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Children Malnutrition and Horizontal Inequalities in Sub-Saharan Africa: A Focus on Contrasting Domestic Trajectories

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This paper is part of a series of recent research commissioned for the African Human Development Report. The authors include leading academics and practitioners from Africa and around the world, as well as UNDP researchers. The findings, interpretations and conclusions are strictly those of the authors and do not necessarily represent the views of UNDP or United Nations Member States. Moreover, the data may not be consistent with that presented in the African Human Development Report.

Abstract: Over the past two decades Sub-Saharan African countries have experienced accelerated economic growth. This positive trend represents a huge opportunity to improve the living standards of millions of Africans and foster inclusive and sustainable development. At the regional level however, such improvements do not seem to have translated into higher human development. Child malnutrition indicators in particular have registered some relatively limited advances. This paper contributes to the literature by providing a more accurate and nuanced view on the progress made with regards to child malnutrition and inequalities across Sub-Saharan Africa.

Focusing on a sample of seven countries – Burkina, Kenya, Malawi, Rwanda, Cameroon, Ghana and Nigeria this studies analyzes the evolution of three anthropometric indicators: underweight, stunting and wasting, and elaborates a classification of countries based on how inequalities in child malnutrition have changed over the past two decades. Three main types of trajectories can be identified: first, the case of countries where improvements in aggregate malnutrition have been offset by large increases in inequality (Cameroon, Rwanda and Nigeria); second, the case of countries where progress in malnutrition has translated into modest reductions in inequality (Kenya); third, the case of countries that have been successful in reducing both aggregate malnutrition and inequality (Burkina Faso, Malawi and Ghana). One strong finding of the analysis is that the countries that have registered the highest improvements in overall malnutrition rates are not the countries that have experienced the highest growth rates, indicating that changes in malnutrition are not proportionate to the pace of economic growth. Furthermore, the countries that managed to reduce inequalities the most were not systematically the ones with the highest growth rates either, indicating that policies need to address the constraints of the most vulnerable households for growth to be both nutrition-sensitive and inclusive.

Keywords: Child Malnutrition, Sub-Saharan Africa, Inequality, Inclusive Growth, Economic development

JEL Classification: 114 (Health and Inequality)

Introduction – A Striking Paradox

Over 1990-2010 Sub-Saharan African countries have experienced fast Gross Domestic Product (GDP) growth. The region has grown by more than 4% on average over the period, which is higher than the world average growth rate of 3.4% over the same time span (Figure 1). This positive trend represents a huge opportunity to improve the living standards of millions of Africans and to foster inclusive and sustainable development.

The strong levels of macro-economic growth experienced in Sub-Saharan Africa could be expected to have had a positive effect on the determinants of child nutrition. Economic growth could have benefited populations' health and nutritional status through different pathways: higher productivity and food availability, larger private and public investments in infrastructures and public services, more employment and income-generating opportunities for the poor and ultimately higher living standards at the household and individual level that stimulate consumption and behavioral changes.²



² For further discussions on the pathways between growth and nutrition outcomes, see notably: Smith and Haddad (2002); Subramanyam et al. (2011); Pritchett and Summers (1997); and Ravallion (1990).

At the regional level however, aggregate data do not show that these improvements have translated into significant progress in nutrition. In contrast with the high levels of GDP growth child malnutrition indicators in particular have registered some relatively limited improvements (Figure 2). From 1990 to 2010, in Sub-Saharan Africa, underweight has decreased by 12% (from 24% to 21%), stunting has decreased by only 5% (from 43% to 41%) and wasting has actually increased by 6% (from 9% to almost 10%)³. These trends represent a striking paradox in terms of development outcomes, and question the links between macroeconomic growth and nutrition.



Child malnutrition occurs when a child's intake of nutrients (fat, protein, vitamins and minerals, etc.) is insufficient to sustain the needs of her body. Malnutrition – used here in the restricted sense of under-nutrition⁴ – originates in a complex set of causes of both biological and socio-

³ For a detailed definition of underweight, stunting and wasting, please refer to the Methodology section of the paper.

⁴ Under-nutrition and over-nutrition (caused by an excessive absorption of certain nutrients) are both forms of malnutrition. This study focuses on under-nutrition.

economic nature. The two main direct determinants of malnutrition are the insufficient quantities of food absorbed as well as the poor quality of the nutrients consumed. Overall children's health has a strong impact on their nutritional status: children exposed to diseases tend to suffer more from malnutrition. This can notably be explained by the fact that diseases (such as diarrhea) can cause a depletion of key minerals and prevent the body from efficiently absorbing and assimilating the nutrients necessary to grow and fully develop (WHO 1995, p. 162).⁵

Nutritional status reflects a larger set of deprivations related to the living conditions to which a child is exposed and to the social and economic opportunities of her care-takers. A set of underlying determinants of nutritional status have been identified as potential obstacles to progress. They go from little access to good-quality food, to a lack of sanitation and clean water, poor health services and absence of immunization programmes, from low levels of education, to gender discrimination, or lack of knowledge on breastfeeding practices, etc.⁶ As emphasized by Braveman and Egerter (2008, p.23): "Behaviors, as well as receipt of medical care, are shaped by living and working conditions, which in turn are shaped by economic and social opportunities and resources."

There have been several attempts in the literature to assess and quantify the magnitude of the relation between income growth and child malnutrition. Most studies use regressions methods on cross-country data to assess the impact of GDP per capita on nutrition indicators. In a seminal paper, Smith and Haddad (2002) run country fixed-effects multivariate regressions on a sample of more than 60 countries over a period 1970-1995, and find that the impact of economic growth is positive but declines as income levels increase. They stress that other non-income factors have larger statistically significant effects on nutrition indicators. Gabriele and Schettino (2007) also point at a nonlinear negative linkage between income and underweight: the correlation is very strong in very poor countries but weakens progressively as income per capita goes up. Harttgen, Klasen and Vollmer (2012) show that the effect of GDP growth on underweight rates in Africa between 1991 and 2009 has been positive but small, and that other determinants, such as socioeconomic position within society or mothers' level of education, have revealed higher and statistically significant impacts.

The main limit of these studies is that the empirical results obtained provide information on the average impact of growth upon malnutrition prevalence rates across the populations, over long periods of time (country observations extend over several decades). Based on these results, it is not possible to clearly distinguish between countries and growth episodes and to address the following questions: why are nutrition indicators more responsive to growth in some countries than in others? Why are some growth episodes more beneficial to nutrition indicators than others?

In an effort to overcome some of these obstacles and to better understand the mechanisms at play, Headey (2011) uses an innovative empirical approach to identify key mediating channels

⁵WHO (1995, p. 162).

⁶ See Benson (2008), Braveman and Egerter (2008), Mosley and Chen (1984); UNICEF (1990).

through which growth can be nutrition-sensitive. Results show that even if rapid economic growth is a precondition to sustainable reductions in malnutrition (especially in countries with low levels of development), growth that increases food production, reduces poverty, increases female education and improves health access, is much more likely to be nutrition-sensitive. At the country level, Frimpong and Pongou (2008) examine child malnutrition in Ghana over the 1980s and 1990s and demonstrate that all three anthropometric indicators of malnutrition did not respond in the same way to different episodes of growth. Authors notably explain that improvements in underweight were consistent with a positive effect of growth on households' socio-economic conditions, while increases in stunting responded to the decline in use of health care after the reform of the health care system. The impact of economic growth on malnutrition therefore appears to be less predictable and to depend on how the underlying determinants of nutrition are affected. Different episodes of growth may not have an impact on all the underlying determinants, and some determinants may change at a slower pace than others. As a result, strong episodes of macroeconomic growth do not necessarily translate into better child health.

Another important caveat to the results obtained is that most of the empirical methods used in the literature do not address the question of the distribution of the impact of macroeconomic growth on nutrition outcomes within the population. It is however very important to know whether these effects are evenly distributed across the population or not, or whether economic growth does trigger some kind of convergence across the population, and why so. These questions are of particular interest when dealing with human development and health inequalities in Sub-Saharan Africa. Understanding the key features of the current growth process is crucial to implementing the right policies to support sustainable progress in nutrition.

This paper contributes to the literature by providing a more accurate and nuanced view on the progress made with regards to child malnutrition across Sub-Saharan Africa in a context of high economic growth over the past two decades. The analysis identifies distinctive patterns of convergence first between income growth and child malnutrition, and second between income growth and malnutrition inequalities across countries. The following questions are addressed:

- Has the observed economic growth in Sub-Saharan Africa translated into significantly lower levels of child malnutrition in the countries of the sample?
- Has the reduction in child malnutrition been shared across the different segments of the population leading to a reduction in inequalities? Have the most vulnerable populations in the sample countries been able to capture some of the benefits of the economic growth with regards to nutrition?

The study focuses on a sample of seven case-study countries: four low-income economies – Burkina, Kenya, Malawi and Rwanda – and three lower-middle-income economies – Cameroon, Ghana and Nigeria⁷ (Table 1).

⁷ Classification based on the World Bank gross national income (GNI) per capita income groups for 2011. <u>http://data.worldbank.org/about/country-classifications/country-and-lending-groups</u>

Underweight, Stunting and Wasting Prevalence Rates								
Underweight			Stunting			Wasting		
Rwanda - 2010	11.4		Ghana - 2008	28.6		Rwanda 2010	2.8	
Malawi - 2010	12.8		Cameroon - 2011	32.5		Malawi 2010	4	
Ghana - 2008	14.3		Burkina - 2010	35.1		Cameroon 2011	5.6	
Cameroon - 2011	14.6		Kenya - 2009	35.2		Kenya 2009	7	
Kenya - 2009	16.4		Nigeria - 2008	41		Ghana 2008	8.7	
Sub-Sah. Africa - 2010	21.3		Sub-Sah. Africa - 2010	41.09		Sub-Sah. Africa - 2010	9.94	
Burkina - 2010	26		Rwanda - 2010	44.2		Burkina 2010	11.3	
Nigeria - 2008	26.7		Malawi - 2010	47.1		Nigeria 2008	14.4	

Source: Calculations based on data from Measure DHS (n.a.) and WHO (2011).

Using data from the World Health Organization Global Database on Child Growth and Malnutrition as well as from Demographic and Health Surveys, we analyze the evolution of three anthropometric indicators: underweight, stunting and wasting over 1990-2010.⁸

We construct a classification of distinctive patterns of progress across the sample, based on how inequalities in child malnutrition have changed over time. Three main types of trajectories are identified: first, the case of countries where improvements in aggregate malnutrition have been offset by large increases in inequality (Cameroon, Rwanda and Nigeria); second, the case of countries where progress in malnutrition has translated into modest reductions in inequality (Kenya); third, the case of countries that have been successful in reducing both aggregate malnutrition and inequality (Burkina Faso, Malawi and Ghana).

The main findings of this study indicate that progress in malnutrition is not proportionate to the pace of GDP growth and that high levels of growth do not necessarily result in smooth progress across the population. Policies should address these aspects so that growth becomes both nutrition-sensitive and inclusive.

The remainder of the paper is structured as follows: the next section presents the data sources and methodological approach used to identify the distinctive patterns of progress in child malnutrition. The third section then presents the classification of countries across three types

⁸ These countries have followed different trends in income growth and malnutrition indicators. See notably the results obtained in Harttgen, Klasen and Vollmer (2012).

of trajectories and the main findings obtained. The annexes contain the tables and data constructed to conduct the analysis for each country of the sample.

Methodology

Child Malnutrition Indicators

Anthropometry is the most common method used to assess the nutritional status of children. Anthropometric indicators are computed using individual data on age, weight, height (or length of babies) and gender. Such data are relatively easy to collect and make anthropometry less costly as compared to other techniques.⁹ Three anthropometric indices – weight-forheight, height-for-age, weight-for-age – can be computed to evaluate the nutritional status of a child.¹⁰

A poor nutritional status will then be assessed according to the following characteristics (WHO 2007):

- Wasting or thinness expressed as a low body weight relative to height– results from a current significant loss of weigh observable by a deficit in tissue and fat mass. Wasting can be caused by insufficient nutrients intake (lack of access to food) or absorption (poor health status and disease).
- Stunting or shortness expressed as low height relative to age– results from a slowing in skeletal growth. Stunting can be caused by poor dietary intake over time as well as poor health conditions and reflects a failure to reach growth potential.
- Underweight expressed as low weight for age results from either a failure to gain weight relative to age or a loss of weight relative to height. Underweight is a combination of the weight-for-height and height-for-age indices.

Though wasting and stunting are often jointly observed, they are not linearly correlated. Both deficits result from different processes and patterns: Wasting is observable in populations where children are exposed to dietary deficiencies and diarrheal diseases causing rapid weight loss, while stunting reflects a slower and longer process of deprivation. However recurring situations causing acute weight loss have sustained impacts on the development and growth of a child and will in the end lead to signs of stunting.

⁹ Other methods include clinical, biochemical and immunological exams, see WHO (1986) and Zere and McIntyre (2003).

¹⁰ For a discussion on the distinction between nutritional status and anthropometric indicators, see for instance Pelletier (1994).

We use a Z-score unit of measure to determine the nutritional status of a child. Each child's anthropometric index is compared to a reference distribution for the index of interest. The distance to the median individual from the reference population will indicate whether a child is suffering from wasting, stunting or underweight.

• The Z-score is defined as follows: $z_i = (A_i - A_r) / (SD_{Reference population})$ Where: A_i is the value of the index of child i; A_r is the value of the index for the median child in the reference population; and SD is the standard deviation of the index for the reference population.

A child is considered malnourished (suffering from wasting, stunting or underweight) when her weight-for-eight, height-for-age, or weight-for-age z-score falls below two standard deviations (<-2SD) from the median child in the reference population. The prevalence of malnutrition in a given population is measured by the share of children with z-scores below –2SD for each index.

Two main sets of reference growth curves have been constructed so as to represent the expected distribution of anthropometric indices across a healthy and well-nourished population: the "National Center for Health Statistics" (NCHS) and the "World Health Organization (WHO) Child Growth Standards". The NCHS elaborated in 1978 was drawn from population samples in the USA. In 2006, the "Child Growth Standards" were elaborated by the WHO to address some of the limits of the NCHS (De Onis et al. 2006). The longitudinal and cross-sectional data used to build the WHO curves was collected on children under five of age in six different countries (Brazil, Ghana, India, Norway, Oman, and the United States). The purpose of these curves is to provide a standard of how children should grow if they were benefiting from socio-economic conditions likely to favor the achievement of their full genetic growth potential (De Onis et al. 2006). There are differences between the two reference standards. As a consequence, malnutrition measures computed using different reference standard and may not be defined as malnourished when using the other standard).

Data Sources

We use cross-sectional data on child malnutrition from the "World Health Organization Global Database on Child Growth and Malnutrition" (WHO 2011) as well as from "Demographic and Health Surveys" (DHS) (Measure DHS n.a.). We also use malnutrition data by wealth quintiles from the World Bank "Socio-Economic Differences in Health, Nutrition, and Population within Developing Countries" module of the "Health, Nutrition, and Population" (HNP) database (World Bank 2011). The primary data sources of the HNP are DHS and "Multiple Indicator Cluster Surveys" (MICS) databases. Wealth quintiles in the HNP are based on the DHS Wealth Index constructed from existing data on household assets, services, and amenities.

One of the difficulties of using these different sets of data is that Malnutrition indicators in have not been constructed with the same methodology.¹¹ As a consequence, malnutrition

¹¹ See section on child malnutrition indicators above for more details.

rates by wealth quintiles from the HNP may be different from the measures extracted from the other dataset. However, since the objective of the study is the investigation of the trends and changes observed across time in each indicator, this does not constitute a major obstacle to the analysis and results presented in the conclusions of the paper remain valid. Furthermore, the time periods between surveys are not uniform across countries. For each country, we look at the longest spell available between surveys.

Growth rates were calculated based on data from the IMF "World Economic Outlook Database" (IMF 2011). In order to remove the effect of price changes and to smooth-out short-term fluctuations, average growth rates were computed using constant domestic prices and a 3-year moving average.

Country Classification Criteria

This paper focuses on a sample of seven Sub-Saharan African countries: four low-income economies – Burkina, Kenya, Malawi and Rwanda – and three lower-middle-income economies – Cameroon, Ghana and Nigeria¹².

For each country, using cross-sectional data from the "World Health Organization Global Database on Child Growth and Malnutrition" as well as from "Demographic and Health Surveys", we first analyze the evolution of the prevalence rate of underweight, stunting and wasting at the national level over time (Table 2). Each detailed country analysis can be found in the Annexes section of this paper.

Table 2: Trends in Children Malnutrition Overall Prevalence Rates							
Country	Period	Underweight	Stunting	Wasting			
Burkina	1992-2010	lower	lower	lower			
Cameroon	1991-2011	lower	lower	Higher			
Ghana	1998-2008	lower	lower	lower			
Kenya	1993-2009	lower	lower	lower			
Malawi	1992-2010	lower	lower	lower			
Nigeria	1990-2008	lower	lower	Higher			
Rwanda	1992-2010	lower	lower	lower			

Source: Calculations based on Measure DHS (n.a.) and WHO (2011).

¹² Classification based on the World Bank gross national income (GNI) per capita income groups for 2011. <u>http://data.worldbank.org/about/country-classifications/country-and-lending-groups</u>

In order to identify differences in exposure to progress in malnutrition across diverse segments of the population, we then look at the evolution of these same indicators, conditional on geographic location, gender and wealth. We disaggregate levels of malnutrition indicators by rural versus urban, male versus female¹³ and by wealth quintiles¹⁴ (Table 3).

Table 3: Trends in Child Malnutrition InequalitiesChanges in inequality of malnutrition prevalence rates between the 1990s-2000s.										
		Rural to Urban Inequality			Male to Female Inequality			Top/Bottom Wealth Quintile		
Country	Perio d	Under - weigh t	Stuntin g	Wastin g	Under - weigh t	Stuntin g	Wasting	Under - weigh t	Stuntin g	Wastin g
Burkina	1992- 2010*	Lower	Higher	Lower	Lower	Higher	Higher	Higher	Lower	Lower
Cameroo n	1991- 2011*	Higher Higher		Higher	Lower	Lower	Higher	Higher	Higher	Higher
Ghana	1998- 2008	Lower	Lower	Lower	Higher	Lower	Reductio n	Lower	Lower	Lower
Kenya	1993- 2009	Lower	Lower	Lower	Lower	Lower	Higher	Higher	Higher	Higher
Malawi	1992- 2010*	Lower	Lower	Lower	Higher	Higher	Lower	Lower	Lower	Higher
Nigeria	1990- 2008	Higher Higher		Higher	Higher	Higher	Lower	Higher	Lower	Higher
Rwanda	1992- 2010*	Higher	Higher	Lower	Higher	Higher	Lower	Higher	Higher	Higher

* Note: Periods differ for Wealth Quintiles data: Burkina (1993-2006), Cameroon (1991-2006), Malawi (1992-2006), Rwanda (1992-2005). Changes in inequality were assessed by computing prevalence rates ratios across each group.

Source: Calculations based on data from Measure DHS (n.a.) and WHO (2011) for Rural to Urban and Male to Female Inequalities, and data from Measure DHS (n.a.) and World Bank (2011a) for Inequalities by Wealth Quintiles.

Based on this analysis, we elaborate a classification of countries depending on how inequalities in child malnutrition have evolved over the past decades as compared to aggregate malnutrition prevalence and aggregate growth rates.

¹³ Rural-urban and gender status are available from the "World Health Organization Global Database on Child Growth and Malnutrition" (WHO 2011) as well as from Demographic and Health Surveys (Measure DHS 2011).

¹⁴ Data on malnutrition status by wealth quintiles is taken from the World Bank "Health Nutrition and Population Statistics by Wealth Quintiles" (World Bank 2011a).

3. Results - Country Classification: Three Distinctive Trajectories

In line with the progress observed over time with regards to a set of indicators, three main types of trajectories can be identified across the sample of seven countries:

First, the case of countries where improvements in aggregate malnutrition have been offset by large increases in inequality:

Cameroon: With an average growth rate of only 0.8% over 1990-2000 followed by an average growth rate of 3.4% over 2000-2010; Cameroon is currently the country with the slowest economic growth in the sample. The country has registered some recent improvements in overall malnutrition rates, and all three indicators of underweight, stunting and wasting are below regional averages. However these changes have been characterized by strong increases in inequalities across the population.

Nigeria: With an average growth rate of 2.8% over 1990-2000 followed by an average growth rate of 8.7% over 2000-2010; Nigeria has benefited from a strong acceleration in its economic growth and is currently the fastest growing country in the sample. The country has registered some improvements in overall malnutrition rates of underweight, stunting and wasting, but these remain above regional averages. Furthermore, recent progress has reinforced inequalities across the population.

Rwanda: With an average growth rate of 1.9% over 1990-2000 followed by an average growth rate of 7.1% 2000-2010, Rwanda has benefited from an acceleration in its economic growth and is currently the second fastest-growing country in the sample. The country has registered significant improvements in overall malnutrition rates; but stunting prevalence remains high (above regional averages) and progress has been characterized by an increase in inequalities across the population.

Second, the case of countries where progress in malnutrition has translated into some modest improvements in inequality:

Kenya: With an average growth rate of 1.9% over 1990-2000 followed by an average growth rate of 3.2% over 2000-2010; Kenya is the second slowest-growing country in the sample. The country has registered some improvements in overall malnutrition rates though progress has recently slowed down. With regards to inequalities, some improvements can be noticed, notably between rural and urban areas but inequalities by wealth quintiles have increased.

Third, the case of countries that have been successful in reducing both aggregate malnutrition and inequality:

Ghana: With an average growth rate of 4.4% over 1990-2000 followed by an average growth rate of almost 5.7% over 2000-2010; Ghana is currently the third fastest-growing country in the sample. The country has registered some improvements in overall malnutrition rates and all three indicators of underweight, stunting and wasting are below regional averages. Inequalities between the different segments of the population have decreased.

Burkina: With an average growth rate of 4.8% over 1990-2000 followed by an average growth rate of almost 5.5% over 2000-2010, Burkina has benefited from medium pace growth as compared to the other countries in the sample. However, the country has registered recent but significant improvements in overall malnutrition rates. Progress has translated into lower inequalities between the different segments of the population.

Malawi: With an average growth rate of 3.8% over 1990-2000 followed by an average growth rate of 4.3% over 2000-2010, Malawi has benefited from medium pace growth as compared to the other countries in the sample. The country has registered significant improvements in overall malnutrition rates and these have translated into much lower inequalities between the different segments of the population.

4. Conclusions

The main result of this analysis is that the fastest-growing countries are not necessarily the ones that have performed best when reducing child malnutrition in a way that benefits the most vulnerable and reduces inequality between the different segments of the population.

Indeed, despite high levels of GDP growth and overall improvements in average malnutrition rates, Nigeria and Rwanda have registered an increase in rural to urban as well as male to female inequalities. Contrastingly, in spite of more moderate rates of GDP growth, Burkina, Malawi and Ghana have performed much better in reducing malnutrition inequalities. Kenya shows more imperfect patterns, with real improvements in overall malnutrition rates but more limited results in terms of inequality reduction. Cameroon, the slowest-fastest country in the sample has followed a different trajectory, registering some improvements in average malnutrition rates but large increases in inequality.

Aggregate reduction in child malnutrition across countries should not conceal the fact that not all segments of the population benefit from improvement with the same magnitude. There is a need for policies that address the specific constraints of households left out of progress so that growth can be nutrition-sensitive and inclusive.

References

Benson, T. 2008. "Improving Nutrition as a Development Priority: Addressing Undernutrition in National Policy Processes in Sub-Saharan Africa." IFPRI Research Report 156. International Food Policy Research Institute, Washington D.C.

Braveman, P. and S. Egerter. 2008. "Overcoming Obstacles to Health: Stories, Facts andFindings."RobertWoodJohnsonFoundation.http://www.commissiononhealth.org/PDF/ObstaclesToHealth-Highlights.pdf

De Onis, M., A. W. Onyango, E. Borghi, C. Garza and H. Yang. 2006. "Comparison of the World Health Organization Child Growth Standards and the National Center for Health Statistics/WHO international growth reference: implications for child health programmes." *Public Health Nutrition* 9 (7): 942–947.

Frimpong J.A. and R. Pongou. 2008. "Does Economic Growth Improve Child Health? Understanding Discordant Trends in Malnutrition Indicators during the Economic Growth in Ghana." Paper presented at the Population Association of America (PAA) 2008 Annual Meeting, April 17-19, New Orleans, LA. http://paa2008.princeton.edu/download.aspx?submissionId=81708

Gabriele, A. and F. Schettino. 2007. "Child Malnutrition and Mortality in Developing Countries: Evidence from a Cross-Country Analysis." Munich Personal RePEc Archive. MPRA Paper 3132. Munich University, Munich. <u>http://mpra.ub.uni-muenchen.de/3132/1/MPRA_paper_3132.pdf</u>

Harttgen, K., S. Klasen and S. Vollmer. 2012. "Economic Growth and Child Undernutrition in Africa. Working Paper 2012-013." United Nations Development Programme, Regional Bureau for Africa, New York.

Headey, D. 2011. "Turning Economic Growth into Nutrition-Sensitive Growth." 2020 Conference Paper 6 (Advance Copy). International Food Policy Research Institute, Washington, D.C.

IMF (International Monetary Fund). 2001. World Economic Outlook Database. Washington D.C. <u>http://www.imf.org/external/pubs/ft/weo/2011/02/weodata/weoselagr.aspx</u>. Accessed in September 2011.

Measure DHS (Demographic and Health Surveys). n.a. Individual Country Reports. <u>http://www.measuredhs.com/publications/publication-search.cfm?type=5</u>

Mosley W., and L. Chen. 1984. "An analytical framework for the study of child survival in developing countries". *Population and Development Review* 10 (Supplement: Child Survival: Strategies for Research): 25–45.

Pritchett L. and L.H. Summers. 1997. "Wealthier is healthier." *The Journal of Human Resources* 31(4): 841–868.

Pelletier, D. L. 1994. "The Relationship Between Child Anthropometry and Mortality in Developing Countries: Implications for Policy, Programs and Future Research." *The Journal of Nutrition* 124 (suppl): S2047–S2081.

Ravallion, M. 1990. "Income effects on Undernutrition". *Economic Development and Cultural Change.* 38: 489–515.

Smith, L.C. and L. Haddad. 2002. "How Potent is Economic Growth in Reducing Undernutrition? What are the Pathways of Impact? New Cross-Country Evidence." *Economic Development and Cultural Change* 51 (1): 55-76.

Subramanyam, M.A., I. Kawachi, L.F. Berkman, and S.V. Subramanian. 2011. "Is Economic Growth Associated with Reduction in Child Undernutrition in India?" *PLos Medicine* 8(3): e1000424. <u>http://www.plosmedicine.org/article/info:doi/10.1371/journal.pmed.1000424#s2</u>

UNDP (United Nations Development Programme). 2011. Human Development Report database. New York. <u>http://hdr.undp.org/en/statistics/</u>. Accessed in October 2011.

UNICEF (United Nations Children's Fund). 1990. *Strategy for Improved Nutrition of Children and Women in Developing Countries.* UNICEF Policy Review, 1990-1. New York.

WHO (World Health Organization). 1986. "Use and interpretation of anthropometric indicators on nutritional status." *Bulletin of the World Health Organization* 64(6):929-941.

WHO (World Health Organization). 1995. "Physical status: the use and interpretation of anthropometry. Report of a WHO Expert Committee." WHO Technical Report 854. World Health Organization, Geneva.

WHO (World Health Organization). 2007. WHO Child Growth Standards, Length/height-for-age, weight-for-length, weight-for-height and body mass index-for-age: Methods and development. World Health Organization, Department of Nutrition for Health and Development. 2007 (217 pages). Geneva.

WHO (World Health Organization). 2011. Global Database on Child Growth and Malnutrition. Geneva. <u>http://www.who.int/nutgrowthdb/database/countries/en/index.html</u>. Accessed in November 2011.

World Bank. 2011a. Health, Nutrition, and Population (HNP) database. Washington D.C. <u>http://databank.worldbank.org/ddp/home.do?Step=12&id=4&CNO=312</u> Accessed in December 2011.

World Bank. 2011b. World Development Indicators (WDI) database. Washington D.C. <u>http://data.worldbank.org/data-catalog/world-development-indicators</u> Accessed in December 2011.

Zere, E., McIntyre D. 2003. "Inequities in under-five child malnutrition in South Africa." *International Journal for Equity in Health* 2:7.

ANNEXES: Individual Country Analyses

Burkina Faso

- In spite of constant and significant increases in GDP per Capita over the past two decades, child malnutrition and malnutrition inequalities in Burkina Faso did not show significant improvements until recently.
- Since 2006 however, some significant amelioration has been registered. All three anthropometric indicators¹⁵ of malnutrition have decreased. Inequalities in underweight and stunting have decreased and gender inequalities have remained stable at a relatively low level. Still, wasting inequalities have worsened to the disadvantage of rural areas.

Recent Malnutrition Trends in Burkina Faso:



¹⁵ Three standard indices of physical growth describing the nutritional status of children are presented:

[•] Height-for-age (stunting) - Chronic malnutrition (over long period of time)

[•] Weight-for-height (wasting) - Acute malnutrition (immediately before survey)

[•] Weight-for-age (underweight) - Both chronic and acute malnutrition

The latest figures put into light a recent and strong reduction in malnutrition prevalence rates in Burkina Faso. Estimates from the 2010 Demographic and Health Survey (DHS) Preliminary Report¹⁶ show that 35% of children in Burkina Faso were stunted in 2010 (suffering from chronic malnutrition) as compared to almost 45% in 2006, 16% were wasted in 2010, as compared to 23% in 2006 and 26% were underweight, as compared to 37% in 2006 (See Figure 1).

Such recent developments contrast with the findings of previous surveys that had put into light a constant worsening in both acute and chronic malnutrition rates over 1992 to 2006. According to the World Health Organization Global Database on Child Growth and Malnutrition¹⁷, the share of stunted children had increased by almost 10% between 1992 and 2006 (from about 40% to almost 45). The share of wasted children had increased by 48% between 1992 and 2006 (from 15% to 23%). Underweight had also increased by more than 26% over the same period (from about 30% to more than 37%) (Figure 1).

Child Nutrition Inequalities in Burkina:

What is particularly striking about the Burkinabe path is that from 1992 to 2006 the deterioration in malnutrition indicators gave rise to enlarged inequalities between the different segments of the population; but the recent improvements have reversed this trend. Since 2006, the changes observed in the three indicators of malnutrition have benefited most of the population, and have resulted in lower inequalities (to the exception of stunting rates). Gender inequalities have remained relatively stable and limited over time.

Geographic Inequalities:

- Malnutrition in Burkina Faso is characterized by very large urban to rural differences. Rural households are strongly disadvantaged. In 2010¹⁸, the largest discrepancies were observed for stunting: more than 37% of children were stunted in rural areas as compared to 18% in Ouagadougou and 23% in other urban areas. Underweight rates also show significant differences, with a rate of more than 27% in rural areas as compared to 20% in Ouagadougou and to 17% in other urban areas. Wasting rates are more evenly distributed, at almost 16% in rural areas, 17% in Ouagadougou and 13% in other urban areas.
- After a period of stagnation, geographic inequalities have started decreasing with regard to underweight and wasting, but inequalities in stunting have grown higher. Over 1992 to 2006 no improvements were observed in terms of geographic inequalities. Some increases were even observed in stunting and underweight rates, while the

¹⁶ DHS 2010 Preliminary Report (French) ENQUÊTE DÉMOGRAPHIQUE ET DE SANTÉ ET À INDICATEURS MULTIPLES (EDSBF-MICS IV) 2010. RAPPORT PRÉLIMINAIRE. Institut National de la Statistique et de la Démographie (INSD), Ouagadougou, Burkina Faso. <u>http://www.measuredhs.com/pubs/pdf/PR9/PR9.pdf</u>

¹⁷ http://www.who.int/nutgrowthdb/database/countries/who_standards/bfa.pdf

¹⁸ Source: see DHS Preliminary Report 2010.

difference in wasting between rural and urban areas remained almost unchanged. In contrast, since 2006, a rapid adjustment has been taking place in rural areas as regards underweight and stunting. Underweight registered the largest change with a reduction of one third I rural areas as compared to a reduction of less than 20% in urban areas. Stunting rates decreased by 22% in rural areas as compared to 10% in urban areas. However, wasting rates did not follow the same trend and inequalities have greatly increased: in 2006 children from rural areas were 1.3 times more likely to be wasted than children from urban areas. In 2010, the ratio had gone up to almost 3 times (Figure 2 and 3).



Gender Inequalities:

- Male children appear to be disadvantaged as compared to female children. In fact, in 2010 almost 37% of male children are stunted as compared to 32% of female children, 16% of male children are wasted as compared to 14% of female children, 27% of male children are underweight as compared to 24% of female children.
- Gender inequalities remained relatively stable over the period from 1992 to 2006. Recent improvements in malnutrition rates have not yet allowed reducing the gap between male and female children. While the progress in underweight and wasting has been evenly distributed across genders, male children appear to have benefited slightly less from the improvements in stunting since 2006 with a reduction of 19% in male stunting prevalence rates as compared to a reduction of 23% for female children between 2006 and 2010.

Wealth Inequalities:

According to data from the World Bank Health Nutrition and Population Statistics by Wealth Quintiles¹⁹, only available from 1993 to 2006, anthropometric indicators by wealth quintiles indicate that:

- Over 1993 to 2006, underweight has increased for all quintiles, but the poorest 20% of the population have undergone the strongest increase, from 35% of children underweight in 1993 to 43% in 2006. Inequalities between wealth groups have deteriorated over the period. In 1993, children from the poorest quintile were 1.6 times more likely to be underweight than children from the upper quintile in, in 2006, this ratio had reached a level of 1.8.
- Over the same period the prevalence rate of wasting has deteriorated and seemed relatively uniformly distributed across wealth groups at a rate above 20% in 2006. This reveals a strong rise in wasting for the upper quintile for which the rate went up by more than 12 percentage points, from 8.5% in 1993 to 20% in 2006.
- Stunting rates show the most differentiated evolution from one wealth group to the other over the period. We observe substantial progress for the upper quintile, with a 15% reduction in the share of stunted children, from 22% in 1993 to 18% in 2006. The prevalence of stunted children has remained relatively stable for the third and fourth quintiles, but has increased significantly in the two lowest quintiles of the population. The share of stunted children has gone up by 19% amongst the first quintile, and by 6%

¹⁹ Indicators by wealth quintiles presented in the World Bank "Health, Nutrition and Populations Statistics" Database were not computed using the 2006 WHO Child Growth Standards. Data by quintile is therefore not comparable to the WHO data used in this paper.

in the second quintile, reaching respectively a level of 42% and 40% of stunted children in 2006. This puts into light increasing inequalities between wealth groups with children from the poorest quintile being almost 2.3 times more likely to be stunted than children from the wealthiest quintile (the difference was only of 1.6 in 1993).

Cameroon

- Over the past two decades, child malnutrition has only improved marginally in Cameroon. However, reductions in all three anthropometric indicators²⁰ seem to have started accelerating since 2007.
- Child malnutrition in Cameroon is characterized by large discrepancies across the population. Measures by both wealth and geographic characteristics show that inequalities have become larger over time, and that recent trends have not resulted in lower inequalities. Measures by gender have remained stable over time and show limited discrepancies between male and female children.

Figure 4: GDP Growth and Children Malnutrition Cameroon 1989 - 2010 Prevalence Rate (%) **Real CFA Franc** 40 550000 500000 35 450000 30 Underweight 400000 25 Stunting 350000 20 300000 Wasting 15 250000 GDP per capita 10 200000 (right axis) 5 150000 0 100000 1989 1991 1993 1995 1997 1999 2001 2003 2005 2007 2009 2011 Note: GDP per capita has been computed based on a 3-year moving average. Source: Calculations based on data from WHO (2011) and World Bank (2011b).

Recent Malnutrition Trends in Cameroon:

²⁰ Three standard indices of physical growth describing the nutritional status of children are presented:

[•] Height-for-age (stunting) - Chronic malnutrition (over long period of time)

[•] Weight-for-height (wasting) - Acute malnutrition (immediately before survey)

[•] Weight-for-age (underweight) - Both chronic and acute malnutrition

The latest estimates from the 2011 Demographic and Health Survey (DHS) Preliminary Report show that 33% of children in Cameroon were stunted in 2011 (suffering from chronic malnutrition), 6% were wasted and 15% were underweight²¹.

The findings of previous surveys had put into light the absence of improvements in both acute and chronic malnutrition rates over 1991 to 2006. According to the World Health Organization Global Database on Child Growth and Malnutrition²², from 1991 to 2006, the share of children wasted, although relatively low, almost doubled from about 4% to 7%. The share of stunted children remained stable at a level of about 36%. The share of underweight children slightly decreased from 18% to less than 17% over the same period. Since 2006 however, some positive changes have been registered. All three indicators of child malnutrition have started decreasing slightly (Figure 4).

Child Nutrition Inequalities in Cameroon:

What is particularly striking in Cameroon's path is that the deterioration in under-nutrition indicators has revealed large discrepancies across the different segments of the population. In fact, when comparing the outcomes of children from different wealth quintiles, as well as from different geographic areas, it appears that nutrition inequalities have become significantly larger over time. Recent improvements in child malnutrition have failed reversing such trends.

Geographic Inequalities:

- Malnutrition in Cameroon is characterized by high urban to rural differences. Rural households are strongly disadvantaged, with prevalence rates about twice the magnitude of the ones of urban areas. In 2011²³, the largest discrepancies were observed for underweight: more than 20% of children were underweight in rural areas as compared to 7% in urban areas. Stunting rates also show significant differences, with a rate of more than 40% in rural areas as compared to 22% in urban areas. Wasting rates are slightly less unequally distributed, at about 8% in rural areas, as compared to 3% in urban areas.
- Geographic inequalities have increased over time, for the reason that rural households have not benefited from recent progress and have been lagging behind. Urban households have benefited from a reduction in all three indicators of malnutrition rates: between 1991 and 2011, urban underweight prevalence has registered a decrease of 50% (from 14% to 7%), urban wasting has registered a

²¹Enquête Démographique et de Santé et à Indicateurs Multiples EDS-MICS CAMEROUN 2011. Rapport Préliminaire, Institut National de la Statistique, Ministère de l'Économie, de la Planification et de l'Aménagement du Territoire, Ministère de la Santé Publique. MEASURE DHS - ICF International. http://www.measuredhs.com/pubs/pdf/PR13/PR13.pdf

²² http://www.who.int/nutgrowthdb/database/countries/who_standards/cmr.pdf

²³ Source: see DHS Preliminary Report 2011.

decrease of 23% (from 4% to 3%) and urban stunting has decreased by 19% (from27% to 22%). Over the same period, rural areas have registered dissimilar trends, with almost no changes in underweight rates (at 20%) or stunting rates (from 42% to 40%), and even a worsening in wasting rates (from 5 to almost 8%) (Figure 5 and 6).



Gender Inequalities:

- Male appear to be slightly disadvantaged as compared to female children in Cameroon, but differences are limited. In 2011 15% of male children are underweight as compared to 14% of female children, 35% of male children are stunted as compared to 30% of female children and almost 7% of male children are wasted as compared to 5% of female children.
- Gender inequalities have remained relatively stable over time. After some slight deterioration was observed from 1991 to 2006, since then some improvements in male malnutrition rates have allowed male children to catching up with female underweight rates of prevalence. No change has been registered as regards the difference in stunting rates and wasting has registered a very slight deterioration.

Wealth Inequalities:

According to data from the World Bank Health Nutrition and Population Statistics by Wealth Quintiles²⁴, only available from 1993 to 2006, anthropometric indicators by wealth quintiles indicate that:

- Over 1993 to 2006, underweight has increased significantly for the two lowest quintiles of the population, reinforcing large discrepancies between the richest and the poorest households in the population. The rate of underweight children went from 25% to 35% in the poorest quintile between 1991 and 2006 and from 17% to 20% in the second poorest quintile, while other quintiles, went through substantial progress (the second upper quintile Q2 notably registered a decrease of more than 20%). In 1991, children from the poorest quintile were 4 times more likely to be underweight than children from the upper quintile; in 2006, this ratio had extended to 6 times.
- Over the same period, even if the prevalence rate of wasting has remained relatively low, it has deteriorated for all wealth groups, weighing more on the lowest quintiles of the population. The rate of wasted children amongst the poorest 20% of the population more than tripled between 1991 and 2006, going from less than 3% to almost 10%. It only increased slightly within the middle quintiles.
- Over the same period, stunting rates have remained very unequal from one wealth group to the other. In 2006, the rate of stunted children reached a level of almost 43% amongst the poorest 20% of the population, and almost 36% in the second poorest quintile, while being significantly lower for the wealthiest quintile of the population at a rate of about 12%. This difference means that children belonging to the lowest quintile are 3.5 more likely to be stunted than the 20% wealthiest children of the population.

²⁴ Indicators by wealth quintiles presented in the World Bank "Health, Nutrition and Populations Statistics" Database were not computed using the 2006 WHO Child Growth Standards. Data by quintile is therefore not comparable to the WHO data used in this paper.

Ghana

- Over the past two decades, child malnutrition has improved in Ghana, though reduction trends in all three anthropometric indicators²⁵ seem to have slowed down since 2006.
- Anthropometric indicators²⁶ by wealth groups as well as by geographic setting show that the situation has become less uneven across the population and that inequalities have reduced. Male children appear to be slightly disadvantaged as compared to female children in Ghana, but differences are limited and have not changed significantly over time.



Recent Malnutrition Trends in Ghana:

²⁵ Three standard indices of physical growth describing the nutritional status of children are presented:

[•] Height-for-age (stunting) - Chronic malnutrition (over long period of time)

[•] Weight-for-height (wasting) - Acute malnutrition (immediately before survey)

[•] Weight-for-age (underweight) - Both chronic and acute malnutrition

²⁶ Three standard indices of physical growth describing the nutritional status of children are presented:

Height-for-age (stunting) - Chronic malnutrition (over long period of time)

[•] Weight-for-height (wasting) - Acute malnutrition (immediately before survey)

[•] Weight-for-age (underweight) - Both chronic and acute malnutrition

The latest estimates from the 2008 Demographic and Health Survey (DHS) Report show that about 28% of children in Ghana were stunted in 2008 (suffering from chronic malnutrition), 9% were wasted and 14% were underweight²⁷.

The findings of previous surveys had put into light recent improvements in both acute and chronic malnutrition rates over the early 2000s: According to the World Health Organization Global Database on Child Growth and Malnutrition²⁸, from 1998 to 2006, the share of wasted children decreased slightly by four percentage point from 10% in 1998 to 6% in 2008. Underweight also decreased by more than 6 percentage point from more than 20% of the population in 1998 to about 14% in 2006. Stunting decreased from more than 31% in 1998 to about 29% in 2006. Since 2006 however, trends appear to have gone upward.

What is particularly striking in the Ghanaian path is that the amelioration in malnutrition indicators has allowed reducing significant inequalities across the population. Differences based on wealth have become smaller; and geographic inequalities have decreased slightly between 1998 and 2008. When looking at malnutrition per gender, male children appear to be slightly disadvantaged as compared to female children in Ghana, but differences are limited and have remained stable over time (Figure 7).

Child Nutrition Inequalities in Ghana

Geographic Inequalities:

- Malnutrition in Ghana is characterized by substantial urban to rural differences especially with respect to underweight and stunting. Rural households are disadvantaged, with prevalence rates about 1.5 times higher than urban prevalence rates. In 2008, large discrepancies were observed for underweight: more than 16% of children were underweight in rural areas as compared to 11% in urban areas. Stunting rates also showed significant differences, with a rate of 33% in rural areas as compared to 22% in urban areas. Inequalities in wasting are more limited, with a rate of about 9% in rural areas and 8% in urban areas.
- Geographic inequalities have slightly decreased between 1998 and 2008. Rural households have benefited from a reduction in all three indicators of malnutrition rates: between 1998 and 2008, rural underweight prevalence has registered a decrease of 27% (from about 23% to 16%), rural stunting has registered a decrease of 6% (from 35% to 33%) and rural wasting has decreased by 14% (from 11% to 9%). Over the same period, urban areas have registered more limited improvements with wasting rates having remained stable (at about 7%), and even some deterioration in stunting (with an

²⁷ICF Macro. 2010. Nutrition of Children and Women in Ghana: A new look at data from the 2008 Ghana Demographic and Health Survey. Calverton, Maryland, USA: ICF Macro. http://www.measuredhs.com/pubs/pdf/DM17/DM17.pdf

²⁸ <u>http://www.who.int/nutgrowthdb/database/countries/who_standards/gha.pdf</u>

increase from 20% to 22%) and in underweight (with an increase from 13% to almost 17%).

Gender Inequalities:

- When looking at malnutrition per gender, male children appear to be slightly disadvantaged as compared to female children in Ghana, but differences are limited. In 2008 almost 16% of male children were underweight as compared to 13% of female children, more than 30% of male children were stunted as compared to 27% of female children, and almost 10% of male children were wasted as compared to 8% of female children.
- Gender inequalities have not changed significantly over time. Over 1998 to 2008 inequalities in stunting and wasting have decreased slightly, with male children having benefited from larger reductions in prevalence rates (a reduction of 11% in stunting rates and of 14% in wasting rates). Inequalities in underweight have been growing though, with female children having benefited the most from the improvements with a reduction of more than 35% of female prevalence rates (from 20% to 13%) as compared to a reduction of 25% in male rates (from about 21% to 16%) (Figure 8 and 9).



Wealth Inequalities:

According to data from the World Bank Health Nutrition and Population Statistics by Wealth Quintiles²⁹, anthropometric indicators by wealth quintiles indicate that:

• Over 1998 to 2008, underweight has decreased for all quintiles, by an average of 28%, which represents significant improvement. The second upper quintile benefited the most from such reduction, going from almost 21% of children underweight to less than 12%. The underweight prevalence rate of the poorest quintile was also reduced significantly from almost 33% to less than 24%. The rate of the upper quintile was only reduced by 8% from 12 to 11%. Such a process resulted in increased inequalities between the poorest quintile and the second wealthiest quintile.

²⁹ Indicators by wealth quintiles presented in the World Bank "Health, Nutrition and Populations Statistics" Database were not computed using the 2006 WHO Child Growth Standards. Data by quintile is therefore not comparable to the WHO data used in this paper.

- Over the same period the prevalence rate of wasting has deteriorated slightly with a 3% increase – but not all wealth groups have been affected in the same direction. We observe a small increase for the upper quintile and a one-percentage point increase for the second lower quintile (from 8.6 to 9.8%). All other groups have experienced improvements with declines in their wasting rate.
- Over the same period the prevalence rate of stunting has declined by 8%, benefiting the most to the poorest quintiles, but upper wealth households have not been affected positively. Stunting rates have declined significantly for the three lowest quintiles, from almost 35% in 1998 for Q1 to less than 28% in 2008 and from 28% for Q3 to about 22%. Stunting rates have not really improved for the two upper quintiles and even show some slight deterioration. Inequalities have been reduced.

Kenya

- Over the past two decades, child malnutrition has improved in Kenya. Progress has notably accelerated in the early 2000s.
- However, anthropometric indicators³⁰ across different segments of the population show that the amelioration in nutrition outcomes has not permitted to reduce inequalities significantly. While some progress has been made with regard to geographic inequalities have slightly decreased between 1993 and 2008 inequalities based on wealth and gender have not improved.



Recent Malnutrition Trends in Kenya:

The latest estimates from the 2008/2009 Demographic and Health Survey (DHS) Report³¹ show that in 2009 the proportion of underweight children represented 16% of the population.

http://www.measuredhs.com/pubs/pdf/FR229/FR229.pdf

³⁰ Three standard indices of physical growth describing the nutritional status of children are presented:

[•] Height-for-age (stunting) - Chronic malnutrition (over long period of time)

[•] Weight-for-height (wasting) - Acute malnutrition (immediately before survey)

[•] Weight-for-age (underweight) - Both chronic and acute malnutrition

³¹Kenya National Bureau of Statistics (KNBS) and ICF Macro. 2010. Kenya Demographic and Health Survey 2008-09. Calverton, Maryland: KNBS and ICF Macro.

The rate of wasted children represented 7%. The rate of underweight children represented 17%.

The findings of previous surveys had put into light some amelioration in both acute and chronic malnutrition rates over the past decade: According to the World Health Organization Global Database on Child Growth and Malnutrition³², from 1993 to 2009 the share of underweight children declined by 4 percentage points (from 20% to about 16%) and the share of stunting declined by 5 percentage point from (40% to 35%). The share of wasted children remained relatively stable (at 7%) (Figure 10).

Children Nutrition Inequalities in Kenya:

What is remarkable in the Kenyan path is that the amelioration in nutrition outcomes observed is not evenly distributed across the population and in spite of some progress, discrepancies persist. Nonetheless, geographic inequalities have slightly decreased between 1993 and 2008 and some reduction in inequalities based on wealth quintiles has been observed with regards to stunting rates. Gender inequalities in wasting have worsened a little over time, while decreasing for underweight and stunting.

Geographic Inequalities:

- Malnutrition in Kenya is characterized by large urban to rural differences; rural children are disadvantaged. In 2009, the largest discrepancies were registered for underweight prevalence, with rural rates about 1.6 times higher than urban rates: more than 18% of children were underweight in rural areas as compared to 11% in urban areas. Stunting rates also showed significant differences, with 37% of children stunted in rural areas as compared to 26% in urban areas. Inequalities in wasting are more limited, with a rate of about 7% in rural areas and about 6% in urban areas.
- Geographic inequalities have slightly decreased between 1993 and 2008. Rural households have notably benefited from a significant reduction in underweight rates that has allowed to considerably reducing the difference with urban areas. In 1993, rural children were 1.9 times more likely to be underweight than urban children. In 2009, rural underweight prevalence had decreased by 17% (from 21% to 18%) as compared to 2% in urban areas (with a rate of 11% in 2009), and the ratio of rural to urban prevalence had decreased to 1.6. Over 1993 to 2009 urban and rural stunting rates have registered a decrease of 11% (from 42% to 37% in rural areas and from 29% to 26% in urban areas). As a result, inequalities in stunting between urban and rural areas have remained stable. Wasting prevalence has not improved in rural areas remaining at a level of about 7% and has increased slightly in urban areas (From 5 to almost 6%), resulting in a comparable rates in both geographic settings (Figure 11 and 12).

³² <u>http://www.who.int/nutgrowthdb/database/countries/who_standards/ken.pdf</u>



Gender Inequalities:

- When looking at malnutrition per gender, male children appear to be slightly disadvantaged as compared to female children in Kenya, but differences are limited. In 2008 17% of male children were underweight as compared to 15% of female children, more than 37% of male children were stunted as compared to 33% of female children, and 8% of male children were wasted as compared to 8% of female children.
- Gender inequalities in wasting have worsened a little over time, while decreasing for underweight and stunting. Between 1993 and 2009 inequalities in underweight and stunting have decreased slightly, with male children having benefited from larger reductions in prevalence rates. Male underweight rates decreased by 23% as compared to 12% for female children, and male stunting rates decreased by 15% as compared to 10% for female children. Inequalities in wasting have been growing, with female

children having benefited from a reduction of 12% (from 7% to 6%) while male rates have gone up by 8% reaching a level of 8%.

Wealth Inequalities:

According to data from the World Bank Health Nutrition and Population Statistics by Wealth Quintiles³³, anthropometric indicators by wealth quintiles indicate that:

- Over 1993 to 2009, underweight has decreased for all quintiles except for the lowest one. Upper quintiles benefited the most from the reduction. The second higher quintile registered the largest change with a decrease of 40% from 21% to less than 13%. On the contrary, the lowest quintile saw no evolution and rates of underweight even increased slightly from about 29 to 31%. As a result, inequalities have increased: in 1993, children from the lowest quintile were 2.1 times more likely to be underweight than children from the upper quintile; in 2009 the ratio had gone up to 2.7 times.
- Over the same period the prevalence rate of wasting has remained relatively stable at a rate of about 5%, but the average does not account for large discrepancies between wealth groups. Actually, the lowest quintile (Q1) saw a large increase in its wasting rate from 7 to 10%, while other groups experienced improvements. This resulted in increased inequalities: in 1993, children from the lowest quintile were 1.8 times more likely to be wasted than children from the highest quintile (Q5); in 2009 the ratio had gone up to 3 times.
- Over the same period the prevalence rate of stunting has declined by 10% but wealth groups have not been affected with the same magnitude. Stunting rates have declined for all wealth groups but the highest quintile (Q₅), which registered a slight increase from 18% to 20%. Stunting rates have declined significantly for the three lowest quintiles (by about 10 percentage points each) it is the second highest quintile (Q₄) that has benefited the most from progress with a 30% decrease in the share of stunted children (from almost 35% to 24%). Inequalities between the poorest 20% and the richest 20% of the population have been reduced, but inequalities have increased between the poorest 40% (the two lowest quintiles Q₁ and Q₂) and the wealthiest 40% (the two highest quintiles Q₅ and Q₄), showing diverging trajectories across wealth groups.

³³ Indicators by wealth quintiles presented in the World Bank "Health, Nutrition and Populations Statistics" Database were not computed using the 2006 WHO Child Growth Standards. Data by quintile is therefore not comparable to the WHO data used in this paper.

Malawi

- > Child malnutrition has recently improved in Malawi.
- Furthermore, anthropometric indicators³⁴ indicate that progress has translated into lower inequalities across the population. Children from the poorest quintiles as well as children from rural areas have benefited from significant improvements in malnutrition rates.

Recent Malnutrition Trends in Malawi:



The latest estimates from the 2010 Demographic and Health Survey (DHS) Report show that in 2010, 47% of children in Malawi were stunted (suffering from chronic malnutrition), 4% were wasted and 13% were underweight³⁵. The findings of previous DHS surveys³⁶ in Malawi had

http://www.measuredhs.com/pubs/pdf/DM17/DM17.pdf

³⁴ Three standard indices of physical growth describing the nutritional status of children are presented:

[•] Height-for-age (stunting) - Chronic malnutrition (over long period of time)

[•] Weight-for-height (wasting) - Acute malnutrition (immediately before survey)

[•] Weight-for-age (underweight) - Both chronic and acute malnutrition

³⁵ICF Macro. 2010. Nutrition of Children and Women in Ghana: A new look at data from the 2008 Ghana Demographic and Health Survey. Calverton, Maryland, USA: ICF Macro.

³⁶ National Statistical Office (NSO) and ICF Macro. 2011. Malawi Demographic and Health Survey 2010. Zomba, Malawi, and Calverton, Maryland, USA: NSO and ICF Macro. http://www.measuredhs.com/pubs/pdf/FR247/FR247.pdf

demonstrated that over the 1990s and early 2000s³⁷ no substantial improvements had been observed except for underweight prevalence rates. Since 2004 though, there have been appreciable changes in all three indicators of the nutritional status of children (Figure 13).

According to the World Health Organization Global Database on Child Growth and Malnutrition³⁸ and to the 2010 Demographic and Health Survey (DHS), from 1992 to 2010 the share of underweight children declined by more than a third, from 24% to 13%; the share of wasted children also declined by more than a third, from 7% to 4%. The share of stunted children declined from 56% to 47% but remained high (Figure 13).

Children Nutrition Inequalities in Malawi:

What is remarkable in the recent improvements³⁹ in nutrition outcomes in Malawi is that progress has translated into lower inequalities across the population. Children from the poorest quintiles as well as the children from rural areas have benefited from significant improvements in malnutrition rates. Male children appear to be slightly disadvantaged as compared to female children, but differences are moderate and have remained stable over time. However, chronic malnutrition inequalities (as measured by stunting rates) have not improved and may even have worsened with increased discrepancies between the poorest and the richest households of the population.

Geographic Inequalities:

- In Malawi rural children tend to be more exposed to malnutrition than urban children, but only to a limited extent. In 2010, though wasting rates were at a relatively low level, they featured the largest rural to urban discrepancies with rural rates about 1.8 times higher than urban rates: more than 4% of children were wasted in rural areas as compared to 2% in urban areas. 48% of children were stunted in rural areas as compared to 41% in urban areas. Underweight rates showed smaller rural to urban differences, with a rate of about 13% underweight children in rural areas and 10% in urban areas.
- Children from rural areas have benefited from significant improvements in malnutrition rates, which allowed reducing the gap between geographical settings. Rural children have notably benefited from a significant and unprecedented reduction in underweight rates from about 26% in 1992 to 13% in 2010. This resulted in lower inequalities: while in 1992, rural children were 1.8 times more likely to be underweight than urban children, in 2009, this ratio had gone down to 1.3 times. Children in rural areas have also benefited from some amelioration in their exposure to stunting with a

³⁷ See for instance: Malawi DHS 2004 Final Report.

http://www.measuredhs.com/pubs/pdf/FR175/10Chapter10.pdf

³⁸ <u>http://www.who.int/nutgrowthdb/database/countries/who_standards/mwi.pdf</u>

³⁹ Changes across wealth groups, as observable through the World Bank Health Nutrition and Population Statistics by Wealth Quintiles Data, is only observable for until 2006.

decline from 57% to 48% between 1992 and 2010, while stunting rates in urban areas have decreased by only 5% (from 42% to 40%). As a result, rural to urban inequalities in stunting have been reduced to a ratio of 1.2. Over the same period urban and rural wasting rates have registered a decrease of similar magnitude of about 37% (from 7% to 4% in rural areas and from 4% to 2% in urban areas). As a result, and in spite of differing initial levels of wasting, inequalities between urban and rural areas have remained high at a ratio of 1.8 (Figure 14 and 15).



Gender inequalities:

• When looking at malnutrition per gender, male children appear to be slightly disadvantaged as compared to female children in Malawi, but differences are moderate. In 2010 14% of male children were underweight as compared to 12% of

female children, 51% of male children were stunted as compared to 43% of female children, and male and female children both had a wasting rate of about 4%.

• From 1992 to 2010, gender inequalities in malnutrition in Malawi have not changed significantly. Over the period inequalities in underweight have remained stable, male children being 1.2 times more likely to be suffering from underweight (with a 14% prevalence rate) than female children. Inequalities in stunting have increased a little, with female children having benefited from larger improvements than male children with a decrease of 19% for female children (from 53% to 43%) as compared to 12% for male children (from 58% to 51%). While in 1992, male children were 1.2 times more likely to be suffering from wasting than female children, in 2010, the difference had almost vanished thanks to larger improvements for male children (from 7% to 4%) than for female children (from 6 to 4%).

Wealth inequalities:

According to data from the World Bank Health Nutrition and Population Statistics by Wealth Quintiles⁴⁰, only available from 1992 to 2006, anthropometric indicators by wealth quintiles indicate that:

- Over 1992 to 2006, the average rate of wasting decreased by more than 25%, from 5% in 1992 to about 3% in 2006. The 3 lowest quintiles (Q1, Q2 and Q3) benefited the most from the reduction (with a 45% decrease on average) while the 2 upper quintiles did not see any improvement and even registered a slight deterioration for the highest quintile. As a result the rate of wasted children lowered and became more evenly distributed across the population in 2006.
- Over the period reductions in the underweight prevalence rate benefited all wealth groups but mostly the poorest which registered the largest reductions in prevalence rate: the rate of underweight children for the lowest quintile decreased from 34% in 1992 to less than 25% in 2006, and the rate of the second lowest quintile went from almost 33% to 20%. Inequalities have reduced: in 1992 a child from the lowest quintile was twice more likely to be underweight than a child from the highest quintile; in 2006 the ratio had declined to 1.5 times.
- Over the same period, in spite of some small improvements, notably for the low quintiles, stunting in Malawi remained high over the period with discrepancies between wealth groups. From 1992 to 2006, stunting rates decreased slightly by about 10% for the two lowest quintiles and in 2006 half of the children from that wealth group were stunted. The rate is somewhat lower for the upper quintile at 37% that

⁴⁰ Indicators by wealth quintiles presented in the World Bank "Health, Nutrition and Populations Statistics" Database were not computed using the 2006 WHO Child Growth Standards. Data by quintile is therefore not comparable to the WHO data used in this paper.

suffered from a 4% increase. Inequalities increased over the period, but too a limited extent.

Nigeria

In spite of improvements in the 1990s, child malnutrition has not showed appreciable changes in Nigeria recently. Anthropometric indicators⁴¹ by wealth groups also show that the situation has become more unequal across the population, even when national averages have registered slight improvements.

Recent Malnutrition Trends in Nigeria:



⁴¹ Three standard indices of physical growth describing the nutritional status of children are presented:

[•] Height-for-age (stunting) - Chronic malnutrition (over long period of time)

[•] Weight-for-height (wasting) - Acute malnutrition (immediately before survey)

[•] Weight-for-age (underweight) - Both chronic and acute malnutrition

The latest estimates from the 2008 DHS Report⁴² show that in 2008, almost 41% of children in Nigeria were stunted (suffering from chronic malnutrition), 14% were wasted and 23% were underweight.

According to the World Health Organization Global Database on Child Growth and Malnutrition⁴³ from 1990 to 2008 the share of underweight children has decreased by 24% from more than 35% in 1990 to about 27% in 2008, and stunting rates have decreased by more than 18% from 50% to about 41% on average over the same period. On the opposite, over the same period of time, wasting rates have increased by one fourth from 12% in 1990 to more than 14% in 2008 (Figure 16).

Children Nutrition Inequalities in Nigeria:

What is remarkable in the changes in nutrition outcomes in Nigeria is that the amelioration observed over the past two decades has not allowed tackling inequality issues across the population. The situation has even deteriorated. Discrepancies between wealth groups have become larger and geographic inequalities have also increased. Gender inequalities in malnutrition are very limited in Nigeria and have remained relatively stable, but female children have benefited from slightly better improvements.

Geographic Inequalities:

- In Nigeria rural children are more exposed to malnutrition than urban children. Such inequalities are particularly salient as regards underweight: in 2008, rural children were 1.7 times more likely to be underweight with a rate of 30% as compared to 18% in urban areas. Differences in stunting and wasting were a bit smaller: rural children were 1.4 times more likely to be stunted or wasted, with a rate of stunting of 45% as compared to 32% in urban areas and a rate of wasting of 16% as compared to 11% in urban areas.
- Geographic inequalities have increased slightly over time except for wasting rates: inequalities in underweight and stunting rates have increased, for rural areas have to some extent benefited from smaller progress than urban areas. Inequalities in wasting have remained stable as both groups have been affected by changes of the same magnitude (Figure 18 and 18).

⁴² National Population Commission (NPC) [Nigeria] and ICF Macro. 2009. *Nigeria Demographic and Health Survey* 2008. Abuja, Nigeria: National Population Commission and ICF Macro. http://www.measuredhs.com/pubs/pdf/FR222/FR222.pdf

⁴³ <u>http://www.who.int/nutgrowthdb/database/countries/who_standards/nga.pdf</u>



Gender Inequalities:

- Gender inequalities in malnutrition are very limited in Nigeria. Male children are slightly disadvantaged as compared to female children, but differences are small. In 2008, 28% of male children were underweight as compared to 25% of female children, 43% of male children were stunted as compared to 39% of female children, and male and female children had a similar wasting rate of about 14%.
- From 1990 to 2008, gender inequalities in malnutrition in Nigeria have remained relatively stable, but female children have benefited from slightly better improvements. Inequalities in underweight have remained steady over the period with male children being less than 1.2 times more likely to be suffering from underweight than female children. Though very similar in 1990, rates of stunting have diverged slightly, with female children having benefited from larger improvements (a decrease of 21%) than male children (a decrease of 17%). As regards the increase in wasting rates over the period, it affected female children more, with a 27% increase as compared to a

17% increase for male children, which eliminated the slight difference that existed between both groups.

Wealth Inequalities:

According to data from the World Bank Health Nutrition and Population Statistics by Wealth Quintiles⁴⁴, anthropometric indicators by wealth quintiles indicate that:

- Over 1990 to 2008, all wealth groups have been affected by the increase in wasting rates, but not to the same extent, which resulted in stronger differences between the poorest and the rest of the population. The two lowest quintiles have registered the worst increase: the rate of Q1 went up from 12 to 18% (which represents an increase of more than 50%) and the rate of Q2 went up from 9 to more than 15% (which represents an increase of 70%). The highest quintile also underwent an important increase from less than 6% to 8%. The rate of wasting of middle quintiles remained relatively stable at a rate of about 10%. As a result inequalities did not increase significantly between the poorest and the richest, but between middle-wealth and low-wealth.
- Over the same period, all wealth groups registered some reduction in underweight prevalence, but the poorest quintiles have benefited much less from such improvements than the higher quintiles, which resulted in increasing inequalities. Both the highest and second highest (Q5 and Q4) went through a decrease of more than 40% of their initial level between 1990 and 2008, from 22% to less than 13% for Q5 and from 36% to 20% for Q4. In the meantime, the lowest quintile (Q1) did not see any improvement at all and the prevalence rate remained above 40% of children and the rate of the second lowest quintile (Q2) went down from 39% to about 34%. This translated into a larger gap between wealth groups: in 1990, children from the poorest quintile were 1.8 times more likely to be underweight than children from the highest quintile. In 2008, this ratio had gone up to 3.2 times.
- Over the same period, all wealth groups registered some reduction in stunting rates but the poorest quintile (Q1). The wealthiest quintiles (Q5 and Q4) as well as the middle quintile (Q3) of the population have benefited the most from the reduction in stunting rates over 1990 and 2006 while the lowest quintiles saw no amelioration. These three groups (Q3, Q4 and Q5) have registered a reduction of more than 10 percentage points of the prevalence rate, with the largest reduction having occurred in the highest quintile, from 32% to 20%. On the opposite, the second lowest quintile (Q2) has seen its situation unchanged with a rate of about 45% and the lowest quintile has even seen its situation worsen with a one percentage point increase from 48 to 49%

⁴⁴ Indicators by wealth quintiles presented in the World Bank "Health, Nutrition and Populations Statistics" Database were not computed using the 2006 WHO Child Growth Standards. Data by quintile is therefore not comparable to the WHO data used in this paper.

increase in prevalence rate. This process resulted in increased inequalities. In 1990, children from the poorest quintile were 1.5 times more likely to be stunted than children from the highest quintile. In 2008, this ratio had gone up to 2.4 times.

Rwanda

- In spite of slow improvements over the 1990s and early 2000s, child malnutrition has showed appreciable changes recently in Rwanda. However, the rate of stunting remains high as compared to the progress registered in underweight and wasting.
- Furthermore, anthropometric indicators⁴⁵ indicate that inequalities between the different segments of the population have not been reduced and may even have worsened.

Figure 19: GDP Growth and Children Malnutrition Rwanda 1989-2010 Prevalence Rate Real Rwandan Franc (%) 60 110000 100000 50 90000 Underweight 80000 40 70000 30 60000 Stunting 20 50000 40000 10 30000 20000 0 Note: GDP per capita has been computed based on a 3-year moving average. Source: Calculations based on data from WHO (2011) and World Bank (2011b).

Recent Malnutrition Trends in Rwanda:

According to the latest estimates of the 2010 DHS Preliminary Report⁴⁶ In 2010, the rate of stunting in Rwanda was of 44%; the rate of wasting was of 3%; and the rate of underweight was of 11%.

⁴⁵ Three standard indices of physical growth describing the nutritional status of children are presented:

[•] Height-for-age (stunting) - Chronic malnutrition (over long period of time)

[•] Weight-for-height (wasting) - Acute malnutrition (immediately before survey)

[•] Weight-for-age (underweight) - Both chronic and acute malnutrition

According to the World Health Organization Global Database on Child Growth and Malnutrition⁴⁷, all three measures of malnutrition have shown significant progress in Rwanda over 1992 to 2010. Underweight and wasting have registered the largest improvements over the period, with a reduction in prevalence rates by more than a half, while stunting trends have proved more irregular.

No real changes were registered in wasting rates in Rwanda, which remained relatively limited at a rate of about 4%. Slight improvements were registered in underweight prevalence, with a decrease from 29% to 22% (below the 2000/2009 regional average of 26%). Slight improvements were also registered in stunting rates with a decrease of 8% of the initial level, from 48% to 44% (close to the 2000/2009 regional average of 43%) (Figure 19).

Children Nutrition Inequalities in Rwanda:

What is remarkable about the improvements observed in malnutrition in Rwanda over the past two decades is that inequalities have not been reduced. No real improvements have been registered in the reduction of inequalities by wealth quintiles or by geographic areas and some deterioration has even been registered. From 1992 to 2010, the differences in malnutrition rates between male and female children have not decreased either.

Geographic Inequalities:

- In Rwanda rural children are more exposed to malnutrition than urban children. Such inequalities are particularly salient as regards underweight: in 2010, rural children were 1.9 times more likely to be underweight than urban children with a rate of 12% as compared to 6% in urban areas. Differences in stunting were also significant, with rural children being 1.7 times more likely to be stunted, with a rate of stunting of 46% as compared to 27% in urban areas. Wasting rates presented a different pattern, with urban areas being disadvantaged as compared to rural areas, with an urban rate of wasting of about 4% as compared to 3% in rural areas.
- No real improvements have been registered in the reduction of geographic inequalities: while inequalities in wasting have reversed to the detriment of urban households, inequalities in underweight and stunting have not been tackled and have even increased over time. Between 1992 and 2010, underweight was reduced by 59% in urban areas and by 51% in rural areas, stunting was reduced by 35% and by 20% in rural areas. Both rural and urban areas benefited from strong adjustments, but such evolutions have not allowed reducing the initial discrepancies between both areas and have actually contributed to reinforcing them. (Figure 20 and 21)

⁴⁶ National Institute of Statistics [Rwanda] and ICF Macro. 2011. Rwanda Demographic and Health Survey 2008 – Preliminary Report. Kigali, Rwanda: National Population Commission and ICF Macro.

⁴⁷ <u>http://www.who.int/nutgrowthdb/database/countries/who_standards/rwa.pdf</u>



Gender Inequalities:

- Some gender inequalities in malnutrition can be observed in Rwanda. Male children appear to be disadvantaged as compared to female children. In 2010, almost 13% of male children were underweight as compared to 10% of female children, 47% of male children were stunted as compared to 41% of female children, and 3% of male children were stunted as compared to 3% of female children.
- From 1992 to 2010, the differences in malnutrition rates between male and female children in Rwanda have not decreased. Overt the period, both female and male children benefited from significant improvements in underweight and wasting. Underweight rates decreased by 50% (from 25% to 13%) for male children and by 56% (from 23% to 10%) for female children. Wasting rates decreased by 45% (from 6% to 3%) for male children and by 41% (from 4% to 2%) for female children, but such trends have actually resulted in slightly higher differences between both sexes in underweight and no improvement in wasting. Differences in stunting, have also increased from 1.1 times higher in 1992 to 1.2 times in 2010.

Wealth Inequalities:

According to data from the World Bank Health Nutrition and Population Statistics by Wealth Quintiles⁴⁸, only available from 1992 to 2005, anthropometric indicators by wealth quintiles indicate that:

- Over the period from 1992 to 2005, selected wealth groups registered some progress as regards wasting rates, while some others registered some deterioration. On the one side, we observe a convergence between the two lowest quintiles: the second poorest quintile (Q2) registered the largest deterioration, with a prevalence rate that doubled from below 4% to almost 6%. On the other side, we can notice a convergence of the three upper quintiles at a rate of about 3%. Indeed, while the middle quintile (Q3) and the second highest quintile (Q4) registered improvements with rates going down, the highest quintile (Q5) registered a slight increase.
- Over the same period the poorest quintiles of the population have not benefited from the improvements in underweight prevalence as much as the higher quintiles, which resulted in increasing inequalities. The highest quintile (Q5) registered the largest progress, with a rate divided by 2 from above 20% to below 10%. Other quintiles also registered some amelioration but to a smaller extent, with prevalence rates ranging from about 22% for Q4 and Q3 to 25% for Q2 and above 30% for the lowest quintile (Q1). Such process resulted in a large increase in inequalities: in 1992, children from the poorest quintile were 1.6 times more likely to be underweight than children from the wealthiest quintile. In 2005, this ratio had gone up to more than 3 times.
- Over the same period, the only quintile that benefited from a significant decrease in stunting rates is the highest one (Q5) that registered a decrease of 20% of the initial level, from above 37% to 30%. Other quintiles did not register any significant amelioration and stunting rates remained high, ranging from 45% for the second highest quintile (Q4) to 54% for the lowest quintile (Q1). As a result, inequalities between the poorest and the wealthiest 20% of the population somewhat worsened: in 1992, children from the poorest quintile were 1.4 times more likely to be stunted than children from the wealthiest quintile. In 2005, this ratio had gone up to 1.8 times.

⁴⁸ Indicators by wealth quintiles presented in the World Bank "Health, Nutrition and Populations Statistics" Database were not computed using the 2006 WHO Child Growth Standards. Data by quintile is therefore not comparable to the WHO data used in this paper.