

# Ending the Double Burden of Malnutrition: Addressing the Food and Health Nexus in the Sustainable Development Goals

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## Highlights:

1. While the prevalence of undernourishment will decline by 2030 through various efforts by various stakeholders, eradicating undernourishment will not be achieved solely through economic growth.
2. Improvement in economic conditions for individuals and communities may lead to higher risks of obesity unless the issue is appropriately addressed by the Sustainable Development Goals (SDGs), correlating targets and indicators, and delivery of educational programmes to increase health literacy globally.
3. To approach ending the double burden of malnutrition and the challenge of dealing with undernourishment and obesity, more focus should be placed on eliminating food disparity. We recommend setting an ambitious nutritional distribution disparity target: to reduce the Interquartile Range (IQR) of the distribution of calorific intake by 50%.

## Addressing the double burden of malnutrition

To “Eradicate extreme poverty and hunger” is the first of the eight Millennium Development Goals (MDGs). To achieve the “end hunger” target, we argue that a focus solely on the pursuit of economic growth is not sufficient, but a fair distribution of nutrition among people is also required to address issues of undernourishment and obesity.

Although the proportion of undernourished people in developing countries has decreased from 24% in 1990 - 1992 to 14% in 2011 - 2013, the goal to halve the percentage of people suffering from hunger by 2015 will require further efforts. For instance, 162 million young children are still suffering from chronic undernutrition (UN 2014a).

In 2012, the UN Secretary General initiated the “Zero-Hunger Challenge”, which emphasized the dire need to end hunger. Recently, more attention has been directed towards addressing the double burden of malnourishment, which is defined as undernutrition and obesity occurring simultaneously in and among different population groups.

Obesity is recognized as a major risk factor for a number of chronic diseases including diabetes, cardiovascular conditions and cancer. According to the World Health Organization (WHO), obesity is responsible for approximately 3.4 million adult deaths each year (WHO 2014). This number is on the rise in both developed and developing countries.

The SDGs outcome document that has been adopted by the Open Working Group on SDGs (OWG) includes the following text related to the double burden of malnutrition:



## Proposed goals and targets related to the double burden of malnutrition in the outcome document by OWG (UN 2014b)

### Goal 2. End hunger, achieve food security and adequate nutrition for all, and promote sustainable agriculture

2.1 by 2030 end hunger and ensure access by all people, in particular the poor and people in vulnerable situations including infants, to safe, nutritious and sufficient food all year round

2.2 by 2030 end all forms of malnutrition, including achieving by 2025 the internationally agreed targets on stunting and wasting in children under five years of age, and address the nutritional needs of adolescent girls, pregnant and lactating women, and older persons

### Goal 3. Attain healthy life for all at all ages

3.4 by 2030 reduce by one-third pre-mature mortality from non-communicable diseases (NCDs) through prevention and treatment, and promote mental health and wellbeing

In order to address the double burden of malnutrition, we emphasize the need to integrate efforts to address both undernourishment and obesity. It is imperative to include an obesity (including overweight) prevention and reduction target to support any food and health related SDGs in combination with targets for the eradication of hunger.

We propose setting an ambitious target for fair distribution of calorific intakes – to reduce the Interquartile Range (IQR) of the distribution of calorific intake by 50%. We propose this target to complement what has been proposed by the OWG outcome document.

We also suggest that nutritional education programmes for communities and individuals, which address both double burden issues, should be a significant component of strategic planning and implementation so that such a target can be achieved.

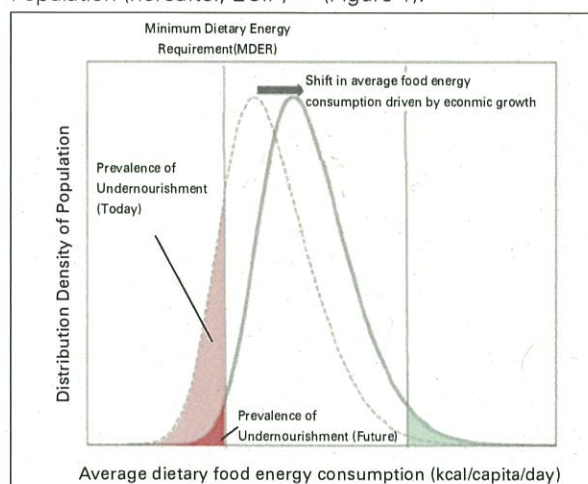
## Can we address hunger and obesity simultaneously?

An “end hunger” SDG would be appealing, simple to understand, and easy to remember. However, such a simple goal could lead to the idea that correlating targets should focus solely on the pursuit of economic growth.

Currently, chronic hunger is observed and monitored mainly in Least Developed Countries, where there is dire need of economic development. However, as development and growth occur, obesity and related health issues may also increase. Since there appears to be a direct correlation, what measures can address these issues simultaneously?

In order to address this question, we have developed a Calorific Distribution Model<sup>i</sup> based on current

methodologies used by the Food and Agriculture Organization (FAO) of the UN. The purpose of creating this model was to simulate both the future prevalence of undernourishment and the “Excessive Calorific Intake Population (hereafter, ECIP)”<sup>ii</sup> (Figure 1).

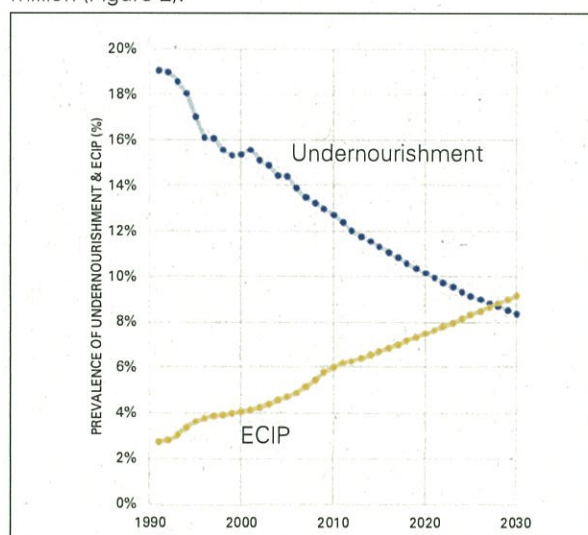


**Figure 1: Conceptual diagram of the Calorific Distribution Model**

In our simulations, a scenario-based approach was used with credible assumptions about each country's population<sup>iii</sup>, economic growth<sup>iv</sup> and distribution of the dietary energy consumption across the population<sup>v</sup>.

## Economic growth is necessary but it is not sufficient to end hunger

The results of our scenario-based simulations show that the prevalence (%) of undernourishment could drop from the current 12% to 8% by 2030, while ECIP in the developing countries may increase from 433 million to 773 million (Figure 2).



**Figure 2: Projected global prevalence of undernourishment and ECIP**

<sup>i</sup> The model is in line with the prevalence of undernourishment calculation in FAO (2013a, 2013b).

<sup>ii</sup> “Excessive calorific intake population” is defined as population with calorific intake of more than 4000 kcal/day/capita.

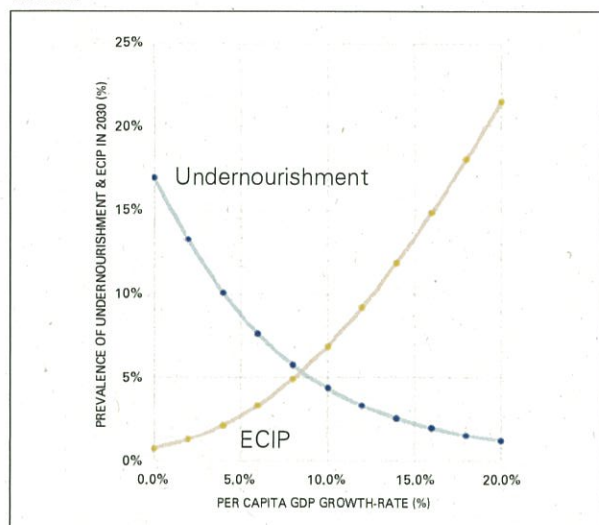
<sup>iii</sup> Total Population: UN World Population Prospects, the revision 2012 was applied (UN 2014c).

<sup>iv</sup> GDP growth (PPP): Economic growth rate in the World Economic Outlook (IMF 2014) was applied in 2012-2019, and the per capita GDP growth rate in 2019 was fixed towards 2030.

<sup>v</sup> It is assumed that the average dietary food energy consumption will increase as GDP growth and the distribution of calorific intake among the population is shifted accordingly without changes in the shape (variation, skewness) of the latest distribution curve after 2012 (See Figure 1).



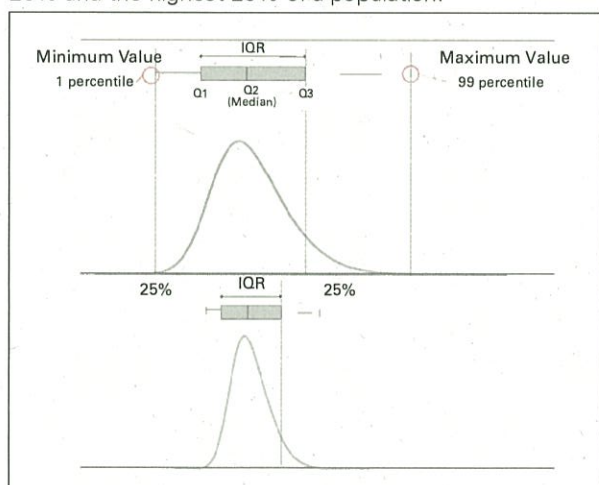
The results also indicate that, although economic growth could contribute to undernourishment reductions, it will not completely “end hunger” since some countries will not reach the economic growth level needed to make this feasible. For example, India, according to our simulations, which has the highest number of undernourished people, would need 21% of per capita annual growth rate throughout the estimated period in order to end hunger<sup>vi</sup> (Figure 3). In some African countries, the situation is far worse.



**Figure 3: India's prevalence of undernourishment & ECIP by 2030 compared to annual per capita economic growth rate**

## Need for a calorific intake disparity target

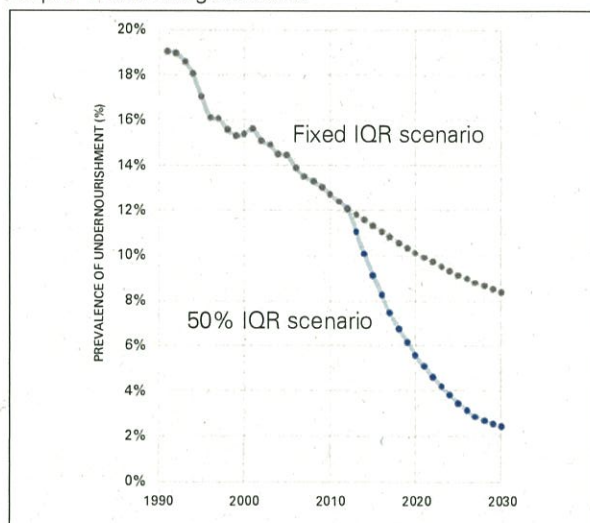
In order to achieve, or at least pursue targets that help “end hunger” and “end obesity” simultaneously, it is necessary to take both feasible economic growth and calorific intake disparity among different countries into account. Although there are already a number of possible targets and indicators being discussed to address this issue, we propose using the following target: reducing the IQR of calorific distribution by 50% (Figure 4). IQR is defined as the difference between the value which divides the lowest 25% and the highest 25% of a population.



**Figure 4: Reducing the IQR of calorific distribution by 50%**

Establishing this target could increase equitable distribution of food resources globally and among

populations within countries. If the target was to be reached using the same economic growth scenario, the prevalence of undernourishment could decrease dramatically to 2% and ECIP could be reduced by half (Figure 5). When establishing this target, there would certainly be room for discussion regarding the feasibility of setting a 50% reduction-rate target, but our results indicate that the inclusion of distribution-related parameters in a malnutrition-reduction target would be helpful in achieving success.



**Figure 5: Prevalence of undernourishment with a 50% IQR range reduction target**

## Education is key to reducing disparity

In order to reduce the IQR of the distribution of calorific intake by 50%, it is essential to empower all people by providing access to nutritional information and education so that they can acquire health literacy (see also Policy Brief 2). Improving health literacy at a community level serves as a critical means of implementation in order to achieve the target we recommend.

### Strategic educational means of implementation:

- 1 By 2030, all governments provide health services and nutrition education programmes in all communities; all people have access to caregivers, health professionals and high quality and up-to-date nutritional information.
- 2 By 2030, all communities have comprehensive and integrated health literacy programmes including maternal, infant and child health.

Using education strategically to reach targets will significantly contribute to achieving food and health-related SDGs and resolving the double burden of malnutrition. Education programmes will help prevent the negative spiral patterns affecting sequential generations. Studies indicate that nutritional deficiency during fetal life and during the first few years after birth may programme a child's metabolism, which can cause adverse effects later in life (Rolland-Cachela et al. 2006). Other health issues, such as gestational diabetes and obesity, can both contribute to the risk of diabetes in the next generation (Hanson et al. 2012).

Poor nutrition contributes to at least half of the 10.9 million

<sup>vi</sup> “End” is defined as less than 1% in this policy brief.

child deaths each year (WHO 2013). Therefore, increasing health literacy of mothers is of utmost importance. Researchers have clearly established links between education and health. Existing studies show that mothers who receive health literacy education can positively impact their children's health (Burchi 2012; Christiaensen and Alderman 2001; Webb and Block 2004; Medrano et al. 2008).

A study conducted by Wallace et al. (2014) showed the effectiveness of providing community-based nutritional education programmes for women in rural areas of Cambodia. Although women in the area consume vitamin A and iron rich foods daily, the amount of necessary nutrition is not enough. Women do not always buy nutritious foods as they consider it expensive, while inexpensive nutrient foods are in fact available. The study showed that women who have nutritional knowledge through the community-based nutrient programme were able to make appropriate choices to select nutritious foods which in turn have positive effects on their children's health.

Another case study shows that obesity and undernutrition

are co-existent in developing countries (James et al. 2004; Usfar et al. 2010). In Indonesia, for example, while 14% of children under the age of 5 years are lacking nutrition, 12% of children are excessively fed (Usfar et al. 2010). The issue of obesity has become one of the major health issues, as "rapidly changing dietary practices and a sedentary lifestyle have led to increasing prevalence of childhood obesity (5-19 years) in developing countries: 41.8% in Mexico, 22.1% in Brazil, 22.0% in India, and 19.3% in Argentina" (Gupta et al. 2013).

Health literacy also holds significant importance in developed countries. For example, in the United States, community-based nutrition education programmes have had positive impacts on people by raising awareness that they themselves have some control over their own health (Dollahite et al. 2003).

These realities highlight the necessity of expanding health literacy at the community level. In order for this to happen, improving nutrition and health literacy should play a significant role to end the double burden of malnutrition.

## References:

- Burchi, Francesco. 2012. "Whose education affects a child's nutritional status? From parents' to household's education." *Demographic Research*, 27, 681-704.
- Christiaensen, Luc and Harold Alderman. 2001. "Child malnutrition in Ethiopia: Can maternal knowledge augment the role of income?" *Africa Region Working Paper Series* no. 22. Washington DC: World Bank.
- Dollahite, Jamie, Christine Olson, Michelle Scott-Pierce. 2003. "The Impact of Nutrition Education on Food Insecurity Among Low-Income Participants in EFNER." *Family and Consumer Sciences Research Journal*, 32, 127-139.
- FAO. 2013a. *The State of Food Insecurity in the World 2013: the multiple dimensions of food security*. Rome: FAO.
- FAO. 2013b. "Food security indicators." Available from [http://www.fao.org/economic/ess/ess-fs/ess-fadata/en/#.U5ZomvL\\_t8E](http://www.fao.org/economic/ess/ess-fs/ess-fadata/en/#.U5ZomvL_t8E) (Accessed 10/20/2014).
- Gupta, Nidhi, Kashish Goel, Priyali Shah and Anoop Misra. 2013. "Childhood Obesity in Developing Countries: Epidemiology, Determinants, and Prevention." *Endocrine Reviews*, 33, 48-70.
- Hanson, Mark A., Peter D. Gluckman, Ronald CW Ma, Priya Matzen and Regien G Biesma. 2012. "Early life opportunities for prevention of diabetes in low and middle income countries." *BMC Public Health*, 12, 1025-1034.
- IMF. 2014. "World Economic Outlook Database." Available from <http://www.imf.org/external/pubs/ft/weo/2014/01/weodata/index.aspx> (Accessed 10/20/2014).
- James, Phillip T, Neville Rigby and Rachel Leach. 2004. "The obesity epidemic, metabolic syndrome and future prevention strategies." *European Journal of Cardiovascular Prevention and Rehabilitation*, 11, 3-8.
- Medrano, Patricia, Catherine Rodríguez and Edgar Villa. 2008. "Does mother's education matter in child's health? Evidence from South Africa." *South African Journal of Economics*, 76, 612-627.
- Rolland-Cachera MF, M. Deheeger, M. Maillot and F. Bellisier. 2006. "Early adiposity rebound: causes and consequences for obesity in children and adults." *International Journal of Obesity*, 30, 511-517.
- UN. 2014a. *The Millennium Development Goals Report 2014*. New York: United Nations.
- UN. 2014b. "Outcome document - Open Working Group for Sustainable Development Goals." Available from <http://sustainabledevelopment.un.org/focussdgs.html> (Accessed 10/20/2014).
- UN. 2014c. "World Population Prospects: The 2012 Revision." Available from <http://esa.un.org/wpp/> (Accessed 10/20/2014).
- Usfar, Avita A., Emanuel Lebenthal, Atmarita, Endang Achadi, Soekirman and Hadi Hamam. 2010. "Obesity as a poverty-related emerging nutrition problems: the case of Indonesia." *Obesity reviews*, 11, 924-928.
- Wallace, Lauren J., Alastair JS Summerlee, Cate E Deewey, Chantharith Hak, Ann Hall and Christopher V Charles. 2014. "Women's nutrient intakes and food-related knowledge in rural Kandal province, Cambodia." *Asia Pac J Clin Nutr*, 23, 263-271.
- Webb, Patrick and Steven Block. 2004. "Nutrition information and formal schooling as inputs to child nutrition." *Economic Development and Cultural Change*, 52, 801-820.
- WHO. 2013. "World Hunger and Poverty Facts and Statistics." Available from <http://www.worldhunger.org/articles/Learn/world%20hunger%20facts%202002.htm/> (Accessed 10/20/2014).
- WHO. 2014. "Obesity and overweight." Available from <http://www.who.int/mediacentre/factsheets/fs311/en/> (Accessed 10/20/2014).

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