Achieving Sustainable Healthy Food Systems

The Need for Actual Food Consumption Data for Measuring Food Insecurity and Its Consequences

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The Food and Agriculture Organization's State of Food Security and Nutrition in the World report for 2020 shows revised numbers of those undernourished, and a continuity in the use of measurement standards initiated in the 2017 report. FAO also initiated a dashboard approach, to bring a deeper level of analysis on the current state of food security and its associated outcomes. What the dashboard needs but currently lacks is data on actual food consumption. This paper outlines the importance of filling this gap, globally.

The authors are grateful to Lawrence Haddad, William Masters, and J V Meenakshi for comments on the earlier draft of the paper.

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The Food and Agriculture Organization (FAO) recently issued its "State of Food Security and Nutrition in the World" (SOFI) report for 2020 (FAO et al 2020). This year's report has the promise of setting the agenda for the United Nations (UN) Secretary General's Food Summit planned in 2021 and helping to transform the global dialogue and action on food and nutrition security at the highest level, particularly playing a role in improving the woefully sparse data on actual food consumption and its determinants. This has received little attention as outlined below when it should be at the heart of achieving sustainable food systems. SOFI is an annual publication, and SOFI 2020, while also undertaking a periodic major revision in the number of the undernourished, continues the use of two measures of food insecurity, which the FAO began publishing together for the first time in 2017: the Prevalence of Undernourishment (POU) measure is popularly known as a measure of hunger, and the recently introduced Food Insecurity Experience Scale (FIES). These dual indicators reflect the widening scope of the food insecurity concept and measurement, as well as growing cooperation among international agencies concerned with food, emergency assistance, nutrition, and health, particularly of women and children. The FAO published the first edition of "the State of Food Insecurity in the World" (SOFI) in 1999. A decade later, SOFI was jointly published with the World Food Programme (WFP). Between 2011 and 2015, SOFI was published with the International Fund for Agricultural Development (IFAD) and WFP, and in 2017, with "Nutrition" added to the title, SOFI became a collaborative publication between the FAO, IFAD, the United Nation's Children Fund (UNICEF), WFP, and the World Health Organization (WHO). These reports now incorporate not just the Sustainable Development Goals (SDGs) indicators but also the World Health Assembly's (WHA) goals towards 2025. SOFI 2017 report comments on a variety of food security measures:

> The worrisome trend in undernourishment is, however, not yet reflected in nutritional outcomes ... At the same time, various forms of malnutrition are still cause for concern worldwide. Overweight among children under five is becoming more of a problem in most regions, while adult obesity continues to rise in all regions. Multiple forms of malnutrition therefore coexist, with countries experiencing simultaneously high rates of child undernutrition and adult obesity. (FAO et al 2017: 2)
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> Undernutrition, overweight and their associated non-communicable diseases now coexist in many regions, countries and even households. Six nutrition indicators—three that form part of the SDGs monitoring

framework, and three that refer to global nutrition targets agreed by the WHA, are described below to better understand the multiple burden of malnutrition, which affects all regions in the world. (FAO et al 2017: 14)

So, a stage has been set to embrace a dashboard approach. Dashboard, a tool for policymakers that describes global, regional, and national food systems, combines data for more than 170 food systems indicators from over 35 sources for more than 230 countries and territories to help decision-makers and other users identify and prioritise ways to sustainably improve diets and nutrition in their food systems. On 1 June 2020, FAO launched the food systems dashboard.

Notwithstanding all the data the dashboard contains, what it lacks is data on actual food consumption. Generally, there is a dearth of nationally representative surveys on food consumption, for instance in India, the last household consumer expenditure survey was in 2011–12. Amidst some controversy, the results of the last survey were not published. The National Sample Survey Office (NSSO) used to work under the union Ministry of Statistics until May 2019. On 23 May 2019, the NSSO merged with the Central Statistics Office (CSO) to form the National Statistical Office (NSO). The government stated that the NSO will be headed by the Ministry of Statistics and Programme Implementation (MOSPI). While the NSSO is responsible for conducting socio-economic surveys, CSO is responsible for the coordination of statistical activities in the country.

To understand why POU and FIES, the two frequently used food insecurity measures, fall short of the need for food consumption data, we first discuss the strengths and weaknesses of POU and FIES, against the widely used definition of food security: "when all people, at all times, have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life" (FAO 1996). Food security is more than simply "freedom from hunger." It is a condition that applies at the individual level on a continued basis; health and nutrition are associated with food consumption. Additionally, it is not simply a fulfilment of basic dietary energy needs, but also of tastes and preferences: "The right to food extends well beyond mere survival, being the basis for a healthy and productive life" (Cafiero 2012: 1).

Given the complexity of the concept and the prolonged debate about its measurement, the principal proponent of the POU has argued that "no direct measure of the state of food insecurity in the world will ever be possible" (Cafiero 2012: 1). Cafiero argues that critics of the method have failed to recognise that since 2001, FAO has made efforts to provide proper inferences based on the individual state of undernourishment, even when lacking ideal data, through the proper statistical treatment of the available data (Cafiero 2012). However, we argue that with the data and technological revolution and the declining cost of data collection and analysis, routine collection of high-quality global data based on food and nutrition consumption is now possible. Indeed, it is unfortunate that we do not have internationally comparable food consumption data that tells us about diet quality, based on regularly collected and easily available estimates, given that diet-related factors are responsible for six of the top 10 risk factors of global burden of disease (GBD),[1] a measure which the FAO relies on heavily. It is the only way to transform the global food system, as the UN Secretary General's 2021 Food Summit aspires to do.

Prevalence of Undernourishment

We first explore the extent to which the various measures, currently at the centre stage, fulfil the many definitional requirements of food security. The FAO calculates the POU annually for each country by estimating how much food is available based on FAO's food balance sheets, how much food is needed for a healthy active life, and by determining the proportion of the population that may not have access to the food they need.

There has been much debate on minimum calorie requirements, and the definition of a representative individual. The latter factor is based on an inequality parameter (coefficient of variation), typically derived from the national household survey data where they are available. While the focus is with "requirements" and access at the individual level, this representative individual has been hard to come by. Most data is collected at the household level, and therefore, information on access at the intrahousehold level, particularly for women and female children, is difficult to obtain.[2] POU is useful for monitoring national and regional trends, but among its drawbacks is that it is limited to measuring food energy deficits only, rather than all nutrient requirements. This is fine when the focus is on bridging the calorie gap, but with an increased focus on a better diet, we needed something better and reliable.

The FAO has deliberately set stringent "minimum" requirements of approximately 1,800 kilocalorie (kcal) per person per day (the exact levels reflect sex and age-specific composition of a given population), so as not to overstate the food gap, and hence, overestimate hunger. Both P V Sukhatme (1970) and T N Srinivasan (1993), with brilliant minds for statistics, have supported this approach. However, countries often perceived higher calorie requirements. India, for instance, used 2,400 kcal for rural, and 2,100 kcal for urban norms, as average "requirements," different from the "minimum" requirement of 1,800 kcal that the FAO uses. The difference between "average" and "minimum" is noteworthy and was used under Sukhatme's watch. For more debate on the confusion between "minimum" and "required" calories, see Chand and Jumrani (2013) and Srivastava and Chand (2017). The expert group headed by C Rangarajan has since revised these norms downwards to 2,155 kcal per person per day in rural areas and 2,090 kcal per person per day in urban areas. The 75th round of the National Sample Survey (NSS) 2017–18 was interrupted under much controversy over whether the decision not to make it public was a result of declining household consumption and divergence across states and income groups or whether it was a result of a measurement error. India's official explanation supports measurement errors and rescheduling of the survey to 2021 (Press Information Bureau 2019). Others have written to confirm the declining consumption.

Kakwani and Son (2015) took up the challenge of understanding the reasons behind the gap between the poverty and

undernourishment estimates of the World Bank and FAO, respectively. Uma Lele (2015) has also identified this gap. Kakwani and Son (2015) propose a methodology of measuring food insecurity, which explains and helps bridge this huge gap. Their approach is also consistent with the emerging literature on food security and nutrition, as well as with Sen's (1981) entitlement approach. Kakwani and Son (2015) provide an alternative definition of food security: "food security exists when all people, at all times, have entitlement to sufficient and nutritious food that meets their dietary needs" (Kakwani and Son 2015: 11). This means that households or individuals suffer from food insecurity if they do not command enough resources to buy food sufficient to meet their nutritional needs. In short, food insecurity (or hunger) is an extreme form of poverty. Kakwani and Son (2015) made a clear distinction between undernourishment and malnutrition by taking into consideration the intake of the basic nutrients—carbohydrates, protein, and fat—which are required to maintain good health. They, therefore, also suggested a need for modification of FAO's food security definition from access to entitlement.

There is another reason why the Kakwani and Son (2015) approach was consistent with today's literature on food security and nutrition security. It challenged Sukhatme's (1961) earlier hypothesis that intra-individual variation is the more important source of variation by far than inter-individual variation. The FAO's (1996) cut-off for undernourishment at 1,800 kcal per person per day is about 300 kcal less than the average calorie requirements of 2,100 kcal of a healthy person, as defined by WFP (2009) in their Emergency Food Assessment Handbook. Wiesmann et al (2009) found that WFP offered no justification of the 2,100-kcal estimation of the basic dietary energy requirement, while they reported that the FAO uses a "minimum" energy requirement. Based on survey data from Burundi, Haiti, and Sri Lanka, the International Food Policy Research Institute (IFPRI) study concluded that the WFP cut-off point of 2,100 kcal can lead to "serious underestimation of food insecurity" (Wiesmann et al 2009: 47). However, nutritionists are deeply divided on this issue, and many hold the opposite view that intra-individual variation is of a minor order of magnitude (Gopalan 1992; Osmani 1992; Payne 1992; Srinivasan 1993). Furthermore, the FAO's estimates are based on a log-normal distribution of calorie intake. This model is convenient from an analytical point of view but not flexible enough to capture the variation at the bottom of the distribution.

The POU does not identify who is undernourished and where they live, their age distribution or genders, or the degree of arduous nature of work they may perform daily. The POU is not geared to address impacts on availability of food during temporary shortages as in 2008 (Lele et al 2021, forthcoming).

The Food Insecurity Experience Scale

The FIES provides information about the adequacy of people's access to food and the severity of their food insecurity. Individuals are directly asked eight survey questions about their experiences (FAO 2019). This measure has been used in the United States and in some Latin American countries well before FAO adopted it globally. The FIES, while not providing estimates of actual food consumption or food deficits for individuals, still helps us better understand who is food insecure, and unlike the POU, their gender and where they live. Further, it can shed light on the causes of food insecurity and its effects in different places—especially when it is included in large national surveys. Also, FIES is conceptually more challenging and obscure in its computation than the POU. Combining FIES with more serious attempts at canvassing large-scale dietary intake surveys will improve our understanding of the precise extent of food insecurity and their causes. For further discussion of the two measures, see Lele et al (2016).

Perhaps, FIES would be unnecessary if consumer expenditure surveys are conducted routinely. In any case, there is a need for standardised surveys (with tested and comparable methodologies) on nutrient intakes, much as the World Bank's Living Standards Measurement Study (LSMS) did for measurement of poverty and the USAID's Demographic and Health Surveys (DHS) have done for nutritional outcomes. Why is it not possible to do the same for diet and nutrition security?

So, it is worth emphasising that one of the two biggest shortfalls at the global level, and for many countries, at the national and subnational levels, is timely, high quality, internationally comparable data on the various aspects of food consumption, including nutrient content.

Other Measures

The authors' written exchanges with Lawrence Haddad confirm that the food systems dashboard uses GBD data on diets. Food expenditure data is very partial and depends on the World Bank's LSMSs, which are often out of date. An exchange with William Masters suggested that the current options for tracking data include the global dietary database at Tufts University (Boston), who collect and connect consumption surveys from around the world. However, as these data sets are not interoperable, they must do a lot of extrapolation. They have substantially expanded their work on the cost of food and use different methods and data sets. Apart from being slow and biased against some kinds of food, traditional pen and paper questionnaires quite often fail to elicit memories from both the respondent and the enumerator. Now, there have emerged technical innovations, with apps that guide the interview process. Apart from lowering time and monetary costs, technical difficulties in conducting dietary intake surveys are addressed (Wafa et al 2020). Masters added that if UN agencies and national governments recognised the cost of these survey sand quality of data, they would be more willing to invest in data collection.[3]

There is the "Global Burden of Disease" at the Institute for Health Metrics and Evaluation (IHME) in Seattle that uses different methods and data sets. The Global Individual Food Consumption Data Tool (GIFT) on the WHO and FAO websites makes data available, in detail, but for fewer countries (SDG 2 Hub 2020).

The 2016 report of the Global Panel on Agriculture and Food Systems for Nutrition discussed some of the initiatives (GLOPAN 2016). International interest in nutrition security has

peaked, with increasing knowledge of the life-cycle effect of nutrition on the quality of human capital, and with the COVID-19 pandemic, this has become clearer with respect to human welfare. The findings of the SOFI 2020 have set the stage for addressing these issues.

Sustainable Production

The other important issue concerns the need for systematic national-level data on sustainable production. This combines data on the quality of natural resources and changes in them—such as soils, water, and climate—with data on food and agricultural production. SOFI reports since 2017 should be congratulated for recognising the health and climate consequences of production. However, as we report those estimates in the next section, knowing what we know about the state of data, these cannot be anything but notional (Lele et al 2021, forthcoming).

Key Findings: Food Security and Hunger

Now we turn to key findings of the SOFI 2020 report as well as some additional ones not contained in the report, which merit further exploration. The FAO's aggregate estimate of POU, prior to the pandemic, has declined from 821 million in 2019 to 690 million in 2020 (FAO et al 2020: viii). The decline is mainly because undernourishment estimates for China were adjusted by over 100 million people, based on a newly available series of household data going back to 2000, resulting in a substantial downward shift of the number of undernourished in the world. China's undernourished decreased from 10% of its population to 2%. While the new POU estimates of 690 million hungry amounts to 8.9% of the world population, it is still up by 10 million people in one year and by nearly 60 million over five years from 2014 to 2019, confirming the trend reported in past editions, even as the number has changed from that published in recent reports (FAO et al 2020: 5–6). The report further notes that, "as new food consumption data from household surveys have been made available, revised estimates of the coefficient of variation (CV) of per capita levels of habitual, daily dietary energy consumption in the population were" made by considering only a few countries and years (FAO et al 2020: 13). How confident can we be in the estimate of an annual change of 10 million, when the change in the CV in one country causes a change of 130 million? How big is the measurement error and how big are the error bars around these estimates? Probably the error exceeds 10 million, which means that the assurance of a rising trend is rather questionable. Since the last edition of this report, 25 new surveys from the 13 countries have been processed to update the CV: Bangladesh, China, Colombia, Ecuador, Ethiopia, Mexico, Mongolia, Mozambique, Nigeria, Pakistan, Peru, Sudan, and Thailand, and notably, of these, only five are African countries. When a new estimate of the CV from a survey is available for a country, the whole series is revised, reconnecting the last available data point to the most recent one through linear interpolation. For most countries, however, the latest available survey dates to 2014 or earlier (FAO et al 2020: 13). The number of people affected by severe food insecurities, which is another measure that approximates hunger, shows a similar upward trend. In 2019, close to 750 million, or nearly one in 10 people in the world, were exposed to severe levels of food insecurity (FAO et al 2020: 20).

Virtually, all the increase in hunger by 2030 is projected to take place in Africa, with the number of undernourished increasing from 234 million in 2019 (POU: 17.4%) to 411.8 million (POU: 29.4%) in 2030. South Asia's numbers of undernourished decline ever so slightly from 257.3 million to 203.6 million (FAO et al 2020: 11, Table 2). The total affected by moderate or severe food insecurity, which appears to be an estimated 2 billion people in the world, did not have regular access to safe, nutritious, and sufficient food in 2019 (FAO et al 2020: 22).

Meeting Targets

The report concludes the world is not on track to achieve zero hunger by 2030. If recent trends continue, the number of people affected by hunger will surpass 840 million by 2030, but that number is very close to the level FAO announced for last year—821 million (FAO et al 2020: 3). Considering that in 2019, 21.3% (144 million) of children under five years of age were stunted, 6.9% (47 million) wasted, and 5.6% (38.3 million) overweight, the targets to reduce child stunting and low birthweight are off track. Only the target for exclusive breastfeeding is on track. The 2025 target to decrease the prevalence of wasting is notably ahead of the target for reduction of child overweight (FAO et al 2020: 26).

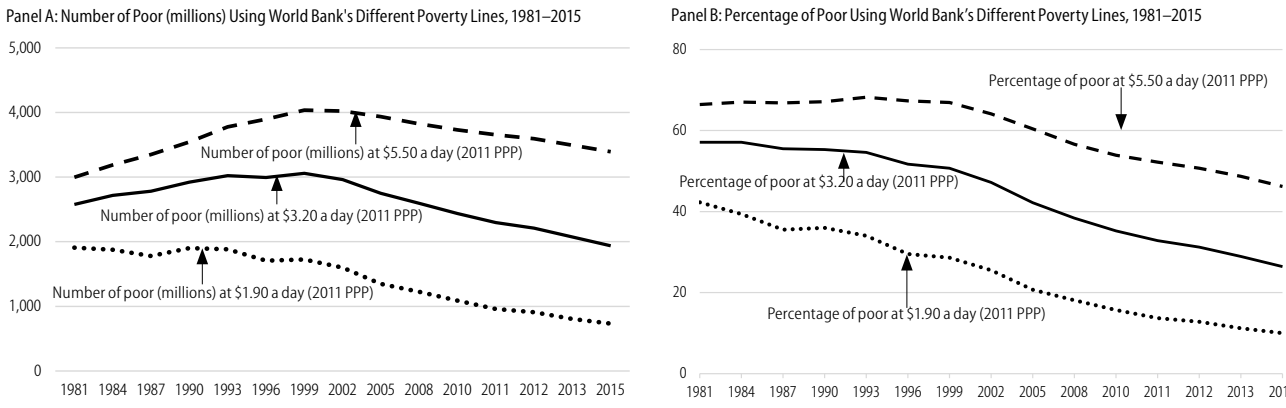
Depending on the economic growth scenario, the COVID-19 pandemic may add between 83 million and 132 million people to the total number of undernourished in the world in 2020 (FAO et al 2020: viii). Globally, the burden of malnutrition in all its forms remains a challenge.

Overall, the report concludes that the world is not on track to achieve the 2025 and 2030 targets, with most regions also not on track. Adult obesity, too, is on the rise in all regions. Urgent action is needed to reverse these upward trends.

Nutritional and Dietary Challenges

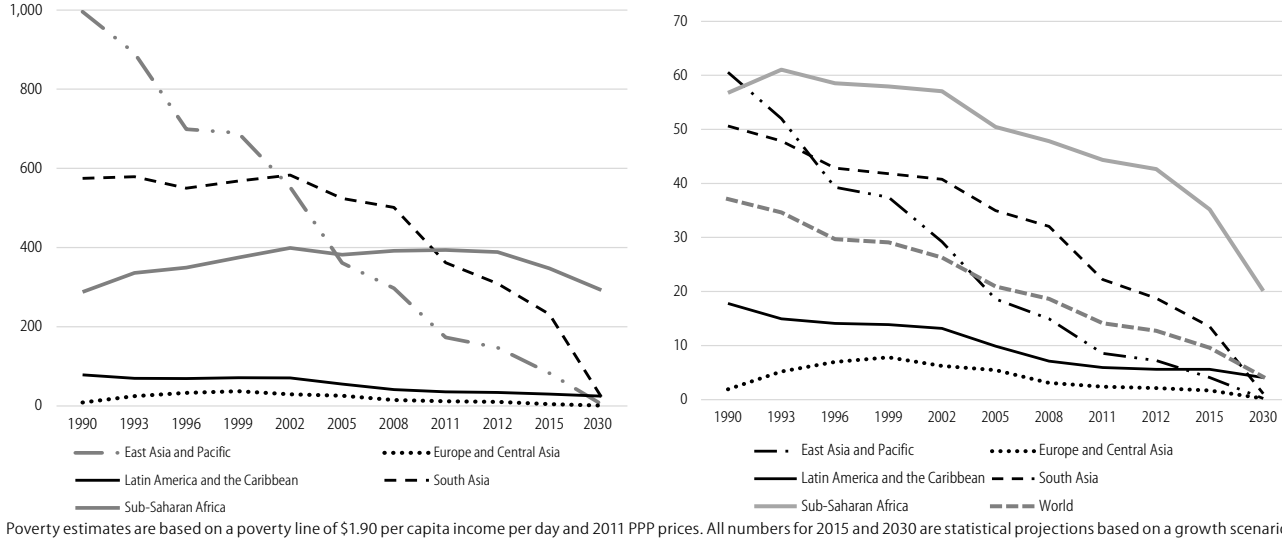
The nutritional status of the most vulnerable population groups is likely to deteriorate further due to the health and socio-economic impacts of the COVID-19 pandemic. Access to healthy diets is an even greater challenge. The FAO's estimate of the POU, through a starchy staple, reveals that healthy diets are estimated to be, on average, five times more expensive than diets that meet only dietary energy needs (FAO et al 2020: xvii). Only in Asia, and globally, in upper-middle-income countries are there enough fruits and vegetables available for human consumption to meet the FAO/WHO recommendation of consuming a minimum of 400 gram per person per day (FAO et al 2020: xvi). Figure 1 (p 44) indicates that only 53% of the world's population (about 3.9 billion) earned at least an income of $5.5 per day (2011 purchasing power parity [PPP]) in 2015, which was enough to afford a nutritious diet and nearly three quarter earned at least $3.2 per day (2011 PPP). Food insecurity can worsen diet quality, and consequently, increase

Figure 1: Number of Poor and Percentage of Poor Using World Bank's Poverty Lines of $1.9, $3.2 and $5.5 per Day (Using 2011 PPP), 1981–2015



Source: Based on data from the World Bank's World Development Indicators, 2020.

Figure 2: World Bank's Old Poverty Estimates—Performance and Projections by Region, 1990–2030



Poverty estimates are based on a poverty line of $1.90 per capita income per day and 2011 PPP prices. All numbers for 2015 and 2030 are statistical projections based on a growth scenario, which assumes each country grows at the country-specific average growth rate observed over 2004–13. And, using distributional assumptions, it should be treated with considerable circumspection. See also Ferreira et al (2015).

Source: Authors' construction. Based on data from Cruz et al (2015).

the risk of various forms of malnutrition, potentially leading to undernutrition as well as overweight and obesity.

Poverty and Hunger

Lele (2015) has shown that at the global and regional levels, there was little relationship between decline in poverty and decline in hunger. The World Bank announced that the poverty target was met by 2010 (Figures 2A and 2B), but hunger declined extraordinarily little by 2015 (Figures 3A and 3B, p 45). This was particularly true in the case of sub-Saharan Africa. With the World Bank's latest revised estimates of poverty (Figures 4A and 4B, p 45), and the FAO's revised estimates on hunger (Figures 5A and 5B, p 46), there is an even lesser relationship between changes in poverty and changes in hunger. In addition, the reasons for this drastic acceleration of food insecurity to 2030 in SOFI 2020, compared to the projections of the previous year's SOFI appear to be mainly due to revisions in population estimates. Indeed, the report asks readers, who tend to be consummate readers of the FAO's food insecurity estimates, not to compare the old and new estimates. Furthermore, the changes appeared to be based on adjustments in just in a few countries.

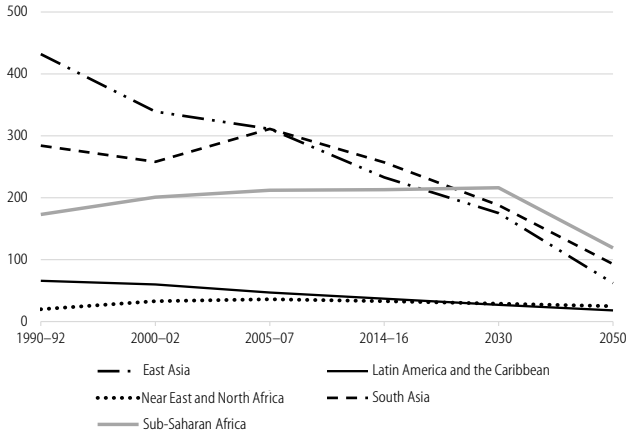
The FAO's most conservative estimate is that more than 3 billion people in the world cannot afford healthy diets. The cost of a healthy diet is five times the cost of basic minimum diet, making it unaffordable for the poor. The cost also exceeds average food expenditures in most countries in the global South: 57% or more of the population cannot afford a healthy diet throughout sub-Saharan Africa and Southern Asia (FAO et al 2020: 66). This number is equivalent to the World Bank's estimate of population earning more than $5.50 per day (2011 PPP) (Figures 1A and 1B).

Political Economy of Dietary Choice

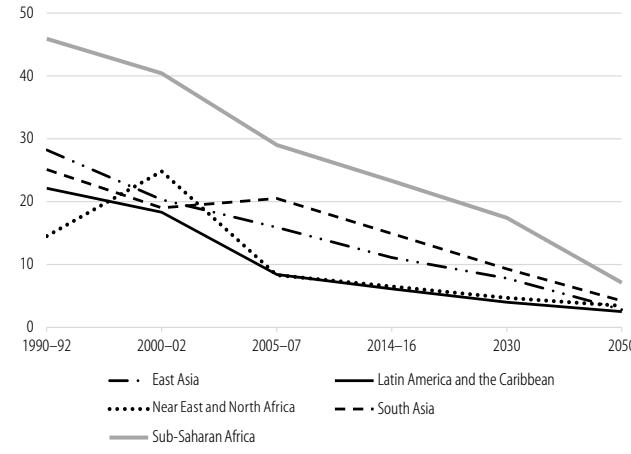
There are substantial hidden costs of the current dietary choices relating to health (SDG 3) and climate-related (SDG 13) consequences. Diet-related health costs linked to mortality and non-communicable diseases are projected to exceed $1.3 trillion per year by 2030. The diet-related social cost of greenhouse gas (GHG) emissions associated with current dietary

Figure 3: FAO's Old Estimates of Hunger—Projections by Region, 1990–2050

Panel A: Number of People Undernourished (millions) by Developing Region and Projections to 1990–2050



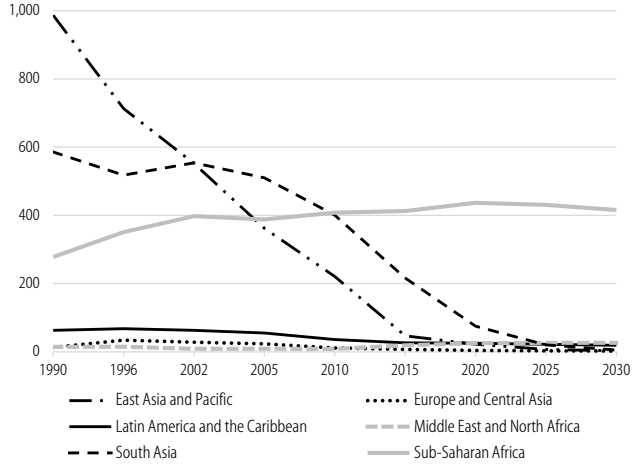
Panel B: Prevalence of Undernourishment (%) by Developing Region and Projections to 1990–2050



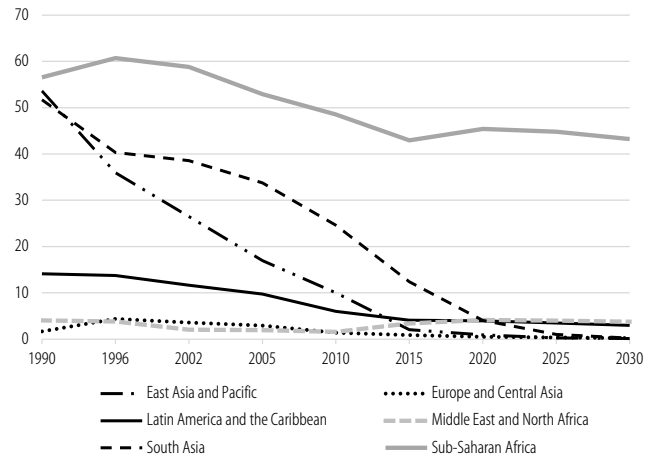
2050 data from Alexandratos and Bruinsma (2012).
Source: Authors' construction. Based on data from FAO (2017).

Figure 4: World Bank's Latest Poverty Estimates—Performance and Projections by Region, 1990–2030

Panel A: Number of Poor (millions) by Region and Projections (Using 2011 PPP and $1.9 per Day), 1990–2030



Panel B: Percentage of Poor by Region and Projections (Using 2011 PPP and $1.9 per Day), 1990–2030



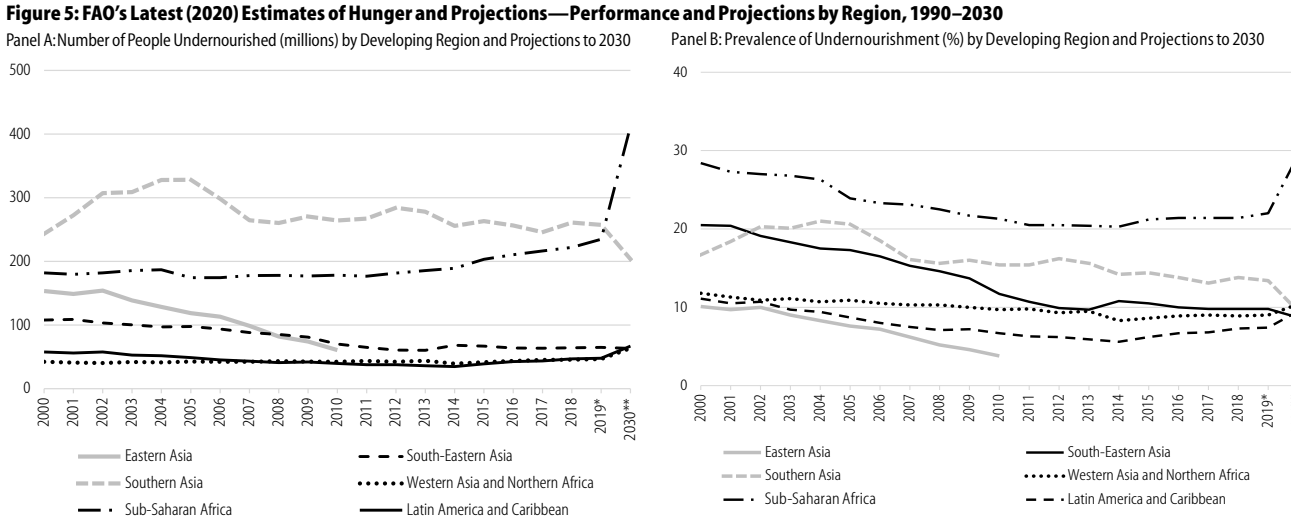
Poverty estimates are based on a poverty line of $1.90 per capita income per day and 2011 PPP prices. All numbers for 2015 and 2030 are statistical projections based on a growth scenario, which assumes each country grows at the country-specific average growth rate observed over 2005–15, and using distributional assumptions, should be treated with considerable circumspection. See also Ferreira et al (2015).
Source: Authors' construction. Based on data from World Bank (2018).

patterns is estimated to be more than $1.7 trillion per year by 2030 (FAO et al 2020: 93).

Further, with respect to health costs, "shifting to healthy diets can contribute to reducing the costs of health and climate change, and is projected to lead to a reduction of up to 97% in direct and indirect health costs and 41%–74% in the social cost of GHG emissions in 2030" (FAO et al 2020: xvii). However, as the report notes, "not all healthy diets are sustainable, and not all diets designed for sustainability are healthy" (FAO et al 2020: 93). To increase the affordability of healthy diets, the cost of nutritious foods must come down. The cost drivers of these diets are seen throughout the food supply chain, within the food environment and in the political economy that shapes trade, public expenditure, and investment policies. Tackling these cost drivers will require large transformations in food systems, with no one-size-fits-all solution and different trade-offs and synergies for individual countries.

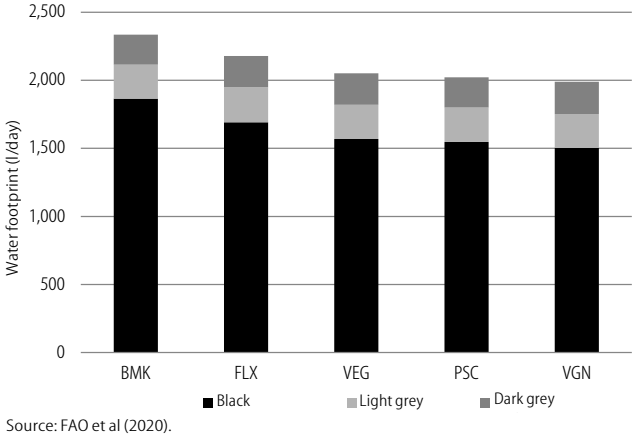
An evidence-based paper notes that the literature on value chains and diet-related health issues have traditionally been unconnected like "two ships passing in the night" (Popkin 2018: 1057). In the case of Latin America, they show that with increased urbanisation, income growth, lower costs of food and women working away from home, a synergistic relationship between the growth of value chains, foreign direct investment, supermarkets, convenient stores, restaurants, fast foods and take-out food emerges, as well as a growing incidence of obesity and other diet related diseases. They attribute this to the liberalisation of agricultural policies and the absence of regulation to build incentives for consumption of healthy foods. They rightly note that unless consumers demand healthy foods, getting to healthy food consumption is a long, hard road ahead. We need better data on actual food consumption and the factors lying behind it to take on the transformative goal of healthy food consumption.

Figure 5: FAO's Latest (2020) Estimates of Hunger and Projections—Performance and Projections by Region, 1990–2030



* Projected values; ** The projections up to 2030 do not reflect the potential impact of the COVID-19 pandemic; and Eastern Asia's data not reported after 2010, as the prevalence of undernourishment is less than 2.5%.
Source: Based on data from FAO et al (2020).

Figure 6: The Black, Light Grey, and Dark Grey Water Footprint of the Five Diets



Source: FAO et al (2020).

The SOFI 2020 report argues that countries will need a rebalancing of agricultural policies and incentives towards more nutrition-sensitive investment and policy actions all along the food supply chain to reduce food loss and enhance efficiency at all stages. Nutrition-sensitive social protection policies will also be central for countries to increase purchasing power and affordability of healthy diets for the most vulnerable populations. Policies that generally behavioural change towards healthy diets will also be needed.

The Water Footprint of Diets

In addition to the impacts on health and climate that SOFI 2020 identifies, diets can either demand or conserve water. We present some estimates of water footprint (WF–litres per day) of the different diets outlined in the 2020 report, by multiplying per capita food consumption (grams per day) by the global average water footprint WF (litres per kg) of the respective food items. The WF coefficients for the different food items were derived from Mekonnen and Hoekstra (2011, 2012), which provide average WF for a large number of products in more than 100 countries.

Figure 6 shows the black, light grey, and dark grey WF of the different diets in the 2020 report—namely benchmark (BMK), flexitarian (FLX), pescatarian (PSC), vegetarian (VEG), and vegan (VGN). The WF for the current or BMK diet was 2,336 litres per capita per day. The shift from BMK to the other recommended diets would reduce the WF by 7% to 15%. Replacing all animal products with nutritionally equivalent crop products helps to reduce the WF of the vegan diet relative to the other diets. The estimated WF based on a global average value is subject to uncertainties inherent in the data used. For example, the WF of crops may have an uncertainty in the range of 15%–49% (Zhuo et al 2014; Kersebaum et al 2016). The WF differences between the different diets therefore fall within the range of uncertainty observed in the WF coefficients.

Summary

The SOFI 2020 performs an important function in raising issues of the growing planetary vulnerability to food insecurity, regionally as well as across poorer income classes. It shows the growing food gap in Africa, while at the same time illustrating the fragility of the food gap projections based on caloric requirements. Most importantly, the report's data calls for attention on estimating food consumption. We highlight the importance of a dashboard idea from the Food Security Information Network (FSIN) report. As the world increasingly uses "big data," having a system that allows databases to be integrated across diverse sources and needs (for example, from different ministries, and combining administrative with survey data), and having these databases talk to each other will be key to having an effective dashboard for policy use. The Global Alliance for Improved Nutrition (GAIN) is currently engaged in a pilot project. Discussions with Haddad suggest that it will cost nearly $10 million annually. Perhaps, it can be combined with an extension of the FIES surveys.

The nutrition community has been sceptical of using consumer expenditure surveys for nutrition assessments, preferring dietary surveys based on 24-hour recall of foods consumed to calculate both calorie and micronutrient intake instead. These issues certainly need to be resolved, but cannot begin without a commitment to getting a better understanding of food consumption in all its dimensions.

NOTES

1 The Global Burden of Disease (GBD) is a tool to quantify health loss from hundreds of diseases, injuries, and risk factors, so that health systems can be improved, and disparities can be eliminated. The GBD endeavours to measure disability and death from a multitude of causes worldwide. It has grown over the past two decades into an international consortium of nearly 5,500 researchers, and its estimates are being updated annually.

2 According to the FAO, undernourishment is a condition of "continued inability to obtain enough food," and the PoU measures the "probability that a randomly selected individual from a population is found to be consuming less than their requirement for an active and healthy life." This probability is assessed against a normative minimum threshold established by nutritionists for reference age and sex groups. While it is not possible to assess precisely the individual dietary energy requirement, the PoU is based on an inference at the population level in probabilistic terms. Indeed, the FAO methodology for estimating the prevalence of undernourishment refers to: a probability distribution of habitual dietary energy consumption (DEC) of a representative individual in a population; and a cut-off points for intake adequacy—minimum dietary energy requirement (MDER)—specific for the same population.

3 The main source of data on "actual consumption" is contained in the following compilation: http://www.fao.org/gift-individual-food-consumption/data-and-indicator/en/.

The USAIDs Demographic and Health Survey (DHS), which used to ask limited diet recall data, is rolling out new modules now, which can be found here: https://blog.dhsprogram.com/nutrition-data-in-dhs-8/.

Gallup uses a stripped-down "low-burden" survey with yes/no questions about specific food groups, available here: https://news.gallup.com/opinion/gallup/321968/global-diet-quality-project-aims-bridge-data-gap.aspx.

And, then there is modelled data on dietary intake, which extrapolates from the few surveys to estimate consumption in every country, overwriting survey data with estimated quantities. This can be accessed here: https://www.globaldietarydatabase.org/gdd-2015-beta-version.

An overview of many of these sources can be found here: https://inddex.nutrition.tufts.edu/data4diets/data-sources-and-methods.

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