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Global Burden of Food Waste on Malnutrition

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ABSTRACT:

The" article addresses the issue of food waste, which presents a global problem that has recently become even more important on the public and political agenda. The importance of this topic will continue to grow, especially given the need to feed a growing world population. At the same time, in the pandemic conditions created by Covid-19, it presents a major challenge at the international level, both from a health and social point of view, enormously affecting the economies and all industrial sectors, including agriculture, food production, and especially food consumption and food waste. Malnutrition is also responsible for costly losses to economic productivity. The agriculture and food sectors are uniquely positioned to address the factors that underlie these global health concerns"

KEYWORDS: Nutrition, progress, hunger, vitamins, minerals, and food.

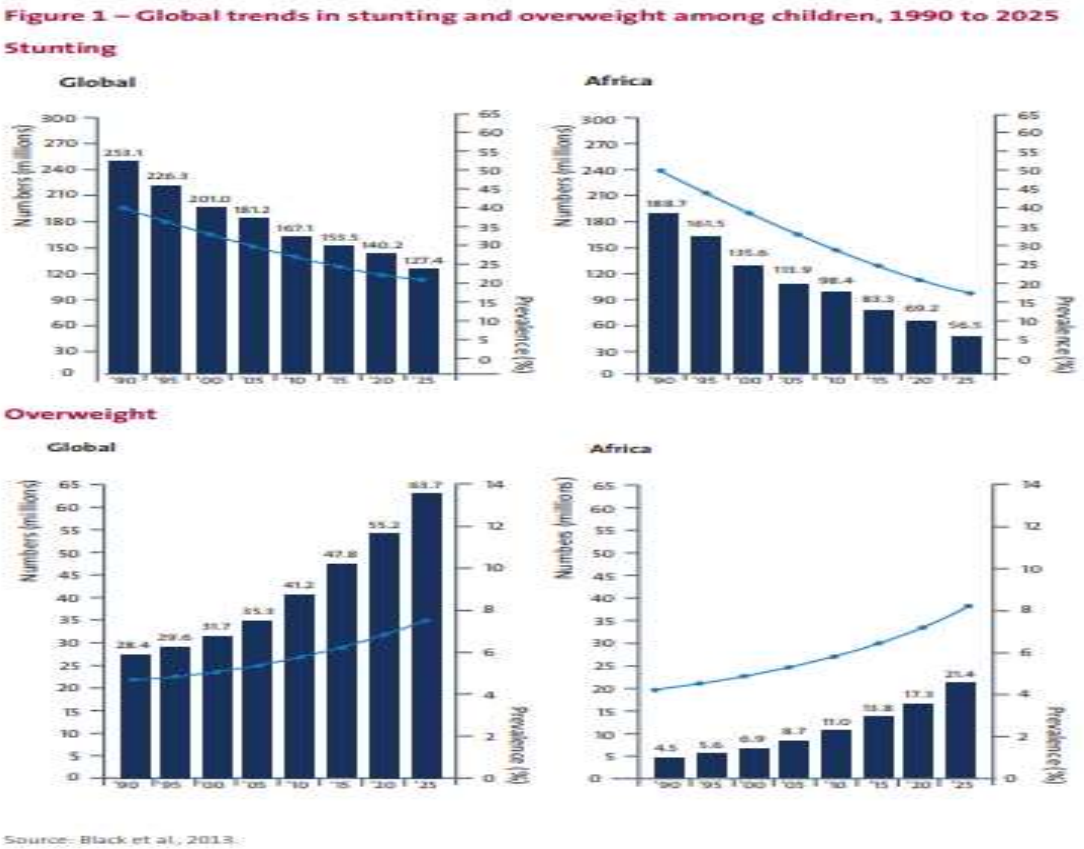
INTRODUCTION:

Malnutrition "affects every country in the world. Although impressive gains have been made in feeding the world's hungry, not enough attention is being paid to nourishing them. Today more than 800 million people still suffer from chronic hunger, and as many as two billion suffer from deficiencies of essential micronutrients. At the same time, approximately 1.9 billion people are overweight, of which 600 million are obese, putting them at greater risk for chronic diseases. This double burden of malnutrition—under nutrition and obesity—increasingly threatens the economies of countries that must underwrite the health-care costs and lost productivity associated with nutrition-related illnesses."

Global patterns of diet and disease are rapidly changing:

Unprecedented "changes are taking place in the way food is produced, distributed, and consumed around the world. Driven by urbanization, increased foreign direct investment in raw and processed foods, and income growth, a "nutrition transition" is taking hold in many low- and middle-income countries (LMICs). This transition is characterized by increased consumption of vegetable oils, refined and processed foods, sugar-sweetened beverages such as soda and fruit drinks, and more sedentary lifestyles and has been linked to a sharp increase in obesity and diet-related NCDs in LMICs over the past three decades. As a result, many LMICs are now facing a "double burden" of malnutrition. These countries are simultaneously confronting both high rates of obesity and undernutrition without the resources, infrastructure, or support of strong institutions needed to combat them. In Nigeria, for example, more than one-third (37 percent) of children under the age of five are stunted. Almost no progress has been made" in reducing this percentage over the past 10 years (38 percent of children were stunted in 2003). Yet one-quarter of adult women of reproductive age (15 to 49 years) are now overweight or obese—a 25 percent increase over the past 10 years

Figure 1 – Global trends in stunting and overweight among children, 1990 to 2025



Source: Black et al., 2013.

Figure 2 – Economic costs of global malnutrition

Sources: IFPRI, 2014; Nugent, 2011.

These "trends are common in many LMICs. The prevalence of diet-related NCDs in low-income countries in particular is increasing faster than the decline in disability and mortality from infectious diseases. The health and economic costs are significant. The global decline in productivity due to illness and death from diet-related NCDs may in fact reach $35 trillion by 2030—seven times the current level of global health spending."

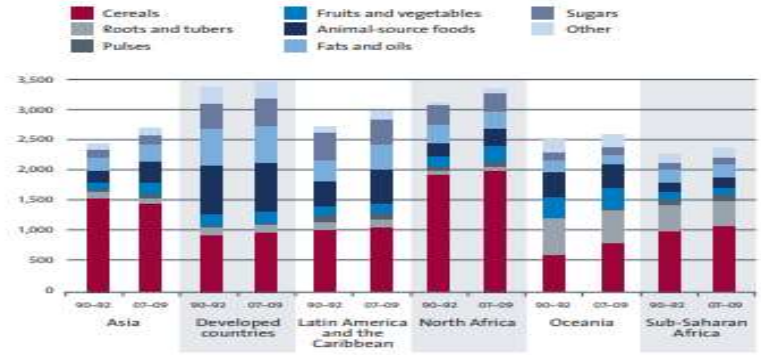
Malnutrition leads to poor health and weakens economies:

Unhealthy "diets are the leading risk factor for disease and disability in both developed and developing countries. Malnutrition—both under nutrition and obesity—contributes to poor health in a variety of ways across different populations. Under nutrition is linked to infection, which impairs children's growth and development. Undernourished children are more susceptible to illness and are more likely to experience severe infections and longer bouts of illness. More than three million children die each year due to under nutrition. Micronutrient deficiencies in particular can lead to serious health risks such as anemia from iron deficiency or blindness from severe vitamin A deficiency. Obesity has also dramatically increased, according to new World Health Organization (WHO) statistics released in January 2015. It has adverse effects on nearly every aspect of health, including cardiovascular, reproductive, respiratory, and mental" health.

Beyond "the individual health impacts, malnutrition weakens economies through decreased productivity, diminished educational achievement and income-earning potential, and increased health-care costs. Under nutrition in early life is associated with permanent IQ loss, impaired cognitive function, and decreased lifelong earning potential. In some countries of Sub-Saharan Africa, child under nutrition may be responsible for losses as high as 16 percent of GDP. Poorly nourished or unhealthy workers are less productive, less likely to innovate, and more likely to leave agriculture due to poor health. At the same time, health-care expenditures on obesity-related medical problems have risen sharply over the past 20 years in the United States and in many developed countries. In China, for example, in 2002 obesity led to a nearly 3.6 percent decline in GNP, a percentage that is expected to more than double by" 2025 (8.7%).36 Between 1996 and 2006 obesity-related medi

Figure 3 – Average diets worldwide

The chart compares the changes in diet from 1990-92 to 2007-09 by region.



Source: FAO, 2012.

Box 5 – Insufficient nutrition—snapshots of diets in four countries

India

This example of a child's meal in India includes wheat, eggplant, and potato.

What's missing:

Vitamin A: 62 percent of children under five are deficient in vitamin A
Iodine: Only 71 percent of households consume adequately iodized salt
Iron: 70 percent of children under five are anemic

Kenya

This example of a child's meal in Kenya includes corn flour and cabbage.

What's missing:

Vitamin A: 84 percent of children under five are deficient in vitamin A
Iodine: 37 percent of Kenyans are iodine deficient
Iron: 69 percent of children under five are anemic

Senegal

This example of a child's meal in Senegal includes cassava and milk.

What's missing:

Vitamin A: 61 percent of children under five are deficient in vitamin A
Iodine: 75 percent of school-aged children are iodine deficient
Iron: 80 percent of children under five are anemic

Guatemala

This example of a child's meal in Guatemala includes corn flour, black beans, and greens.

What's missing:

Vitamin A: 16 percent of children under five are deficient in vitamin A
Iodine: 14 percent of Guatemalans are iodine deficient
Iron: 39 percent of children under five are anemic

Source: The Micronutrient Initiative is working to provide these and other essential vitamins and minerals through supplements, fortified foods, and through other innovative delivery models.

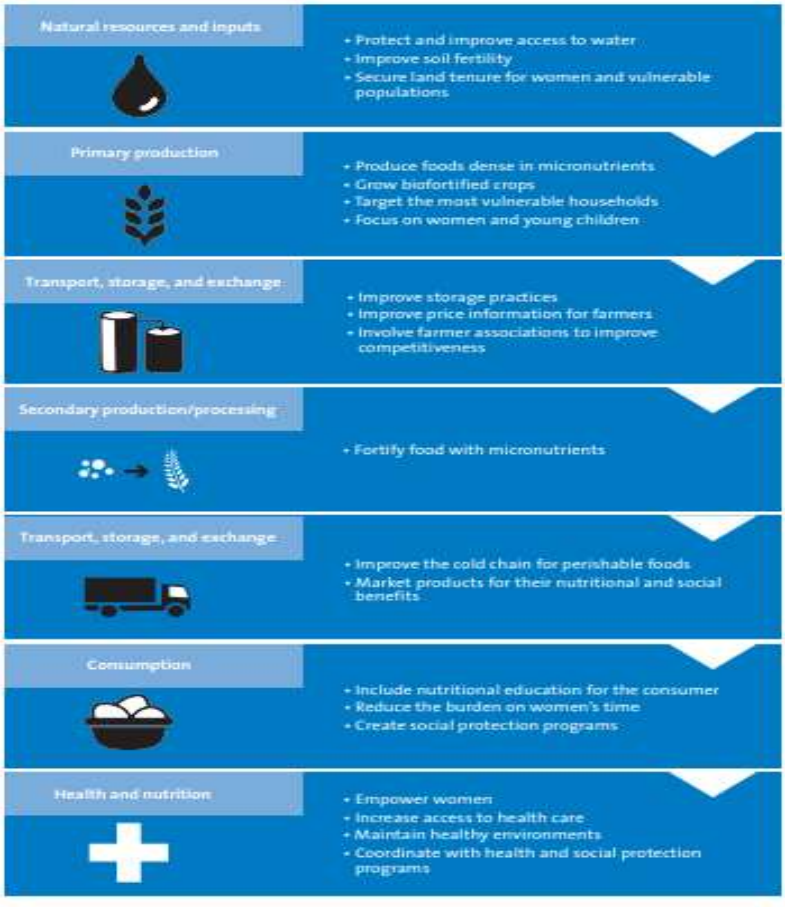
Micronutrient Initiative

Cal "costs in the United States rose from 5.5 percent to 10 percent of medical costs, an increase of $47 billion per year. In the United Kingdom obesity-related health-care costs will consume £648 million per year by 2020. Of particular concern for LMICs are children undernourished in the womb or early in life who may be more vulnerable to NCDs as adults. This compounds the health and economic costs of malnutrition for these individuals and for the countries that are confronting the double burden of malnutrition. Given the substantial costs, malnutrition is not just a social welfare concern, but a key challenge for economic development globally."

Food systems can play a crucial role in reducing the underlying causes of malnutrition:

Improving "nutrition has traditionally been the business of the health sector. Yet the causes of malnutrition span many sectors—not just the political and economic systems of nations, but infrastructure and institutions. Drinking dirty water and using unsanitary practices can lead to diarrheal diseases, limiting a person's ability to absorb nutrients. Access to safe and sufficient water and improved sanitation, therefore, is crucially important for ensuring safe and adequate nutrition. Provision of these basic services can be as important to nutrition as ensuring that families have access to high-quality health care or affordable, healthy foods. Therefore, preventing and reducing malnutrition requires sustained efforts across government sectors. Far too often, however, nutrition has fallen through the cracks or has been included only in health-sector initiatives. This has been a major factor in the slow progress on reducing" malnutrition in many "countries. Multisectoral problems require multisectoral solutions. Without more comprehensive approaches to addressing malnutrition that adopt multisectoral planning and implementation, progress will likely continue to falter. Broad-based economic growth has been viewed as one such comprehensive approach and has certainly been an important force for reducing malnutrition in many countries. However, relying on economic growth alone is not sufficient. Investments in programs and policies that explicitly address the causes of poor nutrition are essential. As the world's food suppliers, the food and agriculture sectors have critical roles to play in addressing the causes of malnutrition. Modern food systems have been engineered to be enormously successful at producing vast quantities of food, fiber, feed, and fuel. The emphasis on quantity in particular has helped to avert food shortages and spur the growth of national economies. However, there remains significant untapped potential for food systems to meet the nutrition and health needs of populations. Rather than simply focusing on quantity of calorie production, a food system that also focuses on the quality of the food produced, taking nutrients and diversity of diets into account, stands to significantly improve global health outcomes. Strategies to realign the goals of food systems with those of human health and nutrition are therefore urgently needed. Through such realignment, there is potential for a range of win-win"

Figure 4 – Nutrition-sensitive policy interventions along the food system value chain



Source: Herforth, Jones, and Pinstrup-Andersen, 2012.

solutions "that can simultaneously improve nutrition, strengthen economies, and provide for a more sustainable future. The food and agriculture sectors are among the most important sectors for strengthening and scaling up "nutrition-sensitive approaches" to reducing malnutrition, or approaches that aim to address the underlying causes of poor nutrition that lead to poor diets and illness. Such causes include the limited availability and affordability of healthy foods, limited access to health services and improved water and sanitation, and a lack of support for women in their roles as caregivers. "Nutrition-sensitive" approaches are needed to supplement "nutrition-specific" interventions that address the immediate causes of malnutrition, commonly implemented through health systems. Nutrition-specific interventions include management of severe acute malnutrition, exclusive breastfeeding, and supplements to address nutrient deficiencies. These interventions have been proven to effectively reduce malnutrition. Yet alone they are not enough. Even if these nutrition-specific interventions could be scaled up to universal coverage in the 34 countries with the highest undernutrition levels, these interventions would only reduce deaths among children under five by nearly 15 percent and global child stunting by 20 percent. Nutrition-sensitive approaches are needed across a range of sectors, including health, education, social welfare, and environmental protection. Yet the food and agriculture sectors play critical roles and are essential to reducing malnutrition. These sectors have the unique potential to effectively address many of the underlying causes of malnutrition through their influence on factors that affect health across the entire food value chain, including:"

> productivity and crop diversity on small-scale farms,
> incomes of farmers and workers throughout the food system,
> social status and productive capacity of women,
> postharvest processing and associated challenges of food waste,
> food marketing and retailing,
> exposure to unsafe food due to inadequate practices, screening, and safety controls.

Productivity and crop diversity on small-scale farms:

Agriculture "can play a prominent role in addressing household food security in the developing world. In many low-income countries, agriculture generates nearly one-third of GDP and employs as much as two-thirds of the labor force. Agriculture and food systems are important drivers of economic growth in these countries, supporting the livelihoods of millions, especially the poor. Agriculture is also a direct source of food for millions of farming households throughout the globe."

Small-scale "agriculture constitutes the majority of agricultural land and produces a significant portion of the food consumed in LMICs. Many of these poor smallholder farmers depend in part on their own production to provide for their food and nutrition needs. For these households, farm productivity directly affects food access, and the diversity and nutritional quality of their crops directly affects household diets. Programs to diversify diets and improve nutrition among smallholder farmers have specifically attempted to increase homestead production" of perishable, "nutrient-rich foods, including fruits, vegetables, eggs, and meat. Producing such foods on the farm make them readily accessible and less vulnerable to losses during storage and transport. Though there is little evidence of improvement in nutritional outcomes from these programs, increased homestead production of nutrient-rich foods has been consistently shown to diversify the diets of the producing households. Therefore, such programs are an important approach to diversifying diets and strengthening the potential of agriculture to contribute to improved nutrition."

Incomes of farmers and workers throughout the food system:

Perhaps "even more importantly, many smallholder farmers earn a living through agriculture by growing crops for sale on local, regional, or international markets. Agriculture is a predominant form of cash income, especially for the poor. Therefore, the direct influence of agriculture on diets is likely less important than the income-generating opportunities agriculture provides—directly or through multiplier effects on local economies—that allow poor households to diversify their food purchases and escape poverty. This is particularly true for landless households that depend heavily on cash income for their livelihoods. In fact, most poor households in both rural and urban areas are actually net purchasers of food, commonly spending more than half of their income on food. Therefore, the postharvest actions that are taken to transform agricultural goods into value-added food products and to influence the reach and price of foods in markets are vitally important to promoting better health."

Social status and productive capacity of women:

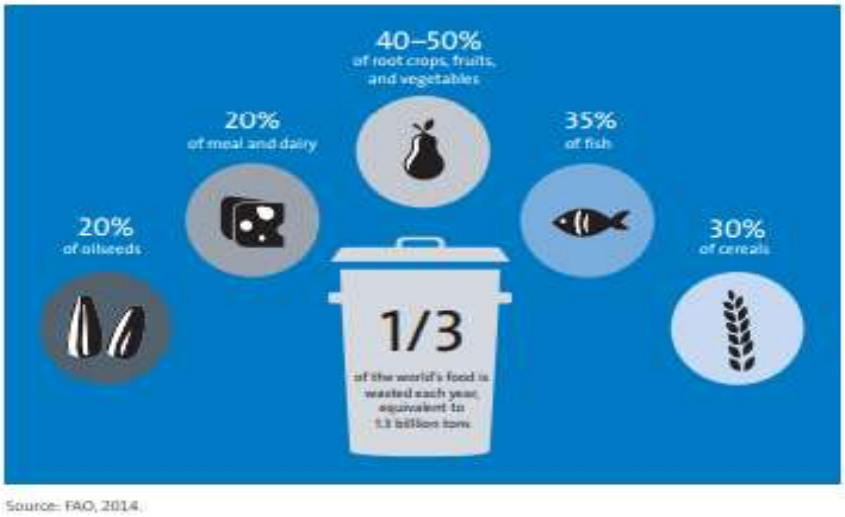
Women "make up nearly half of the labor force in the agricultural sector and provide as much as three-quarters of the labor for subsistence crops in developing countries. Women not only grow and harvest much of the food that is produced in these countries, but they are also the nutritional gatekeepers within households, responsible for preparing food and feeding and caring for children and other household members. In addition, income controlled by women is more likely to positively influence child nutrition and household food security than income controlled by men. Therefore, women's access to productive resources and involvement in household decisions are critical both for agricultural productivity as well as household nutrition."

Yet "women face serious constraints to productivity, including weak or nonexistent land and water use rights; little control over income; limited power to make decisions; and poor access to cooperatives, production inputs, extension services, technology, knowledge, credit, and labor markets. Even within comparable levels of wealth, the agricultural yields of male farmers are consistently higher than those of women farmers in many regions. These constraints increase the time and energy women must put into agricultural activities and can adversely impact their own nutritional status as well as their capacity to feed and care for nutritionally vulnerable children. Therefore, food systems that support women's empowerment and productivity throughout the value chain from agricultural production to postharvest processing are also likely to improve nutritional outcomes."

Postharvest processing challenges and food waste:

Food "processing is important for increasing access to nutrient-rich foods. Limited seasonal availability of fruits, vegetables, and other perishable foods such as milk, fish, and meat is a major barrier to improving nutrition in LMICs. There is an estimated 58 percent supply gap in the production of fruits and vegetables to meet current need for these nutrient-dense foods in the diets of populations of low-income countries. And this gap is expected to increase in the coming decades. Minimal processing and preservation techniques, including drying meat and fish, freezing or canning fruits and vegetables, and pasteurizing milk can improve access to nutrient-rich foods by extending the seasonality of perishable produce. Other postharvest processing approaches can also improve the nutritional profiles of foods, especially staple foods. Industrial fortification, for example, aims to make staple foods more nutritious by adding essential vitamins and minerals. In the United States, fortifying cereals with folic acid reduced the prevalence of neural tube defects in newborns. In some developing countries, fortifying vegetable oil with vitamin A has helped reduce vitamin A deficiencies.61 Food processing and preservation can also help to reduce postharvest food waste and address food safety issues. Poor storage facilities, transportation infrastructure, and cold chain capacity in LMICs contribute to an enormous amount of food wasted in these countries—as much as half of all perishable produce.63 Food waste could be reduced by approximately one-quarter by expanding refrigeration and cooling facilities and other infrastructure for minimal postharvest processing.64 These same efforts can also improve food safety. For example, pasteurization, sterilization, and fermentation— or even simple washing of produce—can reduce foodborne exposure to pathogenic microorganisms. These examples of postharvest processing can also improve nutrition and health through poverty reduction. Local processing and fortification can generate economic activity and employment opportunities, spurring growth in local economies and providing substantial income for" farmers

Figure 5 – Annual global food waste



Source: FAO, 2014

While "there is clearly a need for certain types of postharvest processing of whole foods and basic commodities in many LMICs, not all types of processing enhance the nutritional" value of food. "For example the ultra-processing of foods can in many cases actually be harmful to nutrition and health. Ultraprocessed food products such as sugar-sweetened beverages like soda and fruit drinks, some breakfast cereals, chips, candies, and processed meats are increasingly common in both developed and developing countries. These highly refined products are often energy dense but lacking in micronutrients, dietary fiber, and antioxidants and can be high in saturated fat, salt, and sugar. If consumed in small amounts as part of an otherwise healthy diet, these foods may not lead to increased health risks.68 However, the convenience and low cost of these products, their replacement of home-prepared meals, and the fact that they taste good all contribute to overconsumption. These factors are especially relevant for urban residents in LMICs who are increasingly substituting foods consumed away from home for home-prepared meals. The consumption of these ultra processed products has been linked to an increased risk of obesity, metabolic syndrome, and diet-related NCDs."

Food marketing and retailing:

Food "and beverage companies and retailers strongly influence consumer demand through marketing. These companies spend billions of dollars each year in promotional food and beverage marketing, even reaching remote rural areas of LMICS to influence consumption habits and create more demand for their products. The enormous influence of promotional marketing by food and beverage companies on consumer preferences can negatively shape nutrition and health outcomes,"

But "can also be leveraged to improve nutrition. Highly processed, nutrient-poor foods are the most heavily marketed foods sold by the food and beverage industry. These foods often lack essential vitamins and minerals, dietary fiber, and important phytochemicals, but are also usually high in sugar, salt, and/or fat. Because they are engineered to be tasty, convenient, and ready to eat right out of the package, they are easily overconsumed and can displace more healthy options. They are also affordably priced and therefore may be more appealing to low-income consumers who cannot afford to purchase more expensive fresh ingredients. The marketing of these foods to children in particular may be especially harmful, as children do not understand the persuasive intent of marketing and may develop long-term, unhealthy consumption habits that lead to diet-related NCDs, even before adulthood. However,

the power of promotional marketing to shape consumer demand also means that such approaches can be leveraged to promote nutritious diets and create healthy dietary habits among children from an early age. Education through schools and mass media is certainly important, but social marketing approaches using sophisticated techniques such as those expertly wielded by food and beverage companies to sell highly processed foods hold even greater potential to shift attitudes and food preferences. Therefore, working in partnership with food and beverage companies to improve nutrition through the promotion of healthy foods in line with dietary guidelines (e.g., fresh fruits and vegetables and whole grains) can contribute to making nutritious foods affordable and desirable to consumers. Furthermore, efforts by some food and beverage companies to reformulate products to reduce their sugar, salt, and fat content may also contribute to incremental progress toward reducing the unhealthy nutritional profiles of these foods. Additional" evidence is needed, however, to understand the nutritional benefits of product reformulation, especially if highly processed foods are still commonly overconsumed and substituted for healthy foods in diets.

Conclusion:

Action "must be taken now. Reaching the world's people with adequate food has been a challenge for modern agriculture and foods systems for more than half a century. The success of the agricultural revolution of the 1960s and 1970s in dramatically increasing staple crop production and reducing the numbers of hungry people in many parts of the world is a testament to what can be achieved when nations and people come together to tackle great challenges. Yet hunger has not yet been eradicated, especially in areas missed by this most recent agricultural revolution. And now it has become painfully clear that calories alone are not enough. Indeed, even as hunger in many areas is reduced, malnutrition and the diseases it engenders are draining the health and productivity of millions and sapping the economic potential of nations. The United States now faces the challenge of realigning agriculture and food systems to address the growing double burden of undernutrition and obesity that is costing lives and trillions of dollars in health care and lost productivity. Alongside efforts to sustainably increase production, nutrition must become a priority. The onward march of population growth, urbanization, and climate change make these efforts all the more imperative. Success will mean not only increasing access to healthy food for poor and vulnerable populations, but also creating a virtuous cycle of productivity, sustainability, growing markets, stable societies, and thriving economies, all of which are in the interests of the United States. Leadership by the US administration and Congress will be vital to bringing people and nations together again to spark the next food revolution. The recommendations in this report can help begin this process."

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