

Global Diet Composition: Factors Behind the Changes and Implications of the New Trends

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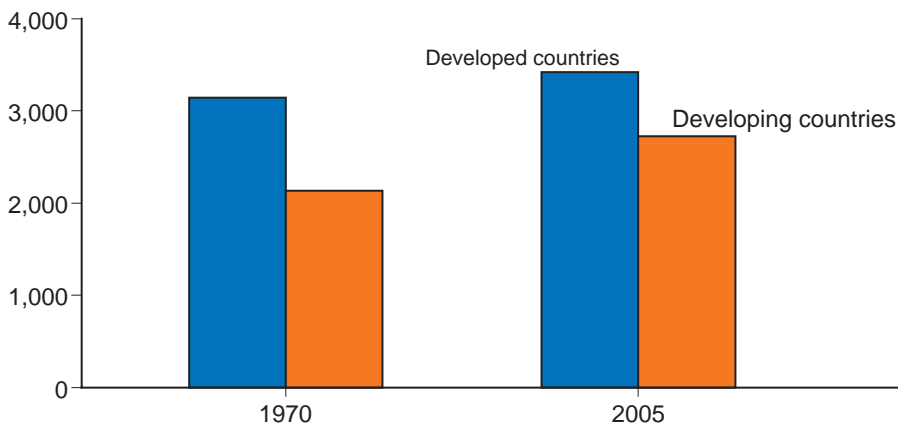
The rise in global per capita food consumption during the last few decades has been largely driven by rising consumption in developing countries. At the global level, per capita calorie consumption (all food available for consumption) increased by 17 percent from 1970 to 2005 (FAOSTAT). Daily per capita calorie consumption in developed countries increased nearly 9 percent since 1970 to 3,418 in 2005 (fig. A.1). While consumption in developing countries was much lower than that in developed countries, 2,722 calories in 2005, it rose at a much faster rate during that 35-year period, more than 27 percent.

The benefit from the global food abundance was not equally distributed among regions and countries. Regionally, the growth in per capita food consumption was the slowest in Sub-Saharan Africa (SSA), with several countries even experiencing a decline in food consumption from some of the lowest levels in the world. The CIS countries (Commonwealth of Independent States or the former Soviet Union) experienced a decline in food consumption after their independence in the early 1990s. However, during the 2000s, they have, on average, experienced an upturn in consumption. In China and India, the two most populous countries, per capita consumption averaged about 2,000 calories per day in 1970, but by 2005 it had jumped by 50 percent in China (to about 3,000) and by 25 percent in India (to 2,500). Because these two countries account for about a third of the global population, their trends carry considerable weight at the global level. Consequently, improvements in their diets were the major factors behind the rising trend in global consumption for the last few decades.

Figure A.1

Calorie availability: Developed vs. developing countries

Calories/person/day



Source: UN, Food and Agriculture Organization.

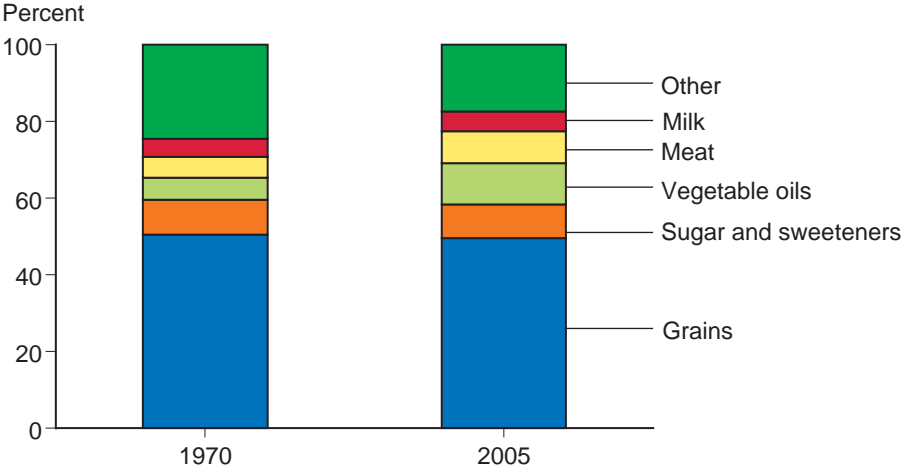
Food consumption also improved in Latin America, on average, during the same period. But the rate of improvement was modest relative to Asia, about 22 percent. But Latin America was starting from a higher base; per capita calorie consumption in Latin America was 16 percent higher than in Asia in 1970. Among the region’s best performing countries was Brazil with a 35-percent increase in daily per capita calorie consumption from 2,411 in 1970 to 3,274 by 2005.

Changes in Global Diet Composition

The growth in food consumption led to a major change in the global diet as the composition of the food basket became more diversified. Among the key features of this change was a growing share in the diet of highly energy dense foods, particularly vegetable oils and dairy/meat products. In 1970, grains accounted for more than half of calories consumed (fig. A.2). Sugar, the next largest commodity group, had a 9-percent share. Both roots and vegetable oils held a 7.6-percent share of the global diet, while meat accounted for 5.4 percent of the total. By 2005, while grains and sugar continued to account for about 60 percent of the global diet, the share of vegetables nearly doubled but remained quite small at under 3 percent. This growth was supported by the expansion and improvement of the global transportation system that facilitated trade in perishable products. The second-highest growth was for meat, whose share exceeded 8 percent in 2005. This change represented an 80-percent increase in meat demand.

The vegetable oils share of the global diet increased by 67 percent, in 2003 accounting for nearly 11 percent of the global diet by 2005. In contrast to these increases, consumption of some traditional food items such as pulses and root crops declined. Overall, trade liberalization and improvement in transportation system opened markets for products and many farmers were able to capitalize on these changes by supplying wider variety of products in growing and evolving markets.

Figure A.2
Global diet composition



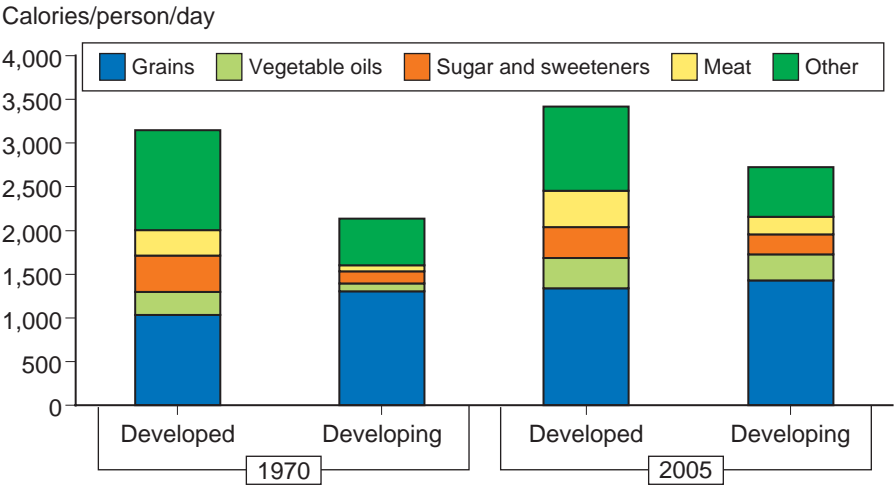
Source: UN-FAO;USDA-ERS.

Diet change in developed countries: Per capita food consumption in developed countries, despite rising at a relatively modest rate of about 8 percent between 1970 and 2005, far exceeds the average USDA recommendation of 2,400 to 2,800 calories per person per day. The cereals share of the developed-country diet did not change much over time—remaining just below 40 percent of average daily calorie consumption (fig. A.3). Meat consumption increased more than 30 percent since 1970, becoming the second ranked food group in the diet of developed countries; its share averaged more than 12 percent in 2005. The rate of increase in calories from fruit consumption was even higher, but this category remains small with less than a 4-percent share of the developed countries’ diet.

The two categories of food items that experienced the biggest declines in diet shares were animal fats and sugar. The largest decrease was for animal fats whose share fell by more than 80 percent. In 2005, animal fats accounted for only 1 percent of the global diet. This decline reflects the influence of research and education on the adverse health effects, such as cardiovascular disease and obesity, associated with consumption of these fats. This decline, however, did not reduce the overall level of fat consumption in developed countries. In fact, per capita fat consumption (from all sources) increased by 27 percent during 1970-2005 mainly due to the rise in vegetable oil consumption. The share of sugar in developed countries’ diets declined by more than 20 percent, measuring around 10 percent in 2005; this drop was due to the increased use of sugar substitutes such as high fructose corn syrup and artificial sweeteners such as saccharin and aspartame.

Diet change in developing countries: Developing countries account for roughly 70 percent of the global population and their population growth is more than 2 times higher than developed countries. Per capita consumption of these countries exceeded 2,722 calories per day in 2005, rising from 2,134 calories in 1970. This change was more than three times that of developed countries. Grains continued to dominate the diet of developing countries, but the 8-percent increase in grain consumption was much lower than the overall

Figure A.3
Diet composition: Developed vs. developing countries, 1970 and 2005



Source: UN-FAO;USDA-ERS.

increase in calorie consumption. Per capita consumption of higher value food items soared; meat, eggs, and vegetable oils increased roughly threefold, while sugar increased 66 percent.

The least developed countries (those with per capita incomes below US\$500 per year) also benefited from the global food abundance. Per capita daily calorie consumption increased from 2,000 in 1970 to 2,200 in 2005, a positive gain, but much smaller than developing countries as a whole. Among the key food groups, calorie contribution of vegetable oils grew the most, 28 percent, followed by sugar and eggs, 15 percent, and meat and milk, 7 percent. In absolute terms, however, the level of consumption of these food items remains well below the level consumed in other countries. Moreover, these countries have experienced a decline in consumption of nutritionally beneficial food items such as pulses, vegetables, and fruits. The decline was the sharpest for vegetables, 32 percent, followed by fruits, 9 percent, and pulses, 5 percent. Even with the modest increase in overall calorie consumption in these countries, there seems to be a clear change in diet that favors fat and sugar and moves away from their traditional diet of vegetables and pulses. This trend could be problematic because while calorie intake is rising, the calories are coming from less-nutritious foods.

The global diet transition occurred in part because of several decades of declining real food prices and high per capita income growth, particularly in large countries such as China, Brazil, and India. Developing countries' per capita income grew by 2.7 times, while developed countries' income doubled. Conversely, per capita incomes in the least developed countries grew very slowly, only 20 percent during the 35-year period.

The decline in staple food prices during this time period was significant; real world prices (adjusted for global inflation) for rice, sugar, and soybean oil in 2000 were less than 40 percent of the 1970 levels. Beef prices in 2000 were about half of their 1970 level while wheat prices were 60 percent. Although food prices have increased since 2004, they remain below their 1970 levels, in real terms. Other important factors such as urbanization, advertising, and access to new varieties of imported food played key roles in the diet transition of developing countries. There is no quantitative study regarding the degree to which different factors contributed to the dietary transition of developing countries, but clearly the speed of change is notable. The emerging trends of rising consumption of fats and sugar in developing countries' diets have followed the path of the western diet. According to Popkin and Ng, the shift in western countries' diets took place within 100-200 years, while those for developing countries have taken only a few decades

Urbanization and Globalization Influence Diet Change

In addition to income levels, income distribution, and food prices, other factors such as education and cultural differences influence diets across and within countries. The growth in urbanization is one phenomenon that has been gaining attention for its contribution to global diet change. The lifestyle in urban areas separates ingredients of home food consumption from local production, which is different than in rural agricultural households. In agricultural areas,

there is an obvious link between foods that are being produced and those that are consumed. That linkage does not exist in the same way in urban areas. In developing countries, according to the World Bank data, the rate of urbanization was two to three times higher than the countries' population growth during the last three decades.

Although detailed disaggregated country data are not available, cross-country (at the national level) examination of diet composition shows that in countries with the same level of income, those having a higher share of urban population tended to have diets with more fats (fat gram), both vegetable and animal. For example, daily per capita consumption of fat in Mexico was half that of Uruguay, the more urbanized country, despite the fact that they had the same level of per capita income (US\$6,172, and US\$6,248 in 2005). The rate of urbanization is 67 percent in Mexico versus 92 percent in Uruguay. Similarly, fat consumption in Jordan was more than 4 times that of Namibia. While their per capita income was almost the same (US\$2,086, and US\$2,083 in 2005), the urbanization rate in Jordan, at 82 percent, was much higher than that of Namibia, at only 35 percent. Other factors such as cultural and dietary habits might also contribute to the differences.

It should be noted that all urban environments are not the same. The openness of an economy and public access to mass media (particularly television) and other marketing systems can significantly influence consumers' choices. However, regardless of consumer food choices, an urban lifestyle usually means a decline in physical activity and higher participation of women in the workforce. The latter factor often translates into less time for food preparation, which often leads to increased consumption of processed foods. Our statistical analysis confirms this relationship. We used cross-country data of 136 countries to estimate the impact of factors such as per capita income, rate of urbanization, the percent of households with TVs, and the level of a country's development (represented by dummy variable: one for developed countries and zero for developing countries), on daily consumption of calories and fat. The results showed positive and statistically significant relationships between all the variables (per capita income, urbanization rate, and share of households with TVs) and their impact on calorie and fat consumption.

In addition to urbanization and access to mass media, the global diet has been influenced by world economic integration, which has promoted trade expansion. Trade agreements of the last three decades, in addition to expanding global trade, have been a catalyst for increased investment in transportation and communication systems. The average ocean freight and port charges per U.S. import and export cargo decreased 60 percent between 1970 and 1990. Air cargo rates not only fallen in the last 30 years, new technologies such as refrigeration allowed trade in perishable products goods such as cut flowers and live lobsters. The decline in global trade barriers was followed by liberalization in global financing which altered food systems of most countries by expanding the role of supermarkets in food marketing.

Food imports have become an important component of food supplies in both developed and developing countries as food self-sufficiency has declined during the last few decades. During the last three decades, trade in foods such as grains, vegetable oils, and meat increased threefold to fivefold. The changes in self-sufficiency vary by country grouping. The higher income

developed countries became more dependent on imports of fruits and vegetables, while the developing countries became more dependent on imports of staple commodities such as grains and vegetable oils. Statistics illustrating increasing consumption of wheat, in the processed form of bread and pasta, in place of traditional grains such as millet and sorghum, as well as root crops, are clear reflections of this trend.

Another important trade development is that the growth in imports was not limited to staple foods as it expanded to a variety of commodities, including semi-processed and processed foods. During 1970 to 2005, the global volume of trade of highly processed foods increased by more than 4.5 times. The FAO definition of highly processed food includes food items such as canned meat, breakfast cereals, pastries, and wine. Developed countries have always dominated the processed food import market; they held an 84-percent share of this market in 2005. However, the highest growth—5.6-fold between 1970 and 2005—in this particular import market has occurred in the developing countries. In the least developed countries, the processed food import market is very small, but it exhibited the same rate of growth as the global level.

The growing demand for imported products has contributed to the evolution of the global food system and spawn of supermarkets that allowed convenience shopping and wider food varieties in developing countries. Supermarkets, due to the large scale of their operations, are able to offer lower prices relative to traditional retail stores. These lower prices boosted their market shares and profits and that, in turn, fueled the expansion. The high growth in market share of supermarkets in Latin America highlights the extent of change: from a 10- to 20-percent market share in the 1980s to a 50- to 60-percent share in the 1990s, rapidly approaching the U.S. share of about 70 to 80 percent. The experience of East and South Asia also shows a similar pattern. In Sub-Saharan Africa, with the exception of South Africa, the supermarket share in the retail food market is much smaller, but expansion is underway due to growing investment by South African companies (Reardon, 2004).

The growing role of supermarkets in many developing countries has both positive and negative implications for consumers. On the positive side, supermarkets are introducing quality, variety, standards, and lower prices to the food system of developing countries. On the negative side, urban consumers' increased access to low-cost, high-calorie convenience foods and those consumers' limited physical activity has fueled obesity problems.

Obesity and Undernutrition in Developing Countries

The global increase in calorie consumption has led to excess food consumption in many countries. In developing countries, consumption of fats and sugar has risen and the income elasticity for these products remains positive. This means as incomes rise, which is projected for almost all developing countries, the role and contribution of these commodities in the diet of these countries is expected to increase. It should be noted, however, that the problem of under-nutrition and food insecurity still exists. The estimates of the number of food-insecure people are in the range of 800 million to 1 billion people, and according to FAO and ERS researchers, there has not been

much of a trend—rising or falling—during the last decade. Parallel to this, it is estimated that there are about 1 billion overweight and obese people at the global level (IFPRI).² Although this problem is more prevalent in Western countries, it is spreading rapidly in developing countries as well.

In many developing countries, the growing trend of overweight populations is most prevalent among the higher income groups. In contrast, in higher income countries, this problem is more prevalent among lower income groups. In 2007, at the regional level, according to ERS estimates, consumption in the highest income quintile in Asia, Latin America and the Caribbean, and North Africa, equaled roughly 2,800 calories per person per day. This level is the upper range of the requirement for a moderately active adult. In fact, consumption for the highest income quintile in North Africa was estimated at nearly 3,300 calories per day. As for individual countries, food consumption of the highest income quintile met or exceeded 2,800 calories in 23 of our 70 study countries.

The situation regarding overweight populations in developing countries could worsen in the future because of the increasing number of overweight children. According to a World Health Organization study, 8-9 percent of children under 5 years old in Egypt and Algeria were overweight; this figure is close to the 10 percent that is estimated for the U.S.

According to FAO, in six case study countries (China, Egypt, India, Mexico, the Philippines, and South Africa), the increase in food consumption over the past 20 years led to a reduction in the number of underweight children and adults. In China, Egypt, Mexico, and the Philippines, the problem of overweight adults was more widespread than underweight adults in 1999. As a result, obesity-related diseases such as diabetes and hypertension have become more widespread. For example, in China, hypertension increased 12 percent (or the equivalent of 160 million people) during 1991 to 2002. Similarly, Caballero and Popkin showed that 25 to 50 percent of the population in countries such as Mexico, Thailand, and Tunisia suffer from diabetes.

Three decades ago, the main concern of the developing countries was how to curb food insecurity and hunger and how to prevent its associated diseases. However, more recently, an assessment by WHO indicates that overweight and obesity represent a rapidly growing threat to health in an increasing number of developed and developing countries. The report also indicates that, in some countries, overweight and obesity are now replacing the more traditional public health concerns such as undernutrition and infectious diseases.

According to Thompson, Edelsberg, Colditz, Bird, and Oster, in 1990, the direct cost of obesity-associated disease in the U.S. was \$45.8 billion, and the indirect cost of obesity related to work days lost and mortality costs was estimated to be \$23 billion. This means that the total economic cost of obesity was estimated to be \$68.8 billion in 1990. The high direct cost of obesity is related to the increased risk of many major chronic diseases such as diabetes, cardiovascular disease, gallbladder disease, and cancer. If the Western pattern of food consumption spreads to developing countries, the health cost implications for these economies could be substantial.

² For adults, overweight and obesity ranges are determined by using weight and height to calculate body mass index (BMI). BMI is used because, for most people, it correlates with their amount of body fat. An adult who has a BMI between 25 and 29.9 is considered overweight, and an adult who has a BMI of 30 or higher is considered obese. More detailed information is available at: <http://www.cdc.gov/NCCdphp/dnpa/obesity/defining.htm> and <http://www.who.int/mediacentre/factsheets/fs311/en/>.

In most developing countries, human capital is a major resource and public health is a key to economic progress. Research shows that obesity reduces a person's productivity. Moreover, health costs associated with the growing rate of obesity and its related diseases could overwhelm developing countries' fragile health care systems. According to the latest World Bank data, per capita average health expenditures in developing countries are less than 10 percent of developed countries' expenditures and in the least developed countries this share is less than 1 percent.

Policy Options

Among policies, nutritional education is probably the key in terms of reaching out to consumers. Since dietary habits are formed at a young age, nutritional education of children can play a vital role influencing dietary habits. Advertising, particularly TV advertising, is capable of reaching a broad spectrum of consumers in urban areas where obesity problem is more acute. Advertising that is directed to children has a profound impact on their perceptions according to a Consumers International survey. The survey of six countries (India, Indonesia, Malaysia, Pakistan, the Philippines, and South Korea) showed that most children in these countries watch television two to four hours per day on weekdays, with the hours rising on weekends and during school vacations. The study showed that Malaysian children watch TV the most during their vacation time compared to other countries; 30 percent of children watch over 8 hours per day and in every hour, 20 minutes are comprised by advertising. Of those ads, 70 percent were related to food. The survey suggested that the case of Malaysia is not unique, as the majority of advertising aimed at children in all study countries is for foods and beverages high in sugar and fat. The survey also revealed that with the exception of South Korea, more than 50 percent of parents in the study countries said that their children were influential in their food purchases.

In the United States, research shows a significant correlation between television viewing and obesity among children. This is the reason that Sweden banned advertising for children under 12 years old. Other countries including Australia, Canada and the United Kingdom, have taken similar steps to curb the impact of advertising on children. It should be noted that other factors also play key roles in building dietary habits. For example, overweight parents tend to purchase larger quantities of fatty foods, thereby influencing a child's tastes and habits.

In addition to nutrition education, healthy eating can be promoted by other policy interventions. The Scandinavian countries reduced coronary heart disease between 1976 and the 1980s by providing subsidies for healthy food items such as fish. During the 1990s, Singapore reduced child obesity through a combination of changes in school diets and increased fitness and physical activity programming. The program of Trim and Fit, started in 1992 and managed by the Singapore Ministries of Health and Education, is named as one of the most successful programs in the world in terms of sustained obesity management. The program includes teacher and student education, changes in school lunches, assessment of students, and increased physical activities during school time.

Conclusions

The issues and problems related to being overweight and obese in developing countries are a fairly new phenomenon. By contrast, food insecurity has long been an issue for the international community. The 1996 World Food Summit goal of cutting global hunger by half by 2015, for example, was initiated by the UN's Food and Agriculture Organization as a universal framework for developing countries and donors and international organization to work together in pursuit of a shared goal. The current escalation of food prices has once again focused attention on global food insecurity and hunger. While the root cause of food insecurity is poverty, the problem of overweight and obesity is prevalent among higher income populations in developing countries.

During the last several decades, the increase in food consumption in developing countries was notable, 28 percent from 1970 to 2005. Of the 6.5 billion people in the world, 5.5 billion or over 85 percent are in developing countries. Roughly 800 million to 1 billion of these people are estimated to be food-insecure (consume less than the nutritionally required level, according to the FAO and ERS estimates). This means food consumption of about 4.5 billion people in developing countries is equal to or greater than the required level. For the higher income people in these countries, income growth, urbanization and global market integration have accelerated access to new varieties of foods, including higher calorie foods. This pattern is expected to continue in the future, meaning that, for some developing countries, obesity may compete with hunger as the key nutritional problem in the future. Currently, health statistics indicate a growing trend in diet-related diseases. For example, the top 10 countries in terms of the number of cases of diabetes are India, China, the United States, Indonesia, Japan, Pakistan, Russia, Brazil, Italy, and Bangladesh. The health and economic costs associated with these diseases are well-known.

The current food price hike could slow down the pace of excess food consumption, but the impact will be limited because in developing countries obesity is more prevalent among higher income groups, which are less responsive to higher food prices. The great challenge for developing countries is to identify effective policies that could prevent repeating the obesity experience of the Western countries.

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