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The Importance of Trend and Policy Influences on Global Diets since 1992

(English only)

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Abstract

1. The 1992 International Conference on Nutrition organized by the United Nations Food and Agriculture Organization (FAO) and World Health Organization (WHO) declared "*Hunger and malnutrition are unacceptable*" and pledged "*to act in solidarity to ensure that freedom from hunger becomes a reality.*"

2. Since 1992 much progress has been made towards these goals. Calorie availability has increased throughout the world. Even in the least developed countries per capita calorie availability has grown by 10%. The proportion of undernourished has fallen as a consequence, but still afflicts 842 million people globally. At the same time obesity has emerged as a major public health concern, primarily in developed countries and the growing middle classes in middle and low income countries. There are now an estimated 1.4 billion overweight and obese people in the world (FAO 2013a). Globally the nutrition transition has seen increases in intakes of livestock products, processed foods and fast foods. These

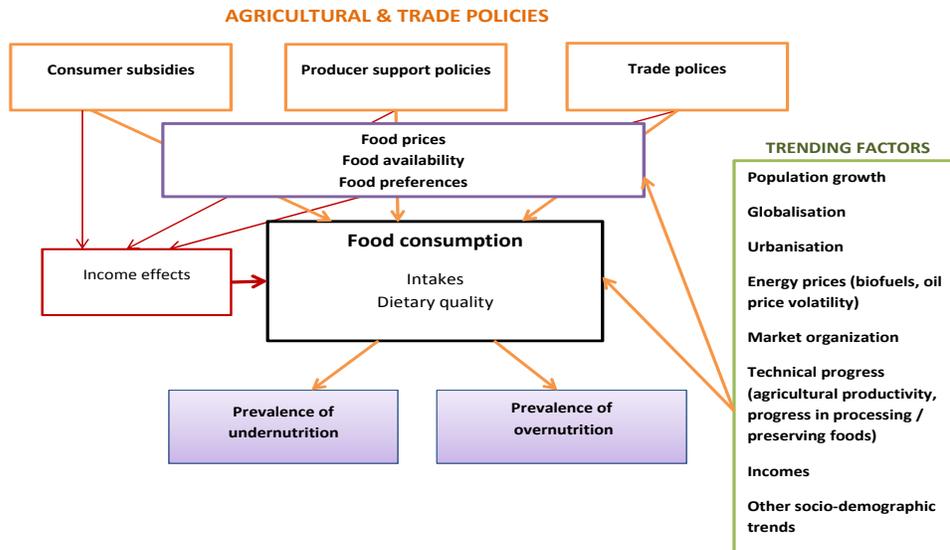
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changes are most readily explained by economic growth, urbanization, globalization and technological change in agriculture, food processing, distribution and trade. International trade and investment liberalization have been key policy drivers of change through their effects on economic growth and globalization. Agricultural policy reform through its impact on food prices has had a relatively minor impact on diets. Consumer policy vehicles like food aid and food assistance programs do not seem to have had major diet quality effects, but they have been effective in their basic goal of assuring minimum calorie requirements are met, particularly in emergencies.

3. While the number of undernourished has fallen slightly from over 1 billion in 1990-92 to 842million in 2011-13 (FAO, 2013), the share of world population that is undernourished has fallen substantially from 18.9% to 12% of the world population; at the same time the number of overweight people globally has leapt to 1.4b from levels so low even most developed countries did not consider them worth counting in 1992 (see OECD, 2011).

4. The aim of this article is to describe and discuss the dietary and nutritional changes that have occurred since ICN-1992, attempting to untangle the multitude of factors that have contributed to such change, with particular reference to the role and importance of public policies that influence food prices and/or food availability, notably agricultural policies (e.g. reform of the Common Agricultural Policy), trade and investment policies (e.g. the Uruguay Round Agriculture Agreement) and consumer-oriented policies (e.g. domestic and international food assistance programs). To this end we draw on a wide range of literature from detailed global trade models through to country-specific descriptions of change. We analyze the evidence through an economic lens, though in our coverage and assessment we range much more broadly than the traditional neo-classical economics approach. Figure 1 indicates the framework for the discussion of dietary change within the paper. Food consumption is influenced by incomes, prices, availability and preferences. Over the past 20 years these have in turn been influenced by important global changes in technology, globalization, population and other socio-demographic changes like urbanization and the increased work-force participation of women. We recognise that many of these changes are inter-related, but we discuss their separate influences on prices, availability and preferences and we attempt to identify the influences of agricultural and trade policies (themselves inter-connected) and consumer food policies, whether or not targeted at influencing diets.

Figure 1: Influences on food consumption



Background: dietary change

5. As the Chicago Council (2011) acknowledges, the shift from early death due to communicable diseases and under-nutrition to later death from chronic non-communicable diseases (NCDs) often associated with overnutrition is primarily a story of technological, social, and economic success. However, it is an incomplete success, for those many countries where rural and child hunger remain common and where advances in health care systems are yet to diminish the adverse health effects of over-nutrition². Such countries suffer what has become known as the double-burden of malnutrition. Indeed, it has become apparent that diet-related NCDs are emerging increasingly among lower- and middle-income groups in less affluent countries (Kearney, 2010) and death rates from NCDs are much higher, for example in Burkina Faso and Bangladesh, than in the UK (Chicago Council, 2011).

6. Table 1 shows how calorie availability has progressed between 1992 and 2007 (latest available data)³. Quite uniformly, for regional aggregates, per capita availability has increased by between 100 and 200 calories per capita per year; in the least developed countries there has been a per capita increase of 10.4%. As a result, FAO calculates that

² In developed countries, deaths from diet-related NCDs has fallen steadily (OECD, 2011) and life expectancy is little, if at all, diminished by being obese (Finkelstein et al., 2009).

³ The FAOSTAT data used here only track national-level calorie availability, rather than intakes based on individual-level data. Their shortcomings in capturing nutrient intakes are well-recognised in the literature and fully acknowledged here. However, their value lies in providing comparable data across countries and over time, with global coverage.

calorie adequacy has increased in all country categories and world regions; for example, globally from 114% to 122%, in low income countries from 97% to 105%, in sub-Saharan Africa from 100% to 111% and in South-East Asia from 99% to 121% (FAO, 2013b).

Table 1. Per Capita Calorie Availability 1992 and 2007

Countries	1992	2007
<i>Least Developed Countries</i>	<i>1957</i>	<i>2162</i>
<i>World</i>	<i>2634</i>	<i>2798</i>
<i>Africa</i>	<i>2300</i>	<i>2462</i>
<i>Americas</i>	<i>3005</i>	<i>3216</i>
<i>Asia</i>	<i>2477</i>	<i>2668</i>
<i>Europe</i>	<i>3253</i>	<i>3406</i>
<i>Oceania</i>	<i>3079</i>	<i>3182</i>

Source: FAOSTAT

7. The rise in available food energy has been accompanied by changes in the composition of the diet. The process of dietary transition follows a pattern involving two main stages (Smil, 2001), the ‘expansion’ stage where the main change is an increase in energy intake, largely from cheaper foodstuffs of vegetable origin. The second stage, called the ‘substitution’ stage, results in a shift primarily from carbohydrate-rich staples (cereals, roots, tubers) to vegetable oils, animal products (meat and dairy foods) and sugar. FAO calculates that globally, since 1992, there has been a reduction in the share of energy from cereals and roots and tubers, and per capita availability increases in fruit and vegetables, livestock products, vegetable oils and protein (FAO 2013b). Culture, beliefs and religious traditions can influence the extent to which animal products substitute vegetable products and the specific types of meat and animal products consumed (Kearney, 2010). Such improvements in dietary quality contribute to reduction in micro-nutrient deficiency which afflicts 2 billion people globally (FAO 2013a).

8. FAOSTAT data suggest even the least developed countries have reached Stage 2 as their energy intake from sugar grew by +45%, from animal products by +25%, by 31% from meat, 25% from vegetables and 20% from vegetable oil. Major increases in calories from animal products also took place in China (+75%) and India (+24%). Globally the share of food expenditure on cereals and tubers fell from almost 40% in the 1980s to little over 20% in 2005 (World Development Report 2008-09). The demand for processed foods follows a similar pattern with rapid growth, particularly among low income countries, as demonstrated in Table 2.

Table 2. Growth rates of sales for selected food categories

	Average annual growth rate (1998-2003)				
	Oils and Fats	Breakfast Cereals	Ready Meals	Dried Food	Dairy Products
Lower Income Countries	11.6%	56.3%	11.0%	14.4%	11.4%
Lower Middle Income Countries	8.1%	12.3%	10.1%	10.9%	9.7%
Upper Middle Income Countries	7.4%	9.7%	7.9%	8.3%	6.7%
Higher Income Countries	0.2%	3.3%	4.7%	1.8%	2.9%

Source: Regmi and Gelhar (2005a), based on the Euromonitor, 2003.

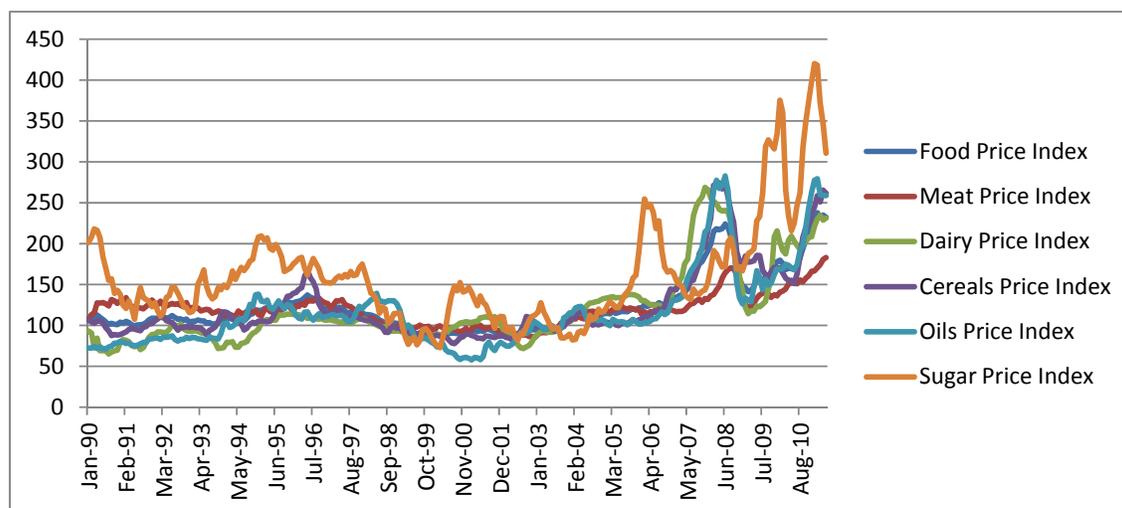
Key trends driving food consumption

9. Following the scheme of Figure 1, we look at changes in the key drivers of change in global food consumption patterns and assess their importance.

Trends in food prices and their impact

10. International food prices were largely stable (with a gentle decline) from 1991 until 2003, having declined for a considerable time before this period. The food price inflation that set in during 2003 turned into a full-blown inflationary crisis in 2008, which has continued subsequently after a brief respite. Figure 3 charts the overall food price index, along with the indices of international prices of individual commodities. Dairy prices have been more volatile, and meat prices have risen less than cereals and dairy products.

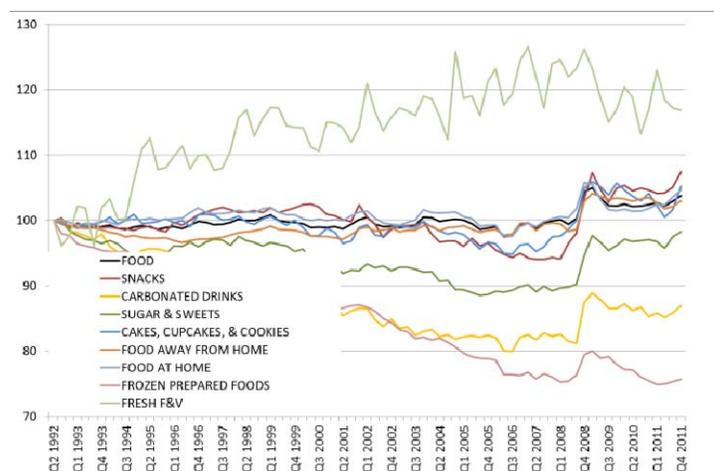
Figure 3. FAO international Food Price indices for commodity groups (nominal prices, 2002-04=100)



Source: FAO Monthly Food Price Index, <http://www.fao.org/worldfoodsituation/wfs-home/foodpricesindex/en/>

11. Global processed food and beverage prices are not available, but Datastream data for the US and EU show that prices for soft drinks, snacks and confectionary have fallen most sharply since 1992, particularly in relation to fresh fruit and vegetable prices (Figure 4).

Figure 4: Real consumer prices for food and selected food groups in the US



Source: our processing of Datastream data

12. The impact of price changes depends on their own and cross-price elasticities. Regmi and Gelhar (2005a) show that among unprocessed foods, own price elasticities are highest (in absolute terms) for fruit and vegetables and meat and lowest for cereals and oils and fats. A systematic review by Green (2011, unpublished) of more than 3700 demand studies worldwide demonstrates that soft drinks and confectionery as a category have the highest elasticity of all food groups, including livestock products. These generalizations are true across all stages of development but low-income consumers are most responsive to prices (own-price elasticities in rich countries approach zero).

13. We conclude that for most of the period, prices were relatively stable so had limited impact on consumption, but that the decline in the price of meat relative to cereals and other foods since the early 2000s, combined with a higher elasticity may partially explains the shift towards meat in diets in several developing countries. Similarly the relative decline in processed food prices has contributed to their increased consumption. Lakdawalla and Philipson (2009) emphasise the importance of reductions in the overall price of food relative to other goods as a result of agricultural innovation in stimulating overnutrition. Other authors (eg. Brownell and Horgen, 2004; Drewnowski and Darmon, 2005) characterise this problem as being caused by energy-dense foods with added sugars and fats being relatively inexpensive compared to healthier diets composed of lean meats, whole grains and fruit and vegetables. It may be too simplistic to state that healthier foods have become more expensive relative to unhealthy foods, particularly because, when the opportunity cost of cooking time is factored into the comparison, the increasing relative attractiveness of ready-to-eat foods as a source of energy becomes apparent. In the last two decades, an increasing proportion of fruit and vegetables has been undergoing value addition through processing (washing, peeling, cutting, microwavable packaging, etc.). When the price trends for such value-added produce is compared to those for processed snacks, thereby holding the level of convenience constant across the two sets, the relatively expensive nature of healthier foods is confirmed. Although the arguments with regard to the role of food prices in overnutrition patterns have largely been framed in the context of the developed world, particularly the US, they carry over to Low and Middle Income Countries (LMICs) undergoing nutrition transition, particularly in urban areas. In addition to the range of processed foods that are increasingly available in developing countries, street foods (often high in fats, salt and sugar) may provide inexpensive energy sources with low time cost of preparation.

14. In relation to undernutrition, the general fall in the price per calorie should be considered as beneficial, though by the same token, recent food price increases are cause for concern. Poor consumers cope with rising food prices by switching from preferred to lower quality staples, or by cutting down on relatively expensive non-staple sources of calories such as meat, fruit and vegetables. Reliance on cheap and energy-dense convenience foods or street foods may increase in urban areas. Dietary diversity and micronutrient intakes are casualties in this process. Although the crisis is recent, a substantial body of evidence from across the world is beginning to accumulate confirming these patterns. The World Food Program's (WFP) application of rapid assessment tools to gauge food security impacts of the crisis shows reduced dietary diversity in Haiti, Nepal and Niger (Brinkman et al., 2010). In Liberia, the WFP finds substitution of cassava for rice following the crisis, and an overall reduction in protein sources and vegetable consumption. In Palestine, households are found to have reduced milk and meat consumption due to the crisis. D'Souza and Jolliffe (2010) find that the food price crisis in Afghanistan resulted in substantial reduction in real per capita food consumption, calorie intake and dietary diversity.

Trends in incomes and their impact

15. Income is a well-recognized determinant of calorie intake and dietary quality, and economic growth is the obvious pathway towards reducing malnutrition (Smith and Haddad, 2002). Table 3 shows world average real per capita income rose by 2.1% per year between 1992 and 2010 (World Bank, 2012). It rose fastest in middle income countries (above 3% between 1990 and 2009), slowest in heavily indebted poor countries (just above 1% over the same period) and the wealthiest countries (between 1.4 and 1.5%).

Table 3. GDP per capita, PPP (constant 2005 international \$)

Country grouping	1992	2010	Yearly growth
Low income	738	1127	2.4%
Middle income	3048	5998	3.8%
High income	24866	33119	1.6%
Heavily indebted poor countries (HIPC)	899	1197	1.6%
Latin America & Caribbean	7376	10117	1.8%
Least developed countries: UN classification	807	1334	2.8%
East Asia & Pacific	4095	8725	4.3%
Middle East & North Africa	6629	9132	1.8%
North America	31431	41908	1.6%
European Union	20664	27555	1.6%
OECD members	22931	30112	1.5%
South Asia	1266	2914	4.7%
Sub-Saharan Africa	1535	2041	1.6%
World	6797	9889	2.1%

Source: World Development Indicators (World Bank, 2011)

16. Income elasticities approximately mirror own-price elasticities (i.e. similar magnitude, opposite sign). They are much higher in low-income countries than in middle- or high-income countries, with average values for all food estimated at 0.73, 0.60 and 0.34, respectively (Seale et al., 2003). Thus, consumption response to a 1% growth in per-capita incomes is more than twice as large in low-income countries compared to high-income countries. Furthermore, income elasticities for animal products, processed foods and eating out are much higher than those for cereals and other staples at all income levels. Thus, income

growth generates a shift towards animal products, and a larger demand for processed products and food away from home (Grigg, 1999), especially in the transition between low and middle income levels, while at higher income levels demand for luxury goods (including health) becomes more prominent and consumption of meat and fats is reduced (Cirera and Masset, 2010). These patterns are consistent with cross-country developments in the distribution of undernutrition and obesity and help to explain why obesity is concentrated in the wealthier part of the population in low- and middle-income countries in contrast to high obesity rates in low-income groups of affluent economies. Data on the evolution of income distribution are incomplete, but in many developing countries the trend seems toward reduction of disparities. However, strong inequalities (i.e. a Gini index above 40) are still associated with undernourishment rates well above 10% in African and South American countries. In recognizing income growth as perhaps the most important factor in influencing malnutrition, it is important to acknowledge as well the significant causal link from nutrition (health) to economic growth (Weil, 2007) in poor countries—thus income growth is not a genuinely exogenous contributor to better diets.

The development of food systems and their impact on diets

17. Food systems in middle and low income countries have changed dramatically in the past 20 years. Multinational retailers have followed multinational food manufacturers, soft drink companies and fast food chains into food and drink sectors in virtually all countries and they have introduced the types of supply chain controls previously seen only in the developed world, based around tight vertical co-ordination, centralized purchasing and distribution, private standards, product differentiation and sophisticated marketing. Domestic firms, driven by competition and learning from new market entrants have followed suit. From an analytical perspective it is difficult to determine whether observed changes in supply chains caused dietary change or were a response to growing consumer demand for soft drinks, fast food and packaged groceries linked to general economic development, but there is plenty of circumstantial evidence that multinational firms have created demand as well as satisfied it (ref global food chain person). They also provide employment and generate income which multiplies through the economy and brings its own nutritional change.

18. The rapid expansion of supermarkets in developing countries has been widely written about by Reardon and colleagues in a series of articles (e.g., Reardon and Berdegue, 2002; Reardon and Swinnen, 2004; Weatherspoon and Reardon, 2003; Reardon et al., 2004). This has happened in response to a number of forces, many of them interconnected: rising incomes (also associated with higher ownership of consumer durables such as refrigerators and cars, which facilitate supermarket shopping); urbanization; greater female participation in the labour force (increased opportunity cost of time); and the desire to emulate Western culture, spurred on by the globalization of media and advertising (Traill, 2006). In Latin America supermarkets deliver 50 to 60 percent of retail food sales (Reardon et al., 2004). Southeast Asia, Eastern and Central Europe are following suit, while Africa is rapidly following, led by South Africa, which has seen a “spectacular” rise since 1994 (Reardon et al., 2004: 171). In developed countries supermarket share of foods purchased is typically around 80%.

19. The continuing spread of multinational food and soft drink manufacturers and fast food franchises has also been well charted (see e.g., Bruinsma, 2003; World Bank, 2008; UNCTAD, 2009). Global inflows of Foreign Direct Investment (FDI) in the food sector have increased from under \$10b in 1992 to over \$40b in 2007 (UNCTAD, 2009). Wilkinson, (2008) shows that United States investments in Mexico have concentrated on convenience and highly processed foods, especially snacks, beverages, instant coffee, mayonnaise and breakfast cereals. However, as pointed out in Regmi and Gehlhar (2005), such products are amenable to foreign investment because they are not location specific; technology and capital are mobile in the world food economy whereas primary processed products, such as fresh or frozen meat, frozen and canned fruit and vegetables, and dry milk powder, are more closely associated with their production location and can be readily exported. Thus it would be a surprise if FDI was not concentrated in highly processed products.

20. Fast food chains and soft drink companies have also been blamed for unhealthy eating in developing countries. Pingali and Khwaja (2004) charts the growth of McDonald's from 951 stores in Asia and the Pacific in 1987 to 7,135 in 2002, and numbers have continued to rise, though more slowly. Pepsico, another global player (main brands Pepsi and Frito-Lay) trebled its sales outside North America and Mexico between 2000 and 2007 (Christian and Gereffi, 2010).

21. Of potentially far greater importance for diets are the domestic manufacturers, fast food and soft drink firms that have sprung up to imitate global brands at much lower price, and therefore with much higher sales (Vepa, 2004, Wilkinson, 2009).

22. International trade increases the availability of foods and provides a further competitive impetus for the modernization of domestic competitors. Between 1992 and 2009, the total trade in food and agricultural products more than doubled from \$40b pa to \$80b pa (UN COMTRADE); the share of processed food in food and agricultural exports grew from 54 per cent to 69 per cent for high-income countries and from 49 per cent to 67 per cent for Asia between the 1970s and 2000s (Sandri et al., 2007). The main impetus was the falling cost of moving products around the world due to technological developments in transport, handling and IT (Anderson, 2010).

23. Preferences for western foods are said to have been encouraged by imports displacing traditional staples, beginning in the era of colonization (see e.g. Thow and Snowdon, 2010). More recently sophisticated marketing activities of global manufacturers, soft drink and fast food chains have been highlighted as changing preferences towards western foods: "marketing aims to develop in consumers the habit of drinking or eating the product regularly" (Hawkes, 2002: p7). To this end children and young adults have been particular targets, the intention to change consumption habits over the long term (Hawkes, 2002). Methods include targeted TV and web advertising, sports and event sponsorship, products targeted at local tastes and special offers/price promotion for market growth (Hawkes, 2007, Pingali and Khwaja, 2004).

24. Limited evidence suggests that supermarkets (and convenience stores) have reduced the prices of packaged foods relative to fresh produce, particularly in the early stages of supermarket penetration in a country (Reardon et al., 2010). A study in Brazil found supermarket prices for packaged foods are as much as 40 percent lower than prices in traditional outlets. By contrast, fresh fruit and vegetables were more expensive in supermarkets (Farina, 2002, Schipmann and Qaim, 2011). Supermarkets and large manufacturers are said to work ‘symbiotically’; the latter are able to supply the large volumes (at high standards) demanded by the supermarkets, which in turn are able to deliver a market for the manufacturers’ products (Farina et al., 2005). The economies of scale on both sides enable the delivery of reduced prices for processed products.

25. Supermarkets and multinational manufacturers further influence consumption by offering a huge variety of previously unavailable products (Hawkes, 2008; Reardon et al., 2010) including refrigerated products, notably dairy lines. Provided there is a market for such products (which there must be or they wouldn’t continue to be available for sale) the supermarkets, again in a symbiotic relationship with large manufacturers, change consumption between product categories.

26. In developed countries snacking has been associated with increases in energy intake (Cutler et al., 2003). There is not a great deal of empirical evidence from developing countries, but the tendency towards consumption of snack foods, largely associated with increased availability, is reported for urban India (Vepa, 2004), where there have also been rapid increases in consumption of biscuits, salted refreshments and prepared sweets (between 1987/1988 and 1999/2000 intakes of these products rose from close to zero to 68, 45 and 13 g per capita per day, respectively). Vepa suggests that processed foods, mainly driven by such snack products, may represent as much as 1,000 kcal in the daily diet of high-income consumers.

27. In summary, processed foods now account for 80 percent of global food sales, and, although spending is still low in developing countries, it is growing rapidly. In addition, spending on food service accounts for 22 percent of food budgets in Brazil and Indonesia and 15 percent of urban food spending in China (WDR 2008-09). The impact of all these changes on nutrient intakes is not confirmed, even in developed countries, though processed foods, fast foods and soft drinks have all been linked to the nutrition transition and the obesity epidemic; they are likely to be equally involved in widening the girths of the expanding middle classes in poorer countries. Whether they have helped to make cheap, safe and palatable energy available to the chronically hungry has not been researched.

Other Trends

28. A number of other factors have been linked to aspects of dietary change since 1992. Agricultural growth for example has been shown to have a strong impact on calorie availability and malnutrition reduction, especially in highly malnourished populations (Headey, 2011) In this respect the low level of agricultural investment and growth in the

agricultural sector suggests a lost opportunity over the last two decades to improve nutrition by investing in agriculture.

29. Perhaps most important, though difficult to separate from other changes associated with economic development and changes in food systems, are the various influences associated with urbanization, which include growth in female labor force participation and more sedentary lifestyles (Misra and Khurana, 2008). Between 1990 and 2010 the world urban population topped rural population, rising from 42% to 51%. The urban population has doubled in low-income food deficit countries, in Africa and China, compared to a 20% increase in Europe and a 30% increase in North America (FAOSTAT). In China, the process of urbanization through the 1990s has been associated with an increased intake of edible oils, animal foods and caloric sweeteners, together with a reduction in fresh food intakes (especially vegetables) and an increased consumption of processed foods (Mendez and Popkin, 2004). Among the causes of dietary shift in the urbanization process is the existence of price differentials compared to rural areas (Drewnowski et al., 2010).

30. Between 1992 and 2009, the female labor force rose by 20% in OECD countries, an increase of about 48 million women. Low-income and lower-middle income countries have experienced a 58% and 46% growth, respectively, about 156 million women entering the work-force (World Bank, 2012). These dynamics in female work have potentially conflicting effects on nutritional status. Some authors have suggested a causal relationship between maternal employment and rising childhood obesity rates, mainly based on US data (Anderson et al., 2003), but recent studies have found that the effect of maternal working hours on children's diets is very limited (Rosin, 2008) or even positive (Powell, 2009). The evidence for developing countries is scarce, but suggestive that increased female participation in the labor force has positive effects on children's nutritional status (Engle, 2000).

I. The Importance of agricultural, trade and food policies in influencing diets

31. In this section we question the importance of the various policy developments of the past 20 years in determining dietary changes. As indicated in Figure 1, policies can influence diets through their effects on prices, availability, food preferences and incomes. Policy measures may have domestic and/or global implications, for example a measure that increases domestic farm production of some commodity may lower domestic consumer prices and at the same time lower the demand for imports or expand exports; if the country is large enough this would lower the global price of the commodity, with implications for producers and consumers in other countries.

Trade policy reform

32. The major achievement in the past 20 years has been the signing of the Uruguay Round Agreement on Agriculture (URAA) in 1994. This represented the first time food and

agriculture were specifically addressed in multilateral trade agreements⁴. Bound tariffs were introduced and a tariff reduction formula was agreed, though this was applied by most countries in ways that minimized the reduction in applied tariffs. The Agreement also included commitments to reduce export subsidies and, perhaps most importantly, introduced discipline on domestic support.

33. Subsequent progress in addressing concerns about non-tariff barriers (NTBs) was made with the Sanitary and Phytosanitary (SPS) and Technical Barriers to Trade (TBT) Agreements of the newly created World Trade Organization (WTO) in 1995. The Doha Round has so far failed to further capitalize on progress and it is partly frustration that multilateral talks have stalled that has led to the creation of over 200 regional agreements notified with the WTO, together with various bilateral treaties. As part of the WTO, the TRIMS Agreement (Trade-Related Investment Measures) has facilitated substantial progress in investment liberalization which has freed up FDI and restricted discrimination against foreign owned firms. As well as increasing levels of international trade, liberalization has changed relative prices of food groups and increased the range of products consumers can choose amongst. Changes in relative prices and availability of themselves induce changes in food consumption and diets but they can also have longer term nutritional implications by helping to shape consumer preferences (Chopra, 2002; Chopra et al., 2002). However, arguably the most important impact of multilateral trade agreements has been through their impact on incomes, both farm and non-farm. The freeing up and promoting rapid expansion in agricultural and food trade has facilitated global efficiency in sourcing, enabling production and processing of agricultural and food products in regions that have a comparative advantage—most frequently developing countries. The ability to specialize and freedom from the need to rely on inefficient local production, even for products unsuited to local conditions has increased food availability, kept down prices and stimulated job creation and rapid global economic growth for most of the past 20 years, and this has been the major driver for dietary change.

34. Trade economists have used partial and general equilibrium models to simulate the impact of trade liberalization, notably the URAA. These models study the distributional consequences of reform on types of farmer and on poverty prevalence within and between countries at different stages of development (e.g. Anderson et al., 2011). Of course, both incomes and prices impact on food consumption, as discussed in the previous section.

35. The review articles by Anderson (2010) and Anderson et al. (2011) summarize findings from the World Bank's Linkage model and various other Global Trade Analysis Project (GTAP) applications: trade-related policy reforms in the agricultural sector added around 1% to GDP of developing countries and 0.7% to developed countries' GDP from the mid-1980s. Developing countries' value added in agriculture is 4.9% higher than it would have been without agricultural and trade policy reforms.

⁴ Although a part of the earlier Tokyo Round, progress to remove trade barriers was modest.

36. Prices tend to be modeled as a byproduct of analyzing farmers' incomes and production, and they are often unreported, as is their impact on consumption. URAA induced reform has tended to raise world food prices by reducing incentives for over-production by the major developed countries, notably the EU and USA, though this has come about mainly through domestic policy reform (lowering intervention payments and a move to direct payments to farmers) rather than removal of tariff protection. Increased prices help exporting countries but (at least in the short run) harm importing countries. Within countries, the urban poor lose if food prices increase (at least in the short run). However, for farmers in developing countries there are opposing forces given that the vast majority are both sellers as well as buyers of food, depending on season: In the longer run, price changes in developing countries feed through labor markets to impact upon incomes of even the landless poor; for example World Bank (2008) reports a study of Bangladesh which suggests that the average landless poor household loses from an increase in rice prices in the short run, but gains in the long run as wages rise over time.

37. The World Bank has estimated that full trade liberalisation would only raise agricultural primary commodity prices by 5.5%. Processed food prices would rise by 1.3% (Anderson et al., 2006; World Bank, 2008). Transmission from world to domestic prices is frequently below 50% (World Bank, 2008: p109).

38. WTO trade reforms are complemented by a proliferation of regional and bilateral agreements, indeed almost 200 RTAs have been notified to the WTO. In general these agreements involve not only tariff removal, but harmonization or mutual recognition of standards to remove non-tariff barriers. More than a third of global trade is between countries that have some form of reciprocal regional trade agreement (Baffes and De Gorter, 2005; World Bank, 2008). The implications of regional agreements are not in principle different from multinational agreements.

39. Although traditional trade liberalization models indicate relatively minor price changes for agricultural commodities, they have induced other, less quantifiable, changes in food supply systems (Hawkes, 2010; Jaramillo and Lederman, 2005). Thow and Snowdon, 2010 relate the cautionary tale of how exports of unhealthy bi-products of sheep ("mutton-flaps" from New Zealand) and poultry ("turkey-tails" from the US) found their way into the hearts (via the stomachs) of Fijians and Samoans before imports were eventually banned. In India, market liberalization in the mid-1990s stimulated a rapid increase in imports of low-priced vegetable oils (Hawkes, 2006), which corresponded with a simultaneous increase in consumption. It also stimulated a switch in the type of oils consumed, away from traditional peanut, rapeseed, and cottonseed oils, and towards imported palm and soybean oils⁵. Indeed, Drewnowski and Popkin (1997) argue that the nutrition transition typically begins with major increases in imports of oilseeds and vegetable oils.

⁵ These developments may also, at least in part, be attributed to domestic policy decisions on what products to prioritise.

Non-tariff Barriers (NTBs)

40. The Sanitary and Phytosanitary (SPS) and Technical barriers to Trade (TBT) Agreements were intended to stop the creeping use of non-tariff barriers (NTBs) as protectionist replacements for reduced tariff barriers. The SPS agreement references the standards of three international bodies as representing the international consensus relevant to the international trade in agricultural commodities; the Codex Alimentarius, the International Plant Health Convention (IPPC) and the World Organization for Animal Health (Organisation Mondiale de la Sante Animale - OIE). The standards of these bodies are considered to represent the international consensus and where countries apply more trade-restrictive standards, they need to justify this on the basis of a risk assessment. By directly referencing Codex Alimentarius, IPPC and OIE, the SPS Agreement of the WTO raised the importance of these standards which can be referenced in trade disputes.

41. With respect to Codex Alimentarius, in a 2002 Codex Evaluation (Traill et al., 2002) member states were surveyed and 2/3 of high income country respondents and 90% of low income country respondents found Codex standards very important to their food exports, while more than 80% of country respondents in all country income classes found them very important for ensuring the safety of food imports. By contributing to a reduction in the use of NTBs as trade barriers and promoting confidence in international standards, the Codex Alimentarius, IPPC, OIE and the WTO have effectively increased the availability and diversity of food products traded, and consumed.

42. In addition to public standards such as Codex, the globalisation of supply chains has led to the development of private standards. Gereffi and Christian (2009) give examples of KFC, McCain, McDonald's and global retailers such as Wal-Mart setting their own standards for their supply chains. Such developments have led to concern over the control of global standard setting and the possible marginalisation of public standards, but for the purpose of the present analysis both public and private standards work in the same way through enhancing availability and lowering prices. The authors are not aware of any quantitative assessment of these impacts on diets.

International Investment Liberalization

43. The global regulatory environment around FDI has become significantly more liberal: between 1991 and 1999, there were 1035 changes in regulations governing FDI worldwide. Many of the new regulations were forged in trade agreements and investment treaties: the number of bilateral investment treaties rose from 181 at the end of 1980 to 1,856 at the end of 1999 (Hawkes, 2006).

44. Investment liberalization has inevitably led to the spread of multinational enterprises at all stages of the food chain, with implications for diets as discussed above. The specific role of policy as opposed to other forces promoting globalization has not been much quantified, though Traill (2006) found openness to inward FDI to be an important stimulus to the spread of supermarkets in middle and low income countries. More commonly assessment is based on case studies. For example, as part of NAFTA, Mexico abolished many

restrictions on foreign investment in the Mexican Foreign Investment Act, and between that year and 1999 American food processing investment in Mexico more than doubled to \$5.3b and Walmart de Mexico is now the largest retailer (Hawkes, 2006).

Agricultural policy liberalization and domestic consumption

45. In the OECD set of developed countries, the period has been marked not only by a reduction in overall levels of support, but also by significant movement from a reliance on market price support (MPS) for producers to forms of support that have progressively been delinked from production levels. MPS, by setting a floor for prices received by producers for certain commodities and thereby driving a wedge between domestic and international prices, has long been implicated in overproduction of protected commodities. A movement towards alternative forms of support that cut the direct link to production levels of specific crops, such as area-based payments, has gone a long way to restore the link between production and international price signals. Martini (2010) estimates an index of 'production impact' of support relative to the baseline of 1991-93. He reports that the EU has made steady progress with the production impact of support, in 2008 at only 38% of 1991-93 levels. However, Japan and Korea at 57% and 98% respectively, have made less progress. Since support for agricultural policies in OECD countries has traditionally involved raising prices paid to producers by keeping consumer prices high, reform has had the effect of lowering consumer prices, hence tending to raise consumption. However, farm prices are often only a small fraction of final prices paid by consumers. In the EU case, Schmidhuber (2007) computed that in aggregate the pre-reform policy-induced impact of agricultural support amounted to only about 5% of consumer food expenditure. Thus agricultural policy reform has likely had a limited dietary impact in the EU (and in other developed countries). Rickard et al. (2012) simulate the removal of support to farm commodities in the US over the 1990s and early 2000s and find a minimal impact on calorie intakes. They also find that as US policies have become less distorted over the 1990s and 2000s, and commodity prices have also become less important in determining consumer prices, the ability of agricultural policy to impact calorie intake has diminished.

46. In non-OECD countries, agricultural support has traditionally been much lower (see e.g. Orden, 2007). Indeed implicit taxation of producers to keep consumer staple prices low, is a prominent feature of agricultural policy in India, and average implicit taxation of producers in 11 agriculture-based countries in Sub-Saharan Africa declined from 28% in 1980-84 to 10% in 2000-2004 (World Bank, 2008). The fact that developing countries have had much lower support levels than developed countries implies that policies have had much less impact on diets (Schmidhuber, 2007). On the other hand, levels of processing and value-addition are also lower in developing countries and thus a farmgate commodity price effect is likely to translate more strongly into a consumer food price effect.

47. On the whole, our judgment is that domestic agricultural policy is only of a second-order of importance in terms of influencing diets.

Food policies targeted at consumers

48. Various policies affect diets by targeting consumers directly. Consumption choices may be affected through three routes: (a) by providing direct access to free food; (b) by supporting access to food through income subsidies; and (c) by altering the absolute and relative price levels among foods and of foods relative to non-foods. The range of policy actions which influence diets through income and price measures and fall under (b) and (c) is very broad, and the focus in this paper is limited to those measures whose ultimate goal is to change nutrition and nutrition outcomes.

Food Aid

49. Food aid has the potential to alter diets, though ‘abuse’ has been limited by the Uruguay Round Agreement (URAA) which ruled out the direct or indirect tying of food aid to commercial exports and also stipulated that food aid should be based on free provision to the maximum extent possible, or on highly concessional terms (Barrett and Maxwell, 2006); and the 1999 Food Aid Convention (FAC), which co-ordinates multilateral food aid interventions among donor countries, also with a stated aim of decoupling food aid from export promotion measures and with a growing focus on nutrition and food fortification (Hoddinott et al., 2008).

50. Trends over the last twenty years show a substantial reduction in global food aid shipments, down from 12.3 million tonnes in 1991 to 5.4 million tonnes in 2010 (World Food Program, 2006), and while there are still reports of distortions – eg, shipments of maize to pastoral areas in the Horn of Africa in the 1990s and 2000s causing protein-heavy pastoral diets traditionally based on animal products to shift towards carbohydrate-rich diets based on grain (Barrett and Maxwell, 2005), there is not much evidence to indicate substantial widespread effects.

51. Additionally, although emergency food aid programs have been found to improve nutritional outcomes by buffering short-run shocks (eg. Quisumbing, 2003), there is evidence to indicate that food aid is too unreliable and too poorly-targeted for even the most vulnerable households to be able to depend on it for any length of time (see e.g. Little, 2008, for Ethiopia). A recent review (Awokuse, 2011) explores a range of failure and success cases and cites food-for-work interventions as the more likely to generate positive nutritional outcomes for people at risk of hunger, especially children.

Domestic food assistance programs, price subsidies and taxes

52. In developed countries, domestic food and nutrition assistance programs have grown in relevance and have improved in targeting. The US is at the forefront, in 2010 there were 15 programs for a federal expenditure of \$68.2 billion, while about 14.5% of US households were food insecure at least some time during the same year (Coleman-Jensen et al., 2011).

53. The main 'food stamp' program (the Supplemental Nutrition Assistance Program, SNAP) covers about 40 million people every month. Eligible recipients are provided with electronic debit cards which can be used in approved retail stores to purchase food. Eligibility is based on household financial resources, and able-bodied adults are also required to accept employment or training programs referred by the SNAP office. Some have argued that participation in food stamp programs has increased the likelihood of being obese, especially for women (Gibson, 2006), but this evidence becomes weak once counterfactual trends are taken into account; and non-participants weight growth rates were faster than those of participants (Alston et al., 2009; Meyerhoefer and Pylypchuk, 2008; Jensen and Wilde, 2010).

54. In contrast to food stamps, the Women, Infants and Children (WIC) program in the US and the Healthy Start program in the UK are targeted at infants and at pregnant and lactating women in low-income groups. In these schemes, food vouchers are constrained to be used for 'healthy' foods such as fruit and vegetables and milk (Dowler, 2008). This type of program has been relatively successful in achieving the nutrient goals, without increasing calorie availability (Barrett et al., 2002), and according to USDA is one of the most successful and cost-effective nutrition intervention programs, as participant children record higher mean intakes of iron and vitamins without an increase in food energy intake, fat or cholesterol. Improved growth rates and reduced rates of foetal death and infant mortality have also been shown⁶.

55. In many developing countries (including India, Ethiopia and Bangladesh) there are domestic food-for-work programs based on the principle that able-bodied vulnerable recipients are paid with food in exchange for public unskilled work. When they are well-timed and well-targeted, these programs are generally found to be effective (Holden et al., 2006). Other types of domestic FAP work through price subsidies both as an instrument to address food insecurity and to maintain price stability. For example, the Indian Public Distribution System (PDS), a large scale program offering subsidies for wheat, rice edible oils and sugar to poor households was found to have a significant (albeit relatively small) effect on calorie intakes (Kochar, 2005).

56. On the other hand, there is some evidence that price subsidies contribute to rising obesity rates in some developing countries (Asfaw, 2007); even when subsidies are calibrated to promote healthier eating in the target population, their effectiveness may be reduced by the income effect of recipients spending their effective increase in real income on non-subsidised (energy-dense and cheap) foods (Jensen and Miller, 2010).

Conclusions

57. Stable or falling food prices for most of the period have combined with rising incomes to stimulate increases in calorie intake and promote the nutrition transition away from starchy staples and towards consumption of livestock products and processed foods, though in the developed world and among the middle classes in developing countries these same factors

⁶ <http://www.fns.usda.gov/wic/aboutwic/howwichelps.htm#diet%20outcomes>

have hastened the obesity 'epidemic'. The main forces behind these changes have been technological change in agriculture, food processing, distribution and international trade, and economic growth (aided by international trade and investment liberalization).

58. In the many regions where dietary change has been observed, the weight of evidence indicates that modernization of food systems and income growth have been the dominant forces for change, and these changes are closely linked (through cause and effect) to urbanization and the increased workforce participation of women. International investment liberalization, linked to trade reform, has been an important precondition for globalization which in its turn has been an important force for the development in food systems. Their impact on preferences and lifestyles is critical and they have made available a range of foods that satisfy new demands.

59. Income growth has worked in tandem with globalization patterns to exert an important influence on dietary change since 1992. This includes positive effects in the form of hunger reduction and diet quality improvement, as well as negative effects associated with overnutrition. Although direct evidence remains scarce, the available information suggests that countries experiencing increases in inequality are most exposed to overnutrition problems.

60. The price effects of trade and agricultural policy reforms have not had a major impact on diets. Consumer policy vehicles like food aid, food assistance programs, local procurement programs and public distribution systems do not seem to have had major diet quality effects, but they have been effective in their basic goal of assuring minimum calorie requirements are met, particularly in emergencies.