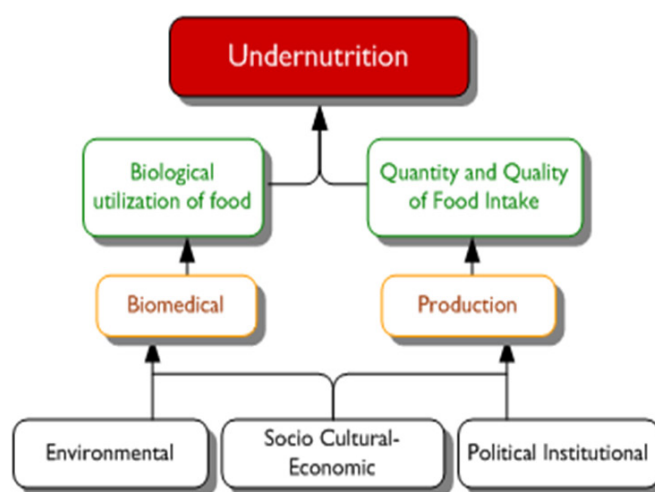
A. Conceptual framework

This conceptual framework explains two broad interrelated relationships; that is, the causes of undernutrition and the consequences of undernutrition.

(i) Causes of undernutrition

The main factors associated with undernutrition can be grouped into three broad causes. These are: environmental (natural or entropic) causes, sociocultural-economic causes (linked to poverty and inequality) and political-institutional causes (Figure 3.1). Environmental factors encompass the surroundings in which the individual or household live, and the risks arising from the natural environment that affects access to adequate food.

FIGURE 3.1: CAUSES OF UNDERNUTRITION



Source: Martínez and Fernández (2007), based on consultations carried out by authors

The sociocultural-economic determinants include elements associated with poverty and inequality, education and cultural norms, employment and wages, access to social security. The political-institutional factors encompass government policies and programmes aimed specifically at solving the population's food and nutritional requirements. Together, these three broad factors influence biomedical and production vulnerabilities. Biomedical vulnerabilities include the individuals' deficiencies that limit the capacity to make biological use of the food consumed regardless of quantity and quality available Martínez and Fernández (2007). On the other hand, production factors include those directly associated with both the production and access to food. Each of these factors helps increase or decrease the likelihood of a person to suffer from undernutrition. Further, the importance of each of these factors depends on the level of the country's demographic and epidemiological transition, and on the person's current stage in the life cycle. As an example, life expectancy at birth for Kenya has improved over time and was 67.5 years in 2018 compared to 52 years in 2000 (World Bank, 2018). Decline in under-5 mortality rate is a major achievement

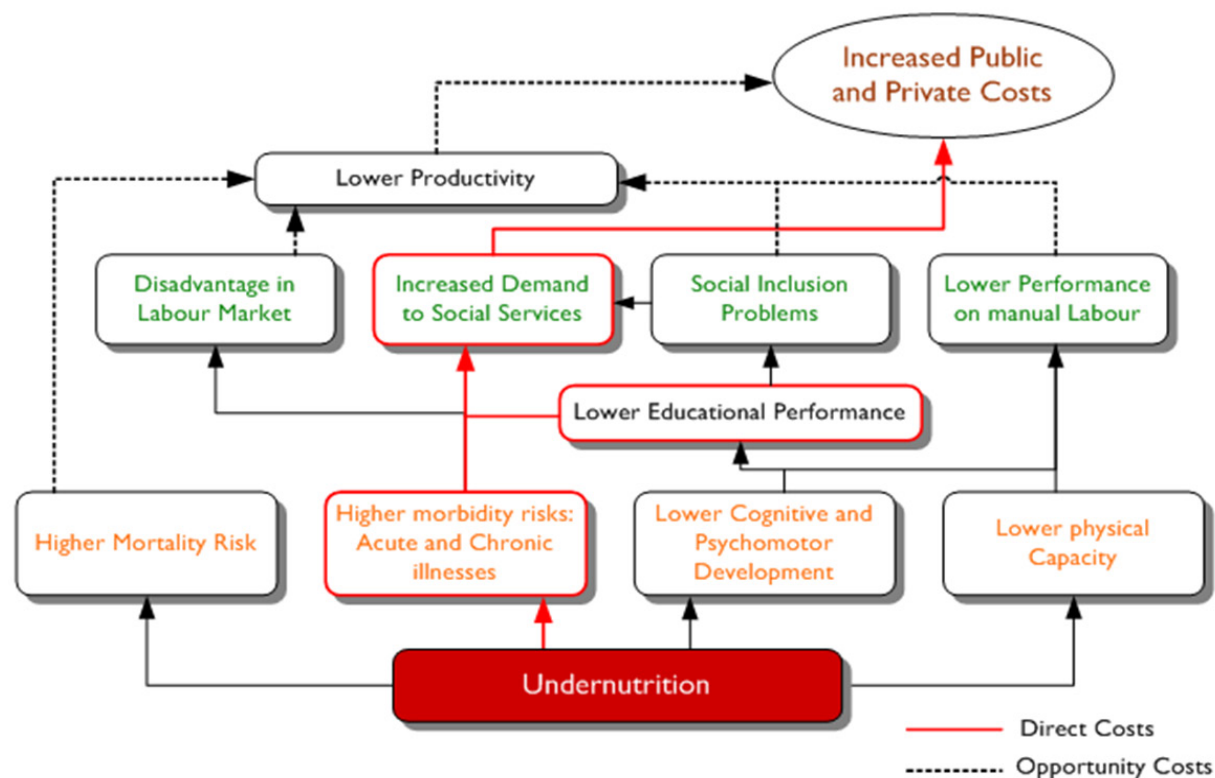
attributed to improvements in access to quality health care service delivery. Moreover, children constitute 41 per cent of the population. There is an epidemiological transition evident through a shift in major causes of mortality from communicable to non-communicable diseases. Together these factors determine the intensity of the resulting vulnerability to undernutrition.

(ii) Consequences of undernutrition

Child undernutrition has long-term negative effects on a person’s life in the interrelated aspects of health, education, and productivity, quantifiable in costs and expenditures to the public and private sectors (Figure 3.2) Alderman et al., 2003).

In health, the focus is on mortality and morbidity attributed to undernutrition. Health studies have shown that undernutrition increases the chance of death (higher mortality risk) during specific stages of the life cycle and leads to increased appearance or intensified severity of specific illnesses (or higher morbidity risk) (Amy et al., 2000). Thus, undernutrition may result in lower productivity (due to avoidable deaths) and increased demand for social services (due to morbidity) and consequently higher public and private costs to society (Figure 3.2).

FIGURE 3.2: CONSEQUENCES OF UNDERNUTRITION



Source: Martínez and Fernández (2007), based on consultations carried out by authors

In education, undernutrition is known to negatively affect cognitive and psychomotor development of an individual and thus results in lower educational attainment (Melissa and Linda (2004). Undernourished children have a greater probability of delays in starting school, repeating grades, dropping out of school and ultimately obtaining a lower level of education. These effects exacerbate problems in social inclusion and increase or intensify poverty both of

which increase demand for social services, including increased need for social protection interventions. The effects of undernutrition on education attainment also perpetuate a vicious cycle as vulnerability to undernutrition grows. Undernutrition also impacts on productivity at later years of life. Individuals affected by undernutrition may experience lower physical capacity in manual labour as a result of stunting (Haddad and Howarth (1991). Stunting is observable in the low height-for-age measurements during childhood. In adulthood, it leads to an overall reduced body mass when compared to the full adult potential. Thus, undernutrition may lower physical capacity of individuals, which may in turn lower performance on manual labour resulting in declines in productivity. This imposes increased public and private costs to society.

Cumulatively, each of the negative impacts in health, education, and productivity described above leads to a social and an economic loss to the individual or the society. The subsequent subsection briefly highlights the costs that this study measured.

B. Methodological aspects

This subsection outlines the central elements considered in the Cost of Hunger model to estimate the effects and costs of child undernutrition. The discussion describes the dimensions of analysis, process of estimating costs of undernutrition and variables and data used in the model¹¹. An overview of the COHA model and how it was adapted for Africa is provided in Annex 3 of this report.

(i) Estimation of costs of undernutrition - dimensions of analysis

Cost of hunger studies have traditionally adopted a two-dimensional analysis model to estimate the costs arising from the consequences of child undernutrition in health, education and productivity. These two dimensions are:

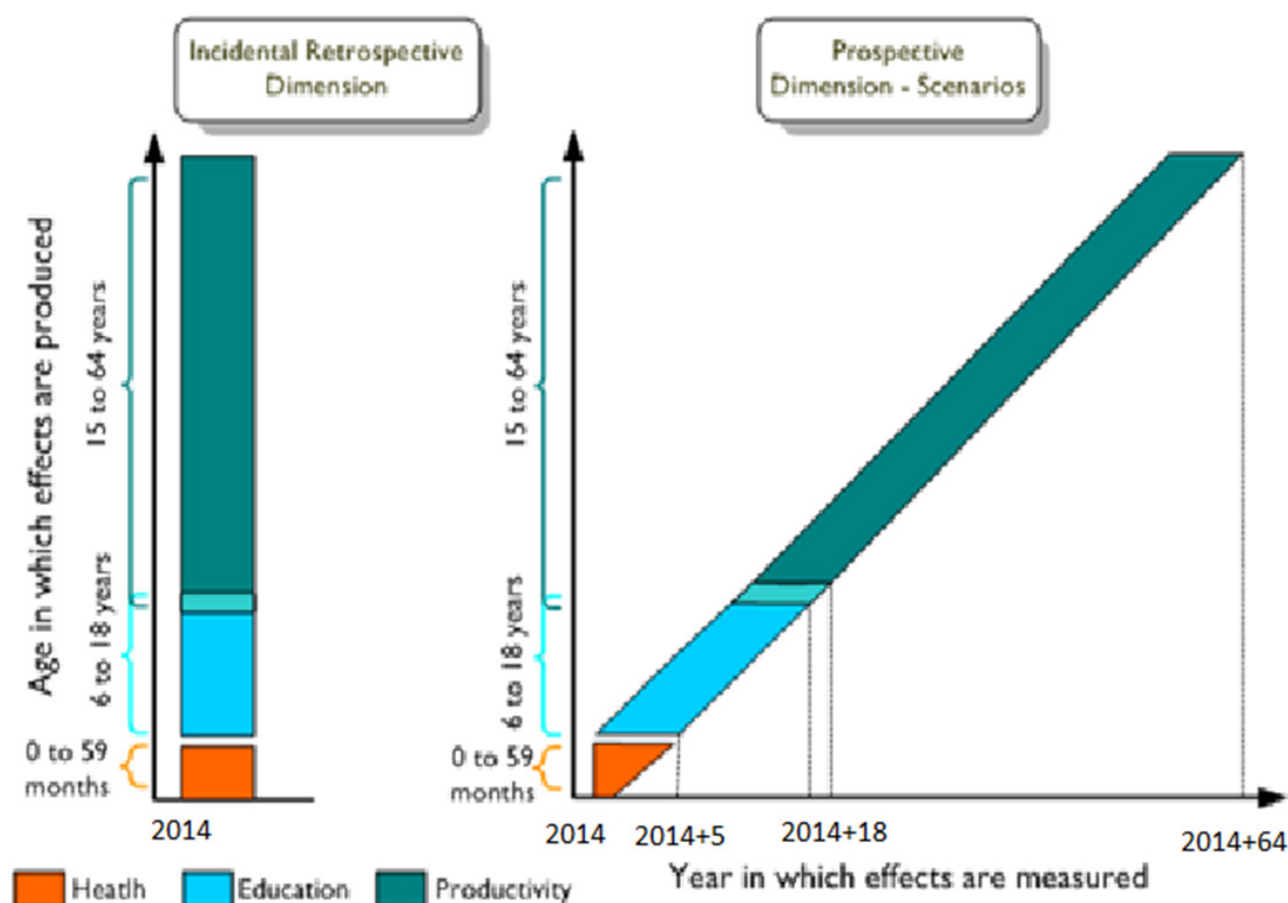
- (a) **Incidental retrospective dimension.** This dimension focuses on the population, including mortality episodes of those who would have been alive in the study year – in our case 2014. The retrospective dimension estimates the nutritional situation of individuals under the age of five to identify the related economic costs in the study year. Thus, it is possible to estimate the health costs of pre-school boys and girls who suffer from undernutrition during the year of analysis, the education costs stemming from the children currently in school who suffered from undernutrition during the first five years of life, and the economic costs due to lost productivity by working-age individuals who were exposed to undernutrition before the age of five.
- (b) **Prospective or potential savings dimension.** This dimension focuses on children under five in a given year and allows analysis of the present and future costs incurred as a result of medical treatment, repetition of grades in school and lower productivity. Based on this analysis, potential savings derived from actions taken to achieve nutritional objectives can be estimated.

As shown in Figure 3.3, the incidental retrospective dimension includes the social and economic consequences of undernutrition in a specific year (for the purposes of this report, 2014 was set as the base year) for cohorts that have been affected (0 to 4 years of age for health, 6 to 18 years for education and 15 to 64 years for productivity).

¹¹ A summarized version of the theoretical background and the basic characteristics considered in the model of analysis are presented here. For a more detailed discussion of the model, see Rodrigo Martínez and Andrés Fernández (2007), Model for analysing the social and economic impact of child undernutrition in Latin America, Naciones Unidas, CEPAL, Social Development Division, Santiago De Chile.

The prospective dimension projects the costs and effects of undernutrition recorded in the reference year of the study (2014). These are based on the number of children born during the period selected in the analysis and, with the application of a discount rate on the present value of costs, estimates of future costs to be incurred due to the consequences of undernutrition. The prospective dimension is the basis for establishing scenarios to estimate the economic and social savings of an improved nutritional situation.

FIGURE 3.3: DIMENSIONS OF ANALYSIS BY POPULATION AGE AND YEAR WHEN EFFECTS OCCUR (CHANGE 2009 TO 2014)



Source: Martinez and Fernández (2007), based on consultations carried out by authors

C. Estimating the cost of hunger

Stemming from our conceptual framework, the total cost of undernutrition (TC^U) is a function of higher health-care spending (HC^U), inefficiencies in education (EC^U) and lower productivity (PC^U). This total cost (TC^U) function can be expressed as:

$$TC^U = f(HC^U, EC^U, PC^U) \tag{I}$$

In the area of health, the high probability resulting from the epidemiological profile of individuals suffering from undernutrition increases the costs in the health care sector (HSC^U). In aggregate, this is equal to the sum of the interactions between the probability of undernutrition in each age group, the probability that a group will suffer from the diseases because of undernutrition, and the costs of treating the illnesses (HSC^U) that typically includes diagnosis, treatment and control. To these are added the costs paid by individuals and their families as a result of

lost time and quality of life (IHC^U). The general function associated with the health costs (HC^U) can be expressed in functional form as:

$$HC^U = f(HSC^U, IHC^U) \quad (2)$$

In education, the reduced learning capacity and attainment of those who have suffered from child undernutrition increase costs to the educational system (ESC^U). Repeating one or more grades commensurately increases the demand that the educational system must meet, with the resulting extra costs in infrastructure, equipment, human resources and educational inputs. In addition, the private costs (incurred by students and their families) derived from the larger quantity of inputs, external educational supplementation and more time devoted to solving or mitigating low performance problems (IEC^U) are added to the above costs. The education cost (EC^U), can be represented by equation 3 as:

$$EC^U = f(ESC^U, IEC^U) \quad (3)$$

The productivity cost associated with undernutrition is equal to the loss in human capital incurred by a society, stemming from a lower educational level achieved by these individuals (ELC^U), a lower productivity in manual labour experienced by individuals who suffered from stunting (MLC^U) and the loss of productive capacity resulting from a higher number of deaths caused by undernutrition (MMC^U). In the model, these costs are reflected as losses in potential productivity (PC^U) and can be represented in functional form as:

$$PC^U = f(ELC^U, MLC^U, MMC^U) \quad (4)$$

As a result, in order to comprehensively analyse the phenomenon of undernutrition, the model considers its consequences on health, education and productivity by translating them into costs. The details of the process used in computing the costs of undernutrition are elaborated in the Operational Manual for Analysing the Social and Economic Impact of Child Undernutrition in Latin America (ECLAC, 2007).

Implementation Process of Estimating Costs of Undernutrition

To implement the methodology developed in the analytical model the following broad steps were followed:

1. An information system was designed

This involved identification of variables and indicators of the model; adaptation of indicators for each dimension; and identification of potential sources of data for each dimension.

2. Data was collected and the database populated

Three working groups (health, education and labour) of about 7 experts each were formed to compile the database. After compilation, the data was validated by the National Implementation Team (NIT) Secretariat. This process involved contrasting data from different sources and filling of the database.

3. The effects and costs of undernutrition were calculated

Calculation of costs were performed in two broad dimensions, i.e. retrospective and prospective. In the retrospective dimension, the team:

- (i) Estimated cases and events in health and education variables. In health, these encompassed number of morbidity events and cases and number of mortality cases. In education, the number of cases of repetition and difference in education attainment were estimated.

- (ii) Estimated the health costs (associated with morbidity), education costs (associated with repetition), and computation of productivity costs (due to mortality and lower attainment in education).
- (iii) The total costs in the retrospective dimension were summed up.

In the prospective dimension:

- (i) Projected cases and events in health and education variables. In health, these encompassed number of morbidity events and cases and number of mortality cases. In education, the number of cases of repetition and difference in education attainment were projected.
- (ii) Estimated the projected health costs (associated with morbidity), projected education costs (associated with repetition), and computation of productivity costs (due to mortality and lower attainment in education).
- (iii) The total costs in the prospective dimension were summed up.

4. Scenarios were analysed

The team defined relevant scenarios based on Kenya's policy environment, national aspirations and global targets. Three broad scenarios were: the savings associated with achievement of the global target of halving stunting and underweight by 2025; reducing the prevalence of stunting and underweight to 10 per cent and 5 per cent, respectively by 2025; and reducing the prevalence of stunting and underweight to 14.7 per cent and 8.4 per cent, respectively, by 2030.

- 5. Based on these findings, a report was prepared focusing on the costs associated with undernutrition.

D Data and data sources

The data collection was led by members of the National Implementation Team. The process was initiated with a regional training held in Nairobi between 2nd and 6th July, 2018. Both primary and secondary data sources were utilized.

For the health sector, the Kenya Demographic Health Survey (KDHS) of 2014 was used. Additional data was obtained from the World Health Organization. Primary data was collected by conducting surveys and interviews in health facilities in Nairobi from facility heads. Data was also sourced from experts. Education data was obtained from the 2014 Basic Education Statistical Booklet, various publications of the annual Economic Surveys and the Comprehensive Public Expenditure Review (National Treasury, 2017).

Labour and productivity data was mainly obtained from the Kenya Integrated Household Budget Survey of 2015/16. This survey provides information related to income, expenditure, education, poverty and living conditions. The survey data was complemented by data from the annual Kenya Economic Surveys and the Statistical Abstracts.

The Kenya Economic Surveys and Statistical Abstracts provided data on average wages and distribution of employment in manual and non-manual work, among other data.



Section

Effects and Costs of Child Undernutrition



Effects and Costs of Child Undernutrition

Introduction

Undernutrition is characterized by different forms, namely wasting - a low weight-for-height, stunting - low height-for-age and underweight - low weight-for-age. In early childhood, undernutrition has negative life-long and intergenerational consequences; undernourished children are more likely to require medical care as a result of undernutrition-related diseases and deficiencies (Ramachandran and Gopalan (2009). This increases the burden on social services and health costs to both households and the government. In addition, undernourished children are at a higher risk of mortality (Black et al., 2008). During schooling years, stunted children were more likely to repeat grades and/or drop out of school due to lower cognitive development (Alderman, 2006). This results in the reduction of their income-earning capability later in life. Furthermore, adults who were stunted as children were less likely to achieve their expected physical development, hence, negatively impacting on their productivity (Alderman, 2006).

A. Social and economic cost of child undernutrition in the health sector

Children who are undernourished at an early age have a higher risk of morbidity and mortality (Ramachandran and Gopalan, 2009). In COHA study methodology, the risk of becoming ill due to undernutrition was estimated using probability differentials. Specifically, the study examined medical costs incurred during treatment of low birth weight (LBW), underweight, anaemia, acute respiratory infections (ARI), acute diarrheal syndrome (ADS), and fever/malaria associated with undernutrition in children under the age of five.

(I) Effects on morbidity

The direct effects of undernutrition are most felt at individual level, as their vulnerability to both illness and death increases. Undernutrition makes certain illnesses more likely to occur and/or intensify (Table 4.1). Based on the differential probability analysis of the 2014 KDHS data, underweight children have a 4.1 per cent increased risk of diarrhoea compared to children who are not underweight. In addition, the risk of malaria was 1.8 per cent higher among underweight children compared to those who were not underweight.

Subsequently, it was estimated that there were 2.4 million additional episodes of childhood illness as a result of undernutrition among children below five years. In addition, 2.1 million (90.3%) of the illness episodes were attributed to underweight whereas low birth weight as a result of intrauterine growth restriction (IUGR), totalled 52,194 (2.2%) episodes in 2014.

TABLE 4.1: MORBIDITIES FOR CHILDREN UNDER-FIVE ASSOCIATED WITH UNDERWEIGHT, BY PATHOLOGY, 2014

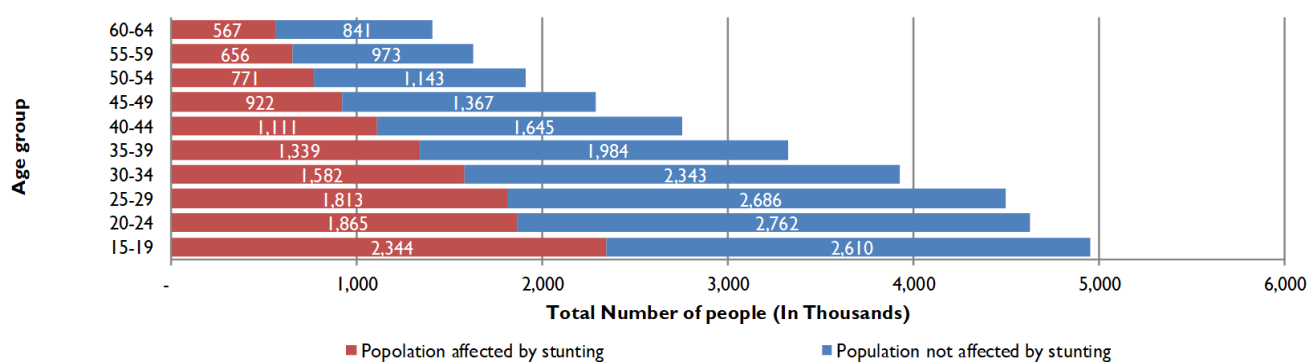
Pathology	Number of episodes	Percentage of episodes
Diarrhoea	155,319	6.6%
Acute Respiratory Infection	7,440	0.6%
Malaria	13,518	0.3%
Subtotal	176,277	7.4%
Low Birth Weight	52,194	2.2%
Underweight	2,138,955	90.3%
Subtotal	2,191,149	92.6%
Total	2,367,426	100.0%

Source: Model estimations based on Government of Kenya (2014), KDHS 2014, and demographic information

(II) Stunting levels of the working age population

Undernutrition, in particular stunting in children, has a negative impact on their productivity at later stages in life. Kenya has made progress in reducing stunting in children from a high of 35.3 per cent in 2008/09 to 26 per cent in 2014 (KDHS). Nevertheless, stunting rates still remain high. As illustrated in Figure 4.1, the model estimated that 12.9 million adults in the working-age population suffered from stunting before the age of five years. This represented 41.4 per cent of the population aged 15-64 in 2014.

FIGURE 4.1: WORKING AGE POPULATION AFFECTED BY CHILDHOOD STUNTING, BY AGE (IN MILLIONS OF PEOPLE)



Source: Model estimations based on demographic information and WHO/NCHS database

(III) Effects on mortality

Child undernutrition has been shown to increase risk of mortality most often associated with incidences of diarrhoea, pneumonia and malaria (Black et al., 2008). However, the cause of death is rarely attributed to undernutrition, but rather to the related illnesses. Given this limitation in attribution, the model used relative risk factors to estimate the risk of increased child mortality as a result of child undernutrition.

Mortality risk associated with undernutrition was calculated using these relative risk factors, historical survival rates, mortality rates, and nutrition information¹².

Between 2008 and 2014, it is estimated that 192,397 child deaths in Kenya were directly associated with undernutrition. These deaths represent 19.4 per cent of all child mortalities for the reference period. Therefore, it is evident that undernutrition significantly exacerbates the rates of death among children and limits the country's capacity to achieve its development agenda, especially the goal to reduce child mortality (Table 4.2).

TABLE 4.2: IMPACT OF UNDERNUTRITION ON CHILD MORTALITY, ADJUSTED BY SURVIVAL RATE, 1950-2014 (IN NUMBER OF MORTALITIES)

Period	Number of child mortalities associated to undernutrition
1950-1997	1,190,440
1998-2007	380,635
2008-2014	192,397
Total	1,763,471

Source: Model estimations based on life tables provided by UN Population Division

12. Data provided by the UN Population Division, <http://www.un.org/esa/population/unpop.htm>.

(IV) Estimation of public and private health costs

The treatment of undernutrition and related illnesses is a critical recurrent cost in the health sector. For example, treating a severely undernourished child requires a comprehensive treatment protocol that is often more costly than the monetary value and effort needed to prevent undernutrition (WHO, 1999). The economic cost of each episode is often increased by inefficiencies when such cases are treated without proper guidance from a health-care professional or due to lack of access to proper health services. These costs generate a significant burden not just to the public sector but also to society.

It was estimated that 2.1 million clinical episodes in 2014 were associated with the higher risk present in underweight children. As indicated in Table 4.3 these episodes generated an estimated cost of Ksh 18.6 billion.

TABLE 4.3: HEALTH COSTS OF UNDERNUTRITION-RELATED PATHOLOGIES, 2014

Pathology	% of episodes	Number of episodes	% of cost	Cost (millions of Ksh)	Cost (thousands of US\$)
Underweight	90.4%	2,138,955	70.1%	13,057.0	148.51
Low birth weight (IUGR)	2.2%	52,194	25.5%	4,754.9	54.08
Acute diarrheal syndrome (ADS)	6.6%	155,319	4.1%	758.5	8.63
Acute respiratory infection (ARI)	0.3%	7,440	0.2%	30.5	0.35
Fever/Malaria	0.6%	13,518	0.1%	19.5	0.22
Total	100%	2,367,425	100%	18,620.4	211.8

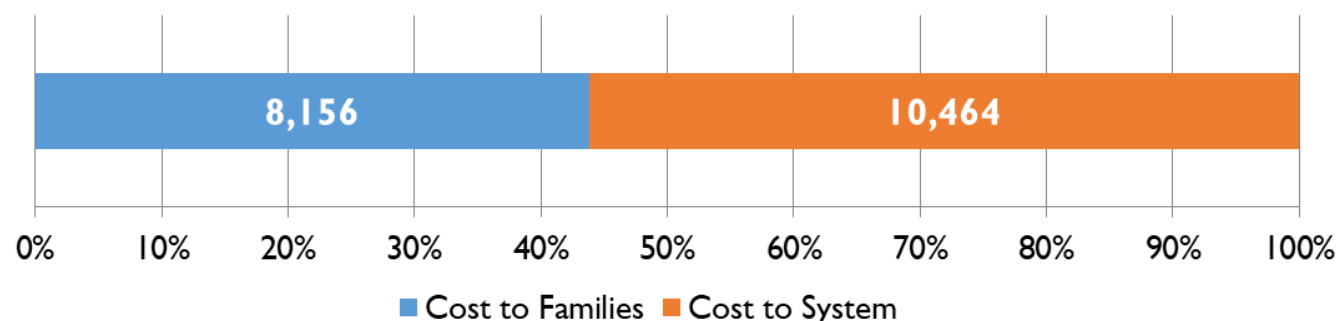
Most of the costs incurred were associated with the treatment protocol required to bring an underweight child back to a proper nutritional status.¹³ Despite low incidence of low birth weight cases, the cost of treating low birthweight children (LBW) was quite high, contributing to 25.5 per cent of the total health costs of all undernutrition related pathologies (Table 4.3). This is due to the special management protocol required by LBW children, which often includes hospitalization and time in intensive care.¹⁴

A large proportion of costs related to undernutrition are borne by families, as these children are often not provided with proper health care. As explained in the methodology section of this report, medical costs incurred in a treatment facility were used as shadow costs to estimate the burden borne by families. Figure 4.2 summarizes the institutional (public system) and costs to caretakers of treating pathologies associated with undernutrition. In Kenya, it is estimated that families bore around 44 per cent of the costs associated with undernutrition, while the cost to the health system was 56 per cent.

13. According to primary data collected from health posts and hospitals in Kenya, a child with a LBW requires to stay in the health facility for more number of days than for other pathologies. This ultimately increases the cost of treatment.

14. The 1,000 Days partnership promotes targeted action and investment to improve nutrition for mothers and children in the 1,000 days between a woman's pregnancy and her child's second birthday when better nutrition can have a life-changing impact on a child's future and help break the cycle of poverty. For more information, visit: <http://www.thousanddays.org/>

FIGURE 4.2: DISTRIBUTION OF PRIVATE AND PUBLIC COSTS (IN PERCENTAGES AND MILLIONS OF KSH)



Source: Model estimations based on demographic information and WHO/DHS nutritional surveys

Although the families of undernourished children incur some of the health costs related to undernutrition, the burden of this phenomenon was still an important expenditure component in the public sector. In 2014, the annual estimated cost to the public sector of Ksh 10.5 billion was equivalent to 10 per cent of the total budget allocated to health¹⁵ while the overall economic cost of undernutrition on health-related aspects of Ksh 18.6 billion was equivalent to 0.34 per cent of GDP.

B. Social and economic cost of child undernutrition in the education sector

There are many potential causes for repetition and dropout. However, there is substantive research that shows that students who were stunted before the age of 5 years are more likely to underperform in school (Melissa and Linda, 2004) because the cognitive development was interfered with, and thus leading to repetition and or drop out. The number of repetition and dropout cases considered in this section result from applying relative risk factors of repeating and dropping out (Daniels and Linda (2004) associated to stunted children to the information provided by the 2014 Basic Education Statistical Booklet. The primary and secondary unit cost estimations are based on information provided in the Comprehensive Public Expenditure Review (CPER) 2017.

(I) Effects on repetition

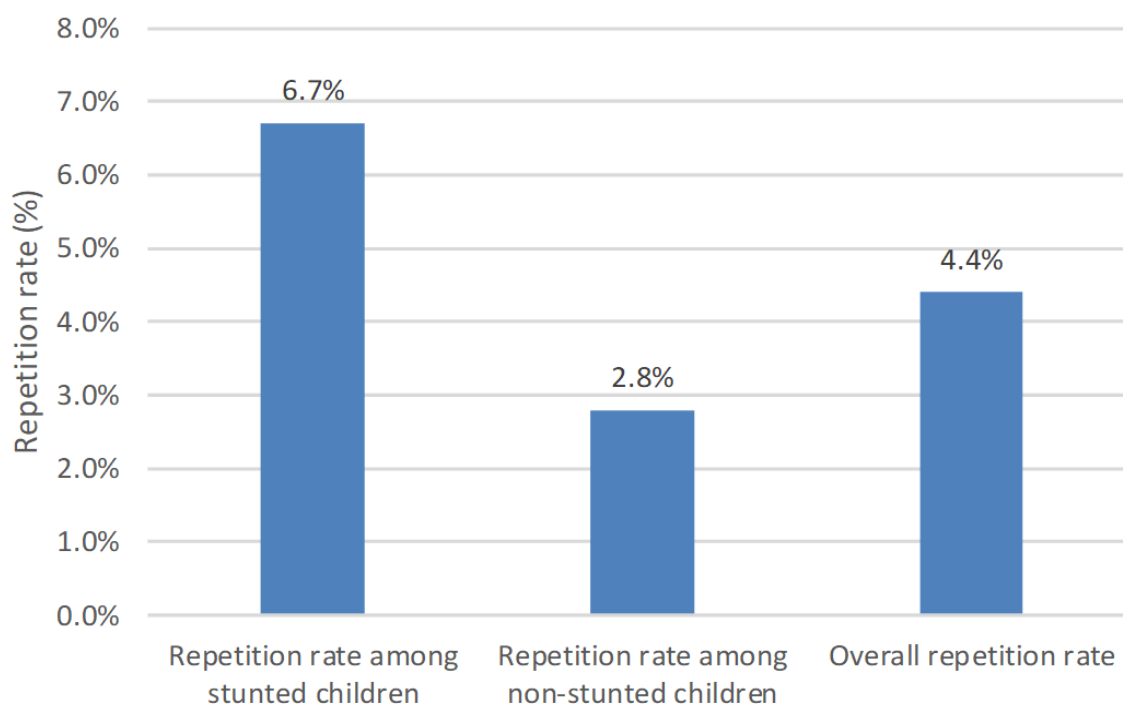
Children who suffered from undernutrition before 5 years of age are more likely to repeat grades, compared to those were not affected by undernutrition.¹⁶ In 2014, Net Enrolment Ratio (NER) was 88.2 per cent for primary school and 48.2 per cent for secondary school.¹⁷

Based on the 2014 Basic Education Statistical Booklet, 36,896 students repeated classes in secondary school while 502,616 pupils repeated classes in primary school, totalling 539,512 repeaters in both primary and secondary schools. During the same period, a total of 595,230 students (553,792 pupils in primary schools and 41,438 students in secondary schools) dropped out of school. Using data on increased risk of repetition among stunted students, the model estimated that the repetition rate for stunted children was 6.7 per cent, while the repetition rate for non-stunted children was 2.8 per cent (Figure 4.3). Thus, given the proportion of stunted students, the model estimates that 94,708 students or 17.5 per cent of all repetitions in 2014 were associated with stunting.

15. The 1,000 Days partnership promotes targeted action and investment to improve nutrition for mothers and children in the 1,000 days between a woman's pregnancy and her child's second birthday when better nutrition can have a life-changing impact on a child's future and help break the cycle of poverty. For more information, visit: <http://www.thousanddays.org/>.

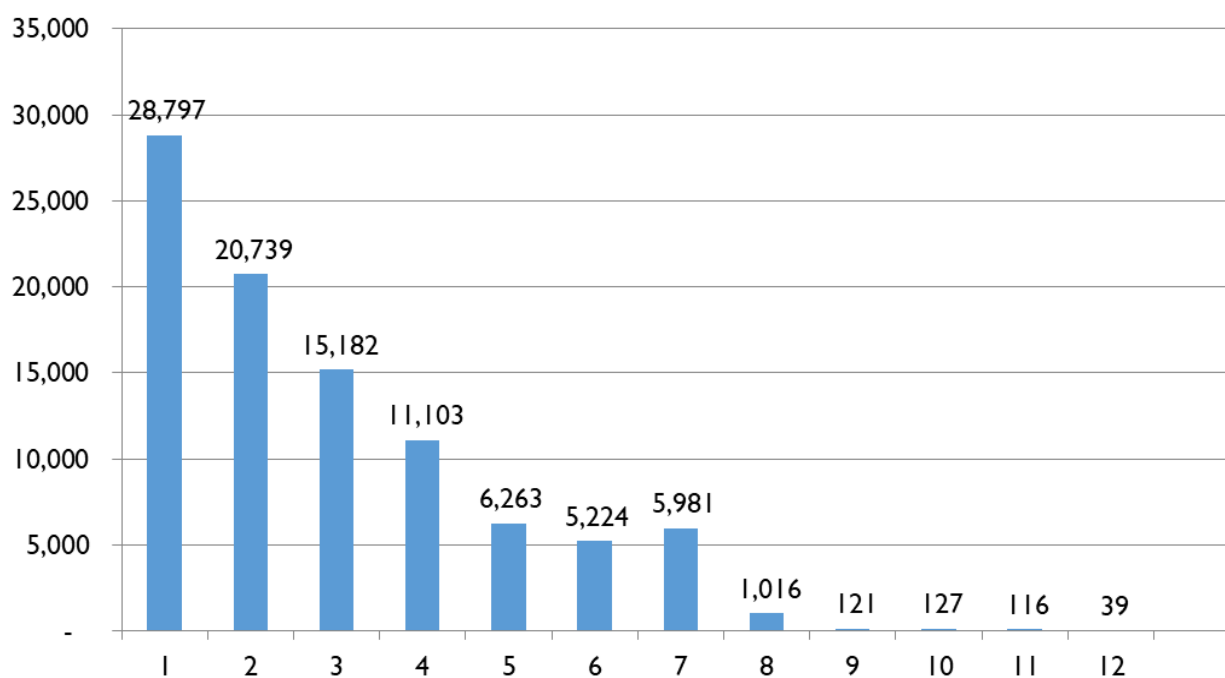
16. Fanzo (2019)

17. Ministry of Education (2014)

FIGURE 4.3: REPETITION RATES IN EDUCATION BY NUTRITIONAL STATUS, 2014 (%)

Source: Estimations based on data from Ministry of Education

As shown in Figure 4.4, most of these grade repetitions happen during the primary and preparatory school. There are far fewer children who repeat grades during secondary school. This largely due to the fact that many underperforming students would have dropped out of school before reaching secondary education.

FIGURE 4.4: GRADE REPETITION OF STUNTED CHILDREN, BY GRADE, 2014 (NUMBER)

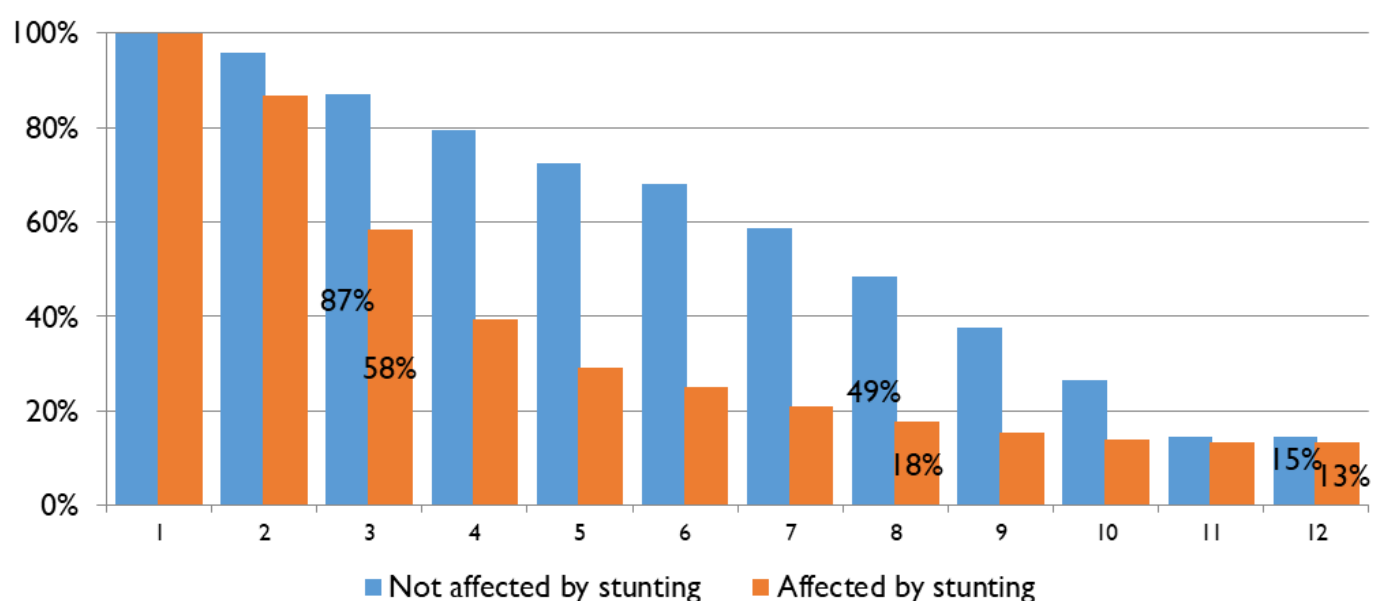
Source: Model estimation using data from 2014 Basic Education Statistical Booklet

(II) Effects on retention

Research shows that students who were stunted as children are more likely to drop out of school (Colclough et al., 2000). According to model estimates using data from the 2014 Basic Education Statistical Booklet and taking into account relative risks relating to the consequences of stunting on education, it can be estimated that only 16.9 per cent of stunted people (of working age) in Kenya completed primary school compared to 62.2 per cent of those who were never stunted.

The costs associated with school dropouts are reflected in the productivity losses experienced by individuals searching for opportunities in the labour market. As such, the impact is not reflected in the school age population, but in the working-age population. Therefore, in order to assess the social and economic costs in 2014, the analysis focused on the differential in schooling levels achieved by the population who suffered from stunting as children and the schooling levels of the population who were never stunted.

FIGURE 4.5: GRADE ACHIEVEMENT BY NUTRITIONAL STATUS, 2014 (%)



Source: Estimations based of data provided by NIT

(III) Estimation of public and private education costs

Repetition in schooling has direct cost implications for families and the school system. Students who repeat grades increase the cost to the education system, as they require additional resources to repeat the year, thus accruing twice as many resources as a result. In addition, the caretakers also have to pay for the additional year of education. In 2014, the estimated 94,708 students who repeated grades (these repetitions are attributed in part to undernutrition) costed the economy an estimated Ksh 3.2 billion. According to the 2014 Basic Education Statistical Booklet, the largest proportion of repetitions occurred during primary school. In primary education, the private budget cover 56.8 per cent of the associated costs of repeating a year, whereas in secondary the burden on the private budget increased to 57 per cent. In both cases, families cover a larger proportion of the burden, implying that private education costs due to these repetitions outweigh the public education costs. The following chart summarizes the public and private education costs associated with stunting.

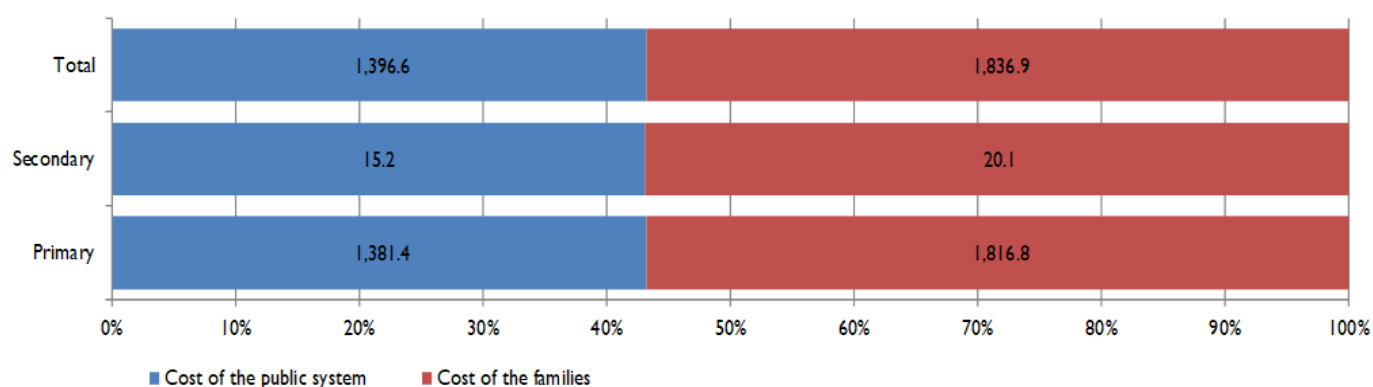
TABLE 4.4: COSTS OF GRADE REPETITIONS ASSOCIATED WITH STUNTING (IN MILLIONS OF KSH)

	Primary		Secondary		Total	
	In [Ksh]	In US\$	In [Ksh]	In US\$	In [Ksh]	In US\$
Number of repetitions associated with stunting (Number of pupils and students)		94,306		402		94,708
Public costs per student (Ksh)	14,648.2	166.6	37,794.2	429.9		
Total public costs (in millions)	1,381.47	15.7	15.2	0.2	1,396.6	15.9
Private costs per student (Ksh)	19,265.0	219.1	49,960	568.2		
Total private costs (in millions)	1,816.8	20.7	20.1	0.2	1,836.9	20.9
Total costs (in millions)	3,198.2	36.4	35.3	0.4	3,233.5	36.8
% social expenditure on education						1.4%

Source: Model estimation using data from 2014 Basic Education Statistical Booklet

As in the case of health, the social cost of undernutrition in education is shared between the public and private budget. Of the overall costs, an estimated total of Ksh 1.8 billion (56.8%) are being covered by private budget, while Ksh 1.4 billion (43.2%) is borne by the public education system (Table 4.6). Nevertheless, the distribution of this cost varied depending on whether the child repeated grades in primary or secondary education.

FIGURE 4.6: DISTRIBUTION OF COSTS IN EDUCATION (IN PERCENTAGES AND MILLIONS OF KSH)



Source: Estimations based of data provided by NIT

C. Social and economic cost of child undernutrition in productivity

Undernutrition reduces productivity through: i) lower levels of education attained by undernourished people; ii) loss in production capacity in the population due to larger mortality attributed to undernutrition; and iii) lower productivity due to less body mass attributed to undernutrition. Research shows that people in the working age population who suffered from stunting as children were less productive than those who were not stunted, leading to lower economic contribution. As described in the health section of the report, the model estimated that 41.4 per cent of the working-age population in Kenya were stunted as children. This represents 12.9 million people whose productivity potential is reduced due to undernutrition.

National productivity was significantly affected by historical rates of child undernutrition. The study confirmed previous research findings that stunted individuals, on average, achieve fewer years of schooling than non-stunted

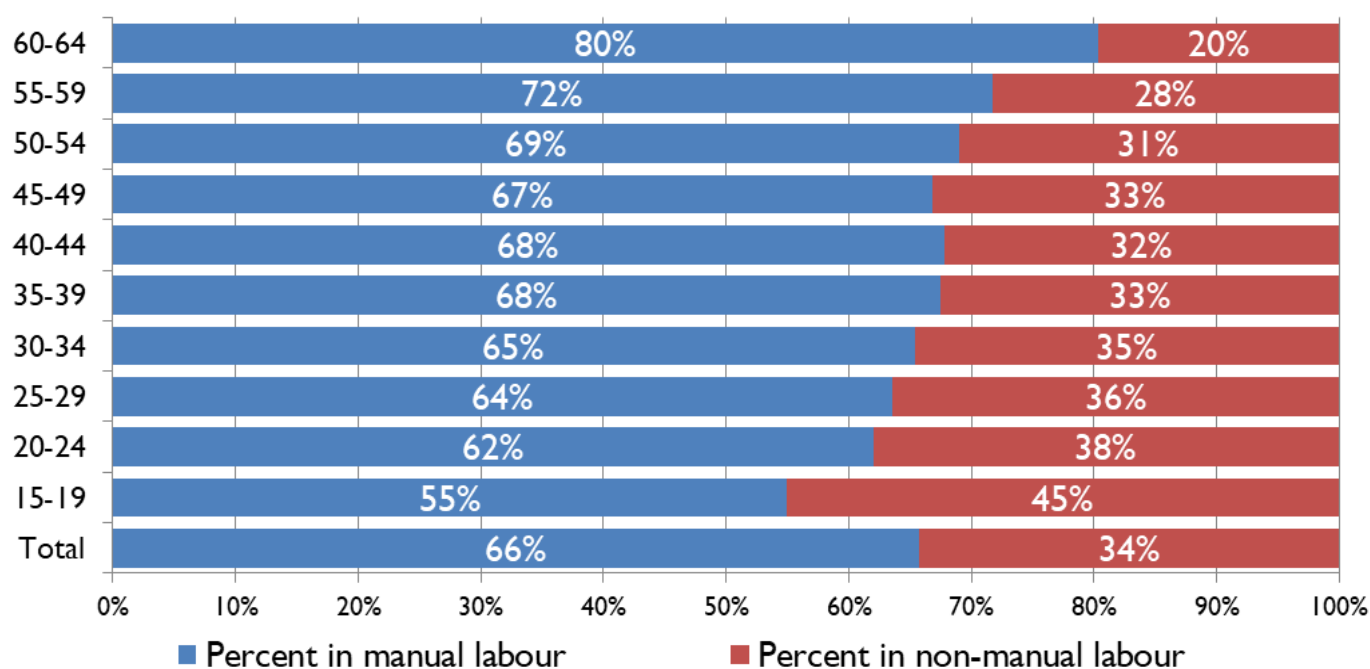
individuals Daniels and Linda (2004). In non-manual activities, higher academic achievement is directly correlated with higher income. Research shows that stunted workers engaged in manual activities tend to have less body mass (Nascimento et al., 2004), and were less productive in manual activities than those who were never affected by stunting (Haddad and Howarth, 1991). The population lost due to child mortality hinders economic growth, as they could have been healthy productive members of the society had they been alive.

The model utilized historical nutritional information, in-country demographic projections, adjusted mortality rates, and data reported in KDHS (2014) to estimate the proportion of the population whose labour productivity is affected by childhood undernutrition.

The cost approximations in labour productivity were estimated by identifying differential income associated with lower schooling in non-manual activities, and the lower productivity associated with people who were stunted in childhood in manual work, such as agriculture. The opportunity cost of productivity due to mortality was based on the expected income that a healthy person would have been earning had he or she been part of the workforce in 2014.

The distribution of the labour market was an important contextual element in determining the impact of undernutrition on national productivity. As shown in Figure 4.7, 66 per cent of the working age population were engaged in manual activities.¹⁸ Across all the age cohorts, the proportion of population engaging in manual labour was higher than the proportion engaging in non-manual labour.

FIGURE 4.7: MANUAL AND NON-MANUAL LABOUR DISTRIBUTION BY AGE, 2014 (%)



Source: Computed from Government of Kenya (2018), Kenya Integrated Household Budget Survey 2015/16

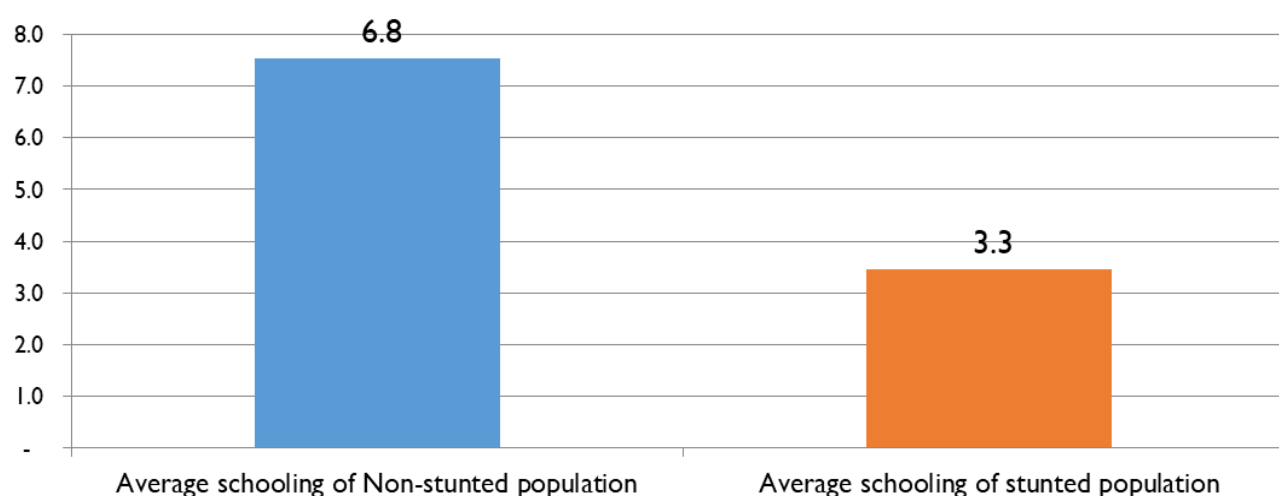
18. In this study, we define manual activities as those in the agricultural, forestry, fishing, mining, quarrying, manufacturing and construction subsectors. Non-manual activities include wholesale and retail trade, hotel and restaurants, import and export, transport, warehousing, communications, banking, insurance, real estate, business services, government, administration and social services and tourism.

(I) Loss from non-manual activities due to reduced schooling

As described in the education section of this report, students who were undernourished in their childhood completed, on average, fewer years of schooling than students who were adequately nourished as children (Daniels and Linda, 2004). This reduction in schooling years had a negative impact particularly on people who were engaged in non-manual activities, in which a higher academic education highly correlates with a higher income.

Data from the Kenya Integrated Household Budget Survey 2015/16 estimates an education gap of 3.5 years between the stunted and non-stunted population, as shown in Figure 4.8. It is important to note that over time, there has been an improvement in the average years of schooling among the working population. Whereas the cohort from 60-64 years showed average level of school education of 6.5 years, the cohort aged 20-24 showed an average of 4.8 years of education.

FIGURE 4.8: AVERAGE SCHOOLING YEARS FOR STUNTED AND NON-STUNTED POPULATION (IN YEARS OF EDUCATION)



Source: Computed from Government of Kenya (2018), Kenya Integrated Household Budget Survey

The lower educational achievement of the stunted population had an impact on the expected level of income a person would earn as an adult.¹⁹ As presented in Table 4.5, the model estimated that 4.5 million people engaged in non-manual activities suffered from childhood stunting. This represents 14.4 per cent of the country's labour force that was currently less productive due to lower schooling levels associated to stunting. The estimated annual losses in productivity for this group were Ksh 66.6 billion (US\$ 757.9 million) equivalent to 1.23 per cent of GDP in 2014.

19. Based on data obtained from average education years estimated for the working age population across the different cohorts.

TABLE 4.5: REDUCED INCOME IN NON-MANUAL ACTIVITIES DUE TO STUNTING, 2014

Age in 2014	Population working in non-manual sectors who were stunted as children	Income losses in non-manual labour	
		Millions of [Ksh]	millions of USD
15-19	967,270	5,631.9	64.1
20-24	708,579	2,870.5	32.6
25-29	659,967	8,098.2	92.1
30-34	547,294	7,892.9	89.8
35-39	435,230	11,981.4	136.3
40-44	357,635	7,330.5	83.4
45-49	306,259	11,390.4	129.6
50-54	239,116	7,664.7	87.2
55-59	185,786	3,383.0	38.5
60-64	111,215	390.8	4.4
Total	4,518,351	66,634.3	757.9
% GDP		1.2%	

Source: Computed from Government of Kenya (2018), Kenya Integrated Household Budget Survey 2015/2016

(II) Losses in manual activities

Manual activities are mainly observed in the agricultural, forestry and fishing subsectors, employing more than 66 per cent of the Kenyan population. Research shows that stunted workers engaged in manual activities tend to have less body mass (Nascimento et al., 2004) and are more likely to be less productive in manual activities than those who were never affected by stunting (Haddad and Howarth, 1991).

The study estimated that 20.3 million people from the working age population in Kenya were engaged in manual activities, of which 8.4 million were stunted as children. The lower productivity of the group engaged in manual labour who were stunted as children resulted to an annual loss in potential income of Ksh 96.7 billion (US\$ 1.1 billion), equivalent to 1.8 per cent of GDP in 2014 (Table 4.6).

TABLE 4.6: LOSSES IN POTENTIAL PRODUCTIVITY IN MANUAL LABOUR DUE TO STUNTING, 2014

Age in 2014	Population working in manual labour who were stunted as children	Income losses in manual labour	
		millions of [Ksh]	millions of US\$
15-19	1,289,154	847.6	9.6
20-24	1,156,102	7,192.7	81.8
25-29	1,153,130	12,845.6	146.1
30-34	1,034,481	16,842.1	191.6
35-39	903,939	14,756.5	167.8
40-44	753,033	12,142.0	138.1
45-49	616,208	10,751.4	122.3
50-54	532,226	9,052.7	103.0
55-59	470,701	8,407.9	95.6
60-64	456,209	3,831.4	43.6
Total	8,365,183	96,669.9	1009.5
% GDP		1.8%	

Source: Computed from Government of Kenya (2018), Kenya Integrated Household Budget Survey 2015 /16

(III) Opportunity cost due to mortality

From the study findings, there is an increased risk of child mortality associated with undernutrition (Black et al., 2008). The model estimated that 1.2 million of the working age population were not in Kenya's workforce in 2014 due to child mortality associated with undernutrition. This represents a 3.8 per cent reduction in the workforce. Considering the productive levels of the population, by their age and sector of labour, the model estimated that in 2014, the economic losses (measured by working hours lost due to child undernutrition) were an equivalent of Ksh 188.8 billion, which represented 3.5 per cent of the country's GDP.

TABLE 4.7: LOSSES IN POTENTIAL PRODUCTIVITY DUE TO MORTALITY ASSOCIATED WITH UNDERNUTRITION, 2014

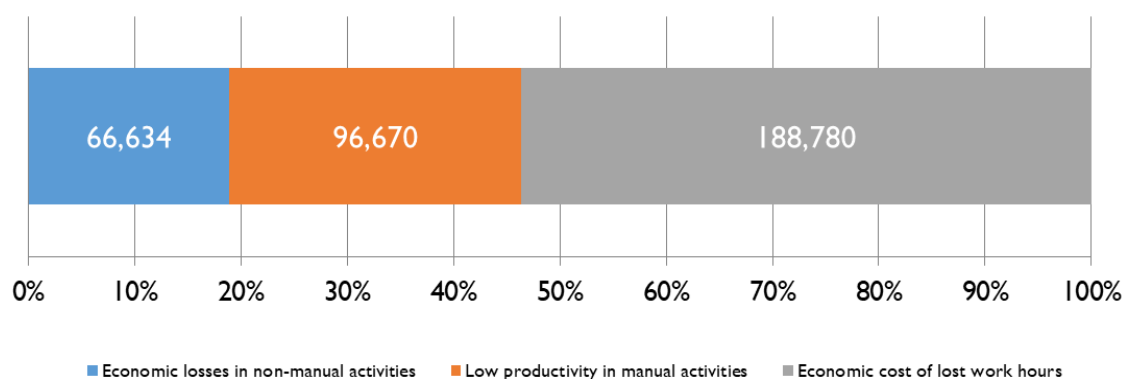
Age in 2012	Working hours lost due to higher mortality of underweight children (in millions of hours)	Income losses due to mortality	
		millions of Ksh	millions of US\$
15-19	169,687	3,008.74	34.22
20-24	152,789	13,733.43	156.20
25-29	142,781	21,236.75	241.55
30-34	126,154	26,274.68	298.85
35-39	121,570	26,147.13	297.4
40-44	104,353	21,855.61	248.59
45-49	105,275	24,038.18	273.41
50-54	96,691	21,755.49	247.45
55-59	88,918	20,696.85	235.41
60-64	82,220	10,032.86	114.11
Total	1,190,440	188,779.73	2,147.18
% GDP		3.50%	

Source: United Nations, Department of Economic and Social Affairs, Population Division (2015), *World Population Prospects: The 2015 Revision, DVD Edition*

(IV) Overall productivity losses

The total losses in productivity for 2014 were estimated at approximately Ksh 352.1 billion (US\$ 40 billion), which was equivalent to 6.5 per cent of Kenya's GDP. The largest share of productivity loss is attributed to productivity loss due to undernutrition-related mortality, which represents 53.6 per cent of the total cost. The income differential in manual labour due to the lower physical and cognitive capacity of people who suffered from stunting as children represents 27.5 per cent of the total costs. The lost productivity in non-manual activities represents 18.9 per cent of the costs as presented in Figure 4.9.

FIGURE 4.9: DISTRIBUTION OF LOSSES IN PRODUCTIVITY (IN PERCENTAGE AND MILLION KSH)



Source: COHA model estimates

Overall, Kenya lost an equivalent of about Ksh 373.9 billion in 2014, which represented 6.9 per cent of GDP due to child undernutrition. Productivity, health and education losses were estimated at Ksh 352.1 billion, Ksh 18.6 billion and Ksh 3.2 billion, respectively. The opportunity costs in productivity alone represented 6.52 per cent of GDP in 2014, followed by health and education at 0.34 per cent and 0.06 per cent, respectively.



Section

Analysis of Scenarios



Analysis of Scenarios

The previous chapter showed the social and economic costs that Kenya incurred in 2014 due to high historical trends of child undernutrition. Policies should be put in place and implemented to improve the lives of those already affected and reduce the incidence of childhood undernutrition.

The results presented in this section project the additional costs to the health and education sectors, and losses in productivity that the country will bear as a result of child undernutrition in future. In addition, they also indicate potential savings to be achieved. This is a call for action for the country to take preventive measures and reduce the number of undernourished children to avoid incurring these future costs and productivity losses.

Scenarios

The model generates a baseline that allows development of various scenarios based on Kenya's nutritional goals using the prospective dimension. These scenarios are constructed based on the estimated net present value of the costs of children born in each year between 2014 and 2025 and 2014 and 2030 in line with the World Health Assembly SDG nutrition-related targets and Kenya Vision 2030, respectively. The methodology follows each group of children and based on each scenario, estimates a progressive path towards achieving the set nutritional goals.

The scenarios developed are as follows:

1. Baseline: No reduction in stunting and underweight in Kenya.

In this scenario, the progress of reducing the prevalence of child undernutrition in Kenya stops at the levels achieved in 2014; i.e. stunting rate stagnates at 26 per cent while underweight rate remains at 11 per cent. It also assumes that the population growth would maintain the pace reported in 2014, the year of analysis, hence increasing the number of undernourished children and the estimated cost. As this scenario is highly unlikely, its main purpose is to establish a baseline, to which any improvements in the nutritional situation are compared to, in order to determine the potential savings in economic costs.

2. Scenario #1: Reducing by half the prevalence of child undernutrition in Kenya by 2025

In this scenario, the prevalence of stunted and underweight children would be reduced by half (50%) of their 2014 values. In the case of Kenya, this would mean a constant reduction of 1.34 percentage points annually in the stunting rate from 26 per cent (estimate in 2014) to 13 per cent in 2025. This is an ambitious target, considering that the average annual rate of stunting reduction between 2005 and 2010 was estimated at 0.52 per cent. Thus, this is most likely to require acceleration of strategic nutrition interventions and investments. In addition, underweight rate would be reduced from 11 per cent in 2014 to 5.5 per cent in 2025, meaning a constant annual reduction of 0.55 percentage points.

3. Scenario #2: The 'Malabo Goal' scenario. Reduce stunting to 10% and underweight children to 5 per cent by 2025.

In this scenario, in line with the Malabo Declaration on Nutrition Security, Kenya committed to ending child stunting by bringing down stunting to 10 per cent and underweight to 5 per cent by 2025. Currently, the stunting and underweight rates in Kenya are estimated at 26 per cent and 11 per cent, respectively. This requires an annual reduction of 1.5 per cent and 0.6 per cent points for stunting and underweight, respectively, from 2015 to 2025.

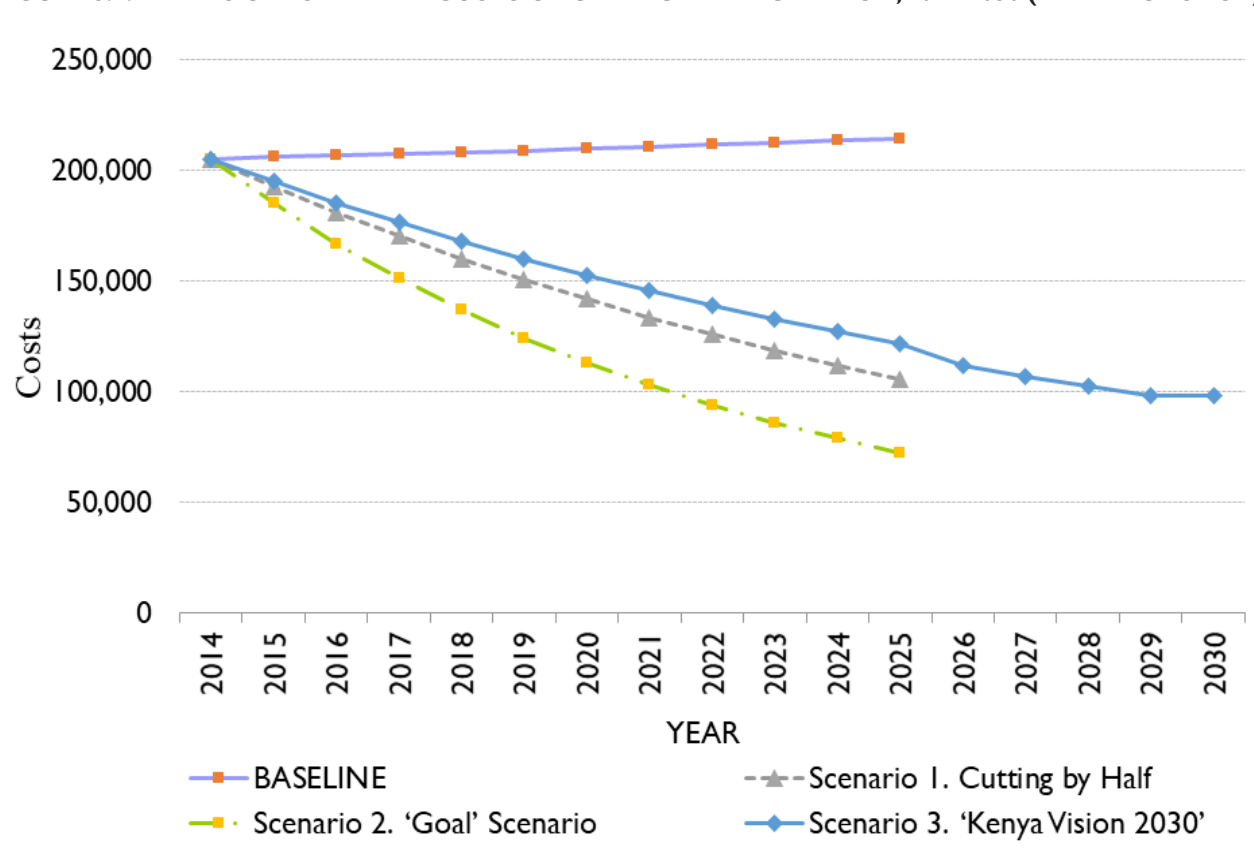
This Goal Scenario would require a true call for action and recommitment to enhance investment in nutrition, and would represent an important national and regional challenge, in which countries of the region could collaborate jointly in its achievement.

4. Scenario #3: The Kenya Vision 2030: Reducing stunting to 14.7% and underweight children to 8.4% by 2030

In this scenario, the prevalence of stunted children would be reduced to 14.7 per cent and the prevalence of underweight children under the age of five to 8.4 per cent. This plan is Kenya's government plan. It requires an annual reduction of 0.71 per cent and 0.16 per cent points for stunting and underweight, respectively, from 2015 to 2030.

As shown in Figure 5.1 and Table 5.1, the progressive reduction of child undernutrition generates a similar reduction in the costs associated to it. The distances between the trend lines would indicate the savings that would be achieved in each scenario.

FIGURE 5.1: TRENDS OF ESTIMATED COSTS OF CHILD UNDERNUTRITION, 2014-2030 (IN MILLIONS KSH)



Source: Authors' computations

In the baseline, where the progress of reduction of child undernutrition would stop at the levels of 2014, the total cost would increase by 4.4 per cent from Ksh 205 billion to Ksh 214 billion during the period leading to 2025. Similarly, in the Scenario 1, in which a reduction by half of the current prevalence is achieved, the total cost would reduce by 49 per cent to Ksh 105 billion. In the case of the Malabo Goal Scenario 2, on the other hand, there would be a 65 per cent reduction in the estimated total costs amounting to Ksh 72.2 billion. In the case of the Kenya Vision 2030 Scenario, there would be a 52 per cent reduction in the estimated total costs, amounting to Ksh 98.2 billion.

The potential economic benefits of reducing undernutrition are a key element in making a case for nutrition investments. The reduction in clinical cases in the health system, lowered grade repetition and improved educational performance as well as physical capacity are elements that contribute directly to the national productivity.

As presented in Table 5.2, cutting undernutrition by half by 2025 would represent a reduction in costs of over Ksh 436.9 billion, equivalent to US\$ 4.9 billion for the 11-year period from 2014 to 2025. Although the tendency of savings would not be linear, as they would increase over time with the achieved progress, a simple average of the annual savings would represent US\$ 39.7 million per year. In the case of the Goal Scenario, the savings would increase to Ksh 631.9 billion or US\$ 7.1 billion, which represents a simple average of US\$ 1,653 million per year.

TABLE 5.1: ESTIMATED TOTAL COSTS OF CHILD UNDERNUTRITION, BY SCENARIO, 2014-9 (IN MILLIONS OF KSH)

	2014	Scenarios for the Year 2025			
		Baseline. The Cost of Inaction	S1. Cutting by Half	S2. Malabo Goal Sce- nario	S3. Kenya Vision 2030 Scenario
Health Costs					
Increased Morbidity	22,309	32,419	17,282	16,054	20,180
Education Cost					
Increased Grade Repetition	3,958	4,622.4	2,914.3	1,681.2	1,310
Productivity Costs					
Lower Productivity in Non-Manual Activities	86,673	84,120	33,943	16,797	39,033
Lower Productivity in Manual Activities	57,238	57,242	31,213	19,405	31,334
Lower Productivity due to Mortality	34,904	35,812	19,904	18,348	6,375
Total Costs	205,082	214,216	105,256	72,284	98,233
Percentage Change from Baseline		4.4%	-49%	-65%	-52%

Source: Model estimations

TABLE 5.2: ESTIMATED SAVINGS FOR EACH SCENARIO, 2014 (MILLIONS OF KSH)

	S1. Cutting by Half		S2. Malabo Goal Scenario		S3. Kenya Vision 2030 Scenario	
	Ksh	US\$	Ksh	US\$	Ksh	US\$
Health Costs						
Reduced Morbidity	49,979	568.46	54,627	621.33	57,709	656.38
Education Costs						
Reduced Grade Repetition	6,910	78.66	12,799	145.57	15,631	177.79
Productivity Costs						
Higher Productivity in Non-Manual Activities	222,779	2,533.88	335,299	3,813.68	197,322	2,244.34
Higher Productivity in Manual Activities	98,090	1,115.67	153,334	1,744.02	110,658	1,258.62
Increased Working Hours	59,196	673.29	75,808	862.24	149,251	1,697.58
Total Savings	436,959	4,969.96	631,868	7,186.85	530,572	6,034.71
Average Annual Savings	39,724	451.81	57,442.5	653.35	33,161	377.17



Section

Conclusion and Recommendations



Conclusion and Recommendations

A. Conclusion

The economic impact associated with underweight and stunting in children is quite significant and has far reaching effects on productivity, health and education. The COHA studies that have already been concluded in Burkina Faso, Chad, Egypt, Ethiopia, Ghana, Lesotho, Madagascar, Malawi, Rwanda, Swaziland and Uganda show that these economies suffered an estimated annual loss ranging from 1.9 per cent to 16.5 per cent of Gross Domestic Product as a result of child undernutrition.

Child undernutrition increases the risk of morbidity and mortality; affects school attendance, performance, grade repetition; and overall economic productivity in the long-term. The findings of the COHA study in Kenya reaffirmed the results of similar studies in Africa, Latin America and the Caribbean that undernutrition in children has significant impacts on the economy.

Kenya is estimated to have lost an equivalent of about Ksh 373.9 billion in 2014, which represented 6.9 per cent of GDP. Productivity, health and education losses were estimated at Ksh 352.1 billion, Ksh 18.6 billion and Ksh 3.2 billion, respectively. The opportunity costs in productivity alone represented 6.52 per cent of GDP in 2014, followed by health and education at 0.34 per cent and 0.06 per cent, respectively. In recognition of ongoing efforts, there is need to eradicate undernutrition through three broad avenues encompassing enhanced implementation of programmes, multi-sectoral coordination and resource mobilization.

B. Recommendations

A. Health sector

- (i) Enhance budgetary allocation at the national level for nutrition interventions.
- (ii) The Ministry of Health should strengthen the implementation of the nutrition component within the community health strategy, with emphasis on addressing health sector determinants of maternal and child undernutrition, enhancing the monitoring of child growth and supporting sustainable change in behaviours towards improved maternal and child nutrition.
- (iii) The Government should exempt taxes on essential nutrition commodities such as Micro Nutrient Powder, Ready to Use Therapeutic Foods, fortification premixes and Fortified Blended Foods besides giving subsidies to these foods. This will make the products affordable, thereby reducing the cost of treatment and prevention of malnutrition. In addition, it will enable schools to incorporate commodities such as the Micro Nutrient powders used in the prevention of malnutrition within the school feeding programme.
- (iv) The products (Micro Nutrient Powder, Ready to Use Therapeutic Foods and Fortified Blended Foods) used in the treatment and prevention of malnutrition should be included in the essential drugs list.

B. Education sector

- (i) The Ministry of Education (MoE) and Ministry of Health (MoH) should disseminate and implement comprehensive school health and nutrition programme as stipulated in the Kenya School Health Policy and

Guidelines, 2018. There is need to increase funds allocation towards implementation of the comprehensive health and nutrition package by the national and county governments.

- (ii) Undertake a detailed analysis of per unit cost to feed a school going child. This will provide guidance to programmes both from government and development partners on how much is needed to adequately offer nutritious meals in schools to implement the national school meals programme.
- (iii) In collaboration with the Ministry of Health, review the existing school meals programme and develop guidelines to stipulate adequate and nutritious school meal that meet both the macro and micro nutrient needs while factoring in regional contexts and disparities.
- (iv) Early Childhood Development and Education (ECDE) and childcare facility regulations need to be developed to ensure that children under their care are handled properly as required to avoid contraction of communicable diseases, avoid injuries, and avoid malnutrition.
- (v) County governments should have budget lines for the ECDE feeding programme to ensure that children have adequate and appropriate meals.
- (vi) Hygiene and nutrition should be integrated in the teacher training curriculum in teacher training colleges.

C. Labour and productivity

- (i) Nutrition should be integrated as targeting component in social protection programmes for the highly vulnerable populations.
- (ii) Nutrition-sensitive interventions should be mainstreamed among public and private institutions, Ministries, Departments and Agencies' work plans and programmes at both national and county levels of government.

D. Cross cutting recommendations

1) Implementation and Coordination

- (i) Elevate the Division of Nutrition and Dietetics in the organogram of Ministry of Health to enable it to effectively coordinate the implementation of multi-sectoral nutrition action plan.
- (ii) Develop and implementation plan to actualize the COHA study recommendations.
- (iii) Establish the National Food and Nutrition Security Council in the Office of the President as stipulated in the National Food and Nutrition Security Policy Implementation Framework (2017-2022).

2) Resource Mobilization

- (i) The government should allocate adequate budget to address food and nutrition security.
- (ii) Develop and implement frameworks to facilitate tracking of finances towards nutrition interventions and services at national and county levels.

- (iii) Revise the Standard Chart of Accounts to provide a budget code for nutrition that will allow counties and national government to allocate funds that go directly to address the problem of malnutrition in the country..
- (iv) Establish an affirmative action that requires all social sectors to allocate budgets and spend on actions that ensure sustainable food and nutrition security.

3) Research, Monitoring and Evaluation

- (i) Establish a common multi-sectoral committee based at the National Food and Nutrition Security Council at the Office of the President for tracking food and nutrition indicators.
- (ii) Monitor and evaluate the set targets and ensure accountability in the implementation of actions/interventions spelt out in various frameworks.
- (iii) Undertake a study to define the minimal resources to be allocated per child towards nutrition enhancement.
- (iv) Undertake further analysis on the cost of hunger attributed to maternal undernutrition.
- (v) Model the cost of hunger over several other years i.e. over and beyond the study year for the present COHA study.
- (vi) Conduct county specific COHA studies/analysis.
- (vii) Document success stories and best practices on addressing malnutrition for replication and scaling up.

4) Advocacy

- (i) Strengthen political commitment towards prioritizing nutrition at national and county level.
- (ii) Advocate for food and nutrition as a key developmental agenda across sectors such as agriculture, water, irrigation, and infrastructural development.
- (iii) Advocate for food security and nutrition as a thematic area during the preparation of Medium-Term Plans and annual budgets.
- (iv) Develop an advocacy plan based on the COHA findings and other finance related studies/analysis from Kenya, targeting key stakeholders.



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WI Section

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Section

Annexes



Annex 1.

Glossary of Terms

1. **Average number of days required for hospitalization:** The average number of days a child needs to stay in a hospital when hospitalized, to receive adequate care.
2. **Average number of days required for Intensive Care Unit (ICU):** The average number of days a child needs to stay in the ICU when put in ICU care, to receive adequate care.
3. **Average number of primary care visits per episode:** When a child experiences a given pathology, he/she may require medical care multiple times. This variable is the average number of primary (outpatient) medical care visits a child requires per episode.
4. **Average waiting time spent at primary care:** When a caretaker brings a child to a primary care facility, the time the parent and child spend at the facility for waiting and receiving care.
5. **Cost of medical inputs per event during hospitalization:** This variable includes the medical materials (medicines, procedures) that are covered by the hospital for treatment of each pathology case.
6. **Cost of medical inputs per event in ICU:** This variable includes the medical materials (medicines, procedures) that are covered by the hospital for treatment of each pathology case in ICU.
7. **Cost of medical inputs per event in primary care:** This variable includes the medical materials (medicines, procedures) that are covered by the health facility for treatment of each pathology case.
8. **Costs not covered by the health system:** This variable includes the value of the inputs (i.e. medications) that are paid for by the family.
9. **Daily cost of hospital bed during hospitalization:** This variable includes the total cost to the hospital calculated per day per patient staying in the hospital. This value includes the cost of staff, facilities and equipment, as a unit cost per patient.
10. **Daily cost of hospital bed in ICU:** This variable includes the total cost to the hospital calculated per day per patient staying in the ICU. This value includes the cost of staff, facilities and equipment, as a unit cost per patient.
11. **Daily hours lost due to hospitalization:** The number of hours the caretaker spends at the hospital each day with the child when he/she brings a child to a primary care facility.
12. **Differential Probability (DP):** Refers to the difference between the probability of occurrence of a consequence (i.e., disease, grade repetition and lower productivity) given a specific condition. The model uses this variable specifically to determine the risk among those suffering from undernutrition and those who are not Economic Commission of Latin America Countries.
13. **Discount rate:** The interest rate used to assess a present value of a future value by discounting. In the model it is utilized to obtain the present value in the scenario section.

- 14. Dropout rate per grade:** Percentage of students who drop out of a grade in a given school year.
- 15. Episodes:** It is the number of disease events occurring for a given pathology. In the model it is based on a 1 year period, i.e. the number of times a specific pathology occurs in 1 year.
- 16. Food insecurity:** Exists when people lack access to sufficient amount of safe and nutritious food and therefore, are not consuming enough for an active and healthy life. This may be due to the unavailability of food, inadequate purchasing power or inappropriate utilization at household level.
- 17. Food vulnerability:** Reflects the probability of an acute decline in food access or consumption, often in reference to some critical value that defines minimum levels of human well-being World Food Programme.
- 18. Hunger:** The status of persons, whose food intake regularly provides less than their minimum energy requirements, i.e. about 1,800 kcal per day. It is operationally expressed by the undernourishment indicator.
- 19. Incidental retrospective dimension:** Used to estimate the cost of undernutrition in a country's population in a given year. The model applies it by looking at the health costs of pre-school children (0 to 5-year-olds) suffering from undernutrition, the education costs of school-age children (6 to 18-year-olds) and the economic costs resulting from lost productivity by working-age individuals (15 to 64-year-olds).
- 20. Intrauterine growth restriction (IUGR):** Refers to the foetal weight that is below the 10th percentile for gestational age. In the model, this is the only type of condition considered in the estimation of cost for low birth weight children.
- 21. Low Birth Weight (LBW):** A new-born is considered to have low birth weight when he/she weighs less than 2,500 grams.
- 22. 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 over nutrition (excessive food intake in relation to energy requirements).
- 23. Mortality rate:** The proportion of deaths per year in a given population, usually multiplied by a 10th population size so it is expressed as the number per 1,000, 10,000, 100,000, individuals per year.
- 24. Percentage of cases that attend health services:** The proportion of episodes for which a caretaker brings a child to a primary health facility for treatment.
- 25. Private costs:** These are costs met by households and individuals.
- 26. Productivity/Labour productivity:** Measures the amount of goods and services produced by each member of the labour force or the output per unit of labour. In the model, it refers to the average contribution that an individual can make to the economy, measured by consumption or income, depending on data availability.
- 27. Proportion of episodes requiring hospitalization:** When a child experiences pathology, he/she may require in-patient care. This variable identifies the proportion of the episodes by pathology, for which a child requires hospitalization.

- 28. Proportion of episodes requiring ICU:** When a child experiences pathology, he/she may require care in an ICU facility. This variable identifies the proportion of the episodes by pathology, for which a child requires ICU care.
- 29. Prospective or potential savings dimension:** This dimension makes it possible to project the present and future losses incurred as a result of medical treatment, repetition of grades in school and lower productivity caused by undernutrition among children under the age of five in each country, in a specific year.
- 30. Public social spending:** Social expenditure is the provision by public (and private) institutions of benefits to, and financial contributions targeted at, households and individuals in order to provide support during circumstances, which adversely affect their welfare, provided that the provision of the benefits and financial contributions constitutes neither a direct payment for a particular good or service nor an individual contract or transfer.
- 31. Relative risk:** Refers to the risk of an event occurring, given a specific condition. It is expressed as a ratio of the probability of the event occurring in the exposed group versus a non-exposed group. In the model it is used to establish the risk level of disease, lower educational performance or lower productivity relative to exposure to undernutrition.
- 32. Repetition rate per grade:** Number of repeaters in a given grade in a given school year, expressed as a percentage of enrolment in that grade in the previous school year.
- 33. 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.
- 34. Survival rate:** A rate calculated for a given geographic area that presents the likelihood of a person surviving in a given period of time.
- 35. Undernourishment:** Food intake that is continuously insufficient to meet dietary energy requirements. This term is used interchangeably with chronic hunger, or, in this report, hunger.
- 36. Undernutrition:** The result of prolonged low levels of food intake and/or low absorption of food consumed (undernourishment). It is generally applied to energy (or protein and energy) deficiency, but it may also relate to vitamin and mineral deficiencies.
- 37. 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.
- 38. Unit cost per attention in primary care:** This variable includes the total cost to the health facility per attention, comprising the cost of staff, facilities and equipment, as a unit cost per patient.
- 39. Wasting:** Reflects a recent and severe process that led to substantial weight loss, usually associated with starvation and/or disease. Wasting is calculated by comparing weight-for-height of a child with a reference population of well-nourished and healthy children.

Annex 2:

Technical note on methods and assumptions

Index	Source
First Economic data	
Gross Domestic Product	International monetary fund data for 2014 Kenya National Bureau of Statistics–KNBS (Various), Economic Survey. Nairobi: Government Printer
USD exchange rate	International monetary fund data for 2014 Central Bank of Kenya, www.centralbank.go.ke/index.php/exchange-rates/
Purchasing power parity	International monetary fund data for 2014 Central Bank of Kenya (2012a), Monetary Policy Statement, December 2012. Nairobi: Central Bank of Kenya. Central Bank of Kenya (2012b), Statistical Bulletin, June 2012. Nairobi: Central Bank of Kenya. KNBS (2017). Economic Survey. Nairobi: Government (pp 87)
Social Expenditure	Ministry of Finance, Kenyan Economic Monitor, December 2010. KNBS (2018). Statistical Abstract. Nairobi: Government Printer
Health Expenditure	World Health Organization. KNBS (2018), Statistical Abstract
Education Expenditure	Ministry of Finance, Kenyan Economic Monitor, December 2010. Statistical Abstract 2018 – KNBS
Average transport cost (two public transportation tickets in urban areas in local currency)	Central Agency for Public Mobilization and Statistics (CAPMAS), Household Income, Expenditure and Consumption Survey (HIECS) 2008/ 2009, Table 2-2. Expert Opinion KNBS and NIT Reference made to the KNBS New Commodity Consumer Price Index, 2018
Minimum wage per hour	KNBS (Various), Economic Survey. Nairobi: Government Printer
Average wage per hour	KNBS (Various), Economic Survey. Nairobi: Government Printer. Computations from the Kenya Integrated Household Budget Survey, 2015/16
Annual consumer price index	Obtained from KNBS
Average income per years of schooling	Computations from the Kenya Integrated Household Budget Survey, 2015/16
Annual average income related to productive work, manual intensive activities (Agriculture, Forestry, Fishery, Mining) by age	Computations from the Kenya Integrated Household Budget Survey, 2015/16
Annual average income related to productive work, NON manual intensive activities (Excluding Agriculture, Forestry, Fishery, Mining) per years of schooling and age	Computed from KIHBS 2015/16 Labour Module. Based on four groups of educational categories

Index	Source
Average working hours per week	Computed from KIHBS 2015/16 Labour Module - Based on four groups of educational categories
Annual worked hours per age group	Computed from KIHBS 2015/16 Labour Module - Based on four groups of educational categories
Employment rate	KNBS (2018). Labour Force Basic Report. Nairobi: Government Printer. (based on the 2015/16 Kenya Integrated Household Budget Survey)
Second Demographic Data	
Volume of Births	Kenya Integrated Household Budget Survey 2015/16, UNDESA
Death rate	Kenya Integrated Household Budget Survey 2015/16, UNDESA
Distribution of workers by Manual and Non-Manual Labor per age group	Kenya National Bureau of Statistics (KNBS) (Various), Economic Survey. Nairobi: Government Printer
Distribution of workers by educational status	Calculated from the Kenya Integrated Household Budget Survey 2015/16
Working age population (WAP) by educational level	Calculated from the Kenya Integrated Household Budget Survey 2015/16
Third Health Data	
Underweight prevalence for the year of analysis or last available	Calculated from Kenya Demographic Health Survey data, 2005 and 2008. KDHS 2014, Mbagathi Hospital, KHIS 2019 and WHO
Stunting prevalence for the year of analysis or last available	Calculated from Kenya Demographic Health Survey data, 2005 and 2008. KDHS 2014, Mbagathi Hospital, KHIS 2019 and WHO http://www.who.int/nutgrowthdb/database/countries/ken/en/
Underweight prevalence of children under 5 years old	Calculated from Kenya Demographic Health Survey data, 2005 and 2008. KDHS 2014, Mbagathi Hospital, KHIS 2019 and WHO
Underweight mode prevalence	Calculated from Kenya Demographic Health Survey data, 2005 and 2008
Stunting prevalence of children under 5 years old	Calculated from Kenya Demographic Health Survey data, 2005 and 2008
Stunting mode prevalence	Calculated from Kenya Demographic Health Survey data, 2005 and 2008
Number of annual disease events (anaemia, ADS, ARI, Stunting, Underweight, Wasting) by Age group	<p>Estimated by health specialists and experts through in-depth interview. Data source: 2018 Kenya Household Health Expenditure and Utilization survey, KDHS 2014, Mbagathi Hospital, KHIS 2019. The incidence rate for Diarrhoea for 28 days -11 months is 5 incidents per child, 12-23 months is 5 incidents per child and 24 -59 months is 3 incidents per child</p> <p>The incidence rate for Fever/malaria for 28 days -11 months is 1 incident per child, 12-23 months is 1 incident per child and 24 -59 months is 1 incident per child</p> <p>The incidence rate for ARI for 28 days -11 months is 3 incidents per child, 12-23 months is 3 incidents per child and 24 -59 months is 3 incidents per child</p> <p>The incidence rate for Underweight for 28 days -11 months is 3 incidents per child, 12-23 months is 2 incidents per child and 24 -59 months is 2 incidents per child</p> <p>The incidence rate for Anaemia for 28 days -11 months is 2 incidents per child, 12-23 months is 2 incidents per child and 24 -59 months is 1 incident per child</p>

Index	Source
Average number of primary care visits for each pathology (anaemia, ADS,ARI, Stunting, Underweight, Wasting) by Age group	<p>Estimated by health specialists and experts through in-depth interview. Data source: 2018 Kenya Household Health Expenditure and Utilization survey, KDHS 2014, Mbagathi Hospital, KHIS 2019</p> <p>The average visits for primary care for Diarrhoea for 28 days -11 months is 5 visits per child, 12-23 months is 5 visits per child and 24 -59 months is 3 visits per child.</p> <p>The average visits for primary care for Fever/Malaria for 28 days -11 months is 1 per child, 12-23 months is 1 visit per child and 24 -59 months is 1 visit per child</p> <p>The average visits for primary care for ARI for 28 days -11 months is 3 visits per child, 12-23 months is 3 visits per child and 24 -59 months is 2 visits per child</p> <p>The average visits for primary care for Underweight for 28 days -11 months is 3 visits per child, 12-23 months is 2 visits per child and 24 -59 months is 1 visit per child</p>
Proportion of events of pathology (anaemia,ADS,ARI, Stunting, Underweight,Wasting) by Age group requiring hospitalization	<p>Estimated by health specialists and experts through in-depth interview. Data source: 2018 Kenya Household Health Expenditure and Utilization survey, KDHS 2014, Mbagathi Hospital, KHIS 2019</p> <p>Diarrhoea episodes between 28 days- 11 months 30 per cent, 12 -23 months 50 per cent and 24-59 months is 60 per cent</p> <p>Fever/malaria episodes between 28 days- 11 months 30 per cent, 12 -23 months 20 per cent and 24-59 months is 10 per cent.</p> <p>ARI episodes between 28 days- 11 months 30 per cent, 12 -23 months 30 per cent and 24-59 months is 80 per cent</p> <p>Underweight episodes between 28 days- 11 months 50 per cent, 12 -23 months 50 per cent and 24-59 months is 60 per cent.</p> <p>Anaemia episodes between 28 days- 11 months 50 per cent, 12 -23 months 50 per cent and 24-59 months is 50 per cent</p>
Average number of days of hospital treatment for each event (anaemia, ADS,ARI, Stunting, Underweight, Wasting) by Age group	<p>Estimated by health specialists and experts through in-depth interview. Data source: 2018 Kenya Household Health Expenditure and Utilization survey, KDHS 2014, Mbagathi Hospital, KHIS 2019</p> <p>The average days for hospital treatment for Diarrhoea for 28 days -11 months is 3 days per child, 12-23 months is 3 days per child and 24 -59 months is 3 days per child</p> <p>The average days for hospital treatment for Fever/malaria for 28 days -11 months is 3 days per child, 12-23 months is 3 days per child and 24 -59 months is 3 days per child</p> <p>The average days for hospital treatment for ARI for 28 days -11 months is 3 days per child, 12-23 months is 3 days per child and 24 -59 months is 3 days per child</p> <p>The average days for hospital treatment for underweight for 28 days -11 months is 7 days per child, 12-23 months is 7 days per child and 24 -59 months is 7 days per child</p> <p>The average days for hospital treatment for 28 days -11 months is 5 days per child, 12-23 months is 5 days per child and 24 -59 months is 5 days per child</p>
Proportion of events of pathology (anaemia,ADS,ARI, Stunting, Underweight,Wasting) by Age group requiring intensive treatment (ICU)	<p>Estimated by health specialists and experts through in-depth interview</p>

Index	Source
Average number of days of intensive treatment UTI / UCI for each event (anaemia, ADS, ARI, Stunting, Underweight, Wasting) by Age group	Estimated by health specialists and experts through in-depth interview
Average waiting time spent at primary care attention (anaemia, ADS, ARI, Stunting, Underweight, Wasting) by Age group	<p>Estimated by health specialists and experts through in-depth interview. Source: NIT's computation from Ministry of Health - Mbagathi Government Hospital: 1. Paeds In-Patient Register 2. Integrated Management Childhood Illnesses (IMCI)</p> <p>Average waiting time for diarrhea 28 days-11 months 50 minutes, 12-23 months 50 minutes, 24 -59 months 50 months</p> <p>Average waiting time for Fever/Malaria 28 days-11 months 30 minutes, 12-23 months 50 minutes, 24 -59 months 50 months</p> <p>Average waiting time for ARI 28 days-11 months 50 minutes, 12-23 months 50 minutes, 24 -59 months 50 months</p> <p>Average waiting time for underweight 28 days-11 months 1 hour, 12-23 months 1 hour, 24 -5 months 1 hour</p> <p>Average waiting time for Anaemia 28 days-11 months 3 hours, 12-23 months 3 hours, 24 -5 months 3 hours</p>
Daily hours lost due to hospitalization (anaemia, ADS, ARI, Stunting, Underweight, Wasting) by Age group	<p>Estimated by health specialists and experts through in-depth interview. Source: KDHS 2014, Mbagathi Hospital KHIS 2019</p> <p>An average estimate of 8 hours was observed across all the pathological incidences</p>
Average unit cost for attention in primary care by age group and pathology (anaemia, ADS, ARI, Stunting, Underweight, Wasting), for the year of analysis (x) in local currency	<p>Estimated by health specialists and experts through in-depth interview. KDHS 2014, Mbagathi Hospital KHIS 2019 Kemsal LMIS Drug list 2018</p> <p>Costs includes extra cost of care borne by the family</p> <p>Calculation of health cost includes; Consultation fee, cost of bed, cost of laboratory tests, cost of drugs as per MOH standard case management protocol, KEMSA LMIS Drug Price List 2018</p>
Average cost of medical inputs for event in primary care by age group and pathology (anaemia, ADS, ARI, Stunting, Underweight, Wasting), for the year of analysis (x) in local currency	Estimated by health specialists and experts through in-depth interview. KDHS 2014, Mbagathi Hospital KHIS 2019
Average unit cost for attention in hospital by age group and pathology (anaemia, ADS, ARI, Stunting, Underweight, Wasting), for the year of analysis (x) in local currency	Estimated by health specialists and experts through in-depth interview. KDHS 2014, Mbagathi Hospital KHIS 2019
Average cost of medical inputs for event in hospital by age group and pathology (anaemia, ADS, ARI, Stunting, Underweight, Wasting), for the year of analysis (x) in local currency	Estimated by health specialists and experts through in-depth interview. KDHS 2014, Mbagathi Hospital KHIS 2019

Index	Source
Average unit cost for attention in hospital intensive care unit by age group and pathology (anaemia, ADS, ARI, Stunting, Underweight, Wasting), for the year of analysis (x) in local currency	Estimated by health specialists and experts through in-depth interview
Average cost of medical inputs for event in hospital intensive care unit by age group and pathology (anaemia, ADS, ARI, Stunting, Underweight, Wasting), for the year of analysis (x) in local currency	Estimated by health specialists and experts through in-depth interview
Average unit private cost by age group and pathology (anaemia, ADS, ARI, Stunting, Underweight, Wasting), for the year of analysis (x) in local currency,	Estimated by health specialists and experts through in-depth interview. KDHS 2014, Mbagathi Hospital KHIS 2019
Average private cost of medical inputs for event by age group and pathology (anaemia, ADS, ARI, Stunting, Underweight, Wasting), for the year of analysis (x) in local currency,	Estimated by health specialists and experts through in-depth interview. KDHS 2014, Mbagathi Hospital KHIS 2019
Percentage of low birth weight children	Kenya Demographic Health survey 2008, KDHS 2014, Mbagathi Hospital KHIS 2019
Proportion of events of LBW requiring/access hospitalization	Estimated by health specialists and experts through in-depth interview. KDHS 2014, Mbagathi Hospital KHIS 2019
Average number of days of hospital treatment	Estimated by health specialists and experts through in-depth interview. KDHS 2014, Mbagathi Hospital KHIS 2019
Proportion of events of LBW requiring intensive treatment UTI / UCI	Estimated by health specialists and experts through in-depth interview
Average number of days of intensive treatment	Estimated by health specialists and experts through in-depth interview
Average waiting time (in hours) spent by an adult accompanying a child patient requiring hospitalization	Estimated by health specialists and experts through in-depth interview. Computation by NIT's from Ministry of Health - Mbagathi Government Hospital: 1. Paeds In-Patient Register 2. Integrated Management Childhood Illnesses (IMCI)
Education Data	
Initial enrolment by years of education	Data were obtained from Ministry of Education
Final enrolment by years of education	Data were obtained from Ministry of Education
Number of passes by years of education	Data were obtained from Ministry of Education

Index	Source
Number of dropouts (rate) by years of education	Data were obtained from Ministry of Education
Number of population repeating grades (rate) by years of education	Data were obtained from Ministry of Education
Private cost per student / year by educational grade	Data were obtained from Kenya Integrated Budget Survey 2015/16
Total Number of students year 2009	Ministry of Education, Statistical Yearbook
Public cost per student	Estimated based on "Education Public Expenditure Tracking Survey (PETS)" prepared by ministry of finance, in 2012
Morbidity differential probability for anaemia among healthy versus underweight children by age groups	Calculated from Kenya Demographic Health Survey data, 2014 and Kenya Integrated Budget Survey 2015/16
Morbidity differential probability for ADS among healthy versus underweight children by age groups	Calculated from Kenya Demographic Health Survey data, 2014 and Kenya Integrated Budget Survey 2015/16
Morbidity differential probability for ARI among healthy versus underweight children by age groups	Calculated from Kenya Demographic Health Survey data, 2014 and Kenya Integrated Budget Survey 2015/16
Morbidity differential probability for anaemia among healthy versus stunted children by age groups	Calculated from Kenya Demographic Health Survey data, 2014 and Kenya Integrated Budget Survey 2015/16
Morbidity differential probability for ADS among healthy versus stunted children by age groups	Calculated from Kenya Demographic Health Survey data, 2005 and 2008. Source: extracted from KDHS 2014 under Child Health Section – from Page 149
Morbidity differential probability for ARI among healthy versus stunted children by age groups	Calculated from Kenya Demographic Health Survey data 2014
Probability ratio of death between those who suffered from undernutrition	Calculated from Kenya Demographic Health Survey data 2014
Probability ratio of death between those who suffered from stunting	Calculated from Kenya Demographic Health Survey data 2014
Higher probability (relative risk) of stunted of repeating grades.	Calculated from Education Statistics Data 2014
Higher probability (relative risk) of stunted of dropping out.	Calculated from Education Statistics Data 2014
Monthly hours worked	Calculated based on Working hour average per week which was calculated from Kenya Demographic Health Survey data, 2014 and Kenya Integrated Budget Survey 2015/16
Average travel time for ambulatory care	Calculated from Kenya Demographic Health Survey data, 2014 and Kenya Integrated Budget Survey 2015/16

Annex 3: Overview of the COHA model

The model for the COHA study represents a step forward in estimating the social and economic consequences of child undernutrition in Africa. Several national and regional efforts have been implemented to assess the costs of undernutrition globally and in the region. Notable initiatives at the regional level include those led by ECLAC, carried out jointly with WFP in Latin America and the Caribbean (LAC) and the PROFILES initiatives²⁰ which developed similar country-level estimations in selected countries worldwide. The COHA, however, represents the only effort constructed for the African continent, involving nutrition experts from the continent, who provided recommendations during the adaptation process, with critical support of country teams. The model developed by ECLAC to estimate the social and economic consequences on child undernutrition in LAC²¹ presented the most appropriate base to develop a model for Africa. In the development of the model for LAC, the authors focused on the consequences of child undernutrition from a life-cycle approach, avoiding the potential overlaps with other nutritional deficiencies. This approach proved to be an important political instrument to mobilize stakeholders around nutrition in LAC and was considered by many to be state-of-the-art knowledge in this field.

The development of the COHA model proved to be a good practice of South-South collaboration between two regional UN Economic Commissions. ECLAC, AUC and WFP Africa office worked together in a series of joint technical activities and consultations to transfer knowledge and generate the adjustments for the development of the new model to Africa. An interdivisional working group was created within ECA that included the African Centre for Statistics, the African Centre for Gender and Social Development, the Economic Development and NEPAD Division of the ECA as well as a number of UN partners, namely WFP, UNICEF, the International Labour Organization (ILO) and WHO – to ensure multidisciplinary contributions in the development of the model.

At the regional level, the technical validation of the COHA model was provided by the African Task Force for Food and Nutrition Development (ATFFND). The Task Force, which brings together regional nutrition experts and practitioners, was the ideal body to provide guidance in the development of the model. In consecutive meetings, the ATFFND provided key recommendations, thus laying out a roadmap for the adaptation process, and finally expressed its satisfaction with the proposed COHA model.

Adapting the COHA process

To facilitate the implementation of the project, leadership roles were identified: the AUC Department of Social Affairs and the NEPAD Planning and Coordinating Agency led the initiative; ECA/ECLAC coordinated its implementation, while WFP and other partners supported the capacity building process, both at regional and country levels. Further, the following governing structures were established:

1. The Steering Committee/ATFFND: The high-level Steering Committee is chaired by the AUC. The Steering Committee is charged with convening partner organizations, approving the study design and action plan and overseeing the implementation of the study and dissemination of results. The Steering Committee also provides political support to the initiative.
2. The Regional Secretariat: The Regional Secretariat, based at WFP Africa office, worked through a small technical team, drawn from NEPAD, AUC, WFP, ECLAC and other relevant organizations, to support the preparation, implementation and dissemination of the study, and to facilitate smooth and quality work of the national

²⁰ "FHI 360 Profiles," FHI 360 Profiles, accessed on 27 September 2013, <http://fhi360profiles.org/>.

²¹ Rodrigo Martínez and Andrés Fernández (2007), Model for Analysing the Social and Economic Impact of Child Undernutrition in Latin America (Santiago de Chile: Naciones Unidas, CEPAL, Social Development Division, 2007).

implementation teams and expert committees. The Secretariat reported to the Steering Committee and executed the study budget.

3. The National Implementation Team (NIT): The core implementation of the study was carried out by a national team 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. In certain situations, a broader reference group was also created to include other actors and United Nations agencies, such as WFP, UNICEF and WHO. The WFP country offices facilitated the process according to specific country situations and supported coordination of the NIT as required.

For the initial phase of the project, a number of criteria were agreed upon to select the initial countries. The requirements were as follows:

1. Data availability: The availability of at least two recent, nationally representative survey datasets on fertility, family planning, maternal and child health, gender, malaria and nutrition, preferably the Demographic and Health Survey (DHS).
2. Sub-regional coverage: At least one country selected from each AU region: Community of Sahel-Saharan States (CEN-SAD), Common Market for Eastern and Southern Africa (COMESA), Economic Community of Central African States (ECCAS), Economic Community of Western African States (ECOWAS), Intergovernmental Authority for Development (IGAD), Southern African Development Community (SADC) and Union du Maghreb Arabe (UMA). Overlapping membership to various Regional Economic Communities was also taken into account in the final selection of countries.
3. Socio-economic representation: Prevalence of poverty and under-nourishment in the overall population and occurrence of episodes of drought or other natural disasters.
4. Existence of a national platform on malnutrition and hunger.

Based on these criteria, 12 initial countries were selected. Eight (8) of these countries, namely Egypt, Ethiopia, Swaziland, Uganda, Burkina Faso, Ghana, Malawi, and Rwanda have completed the study. Beyond the initial selection of countries studied, the study has been completed in Chad, Madagascar, Lesotho and the Democratic Republic of Congo.

Annex 4:

Brief Description of COHA Data Collection Process in Kenya

The data collection process was led by members of the National Implementation Team. The process was initiated with a regional training held in Nairobi from 2nd to 6th July, 2018. The NIT team was introduced to COHA-Kenya and developed a work plan and assigned responsibilities among the specialists. On 17th-21st December 2018, a workshop was held in Nakuru where the National Implementation Team was sensitized on the methodology and a work plan was developed to implement the COHA study in Kenya. For analysis, both primary and secondary data sources were utilized. For the health sector, the Kenya Demographic Household Surveys (KDHS) and the hospital records of Mbagathi Hospital in Nairobi, Kenya were used. In addition, primary data was collected by conducting surveys and interviews with health specialists in the aforementioned health facilities.

These questionnaires included a template on medical inputs per pathology, created on the basis of WHO guidelines, to assess which medical input is used and which not or which additional medical input per pathology in general is also given to the patient of the respective pathology. Subsequently, the costs of these medical inputs were estimated on the basis of the hospital records. The questionnaire was also used to calculate the amount of time each staff member dedicated to a certain case of pathology. Based on the hospital records, the unit cost of attention was accordingly calculated by taking into account the individual salary of each staff member involved and the time they spend on a pathology case. Finally, the hospital records also formed the basis to estimate the cost of a hospital bed, which was calculated by dividing the annual overhead costs (which consists of the operational costs such as water, electricity, gas and staff) of the hospital by the annual number of in-patients.

The Kenya Integrated Household Budget Survey 2015/16 was used to obtain information on labour. This survey provides information related to income, expenditure, education among many other related information.

After the data collection and/or collation process, the NIT team organized a validation workshop in Nairobi in August 2019. The purpose of the workshop was to validate the results of the Cost of Hunger in Kenya and produce recommendations for the future. The final report of the Cost of Hunger in Kenya was validated and approved by the African Union Commission and the Government of Kenya in 2019.





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