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Revised hunger estimates accelerate apparent progress towards the MDG hunger target

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ABSTRACT

In 2012, the Food and Agricultural Organization released new measures of hunger data in its authoritative report "State of Food Insecurity in the World". These revised estimates of global hunger were not only lower for recent years than previously reported, but also significantly higher for 1990. Both changes have implications for the attainability of the Millennium Development Goal target, set in 2000, making it appear much more within reach. Implications are discussed.

1. Introduction: the challenge of measuring world hunger

The global community, principally via the Food and Agricultural Organization of the United Nations (FAO), has for several decades measured and tracked world hunger. Hunger is most commonly defined as energy insufficiency (measured in kilocalories) rather than micronutrient insufficiency (e.g. of iron, zinc, Vitamin A or even essential amino acids).

It is in the interest of the global community that these data be as accurate, consistent, reproducible, transparent and scientifically defendable as possible. Such estimates will enable policy makers not only to know the magnitude of the challenge of hunger, but also to accurately monitor short and long-term progress. In turn, the achievement of these goals would allow more accurate preparation of budgets, including for agricultural research and development, food relief programs and to pay for the infrastructure and to promote the social policies needed to reduce hunger and thus improve world health. Hunger measures also provide valuable "snapshots" of global development progress.

However, many of the properties of ideas hunger measurements are aspirational. The accurate measurement of hunger, especially in developing countries with limited statistical and other resources, is fraught with difficulty. National cultures and external political forces may also influence hunger data, which can be misrepresented both deliberately and inadvertently. Errors are plausible because populations, including nations, can at times have collective motivations to both overstate and understate data. Overstatement of success in reducing hunger might gain international prestige, minimize embarrassment, or even be viewed as promoting national security. Understatement of success (overstatement of hunger) might help gain concessional loans or grants, in order to attempt to reduce hunger, poverty, or both. Additionally, the motivation of countries to provide inaccurate data may vary over time, even for the same nation. Finally, even if consistent transparency and accuracy are highly valued and sought after, inaccuracies are still plausible, due to inadequate resources, the scale of which may vary with time. Thus, the size and sign of such inaccuracies may also vary over time.

Because these issues continually affect national data relevant to hunger estimates, the global aggregation of these data is also problematic. The size and sign of global errors may also vary. In addition, it is not inconceivable that external factors may influence aggregated global data. Whether or not such global forces exist, the estimates of world hunger have been adjusted many times, though usually by only small proportions.

There are issues other than data that are also relevant. For example, what energy intake is sufficient to not be counted as hungry? Should this intake be estimated over 12 months, or longer or shorter periods? Should this intake only account for baseline energy expenditure, or include a buffer to compensate for the energy demand from infections, including parasitic? Such infections, whether relatively short-lived or acute (e.g. malaria caused by *Plasmodium falciparum*) or chronic (e.g. untreated tuberculosis or *Plasmodium vivax*) are likely to significantly increase nutrient demand and are especially common in low-income settings.

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Some forms of bacterial gastro-intestinal infection can also cause chronic malabsorption, also increasing nutrient demand (Humphrey, 2009). Should such minimum intake measures vary with energy demand, due for example to take account of differences in physical exertion to obtain necessities such as water or fuel, variations in climate such as from harsh winters, or the exertion due to living in hilly terrain?

Or, might a "catch-all" metric for hunger be developed that relies on anthropometry, such as age-standardised measures and distributions of height and perhaps weight and performance? If so, such a measure could obviate several of the problems that have been described. For example, if a certain percentage of children aged ten have attained a minimum height (i.e. above the threshold defined as stunting, generally considered two standard deviations below normal for any given age) then it could be argued that over the 10.75 years of life, including fetal, then that fraction must have absorbed sufficient energy to compensate for the energetic cost of whatever parasites, other infections and calorie-intense exertions they have experienced or undertaken.

Alas, it is not this simple. Most obviously, body metrics at any given age are not only a function of the factors mentioned. They also rely, substantially, on micronutrients. For example, a child may have ingested and absorbed ample calories over her lifetime, but still be stunted due to profound iodine or zinc deficiency. Furthermore, such measures, though certainly of value, would not solely be of hunger, at least not as most people conceptualize it.

Until recently, national hunger estimates have been substantially derived from the aggregation of reported "food balance sheet data". These reflect national food production, adjusted for data for national food imports and export. These data are also problematic, subject, at least at a national level, to forces that might either depress or elevate production estimates. In addition, might the fraction of food that is wasted, whether due to poor storage, vermin or post-purchase loss vary between times and locations? Are such wastage data properly considered in food balance sheets, and if so, has this adjustment been consistent over time?

Given the complexity of these issues it is understandable that periodic adjustments in the methodology used to measure global hunger have occurred and that such changes are likely to continue. In 2002 the FAO stated: "estimates of the number of undernourished people in the world are necessarily based on imperfect information. As better data become available the estimates are revised retrospectively" (Food and Agriculture Organization, 2002). Several reports published within 5 years of the seminal 1996 World Food Summit (1996 WFS) show such variation.

It is also reasonable to expect that as knowledge advances more recent measures will be more accurate than their predecessors. However, there is less appreciation that changes in the methodology of measuring hunger can affect not only measures for recent years, but may also alter the estimates of data that are more distant. Furthermore, changes to the estimates of world hunger for years long passed may not just have historical interest; they may also affect the magnitude of hunger targets that are still in the future, particularly if, as is the case, data are significantly revised for the period 1990-1992.

2. From the 1974 World Food Conference to the millennium development hunger goal

In recent decades there have been three major global hunger targets, set in 1974, 1996 and 2000. The 1974 summit sought, optimistically, to eradicate hunger in the world within a decade (Anonymous, 1996; Shaw and Clay, 1998). At the 1996 WFS representatives from 186 countries, many of whom were national leaders, set a target that was considerably less ambitious than in 1974. This was to halve the *number* of hungry people in the world in 1990–1992 (n.b. not restricted to developing countries) estimated to have then been at least 800 million, by 2015 (Anonymous, 1996; Food and Agriculture Organization, 2000a, 2006). The experts setting these targets relied on hunger data and hunger forecasts collated and made by the FAO.

The text of the 1996 WFS declaration does not discuss the period 1990–92 as the foundational year, but other evidence suggest this was then considered the baseline. Most important is a figure and text in the first of the annual series of reports called the *State of Food Insecurity in the World* (SOFI). SOFI 1999 states "new estimates for 1995/97 show that around 790 million people in the developing world (sic) do not have enough to eat" and that "the number of undernourished people has decreased by 40 million since 1990/92, *the period to which the estimates of 830 to 840 million cited at the Summit refer*" (emphasis added) (FAO, 1999).

A key figure in SOFI 1999 called "Number of undernourished in the developing world: observed and projected ranges compared to the World Food Summit target" also shows that at the time of the 1996 WFS it was estimated that hunger in the developing world (sic) had declined from a range of between 875 to 960 million in 1970. This was about 25% of the world population in 1970 (3.7 billion). In SOFI 1999 the percentage of hungry in the world was reported to have fallen to less than 16% (830–840 million/5.3 billion) in 1990–1992 (FAO, 1999). A further decline to a number that would be under 6% (400 million/7.2 billion is less than 5.6%) in the 25 years following 1990 was declared as achievable by the 1996 WFS framers (see Fig. 1).

Note however, the inconsistency in the definition of denominator, with some texts referring to the whole world and other texts referring to "developing countries". It is worth mentioning that the definition of a developing country is likely to change over time. The population estimated as hungry in non-developing countries has in recent years occasionally been reported as between 20 and 34 million in SOFI reports.

Of relevance to the main purpose of this paper, the first two SOFI reports reveal concern about the feasibility of the 1996 WFS target. Each report contains a figure which compares the trajectory of the reduction of hunger in the 1990s with the steeper rate of decline needed to reach the 1996 WFS 2015 target. SOFI (2000) reported that the number of hungry in 1996–1998 was 826 million, of whom 34 million lived in developed nations. This report states that this is no lower than the 1995–1997 level (FAO, 2000b), something that disturbed FAO Director General, Jacques Diouf at that time. Diouf, who wrote many forewords to SOFI reports, commented in 2000 that "to realize the Summit target, we have to achieve a reduction of at least 20 million every year between now and 2015. The actual rate of decline, of slightly fewer than 8 million per year since the early 1990s, is woefully inadequate" (FAO, 2000b). The report noted that the trend was no longer "on track".

In the same year, four years after the 1996 WFS, world leaders again met, this time to announce the Millennium Development Goals (MDGs). One of these targets (1c) related to the aspect of global food security reflected by dietary and metabolic energy insufficiency. It was reformulated to a target that was less ambitious, namely, to halve, between 1990 and 2015, the *proportion* of hungry people in the world (FAO, 2005). Note, again, there is no mention of developing countries as the denominator.

Changing the target from a number to a fraction protected the goal from unexpectedly high rates of global population growth. The original WFS target (circa 425 million) if converted to a percentage of the forecast 2015 population of 7.25 billion is less than 6%. This target is substantially more ambitious than the new target percentage of 8% made at the MDG summit.