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Contents

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Foreword

The workshop "Globalization of food systems: impact on food security and nutrition" was held at the headquarters of the Food and Agriculture Organization of the United Nations (FAO) in Rome, Italy from 8 to 10 October 2003. The workshop was convened to gain a better understanding of the influence of globalization and urbanization on food systems (food supply, marketing and distribution) in developing countries and to analyse the effects of these changes on smallholders and small firms, on food consumption patterns and on nutrition and health outcomes. The event was jointly organized by two divisions within FAO, representing two sectors: the Agricultural and Development Economics Division, examining key economic issues, and the Food and Nutrition Division, addressing health and nutrition outcomes. Thus, two parallel themes were explored: i) the transformation of food systems and its effect on small farmers in developing countries and ii) the impact of globalization, largely influenced by urbanization, on dietary patterns and the nutritional status of urban populations. The workshop was partially funded through the FAO-Netherlands Partnership Programme.

This publication examines in detail the second theme, related to features of globalization, changes in dietary patterns and shifts in the burden of malnutrition and diet-related chronic diseases. It comprises a synthesis paper bringing together the salient features of the impact of the globalization process on nutrition and reflecting some of the discussions at the workshop, three overview papers and 11 country case studies that were presented at the workshop. The overview papers describe shifts in food availability, food consumption and food and nutrition security in the urban environment. The topics are further explored through a series of 11 country case studies from Africa (Nigeria, the United Republic of Tanzania and South Africa), Asia (Bangladesh, China, India, and the Philippines) and the Pacific (Fiji) and Latin America (Brazil, Chile and Colombia). Each case study presents unique insights on different aspects of globalization, including urbanization, access to services and technologies, evolution of the workforce and impact of government decentralization on dietary changes and alterations in population health and nutritional status.

The compilation of the 11 case studies represents each individual author's perspective using the best available national data to highlight those features thought to be most important to changes in food systems, nutrition and health in each country covered. Some case studies explore the issues from an economic perspective (India, Nigeria) while others are more focused on nutrition and health outcomes (Bangladesh, Chile). The purpose of this collection of papers is not to provide a value judgment of the differing forces related to globalization, but to contribute to the body of knowledge by documenting the pace and spread of change.

The overview papers appearing in the first part of this publication will also be published in the electronic *Journal of Agriculture and Development Economics*, which can be found at www.fao.org/es/ESA/en/ejade.htm/.

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Director
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Acronyms

AIDS	acquired immunodeficiency syndrome
APIN	AIDS Prevention Initiatives in Nigeria
ARMM	Administrative Region of Muslim Mindanao
ASFs	animal source foods
BMI	body mass index
CBN	Central Bank of Nigeria
CHD	coronary heart disease
CHNS	China Health and Nutrition Survey
CHS	community health worker
CREN	Centro de Recuperação e Educação Nutritional (Centre for Nutritional Recovery and Education) (Brazil)
DALYs	disability-adjusted life years
DES	dietary energy supply
DHS	Demographic and Health Survey
EBF	exclusive breastfeeding
FAO	Food and Agriculture Organization of the United Nations
FGN	Federal Government of Nigeria
FMoH	Federal Ministry of Health (Nigeria)
FOS	Federal Office of Statistics (Nigeria)
GDP	gross domestic product
GNP	gross national product
HIES	Household Income and Expenditure Survey (Fiji)
HIV	human immunodeficiency virus
HKI	Helen Keller International

HTN	hypertension
ICMR	Indian Council of Medical Research
ICT	information and communication technologies
IDA	iron deficiency anaemia
IDD	iodine deficiency disorder
IMR	infant mortality rate
IOTF	International Obesity Task Force
IPHN	Institute of Public Health Nutrition (Bangladesh)
LSMS	Living Standards Measurement Study
MDGs	Millennium Development Goals
NAFDAC	National Agency for Food and Drug Administration and Control
NCDs	non-communicable diseases
NCFN	National Committee on Food and Nutrition (Nigeria)
NGO	non-governmental organization
NPC	National Planning Commission (Nigeria)
NSP	Nutrition Surveillance Project (Bangladesh)
NSS	National Sample Surveys (India)
OECD	Organisation for Economic Co-operation and Development
OFW	overseas Filipino workers
RDA	recommended daily allowance (China)/recommended dietary allowance (Philippines and South Africa)
SAP	Structural Adjustment Programme
SES	socio-economic status
STDs	sexually transmitted diseases
STIs	sexually transmitted infections

TTD	type-2 diabetes
UNDP	United Nations Development Programme
UNICEF	United Nations Children's Fund
UWC	University of the Western Cape (South Africa)
VAD	vitamin A deficiency
VAT	value-added tax
WHO	World Health Organization
WTO	World Trade Organization
YLL	years of life lost

Globalization of food systems in developing countries: a synthesis of country case studies

Gina Kennedy[1], Guy Nantel and Prakash Shetty

INTRODUCTION

The phenomenon of globalization is having a major impact on food systems around the world. Food systems are changing, resulting in greater availability and diversity of food, although access to this food is by no means universal. Many of these changes are closely associated with urbanization, increasing incomes, market liberalization and foreign direct investment. Competition for a market share of food purchases tends to intensify with entry into the system of powerful new players such as large multinational fast food and supermarket chains. The losers tend to be the small local agents and traditional food markets and, to some extent, merchants selling "street foods" as well as other food items. The supermarkets bring with them significant improvements in standards of food quality and safety at competitive prices and convenience, factors which are highly attractive to an increasingly sophisticated consumer. Thus these changes in food systems affect availability and access to food through changes to the food production, procurement and distribution systems and the food trade environment. In turn this is bringing about a gradual shift in food culture (towards a more universal one), with consequent changes in dietary consumption patterns and nutritional status that vary with the socio-economic strata. Indeed, the lower socio-economic population groups drift towards poor-quality, energy-dense but cheap and affordable foods.

The main drivers to changes in food systems and dietary patterns, such as urbanization, increased income, capital flow and market liberalization, have been discussed by others (de Haan *et al*., 2003; Haddad, 2003; Popkin, 2003; Reardon *et al*., 2003; Lang and Heasman, in press). This paper looks at the impact of globalization and increasing urbanization on dietary and physical activity patterns and their effect on nutritional status and health.

First a conceptual framework of the determinants of these profound changes to food systems in the societies of developing countries is provided. The remainder of the paper draws upon and summarizes observed dietary changes and their resulting impact on nutritional status from 11 case studies in Latin America (Brazil, Chile and Colombia), Asia (Bangladesh, China, India and the Philippines), Africa (Nigeria, the United Republic of Tanzania and South Africa) and the Pacific (Fiji).

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CONCEPTUAL FRAMEWORK

The conceptual framework shown in Figure 1 was elaborated in an attempt to illustrate the major driving forces behind the observed changes in food systems.

FIGURE 1
Changes in food systems

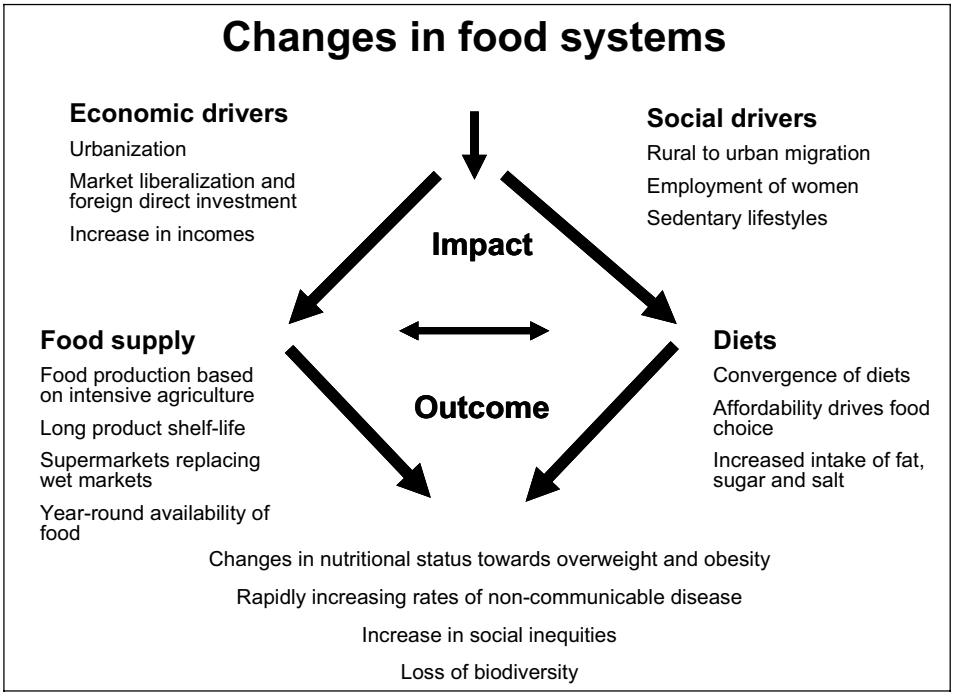


Figure 1 highlights urbanization, increasing incomes and foreign direct investment in markets of developing countries as the main economic drivers influencing changes in food supply and diet. In addition to the economic forces, concomitant social changes are taking place, such as more women entering the workforce and increasingly sedentary lifestyles. Accompanying these trends are changes in nutritional status and disease burden. The relationships between environment, diet and disease are complex and influenced by several external factors. Urbanization and the connection to dietary changes, health and nutritional status (the lower right and bottom areas of Figure 1) will be the primary focus of this paper. However, a brief summary[2] of the changes in the food supply chain (left side of Figure 1) may be instructive.

Lang (2003) describes changes to agricultural and food systems. These include massive use of agrochemicals and hybrid plants and, more recently, genetically modified plants; changes in food processing designed to produce uniform quality, size and shape, particularly suited for brand name products; and changes in distribution and marketing systems supported by computer systems for ordering, delivery and improved corporate control over markets. These food system features are already well in place in developed countries, and are now rapidly moving into developing country markets, impacting agriculture systems, squeezing small farmers out of business and contributing to increasing urbanization.

[2] *Development Policy Review*, vol. 21, No 5-6, 2003 provides a comprehensive review of these changes.

GLOBALIZATION OF FOOD SYSTEMS IN CONTEXT

In order to embark upon a discussion of the globalization of food systems it is first necessary to define what globalization means in this context. For the purposes of this paper, globalization refers to reduction in barriers to the cross-border movement of goods, services and capital; an increased flow of commodities, technologies, information, financial capital, modes of distribution and marketing; and, to a certain extent, migration of peoples and labour (Shetty, 2003a). A common feature of this process of globalization is a convergence, although at differing speeds, of many institutional, legal, economic, social and cultural practices and processes across different countries. In terms of food systems, changes are occurring all along the food chain from production and processing to retail and marketing. An attempt is made to refrain from assigning any value judgement to this process, but rather to isolate the common features of the phenomenon, citing examples of changes taking place in 11 country case studies from developing countries.

The pace and depth of change in food systems are occurring at different rates across regions and countries, although all countries appear to be moving in the same direction. Country-specific examples are useful in identifying factors that may contribute to the rapidity with which these changes are taking place and their impact on the nutritional status of the populations. For some case study countries such as Colombia, South Africa, the United Republic of Tanzania and India, a definite period of recent economic reform and market liberalization marks the opening of the national market to wider international trade.

> In Colombia the government undertook a series of reforms in the early 1990s which removed tariffs on imported food and created a more competitive market environment. In turn this led to increased importation of goods, in particular cheap feedgrains which spurred massive increases in livestock production (Fajardo, Colombia case study).

Reardon *et al*. (2003) also cite the 1990s as an influential period in terms of impact on forces of supply and demand, which facilitated changes in food retail systems and, in particular, the growth of supermarkets. On the demand side are urbanization, women in the workforce and greater access to refrigeration – the latter two fuelling and promoting convenience foods – while the supply side is characterized by liberalization of markets, foreign direct investment and better technology to track food stocks/shipments (Reardon *et al*., 2003).

The following section compares and contrasts, in the 11 case study countries, specific regional and national variables broadly associated with globalization, and their impact on income, health, education, infrastructure and communications.

Urbanization

Probably the greatest influencing factor in dietary change and subsequent changes in nutritional status is urbanization and the myriad lifestyle changes associated with it. In 2001, 47.7 percent of the global population lived in urban areas, including 75.5 percent of the population in more developed countries and 40.9 percent of the population in less developed countries (United Nations Population Division, 2002). Within developing regions, there is a wide disparity in terms of urbanization. In Latin America and the Caribbean 75.8 percent of the population is classified as urban while in both Asia and Africa it is only 38 percent (United Nations Population Division, 2002). It is therefore not surprising that in the latter two regions urbanization is projected to increase the most, with a forecast of 50 percent of the population living in urban areas by 2020.

Table 1 demonstrates large differences in the extent of urbanization in the case study countries, with all countries moving towards even greater levels of urbanization. In 2000, all three case study countries in Latin America were highly urbanized while just about half of the populations of Fiji, the Philippines and South Africa lived in urban areas. Attention needs to be paid not only to the current level of urbanization, but also to the pace at which urbanization is expected to occur. The greatest projected increases in urban growth rate for the period 2005-2010 are expected in Bangladesh, the United Republic of Tanzania and Nigeria (United Nations Population Division, 2002). These case study countries have among the lowest per capita gross domestic product (GDP).

TABLE 1
Increasing urban populations in case study countries

Countries	Trends in percentage of the population living in urban areas				Current urban population
	1960	1980	2000	2020	2001
Brazil	45.6	66.8	81.2	88.9	141 041 000
Chile	67.8	81.2	85.8	89.8	13 254 000
Colombia	49.1	62.6	75.0	82.8	32 319 000
Bangladesh	5.1	14.9	25.0	37.7	35 896 000
China	16.0	19.6	35.8	53.4	633 651 000
India	18.0	23.1	27.7	34.7	285 608 000
Philippines	30.3	37.5	58.6	71.4	45 812 000
Fiji	29.7	37.8	49.4	62.8	413 000
Nigeria	14.4	26.9	44.1	58.3	52 539 000
South Africa	46.6	48.1	56.9	69.6	25 260 000
United Republic of Tanzania	4.7	14.8	32.3	49.4	11 982 000

Source: United Nations Population Division, 2002.

It is beyond the scope of this paper to discuss in detail the myriad forces influencing urbanization. The answers are neither uniform nor simplistic. While cities are generally considered engines for economic growth, Nef (1995) argues that "hyperurbanization" or "overurbanization" occurs more as a result of poverty than affluence, with megacities and their surrounding sprawl becoming more associated with conditions of deprivation than prosperity. Sachs *et al*. (2004) cite abject rural poverty as fuel for rural-urban migration. Explicit and implicit evidence of the uneven global trading climate, including unfair tariffs, export dumping and agricultural subsidies to farmers in industrialized countries are cited by many as factors deepening poverty in developing countries (Murphy, 2002; Pinstrup-Andersen, 2001; Watkins, 2003).

While migration to urban areas may often occur as an act of desperation, given the destruction of agricultural-based rural livelihoods and reducing returns on domestic agriculture, caution should be employed before making generalizations about urbanization being absolutely reflective or either prosperity or poverty. Context-specific socio-economic, political, historical and ecological situations need to be considered over generalized statements regarding the nature and motives surrounding urbanization (Tacoli, no date).

Despite the impetus for migration, the urban environment appears to exert an influence on dietary habits that reaches both the rich and the poor segments of the population and can impact health and nutritional status. The positive dimensions of urbanization on diet and

health include greater access to education and health care services, and greater availability of diverse foods. However, these advantages may not reach all urban residents. There are also negative or potentially negative features, including diets with greater amounts of fat and sugars or sweeteners, increasingly sedentary lifestyles, environmental pollution, unsanitary and overcrowded living conditions and crime. These features will be discussed in more detail in the following sections.

Economics, health and education

Table 2 gives indicators of economics, health and education in the 11 case study countries.

TABLE 2
Indicators of economics, health and education

	Economics		Health		Education	
Case study countries by GDP	**GDP per capita (purchasing power parity [PPP] US$, 2001)**	**Inequality Gini index**	**General government expenditure on health as % of total government expenditure, 2001**	**Infant mortality rate (IMR)**	**Public expenditure on education (as % of total government expenditure)[1]**	**Adult literacy (% age 15 and over), 2001**
United Republic of Tanzania	520	38.2	12.1	104	11.4	76.0
Nigeria	850	50.6	1.9	110	-	65.4
Bangladesh	1 610	31.8	8.7	51	15.7	40.6
India	2 840	37.8	3.1	67	12.7	58.0
Philippines	3 840	46.1	6.2	29	20.6	95.1
China	4 020	40.3	10.2	31	-	85.8
Fiji	4 850	-	6.9	18	17.0	93.2
Colombia	7 040	57.1	10.8	19	-	91.9
Brazil	7 360	60.7	8.8	31	12.9	87.3
Chile	9 190	57.5	12.7	10	17.5	95.9
South Africa	11 290	59.3	10.9	56	25.8	85.6

[1] Some data are preliminary or United Nations Children's Fund (UNESCO) estimates where there is no national estimate.
Source: UNDP, 2003; WHO, 2003.

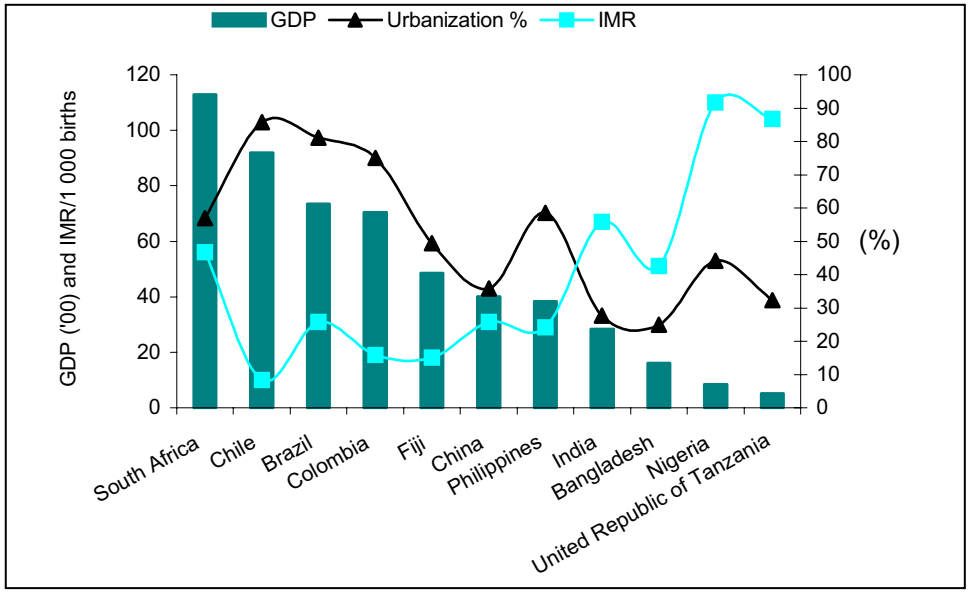
Those countries with the greatest proportion of population living in urban areas also tend to have the highest GDP per capita. Figure 2 shows the relationship between GDP, infant mortality rate and urbanization. Benefits are not necessarily evenly distributed and averages can mask inequalities. Those countries with a higher GDP have the most pronounced social and economic inequalities. (Table 2).

The infant mortality rate in Brazil is estimated to be 31 deaths per 1 000 live births. The Brazil case study points out that in certain pockets of the population the infant mortality rate exceeds 100 (Sawaya, Martins and Martins, Brazil case study).

Among the case study countries, Chile has one of the highest government expenditures on health and education, combined with low infant mortality rates and high adult literacy rates. In contrast, Nigeria has the lowest government expenditure on health and the highest infant mortality rate. Figure 2 compares GDP, urbanization and infant mortality rate. There is a relatively consistent relationship with GDP and urbanization, with notable exceptions

in South Africa, the Philippines, Nigeria and the United Republic of Tanzania. The peak in urbanization seen in the Philippines, Nigeria and the United Republic of Tanzania, given lower GDP, may be a result of hyperurbanization patterns driven by poverty, as described by Nef (1995). Infant mortality also appears roughly inverse to urbanization, except in South Africa.

FIGURE 2
Relationship between gross domestic product (GDP), infant mortality rate (IMR) and urbanization



Source: UNDP, 2003; United Nations Population Division, 2002.

Employment

The case studies converged on three urban employment trends: i) increasing number of women entering the workforce; ii) expansion of the informal employment sector; and iii) rising unemployment. The trends are associated with migration from rural areas to cities and in some case study countries massive inflation and cuts in the number of salaried government employees.

Women are entering the workforce in larger numbers through necessity and greater opportunities and availability of jobs traditionally filled by women, such as house cleaners and child carers.

In São Paulo, Brazil 70 percent of new jobs created were filled by women (Sawaya, Martins and Martins, Brazil case study).

In the Philippines, the situation is slightly different. Large numbers of women are seeking work as domestic helpers overseas (Pedro, Barba and Candelaria, Philippines case study).

Nearly all the case studies report a growth in unemployment alongside the simultaneous increase in informal sector jobs; the two would seem to go hand in hand.

In South Africa, unemployment increased from 33 to 41 percent over the period 1996 to 2001, with the ethnic African population experiencing the largest increase up to 50 percent (Chopra, South Africa case study).

In Nigeria, the government has reduced jobs and unemployment is high. The informal sector is estimated to account for 75 percent of employment (Olayiwola, Soyibo and Atinmo, Nigeria case study).

Much of the growth in the informal sector involves food preparation and retailing. Families engage in food preparation or the sale of street foods since entry into the system is largely unregulated, requires skills that most families already possess and does not require much upfront investment. Complementary to this trend is an increasing demand for meals away from home as commuting distances between residence and employment increase, and working hours are long and often unpredictable.

Technology and facilitating mechanisms

Availability of and access to modern technologies also exert significant influences that change food systems. It is useful to look at these factors, although data are sparse and not always in a form that lends itself to comparisons. For example, a convenient starting-point would be to look at infrastructure and access to services and technology. It would be helpful to have an estimate of the percentage of the population with access to electricity, the proportion of well-maintained and/or paved roads, statistics on car ownership and number of households with refrigerators. Unfortunately, most of this information is not available in a standardized form that allows cross-country comparisons. Despite these limitations, some trends are visible.

The most complete and current set of comparable information relates to Millennium Development Goal (MDG) indicators, such as access to safe water and sanitation, to telephones, computers and the Internet. For purposes of cross-country comparison, indicators of MDGs from the UN Statistics Division (2000) are presented in Table 3. Access to water, sanitation and paved roads are taken as indicators of infrastructure. Telephone, computer and Internet user rates are used to describe access to communications.

TABLE 3
Indicators of infrastructure and communications

	Economy	Infrastructure			Communications		
Countries	**GDP per capita (PPP US$, 2001)**	**Access to improved water source,[1] 2000**	**Access to improved sanitation,[2] 2000**	**Paved roads (as % of total)**	**Telephones and mobile subscribers/ 100 population, 2000**	**Internet users/100 population, 2000 (ITU)[3]**	**Computer users/100 population, 2000 (ITU)**
United Republic of Tanzania	520	68	90[4]	5	1.08	0.12	0.31
Nigeria	850	62	54	31	0.46	0.07	0.66
Bangladesh	1 610	97[5]	48	9	0.58	0.08	0.15
India	2 840	84	28	46	3.56	0.54	0.45
Philippines	3 840	86	83	20	12.44	2.01	1.93
China	4 020	75	40	19	17.76	1.74	1.59
Fiji	4 850	47	43	49	17.51	1.49	4.46
Colombia	7 040	91	86	24	22.33	2.07	3.54
Brazil	7 360	87	76	9	31.87	2.94	5.01
Chile	9 190	93	96	14	44.63	16.68	9.34
South Africa	11 290	86	87	17	30.45	5.49	6.64
Sources		UNDP, 2003			CIA, 2003	United Nations Statistics Division, 2000	

[1] Improved water sources are defined as household connection, public standpipe, borehole, protected dug well, protected spring and rainwater collection. *Reasonable access* is defined as availability of 20 litres/person/day within 1 km of the user's dwelling.
[2] Adequate sanitation facilities are defined as connection to a sewer or septic tank, a pour flush latrine, simple pit latrine or ventilated improved pit latrine. The facility should effectively prevent human, animal and insect contact with excreta. The facility is considered adequate if it is private or shared (but not public).
[3] International Telecommunication Union.
[4] This figure was cross-referenced with the 1999 the United Republic of Tanzania Reproductive and Child Health Survey in which it was reported that 86 percent of households had access to a pit latrine (12 percent had no kind of toilet facility).
[5] A recent estimate by UNICEF (www.unicef.org/infobycountry/bangladesh.html) has decreased this figure to 70 percent because of arsenic contamination in groundwater.
Source: United Nations Statistics Division, 2000.

The first three indicators of basic infrastructure present a somewhat inconsistent picture within and across countries. The figures should be considered best estimates, their reliability having been questioned elsewhere (Satterthwaite, 2003). It is also important to note that, given the great inequalities in many of the countries, there will be sections of the population, particularly those in poorer areas, with little or no access to services despite high national averages.

When considering population access to water and sanitation, the more urbanized countries – Brazil, Chile, Colombia and the Philippines – appear to be slightly better off. However, access to improved water and sanitation does not correlate strongly with GDP. For example, Fiji ranks lowest in terms of water and sanitation access yet has the fourth highest GDP. The geography of small island countries, which limits the availability of fresh drinking-water, is the most likely explanation for this discrepancy between GDP and access to a safe water supply. The United Republic of Tanzania also presents an exception, with relatively high population access to improved water and sanitation services and the lowest GDP among the 11 case study countries.

Roads, particularly paved roads that are not subject to seasonal deterioration, are an imprecise indicator of ease of interstate movement of goods and market access. It is difficult to use this indicator as a comparison across countries, largely because of the

variations in country sizes. Brazil, for example, has 1.98 million km of road, 9 percent of which are paved. Fiji, on the other hand, has 3 440 km of road, with half paved.

The three indicators of communications seem to follow urbanization closely, with Chile, Brazil and Colombia having the greatest number of telecommunications users, followed by South Africa and the Philippines.

Refrigeration and freezer technology is a primary spark for the transformation of food systems. Extension of cold storage from food processing centres to large or small food outlets and eventually to private homes creates vast potential for changing the patterns of food procurement. A large variety of foods can be stored in a way that maintains quality, and consumers can choose between fresh or frozen (often ready to eat) products. Lack of access to a reliable source of electricity is undoubtedly the greatest barrier to access to refrigeration in many developing countries. According to the International Energy Agency (2002), 56 percent of people in developing countries lack access to electricity. Electrification rates by region show Latin America with 87 percent access, South Asia with 41 percent and sub-Saharan Africa with 23 percent. Thus, a prerequisite for expansion of the frozen food market is household ownership of refrigerators/freezers, which in turn requires access to electricity. Large supermarket chains are still able to establish markets in countries with limited electricity; however, it would be interesting to research any differences in the products sold in areas with different access levels to electricity.

The case study from Brazil indicates that refrigeration capacity is currently reaching individual homes, with over 80 percent of households owning refrigerators and 20 percent owning freezers (Sawaya, Martins and Martins, Brazil case study).

CHANGES IN DIETARY PATTERNS

Details of the dynamics of change in diet are provided in the paper in this volume by Mendez and Popkin. Overall, the changes can be described by two distinct phenomena: dietary convergence and dietary adaptation. Dietary convergence is occurring as a result of increased reliance on a narrow base of staple grains, increased consumption of meat and meat products, dairy products, edible oil, salt and sugar, and a lower intake of dietary fibre. Dietary adaptation is characterized by an increased consumption of brand name processed and store-bought foods, an increased number of meals eaten outside the home and consumer behaviours driven by the appeal of new foods available.

Dietary convergence

Income and price are the two most influential factors leading to dietary convergence. These in turn are affected by supply and availability. On the price side, low prices for the three dominant global staples – rice, wheat and maize – are largely maintained by subsidies to farmers in producing countries, particularly for wheat and maize. The rice trade has increased dramatically, fuelled by increasing demand in Africa and parts of Asia. World trade in rice reached a historic high of 28 million tonnes in 2002 (FAO, 2003). Dramatic production increases that have driven down cost were made possible as a result of yield improvements and intensive agricultural practices.

Increased consumption of fat, particularly from vegetable oils, is another phenomenon of dietary convergence. Higher fat intakes are now possible at a lower gross national product (GNP). Using GNP values standardized to 1993 US$, Popkin (2003) found that in 1962 an average GNP of $1 475 was necessary to derive 20 percent of energy from fat,

while by 1990 the GNP needed for a diet with 20 percent of energy derived from fat was only half that at $750.

Similar price reductions have been seen for animal source foods (ASFs). Delgado *et al*. (1999) show dramatic declines in the price of milk and beef and more modest declines in the price of pork and poultry.

TABLE 4
Twenty-year trends in dietary energy supply (DES) and percentage of DES from fat, oil and animal source foods (ASFs)

Countries	Total DES (kcals/per capita/day)		% DES from fat		% DES from vegetable oil		% DES from ASFs	
	1980	2000	1980	2000	1980	2000	1980	2000
Brazil	2 677	3 002	22	26	11	11	15	20
China	2 328	2 974	13	25	3	6	7	20
South Africa	2 819	2 894	21	23	6	11	15	12
Chile	2 665	2 851	20	27	8	9	16	22
Fiji	2 501	2 782	32	33	10	11	20	19
Nigeria	2 030	2 768	25	21	15	12	6	3
Colombia	2 293	2 572	18	23	7	11	14	16
India	2 083	2 492	14	19	6	10	6	8
Philippines	2 221	2 374	15	18	5	6	11	15
Bangladesh	1 976	2 156	7	11	3	7	3	3
United Republic of Tanzania	2 191	1 970	13	13	4	5	6	6

Source: FAO, 2004. FAOSTAT (three-year averages – 1980 (1979-1980), 2000 (1999-2001).

The data in Table 4 do not distinguish between urban and rural availability. Nevertheless, they provide an overall view of the direction and pace of change related to dietary convergence. In all case study countries except the United Republic of Tanzania, the per capita availability of dietary energy has increased. The percentage of dietary energy obtained from fat has consistently risen over time in all but two countries. An increased percentage of dietary energy from vegetable oil is seen in nine of the case study countries, while an increased percentage of dietary energy from ASFs is noted in six countries.

Many of the case studies provide supporting evidence for the trends observed in Table 4.

In China, animal food intake (meat, poultry, fish and eggs) increased on average by 26 g/day from 1991 to 1997. The most dramatic increases were noticed in "less urbanized" urban areas and "more urbanized" rural areas (Mendez, Du and Popkin, China case study).

Significant gains were achieved in poultry production from 1990 to 2001 in Colombia, where increases of 55 percent for chicken meat and 36 percent for egg production were noted. These dramatic increases in poultry production were achieved through importation of cheaper animal feed (Fajardo, Colombia case study).

For urban India as a whole, from 1987-1988 to 1999-2000, consumption of rice and wheat declined marginally. The consumption of milk and eggs records an increase. A substantial increase over the three time periods is seen in the consumption of eggs, tea, biscuits, salted refreshments, prepared sweets, edible oils, sugar and country sugar (jaggary) (Vepa, India case study).

Dietary adaptation

Adaptation of diets to include more processed, refined and brand name foods is influenced by dramatic changes in lifestyle which are driven by, among others, demands on time, increased exposure to advertising, availability of new foods and emergence of new food retail outlets. Urban residents are the first to undergo lifestyle and environmental changes, but these eventually filter down into less urbanized areas as well.

Lifestyle changes and adaptation of meal patterns

In urban areas, men and women are driven into the workforce by the overriding need for an increase in income to pay for food, shelter, clothing and other household expenses. Working hours and commuting times are often long and, with growing numbers of family members entering the workforce, there is less time available to prepare food and hence there is a greater desire and necessity to consume meals outside the home.

In Chile the average working day is ten hours, with an additional one to three hours commuting time (Vio and Albala, Chile case study).

These factors have fuelled demand and led to massive market expansion of convenience and fast food options. Traditional meals and meal times are replaced by spontaneous often unplanned food purchases on street corners or in small kiosks. The traditional model of one family member taking responsibility for meal planning and food preparation for the household has fractured in most urban environments. Increasingly it is street food vendors, cafeterias at work or school and child care facilities that provide family members with at least one and often several meals per day. Thus, attention to dietary balance and dietary quality, which was traditionally "intuitive" at the household level, is now subject to wider cultural changes and external influence.

Street foods

In the context of rapid urbanization, street foods are becoming increasingly important as both a cheap and quick meal option and as an income-generating strategy. The meals and snacks served on the streets cater for a wide variety of customer tastes and range from traditional recipes of rice or maize with vegetables and beans, to more modern items including various types of fried or grilled meats, potatoes and bread. Many countries do not regulate street vendors and it is therefore possible to enter into street food vending with a relatively low start-up cost, making this activity attractive to many low-income urban residents.

In the United Republic of Tanzania, street foods account for 70 percent of total caloric intake of low- and middle- income groups (Kinabo, the United Republic of Tanzania case study).

Quality and safety are two common concerns cited with regard to street foods, yet there are very few concrete data on pathogen levels of street foods compared to home-prepared or restaurant food. The WHO Regional Office for Africa has conducted research on bacterial contamination of street food in Ghana. In this study, the microbial quality of most of the 511 food samples was within acceptable limits. Of the 26 types of foods (each food was sampled from multiple vendors) included in the study, four items – salad and macaroni dishes, red pepper and *fufu* – had total bacterial counts above acceptable limits (Mensah *et al*., 2002). Lack of knowledge about sanitary practices, vehicle pollution, absence of

structural insect barriers and scarcity of water for preparation and cleaning up all contribute to the likelihood of street foods being unhygienic.

Street food vending is not limited just to meals but also includes beverages, fruit juices and yoghurt drinks, and various snack foods: a practice that is little discussed in the nutrition community. In contrast to street vending of beverages made from fresh fruit is the continuously growing sale of carbonated beverages such as Coca-Cola and Fanta. Vendors are trained and promoted by multinational beverage companies that also employ and equip them. China, India and Nigeria are listed among the top emerging markets in the Coca-Cola Company's Annual Report (Coca-Cola Company, 2002) and mobile street vending is one effective promotional technique.

Supermarkets

Reardon and colleagues have documented a phenomenal increase in supermarkets[3] in developing countries (Reardon *et al*., 2003). They may be independently owned, but increasingly are part of larger commercial conglomerates, such as Ahold, Carrefor and Walmart. Supermarkets began to spread through Latin America in the early 1990s followed five to seven years later in Asia, and most recently in Africa. Their share in national retail reached 75 percent in Brazil in 2000 and 50 percent in Chile while in urban China and the Philippines the share in sales of packaged and processed foods reached 48 and 57 percent, respectively (Reardon, Timmer and Berdegue, 2003). An important aspect related to dietary adaptation is the range of products sold. The general pattern of supermarket entry into retail is first to specialize in the sale of packaged and processed foods, followed by fresh or frozen meat and lastly fresh produce. The initial entry into the market using packaged and processed foods exposes consumers to "exotic" food items or those with a long shelf-life such as powdered milk, ramen noodles and many varieties of sweet and savoury snack foods. Many processed foods contain added sodium and sweeteners and are also high in fat.

Fast food industry

The past decade has seen a dramatic increase in convenience food markets in developing countries. In 1985, the McDonald's restaurant chain operated 9 000 restaurants worldwide; by 2001 this number had expanded to 30 000 restaurants in 121 countries (Ghezan, Mateos and Viteri, 2002). In China, the first foreign fast food company, Kentucky Fried Chicken, opened a restaurant in Beijing in 1987 and, after nine years, the business had expanded to 100 restaurants. Today, 15 years after the opening of the first restaurant, there are 600 Kentucky Fried Chicken outlets in China, the majority in urban centres (Agriculture and Agri-food Canada, 2002). Similarly, in Latin America 15 years ago there were 100 McDonald's outlets, whereas today there are 1 581, with one-third located in the urban areas of Brazil (Ghezan, Mateos and Viteri, 2002).

Role of advertising

Secondary factors such as marketing, advertising, the appeal of new products, new retail outlets including supermarkets and multinational fast food chains contribute to dietary adaptation and convergence. Aside from the driving force of time constraints, part of the rapid adoption of new foods in the diet stems from successful advertising. The advertising budget of the largest food companies can exceed national expenditures on health promotion and health education by massive proportions (Lang, 2003). For example, British

[3] A supermarket outlet is defined as a food retail market of 350-400 m^2 in size with three to four or more cash registers.

government expenditure on healthy eating advice is about £5 million per year while the Coca-Cola company spends £27 million per year in the United Kingdom of Great Britain and Northern Ireland alone, and total advertising expenditures by the food industry is just under £0.5 billion (Lang, 2003).

The global marketing of products and lifestyles via television in small island countries such as Fiji has become common. Subtle as well as aggressive advertising by transnational tobacco and alcohol companies in particular, both in print and electronically, appears to be aimed at younger receptive age groups. Generally, these advertisements portray lifestyles that are economically unachievable in local circumstances, generating expectations and a sense of envy and frustration that is deemed to be socially disruptive for individuals and groups (Schultz, Fiji case study).

Increasingly in developing countries television is becoming a good medium for advertising to large audiences and, with the spread of mobile phones and text messages, new channels for reaching consumers are emerging. In Brazil and Chile individuals watch four to five hours of television per day, while in the Philippines children spend on average more than one and a half hours per day in front of the television. Advertisements for food are becoming increasingly predominant and are expected to have greater impact as television audiences grow.

A review of food-related television advertisements in Brazil reported 58 percent of commercials promoting high fat and high sugar products, 9 percent featuring meat, beans or eggs and no advertisements for fresh fruit and vegetables (Sawaya, Martins and Martins, Brazil case study).

Changing attitudes

Value judgements in response to the appeal "to be modern" also influence food purchases and food preparation. In the urban areas of Johannesburg, residents consider fried food to be a sign of modern living and wealth, while food that is boiled is considered inferior and demonstrates outdated customs (Chopra, South Africa case study).

In the Cape Town region of South Africa the notion of farming characterized by physical effort and hardship in general remains an issue for recent migrants to urban slums (South Africa case study). Dwellers of Khayelitsha, an informal settlement of about 750 000 people, are willing to engage in communal gardening only to the extent that they need to do it for survival and have no alternative. They prefer to earn an income and to purchase food instead. Of those who work in the community gardens, the majority leave as soon as they have found a source of revenue. The result is that what were created as "community gardens" to meet the food needs of the Khayelitsha communities are now being transformed into businesses of market gardening and produce is sold to local markets where community dwellers do their food purchasing. Those individuals remaining active in the community gardens now consider themselves as "employees" in some sort of a cooperative arrangement from which they draw revenue.

DIET-RELATED HEALTH AND NUTRITION CHALLENGES

It is important to study changing food systems and dietary patterns in order to understand how these alterations affect the health and nutrition of populations. Diet-related factors

such as cholesterol; low fruit and vegetable intake; and iron, zinc and vitamin A deficiency rank among the major risk factors for decreased disability-adjusted life years (DALYs) (WHO, 2002). Health problems related to diet may be caused by a limited intake of dietary energy or micronutrients, an excessive intake of dietary energy, or poorly balanced intakes. There are direct health consequences from nutritional deficiencies such as blindness from severe vitamin A deficiency or mental incapacity as a result of iodine deficiency. Likewise, diet plays a critical albeit more covert role in the development of many other diseases including type-2 diabetes, cardiovascular disease, cancer, dental disease and osteoporosis (WHO/FAO, 2003).

High levels of undernutrition in adults and children in developing countries remain a grave concern and a top priority for public health action in many of the case study countries, as do deaths from communicable diseases such as malaria, diarrhoea, tuberculosis and other respiratory infections. However, the increasing prevalence of obesity and non-communicable diseases (NCDs) in developing countries is rapidly becoming a concern necessitating more attention. The most recent global estimates indicate that as many as 1.7 billion persons could be overweight or obese (IOTF, 2004). The majority of these people live in developed countries; however, overweight and obesity have been increasing exponentially in several regions of the developing world, particularly Latin America and the Caribbean and North Africa (Martorell, 2001). The term "double burden" has been used to describe countries experiencing continuing high prevalence rates of infectious and communicable diseases while at the same time NCDs are on the increase.

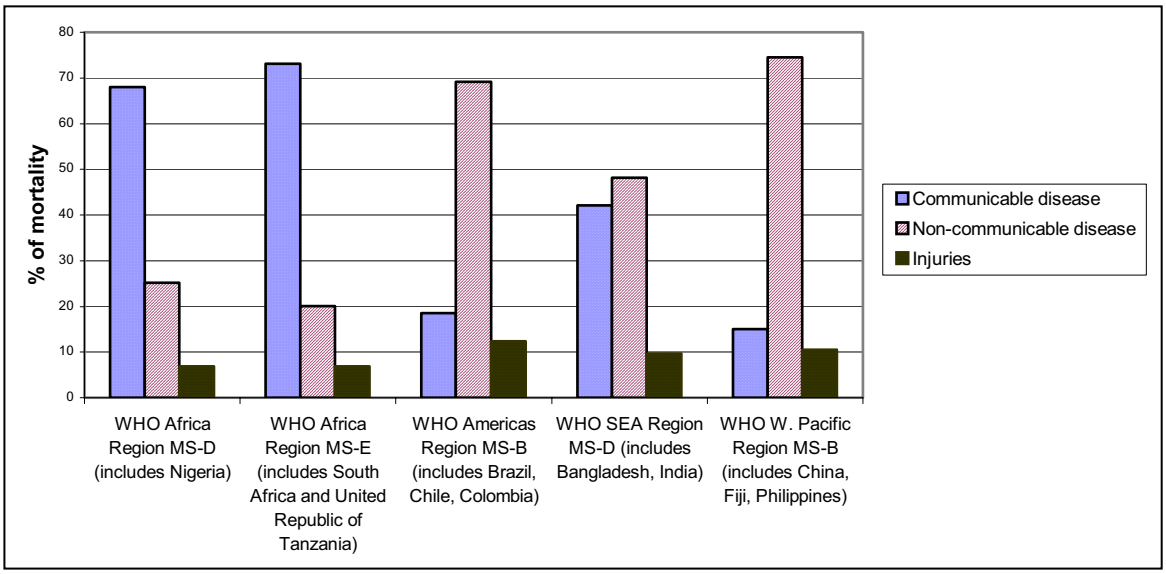
Popkin (2003) has defined a set of three stages which he terms the "nutrition transition". In brief, the stages are: i) receding famine as incomes rise; ii) changes in diet and activity patterns, which increase the incidence of diet-related chronic disease; and iii) a stage of behavioural change where intake and activity are regulated such that health ageing is prolonged as diet-related chronic diseases are better prevented or controlled. The stages are closely linked to demographic and epidemiological shifts.

Burden of disease

Figure 3 shows the relative percentage of mortality from communicable and non-communicable diseases and injuries based on the WHO mortality classification. The data presented do not correspond to individual countries, but to the WHO region and mortality stratum in which each case study country is located. WHO uses a quintile distribution to classify countries by different levels of child and adult mortality. The WHO mortality stratum classification can be found in the Annex. For further details on the methodology used to derive the mortality strata, the *World Health Report 2002* can be consulted (WHO, 2002).

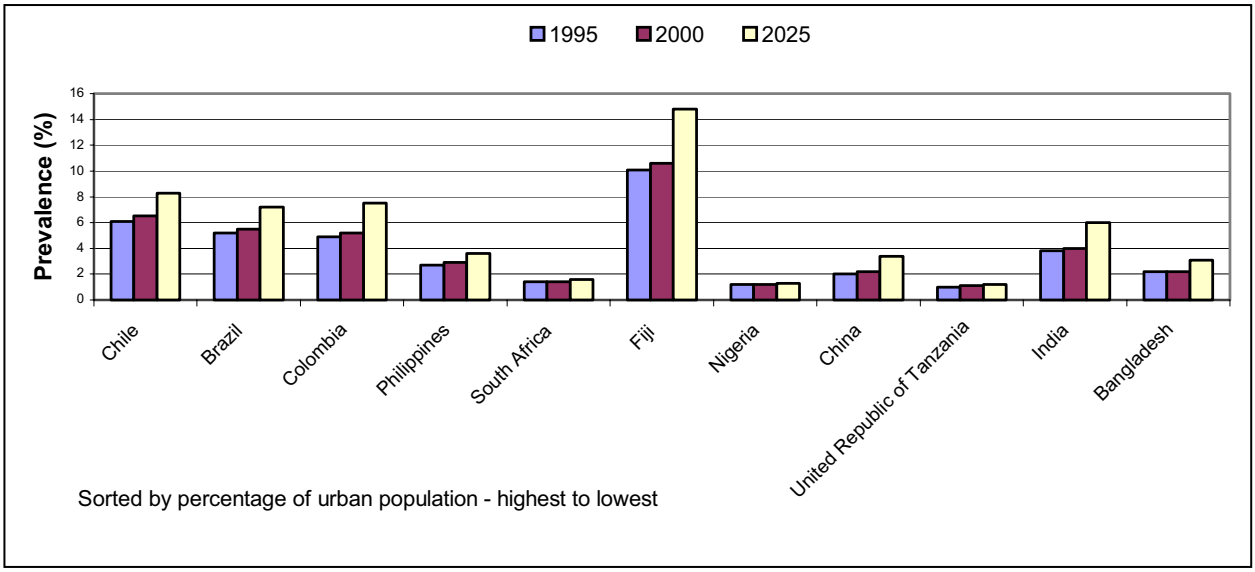
Figure 3 illustrates the largest dual burden of mortality for countries in the WHO Southeast Asia Region, which includes Bangladesh and India. In this regional stratum, deaths caused by communicable and non-communicable diseases are nearly equal. In the America and Pacific regional strata, NCDs account for the majority of mortalities, while the opposite pattern is observed in both WHO Africa mortality strata. Clearly public health strategies will need to be adapted accordingly in the different regions presented.

FIGURE 3
Deaths from communicable diseases, non-communicable diseases and injuries by WHO region and mortality stratum (MS)



Source: WHO, 2003.

FIGURE 4
Estimated past, current and predicted prevalence of diabetes



Note: Many extrapolations were necessary because of a lack of suitable survey data. All estimates for sub-Saharan Africa come from data from the United Republic of Tanzania. For a full description of the methodology used, refer to the article by King, Aubert and Herman (1998).
Source: King, Aubert and Herman, 1998.

WHO and FAO have signalled concern about the increasing prevalence of chronic NCDs linked to diet including diabetes mellitus, cardiovascular disease, hypertension and strokes and some types of cancer (WHO/FAO, 2003). Estimates for 2000 indicate 171 million persons had diabetes with a projected increase to 366 million by 2030 (Wild *el al.*, 2004). Diabetes is a condition closely linked to diet and exercise. Figure 4 provides an estimate of the prevalence of diabetes along three time points. The highest prevalence of diabetes by 2025 among the case study countries is predicted in Fiji, followed by Chile,

Colombia and Brazil. In terms of the absolute number of persons with diabetes, India and China are predicted by 2025 to have the highest global burden at 57.2 and 37.6 million cases, respectively (King, Aubert and Herman, 1998).

Malnutrition

The term malnutrition is often used as a synonym for undernutrition. In the context of the changing burden of nutritional disorders, more clarity of terminology is needed. Malnutrition is any state of nutritional imbalance and includes under- and overnutrition and inadequacies in micronutrients. Undernutrition is the preferred term for describing nutrition disorders related to lack of adequate dietary energy, while overnutrition is used to describe excess dietary energy intake, most often also associated with low energy expenditure or reduced levels of physical activity (Shetty, 2003b). Micronutrient deficiencies occur when intake of micronutrients is inadequate or when disease processes prevent adequate absorption of micronutrients available in the diet. Lack of adequate dietary diversity tends to lead to micronutrient deficiency.

The burden of malnutrition in the case study countries is shown in Table 5. Bangladesh, India, the Philippines, Nigeria and the United Republic of Tanzania have levels of undernutrition in children that are still considered high by WHO standards. In Chile, stunting and underweight have nearly disappeared, yet 8 percent of the children are malnourished at the other end of the spectrum because they are overweight.

WHO has classified stunting above 30 percent and underweight above 20 percent as problems of high public health concern (WHO, 1995). The highlighted cells in Table 5 indicate prevalence levels of undernutrition which are of a magnitude to cause public health concern. Ideally, criteria for signalling concern over the magnitude of overweight and obese individuals in populations will also become available, making it possible to isolate more clearly the most immediate priorities. Currently, no such criteria have been established. The picture for adults reveals more of a problem with overweight in those countries with data. Even in some countries where chronic malnutrition is prevalent in children (Philippines, Nigeria), the prevalence of overweight and obese adults is of concern.

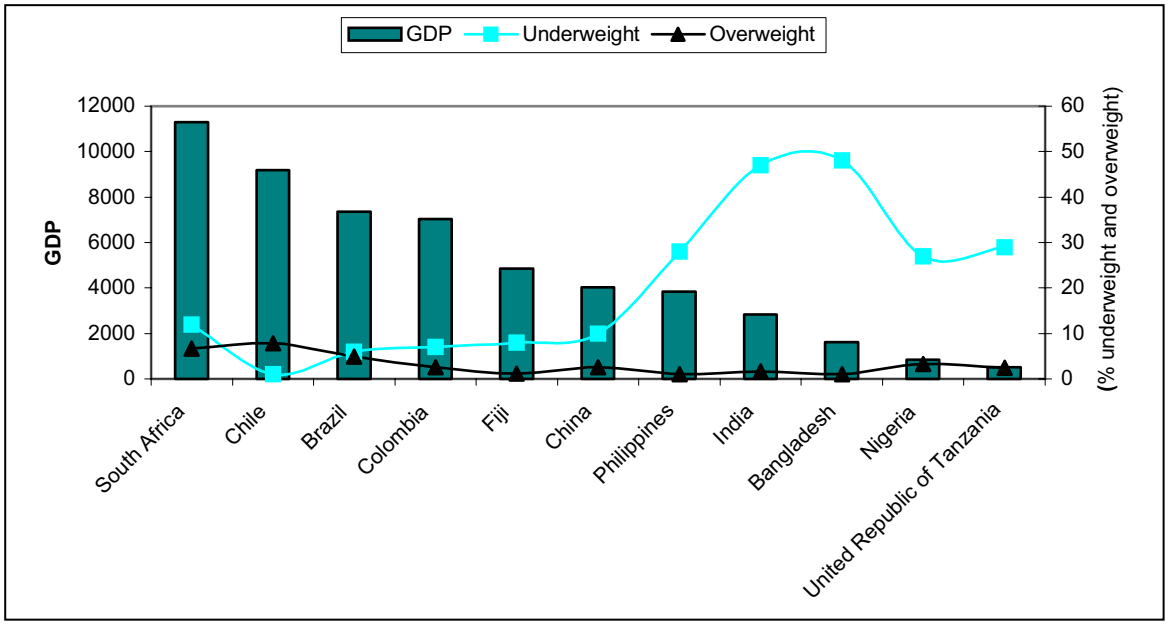
TABLE 5
Prevalence of malnutrition (sorted by underweight in children)

Countries	Children under five years of age			Adults[3]					
	Underweight[1]	Stunted[2]	Overweight[2]	Underweight		Overweight		Obese	
				M	F	M	F	M	F
Bangladesh	48	45	1.1				3.7		0.7
India	47	46	1.6				4.7		1
United Republic of Tanzania	29	44	2.5						
Nigeria	27	46	3.3		16.2		15.8		7.1
Philippines	28	30	1.0	11.1	15.4	14.9	18.9	2.1	4.4
South Africa	12	25	6.7	12.2	5.6			9.1	29.4
China	10	17	2.6	9.1	9.9	14.6	11.9		
Fiji	8	3	1.2	10.7	9.6	25.2	29.9	7.4	20.6
Colombia	7	14	2.6		3.1	32		21	
Brazil	6	11	4.9		6.2	31	36.8	26.5	10.2
Chile	1	2	7.9					15.7	23

Note: Years for data range from 1992 to 1999.
[1] *Source*: UNDP, 2003.
[2] *Source*: de Onis and Blossner, 2003.
[3] *Source*: IOTF, 2004; Demographic and Health Surveys (www.measuredhs.com); FAO Nutrition Country Profiles.

Figure 5 shows the prevalence of underweight and overweight children by GDP. Child overweight increases relatively consistently with GDP. The prevalence of underweight in children is less consistent with economic ranking.

FIGURE 5
Relationship between GDP, underweight and overweight children (under five years of age)



Source: UNDP, 2003; de Onis and Blossner, 2003.

BROAD CONCERNS

Cities are engines of national economic growth and can provide citizens with diverse income-earning opportunities. At the same time there are negative factors associated with urban life such as crime, pollution, increased cigarette and alcohol consumption and decreased physical activity. The rapid pace of urbanization in many cities outstrips the capability of municipalities to provide basic services such as water, sanitation and housing. In this respect, the forces of globalization appear to drive the phenomenon of urbanization to a pace that is beyond the accommodative capacity of municipalities.

The changing food systems brought about by the forces of globalization and characterized by increasing urbanization have led to new challenges and opportunities. Many countries in the developing world are faced with the continuing burden of undernutrition and food insecurity. At the same time, changes in diet and physical activity patterns are increasing the incidence of diet-related NCDs, principally obesity, coronary heart disease, diabetes and hypertension. In addition, for most countries, regardless of the stage of transition, micronutrient deficiencies are of concern.

Broader issues related more specifically to food systems were also raised in the case study reports and during the discussions. There is concern about the impact (both positive and negative) on dietary change exerted as a result of the greater influence and control of national food systems by multinational and transnational corporations. There is alarm that local culture and food traditions are disappearing. Environmental concerns included the effects of changed production and distribution systems, which could lead to environmental degradation as a result of intensification of inputs into the agricultural system, the overall sustainability of the system and loss of biodiversity through narrowing of the crop base.

There is policy debate about the supermarket and shopping mall phenomenon that attracts consumers away from the traditional small community stores and erodes traditional community life, yet can increase the range and cross-seasonal availability of foods, albeit at a cost to local food supplies. Supermarket suppliers tend to be large producers who can provide guarantees of quality (nutritional and safety) and reliability, thus gradually eliminating smaller farmers who are less able to meet these standards or production quotas. This further undermines small-scale farming as a livelihood, and these farmers find themselves with little choice other than to migrate to the cities.

POTENTIAL SOLUTIONS AND STRATEGIES

This paper has presented evidence of the way in which changing food systems have an impact on the health and nutritional status of populations and has drawn on background data and analyses to depict the determinants of dietary change. These illustrate some of the forces of globalization at work in the case study countries. Basic needs including education, access to health services and critical infrastructure still need to be met in many of the case study countries. The fundamental targets to be achieved are clearly delineated in the Millennium Development Goals. These include a commitment to reduce childhood undernutrition, increase literacy and deliver improved access to safe water and sanitation.

Reaching these goals requires, at the very least, collaboration between agriculture, health, nutrition and education to address the problems of malnutrition in a holistic manner. The Millennium Development Goals are a reminder of the absolute necessity of cross-sectoral cooperation. Achieving the targets will be possible only if different disciplines work together. Opportunities for collaboration towards decreasing malnutrition are presented below.

General education

Education is a proven strategy at both ends of the nutrition spectrum. In countries where undernutrition is prevalent, it is lower among the better educated; likewise for countries where overnutrition problems predominate, the better educated have less prevalence of overweight (most of the latter examples come from industrialized nations). Even though in this example, the spectrum of educational achievement is vastly different, it would still seem that one of the best policies for optimal nutritional status is general education. In a recent review of best practices in poverty eradication, education – both formal and informal – was highlighted as essential (UN Sub-Committee for the Eradication of Poverty, 2003).

The importance of education is amplified by a quote from a representative of the Carmen Papa University in Bolivia:

> *"Education is key in the search for more justice in the world. The untapped excellence of the poor is being wasted in the need to survive."* (UN Sub-Committee for the Eradication of Poverty, 2003, p. 29).

Healthy food culture

Many of the case studies highlighted changing patterns of meal provision and a large influence of advertising on shaping food habits. For many urban families, one to two meals per day are eaten outside the home. For many children this means the majority of meals are consumed at school or day care centres. Coordination between agriculture, education, health and nutrition is essential in this arena to provide favourable environments and appropriate messages for maintaining or recreating healthy food cultures.

As a direction towards a solution, the United Republic of Tanzania case study suggests that there should be a healthy relationship between the rural and urban communities, pointing out that it is in the interest of both urban and rural areas to maintain linkages. In Dar es Salaam, newly arrived residents from rural areas tend to maintain links with their rural place of origin as insurance in obtaining supplies of fresh produce. This is a frequently occurring pattern with new migrants to cities but, over time, these connections tend to fade. A challenge might be to search for ways of maintaining and nurturing these links. There is a definite need to develop a vision of cities and the rural world as different ends of a sociogeographic spectrum, rather than as individual worlds on their own.

Increased consumption of fruit and vegetables

One of the most obvious unions between agriculture, health, nutrition and education is via the promotion of fresh fruit and vegetables. Most national and international dietary guidelines are in agreement that consumption of fresh fruit and vegetables is a healthy food choice and generally needs to be increased. The benefits of fruit and vegetable consumption span the spectrum of nutritional disorders. Fruit and vegetables are rich sources of micronutrients, needed by children for optimal growth and development. Consumption of fruit and vegetables also decreases risks of obesity, cardiovascular disease and some cancers (WHO/FAO, 2003), perhaps in part through their contribution of bioactive substances.

Schools and child care facilities are an ideal place to promote fresh fruit and vegetables. Here children can be taught the health benefits of consuming them in adequate amounts. Appreciation of local produce can also be cultivated through exposing children to indigenous crops and teaching them about their nutritional properties.

Street food vendors can easily and usefully be involved in projects to promote traditional fruit and vegetables. Vendors selling near schools and workplaces can be provided with incentives to include more fruit and vegetables in the meals they prepare. Mobile vendors selling fruit and natural fruit juices can be encouraged.

Regulatory measures

Case study evidence of the use of regulatory measures to limit the negative or accentuate the positive impacts of food systems on health and nutrition outcomes was limited. China initiated a policy to provide subsidies and price adjustments to promote vegetable production and consumption; the impact thus far is thought to be positive, although there is little in the way of supportive data (Mendez, Du and Popkin, China case study). Fiji passed a bill in 1999 banning the importation of mutton flaps (a fatty cut of mutton). This regulation is now being bypassed by importation of the entire mutton carcass and sale of the same cut under a different name (Schultz, Fiji case study).

Additional regulatory measures that could be considered include tax on certain foods; better, more widespread and appropriate food labelling; advertising restrictions; rewards for good practices; and incorporation of nutritional and health concerns into currently existing food legislation. In a recent review (Haddad, 2003), the most successful strategy for curbing dietary fat intake was the use of food labelling descriptors, for example, low fat and dietary information for consumers such as food guide pyramids. More research on the potential impact of similar strategies is needed.

TABLE 6
Activity options for improving nutritional status

Primary health and nutrition problems	Focus of activity for improving nutritional status	
Undernutrition, micronutrient deficiencies and communicable diseases	Monitoring and surveillance	Undernourished preschool and school-age children; micronutrient deficiencies (children and adults, particularly women of child-bearing age); low birth weight; chronic energy deficiency in adults
	Thematic	Food and nutrition security; rural development; market access
	Educational	Nutritional value of foods; emphasis on increasing dietary intake of foods rich in iron, vitamin A, iodine and zinc. Appropriate weaning foods. Dietary variety and diversity. Educational media – radio, community/religious leaders, church groups
	Operational	Home, school and community gardens. Targeted feeding programmes. Focus on incorporating nutrition education into curriculum for teachers and nurses
	Legislative	Social programmes and safety nets
Double burden of disease and malnutrition	Monitoring and surveillance	Monitoring double burden of nutritional disorders and diseases (infectious and diet-related). Inequalities in health and nutritional status
	Thematic	Diet and chronic disease; urban planning
	Educational	Healthy food choices, reading nutritional information on food labels; appropriate portion sizes. Greater emphasis on nutritionally appropriate food choices available from restaurant and fast food chains. Internet, television, mobile phones as more prominent educational media
	Operational	Home, school and community gardens for promotion of fruit and vegetable consumption. Promotion of increased physical activity during leisure time. Civil society and community action groups
	Legislative	International trade; food labelling. Urban planning (particularly for physical activity)
Overweight and obesity, NCDs	Monitoring and surveillance	Monitoring of health and nutritional status of children and adults, with particular attention to the health and nutritional status of older population groups
	Thematic	Ageing, diet and chronic disease
	Educational	Nutrition advice for healthy ageing; physical activity. Strengthening and promotion of urban connections with agriculture
	Operational	School field trips to farms. Programmes to promote greater awareness of food systems including school and community gardens. Civil society groups. Integration of local farmers into urban communities via ties to school meal programmes and farmers' markets
	Legislative	Food standards; health claims

Regulations in public (state) schools

Lessons on how not to proceed can be learned from observations of schools in developed countries. For example, state school systems in the United States of America and the United Kingdom of Great Britain and Northern Ireland have engaged in partnerships with

private food industry, leading to promotion and sales of certain food products on the school campus. This policy of sales of foods and beverages of little nutritional value and often with high saturated fat, added sugars and salt has been implicated in the burgeoning overweight population and obese schoolchildren in these countries (American Academy of Pediatrics, 2003; Dalmeny, Hanna and Lobstein, 2003). This issue as a whole has been thoroughly documented recently in an important British parliamentary report (House of Commons, 2004). Governments or school districts that have not yet had to make policy decisions on this issue should formulate guidelines and a position on which types of foods are to be promoted and sold in the schools.

In a national context, the key nutrition strategies to be pursued should be developed based on a thorough assessment of the most pressing national nutritional concerns. A combination of activities listed in the categories in Table 6 could provide useful guidance. The list given is not exhaustive, but rather illustrative of a mixture of interventions that could be used based on the predominant nutritional problems being experienced in the country.

CONCLUSION

This paper has attempted to synthesize the main issues raised during the workshop and presented in the individual country papers in this publication. For the sake of completion it has also included some points raised during discussions in the course of the workshop. It is the hope of the authors that the paper has been able to provide an adequate overview of the forces of globalization responsible for bringing about important changes in food systems and lifestyles, and how these are having a major impact on the health and nutritional status of populations of developing countries.

In studying the main drivers of globalization, one is drawn to the observation that the overall political and policy environment is clearly important in making the necessary commitment to strive for adequate health and nutrition of entire populations, both rural and urban, in any country. The provision of infrastructure, including roads and electricity, and education and health care systems, is a basic prerequisite to allow citizens to avail themselves of greater economic opportunities created through market liberalization and increased foreign investment. Greater individual economic prosperity fuels several household-level changes in lifestyles, including greater access to communications technologies, labour-saving devices and entertainment options. The synthesis demonstrates that access to these new technologies varies markedly from country to country and within countries, and certainly also between urban areas. In many instances the forces at work are overloading the capacity of cities to accommodate the large and ever increasing influx of people who are leaving the rural areas to migrate to the cities. A significant part of the reality underlying this phenomenon is that rural areas are no longer able to provide adequate livelihoods for the majority of populations. People move to cities because they are perceived to offer better "survival" opportunities.

The forces of globalization affect economic development and lifestyles in developing countries in a variety of ways. From a health and nutrition point of view, the most obvious changes are those resulting in sedentary lifestyles and adoption of dietary patterns that can lead to high rates of obesity and NCDs. Despite some improvement, undernutrition and micronutrient deficiencies are generally still present. In other words, for the majority of cases, the issue of food and nutrition security has not been resolved, yet another level of complexity is being added to the problem as the incidence of diet-related NCDs increases.

The emergence of supermarkets and fast food chains, while catering to the changing demands of the consumer in terms of convenience, quality and safety, engenders new

problems. These include erosion of food culture and reduction in biodiversity as a result of newly created demand for standardized, uniform produce. Additionally there has been a loss of livelihood opportunities at various stages of the food sector, including agricultural production.

Creating more equitable access to the new opportunities provided through globalization seems unlikely, at least in the short term, without very generous development assistance and a large dose of international good will, including fair access to world markets for agricultural products. A concerted effort to diminish inequalities and focus on delivering positive gains is needed to stem the tide of the increasing double burden of undernutrition and overnutrition coupled with excessive urbanization rates and growing poverty. The challenge for the global community to move smoothly towards a truly sustainable and inclusive "global village" has never been as great as it is at present.

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Annex

WHO Mortality Stratum

Countries	WHO mortality stratum*
Brazil	Low child, low adult
Chile	Low child, low adult
China	Low child, low adult
Colombia	Low child, low adult
Fiji	Low child, low adult
Philippines	Low child, low adult
Bangladesh	High child, high adult
India	High child, high adult
Nigeria	High child, high adult
South Africa	High child, very high adult
United Republic of Tanzania	High child, very high adult

* Further information on the mortality stratum can be found in WHO, 2002.

Features of urban food and nutrition security and considerations for successful urban programming

Marie T. Ruel[1] and James L. Garrett [2]

INTRODUCTION

This paper updates our earlier reviews of urban food and nutrition security (Ruel, Haddad and Garrett, 1999; Ruel *et al.*, 1998). These earlier pieces reviewed existing knowledge from published literature concerning the unique characteristics of urban food and nutrition security and their determinants, and experience of successful programme and policy responses to alleviate urban food insecurity and malnutrition. The reviews also identified key research gaps.

The present review focuses more on what we have learned on these issues from five years of empirical research and through our collaboration with partners directly involved in the design and implementation of urban programmes in the field. CARE International and some of their country offices have been our main partners to date, and we have also collaborated with the Government of Guatemala in the evaluation of a community day care programme. Our research programme combined primary data collection in a number of countries and secondary analysis of data from the Demographic and Health Surveys (DHS) and the World Bank Living Standards Measurement Surveys (LSMS).

The paper is structured as follows. First we present new information from our empirical research on urban/rural differences in food security and child nutritional status, and on socio-economic differentials within area. Then some of the unique features of urban food security and its determinants are highlighted. The paper concludes with a discussion of lessons learned and implications for urban programming.

URBAN/RURAL DIFFERENCES IN FOOD SECURITY AND CHILD NUTRITIONAL STATUS

This section updates the empirical evidence concerning urban/rural differences in food security and child nutritional status, using newly available data sets from several developing countries.

Urban/rural differences in food security

Quantitative data on urban food security are scarce, but a recent analysis of nationally representative consumption/expenditure surveys from ten African countries provides useful

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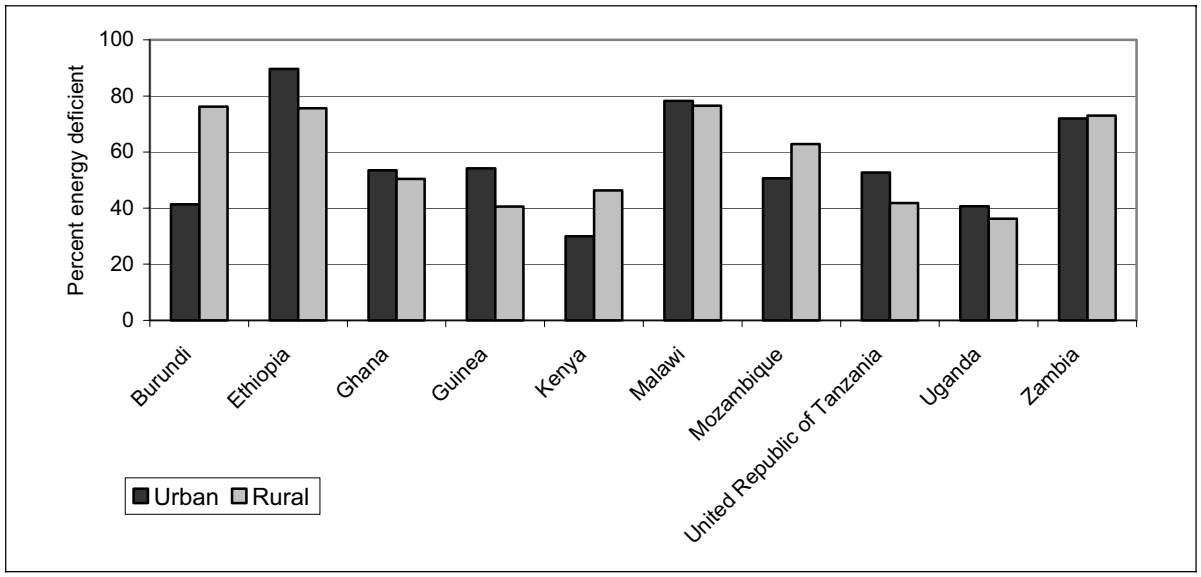
insight (Smith and Aduayom, 2003). Figure 1 presents an estimate of the percentage of the population who are energy deficient by urban/rural area (see also the Annex for more information about methods used and results). Contrary to expectations, the percentage of the population found to be energy deficient is higher in urban areas in six of the ten countries studied. In all countries except Kenya and Uganda, at least 40 percent of the urban population is energy deficient; with percentages reaching 90 percent in urban Ethiopia and 76 and 72 percent in urban Malawi and Zambia, respectively. However, because Africa is not yet as highly urbanized as other regions, the absolute numbers of energy deficient people in rural areas still exceed the numbers in urban areas. Nevertheless, the urban population is currently contributing a significant proportion to the total number of energy deficient individuals – more than a third in four of the ten countries studied (Zambia, Ghana, Guinea and the United Republic of Tanzania, by descending order). Similar analyses are currently ongoing for several Latin American and Asian countries. We expect that the findings will differ substantially between regions and countries depending on their stage of urbanization.

FIGURE 1
Urban/rural differences in food insecurity (percentage energy deficient individuals) in sub-Saharan Africa



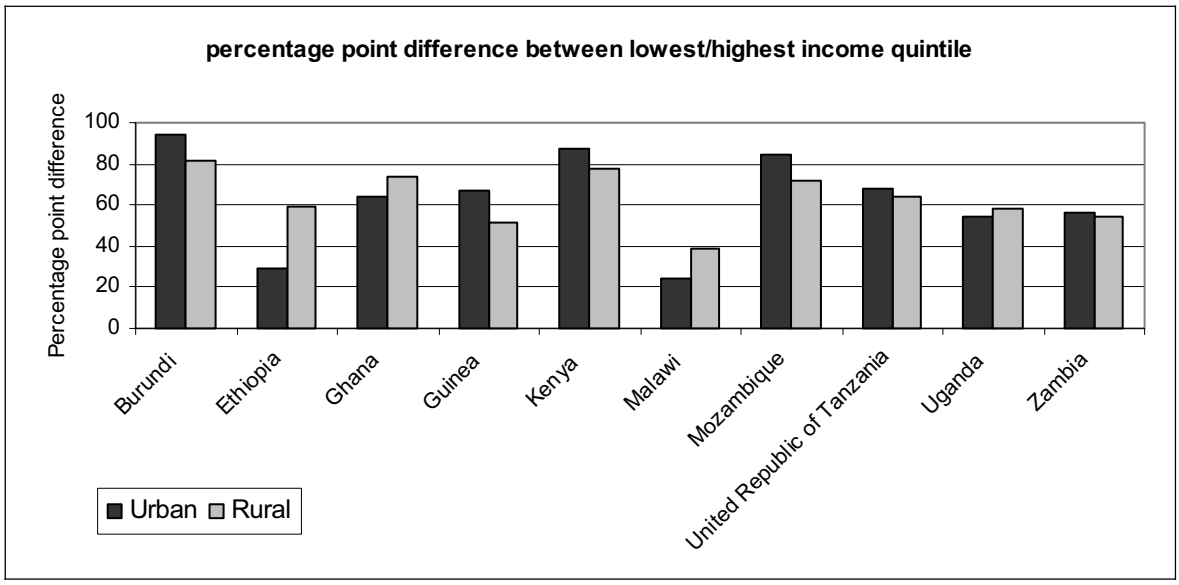
Source: Smith and Aduayom, 2003.

It is important to note, however, that the methodology used to derive the statistics presented here on the numbers and percentages of energy deficient individuals does not take into account potential differences in energy expenditures (and therefore requirements) between individuals living in urban and rural areas. Typically, individuals living in rural areas have higher energy requirements because they tend to have more physically demanding employment such as farming, and they may need to walk long distances to and from their place of work. Household chores may also require greater energy expenditure, especially to fetch water and/or do the laundry. Although there is clearly a good proportion of urban dwellers who may also have high energy expenditures, from physically demanding employment and travel, on average it is believed that urban dwellers tend to live a more sedentary life, especially in countries experiencing rapid economic growth (Popkin, 1994; Popkin and Doak, 1998). Therefore, failure to account for differences in

energy expenditure/requirements in the urban/rural comparisons presented here is likely to underestimate the true prevalence of energy deficient individuals in rural areas. These findings should thus be interpreted with caution.

Considering the caveat described above, a potentially more useful comparison is to look at the magnitude of socio-economic differentials in food security within urban and within rural areas. The differences (in percentage points) in the percentage of energy deficient individuals between the lowest and the highest income quintile within each area are presented in Figure 2. If we take the example of the first country, Burundi, the first bar shows for the urban sample the percentage point difference in the proportion of food insecure individuals between the lowest income quintile compared to the highest income quintile. The next bar (still for Burundi) gives the same information, but for the rural sample. So, in the case of Burundi, the socio-economic differentials in food insecurity are larger in urban compared to rural areas, but this is not the case for all countries. In fact there are no clear patterns emerging in the magnitude of the socio-economic differentials between urban and rural areas; in some countries differences are wider in urban areas, whereas in other countries they are wider in rural areas and yet in others, the differences are very small and insignificant. Overall, socio-economic differentials are very large – often larger than 60 percentage points – both in urban and rural areas.

FIGURE 2
Socio-economic differentials in food insecurity by area of residence (sub-Saharan Africa)

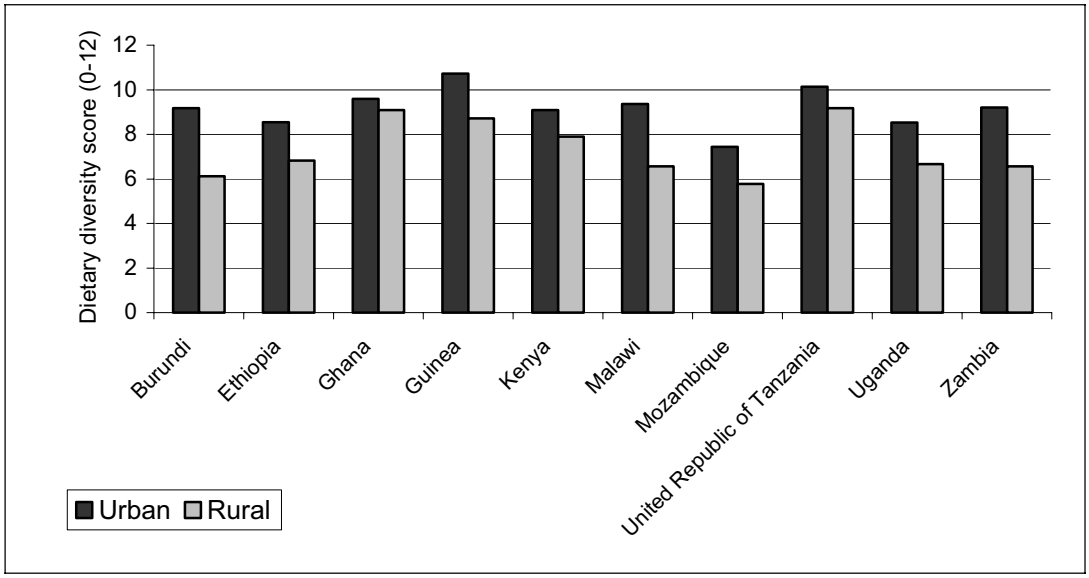


Source: **Smith and Aduayom, 2003.**

Household dietary diversity, defined as the number of foods or food groups consumed by households over a reference period, has been recently shown to be strongly associated with household consumption/expenditure and food security in a multicountry analysis (Hoddinott and Yohannes, 2002). This research was based on the premise that as income increases people tend to diversify their diet, largely because greater variety makes diets generally more palatable and more pleasant. Diversity also significantly improves dietary quality and the likelihood that individuals will meet their daily nutrient requirements, especially with regard to essential micronutrients. Therefore greater dietary diversity is

highly desirable, both from a quality of life and a dietary quality point of view, and appears to be a good proxy for household income/expenditure and food security.

FIGURE 3
Urban/rural differences in household dietary diversity (sub-Saharan Africa)

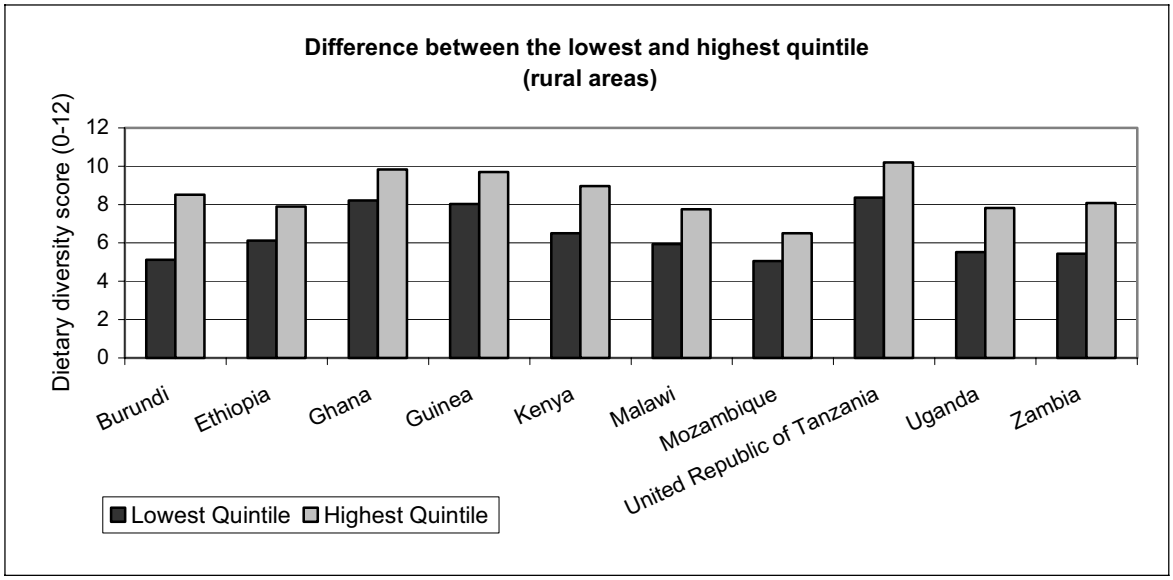


Source: Smith and Aduayom, 2003.

Thus, using the same set of African countries listed in the Annex, Smith and Aduayom (2003) computed a household dietary diversity score using the methodology developed by Hoddinott and Yohannes (2002), which measures diversity at the household level, using 12 food groups[3]. Findings are presented in Figures 3 to 5. Dietary diversity was consistently higher in urban compared to rural areas (Figure 3), but in many of these countries (especially Kenya, Mozambique, Uganda and Zambia), the urban poor had dietary diversity scores as low as the rural poor (see Figures 4 to 5). Socio-economic differentials (again comparing households from the lowest and the highest income quintiles) were generally large in both urban and rural areas, but there were no obvious differences in the magnitude of these differentials between urban and rural areas. Consistent with the findings from Hoddinott and Yohannes (2002), dietary diversity seemed to be strongly associated with income, and in the set of countries from sub-Saharan Africa used here, the association was generally linear (not shown).

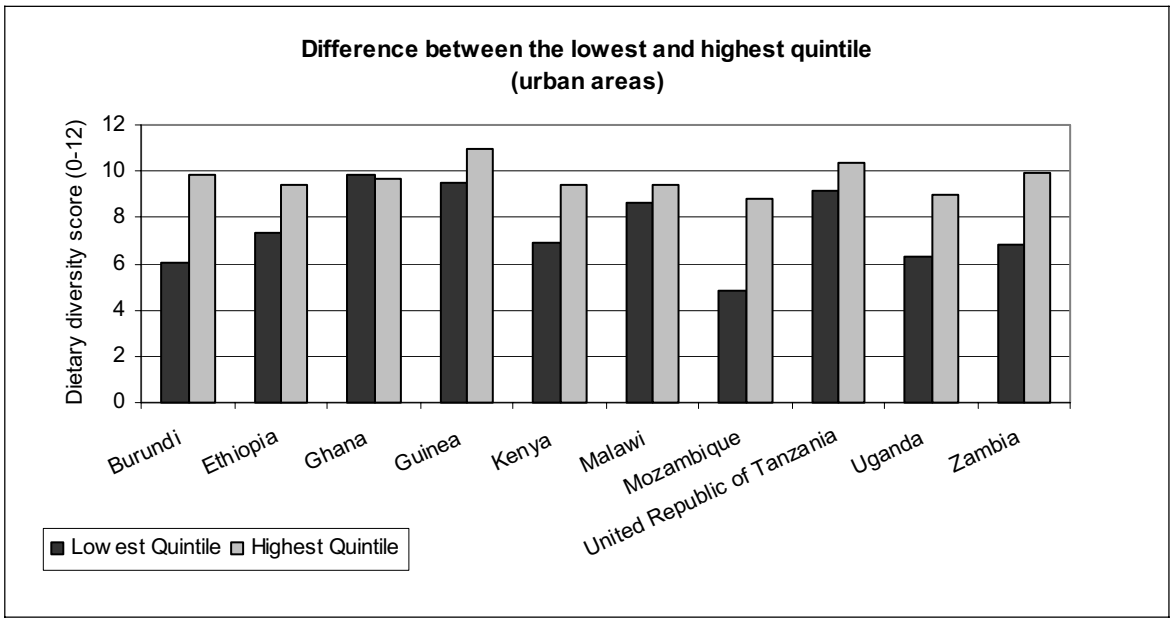
[3] This study adopted the 12 food groups used by the Food and Agriculture Organization of the United Nations (FAO) food balance sheets.

FIGURE 4
Socio-economic differentials in household dietary diversity (sub-Saharan Africa)



Source: Smith and Aduayom, 2003.

FIGURE 5
Socio-economic differentials in household dietary diversity (sub-Saharan Africa)



Source: Smith and Aduayom, 2003.

Urban/rural differences in child nutritional status

Global statistics on child nutritional status could not be more consistent in showing that urban children are better nourished than rural children. No matter which country or sets of countries are analysed, the prevalence of undernutrition among urban children is consistently lower than among rural children (Ruel *et al.*, 1998; Ruel, 2000; Ruel, 2001b; Smith, Ruel and Ndiaye, 2003; National Research Council, 2003; Menon, Ruel and Morris,

2000; Garrett and Ruel, 1999b). This is particularly true for stunting (low height-for-age)[4] and for underweight (low weight-for-age). Urban/rural differences in stunting are generally of smaller magnitude in Africa and Asia compared to Latin America, where differences of up to twofold are observed (Ruel *et al*., 1998; Ruel, 2001b).

Urban/rural differences in wasting (low weight-for-height) are less consistent. Although generally lower in urban areas, the prevalence of wasting is often similar in urban and rural areas and, when differences exist, they tend to be of small magnitude (Ruel *et al*., 1998; Ruel, 2001b; National Research Council, 2003).

Figure 6 shows results from a pooled analysis of 36 data sets from the Demographic and Health Surveys (DHS) from three regions: South Asia (SA), sub-Saharan Africa (SSA) and Latin America and the Caribbean (LAC)[5] (Smith, Ruel and Ndiaye, 2003). These pooled data confirm previous findings of lower stunting rates in urban compared to rural areas, and larger urban/rural differences in stunting in the LAC region than in the other two regions.

Yet global comparisons can be misleading …

Clearly, global comparisons such as the ones presented above are misleading because they hide the wide disparities that exist within areas. Socio-economic differentials are particularly large in urban areas, and therefore central statistics reporting overall rates of undernutrition may be deceiving.

Research by the International Food Policy Research Institute (IFPRI), using DHS surveys from 11 countries from three regions, specifically tested the hypothesis that socio-economic, intra-urban differentials in child stunting were greater than intra-rural differentials[6] (Menon, Ruel and Morris, 2000). The analysis clearly showed that across these countries: i) there are large socio-economic differentials in childhood stunting; ii) these differentials are commonly greater in urban than in rural areas (see Figures 7 and 8); and iii) the most disadvantaged urban children have rates of stunting that are on average only slightly lower than those of the most disadvantaged rural children. In order to quantify the magnitude of urban/rural and socio-economic differentials in stunting, we computed odds ratio[7] (e.g. the odds of being stunted for children in rural compared to urban areas; or the odds of being stunted for children from low- income versus higher-income families). Results for the 11 countries analysed showed that odds ratios for urban/rural comparisons were relatively small (<3.3), indicating that the risk of being stunted for children living in rural areas of the countries studied is <3.3 times greater than for children living in urban

[4] Stunting, or linear growth retardation, is an indicator of long-term chronic undernutrition. Stunting is defined as height-for-age lower than -2SD from the median of the CDC/WHO reference population (WHO, 1979). Wasting, an indicator of short-term, acute undernutrition, is defined as weight-for-height lower than -2SD from the median of the reference population. Underweight, a global indicator of undernutrition, which does not differentiate between stunting and wasting, is defined as weight-for-age lower than -2SD from the median of the reference population.

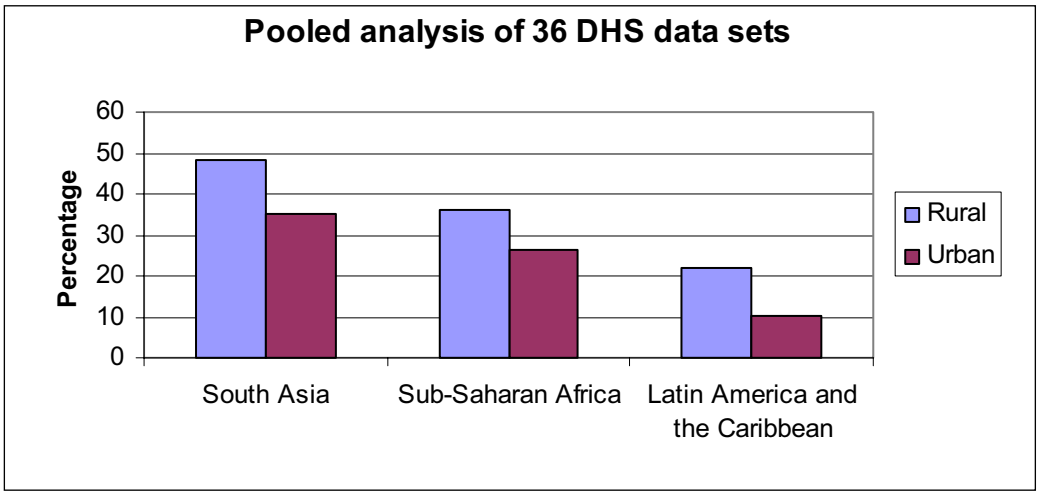
[5] This analysis uses data from 36 of the most recent DHS conducted between 1990 and 1998 in three regions: South Asia (SA), sub-Saharan Africa (SSA) and Latin America and the Caribbean (LAC). Eighty percent of all SA countries, 58 percent of SSA countries and 36 percent of LAC countries are included. The sample included 129 351 children under three years of age and 117 007 women, usually their mothers.

[6] In this study, a socio-economic status (SES) index was derived from data on household assets, housing quality and availability of services. The index was created separately for urban and rural areas of each country, using principal components analysis (11).

[7] Odds ratio were used to assess the magnitude of urban/rural differentials in childhood stunting, as well as within-urban and within-rural socio-economic differentials. The latter were computed by comparing the lowest SES quintile group with the highest quintile group. Odds ratio were computed using the following formula: [p/(1-p)]/[q/(1-q)] where, for the urban/rural comparison p is the proportion of stunted children in rural areas and q is the proportion of stunted children in urban areas. For more information, see (11).

areas. The gap between the lowest and highest socio-economic status (SES) quintile in urban areas, however, was much larger (ranging from 2.8 to 10.2) than between the lowest and highest SES quintile in rural areas (all <3.3 except Brazil). The risk of being stunted among poor children was up to ten times higher than for the wealthiest group in two urban areas of Latin America (Peru and the Dominican Republic). The fact that such strong socio-economic gradients are consistently found in urban areas of developing countries implies that reliance on global average statistics to allocate resources between urban and rural areas could be dangerously misleading, a point originally made in the late 1970s (Basta, 1977).

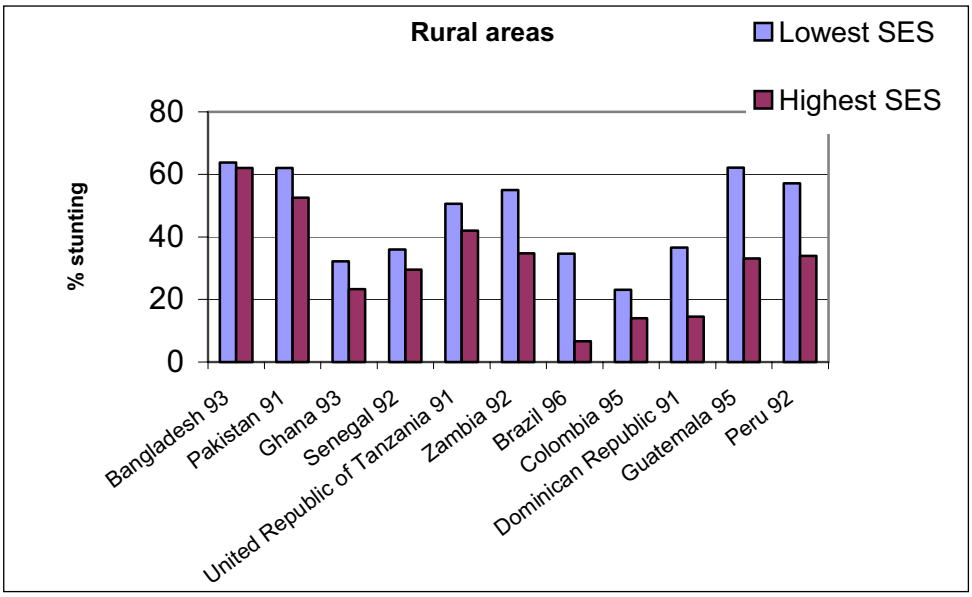
FIGURE 6
Stunting prevalence across urban and rural areas, by region



Source: Smith, Ruel and Ndiaye, 2003.

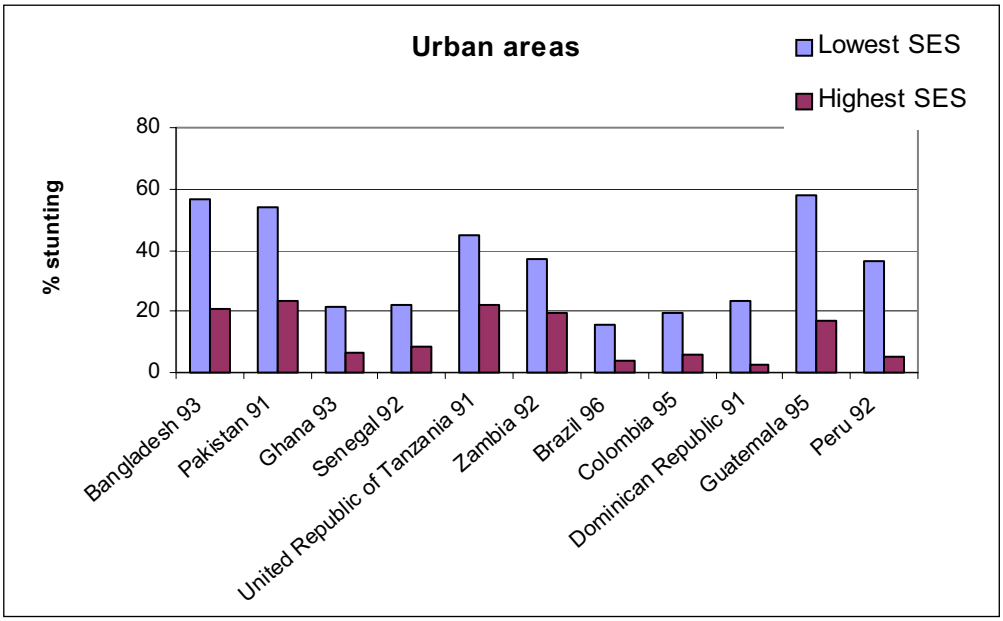
An additional concern for countries undergoing rapid economic and nutritional transitions is the rising prevalence of overweight and obesity among children. This topic, however, is addressed in this publication by Popkin and collaborators.

FIGURE 7
Prevalence of stunting by socio-economic status (SES) quintile (DHS)



Source: Menon, Ruel and Morris, 2000.

FIGURE 8
Prevalence of stunting by socio-economic status (SES) quintile (DHS)



Source: Menon, Ruel and Morris, 2000.

Why are urban children better off nutritionally, compared to rural children?

The empirical analysis described above provides irrefutable evidence that overall, urban children have a better nutritional status than their rural counterparts, and especially so with regard to linear growth (stunting). A question that arises then, especially in view of the evidence concerning the high rates of urban poverty and food insecurity, is why are urban children better off than rural children? We examined this issue, first with a nationally representative sample from Mozambique and then through a multicountry pooled analysis of DHS data sets from 36 developing countries (Garrett and Ruel, 1999a; Smith, Ruel and Ndiaye, 2003). The main question that was addressed in both studies was whether the socio-economic determinants of child nutritional status differed across urban and rural areas. The socio-economic determinants examined were maternal education and maternal status (only in the multicountry analysis); household access to services such as safe water and sanitation; and household socio-economic status.

The findings showed little evidence of differences in the nature of the socio-economic determinants or in the strength of their association with child nutritional status between urban and rural areas. Marked differences in the levels of these determinants in favour of urban areas were found, however. Urban mothers were consistently more educated (by a difference of approximately twofold) and had higher decision-making power. Maternal education is known to have profound beneficial effects on a range of child feeding, health seeking and care giving practices, and thus may be an important driver of urban/rural differences in child nutrition (Engle *et al*., 1997; Engle, Menon and Haddad, 1997; Armar-Klemesu *et al*., 2000). Urban women were also more likely to have access to electricity, water and sanitation services (Smith, Ruel and Ndiaye, 2003). Similar findings regarding the availability of electricity and sanitation services have been documented recently, using a different set of DHS data (National Research Council, 2003). The authors show that, compared to rural dwellers, the urban poor have better access to electricity and flush

toilets, but they are at a clear disadvantage when compared to other wealthier urban dwellers.

In our pooled analysis, large gaps in favour of urban areas were also found in the levels of key proximate determinants of child nutritional status in all three regions (see Table 1). This was true especially for access and use of preventive maternal and child health care (e.g. maternal prenatal and birthing care and child immunization), and the timing and quality of complementary feeding. The only exceptions were practices related to breastfeeding, which were more likely to be optimal among rural compared to urban women (i.e. exclusive for the first six months and continued for up to 24 months).

Other evidence supporting the advantage of urban children over their rural counterparts is provided by country-level analyses. The findings are consistent with the pooled analyses; they show that: i) urban children tend to have better access to health services, which in turn is reflected by higher immunization rates (Ruel *et al*., 1998); ii) urban households are also more likely to have access to water and sanitation facilities, although they may come at high cost, especially for the poor (World Resource Institute, 1996); and iii) except for breastfeeding practices, which are more likely to be optimal among rural mothers, children's diets in urban areas are generally more diverse and more likely to include nutrient-rich foods such as meat, dairy products and fresh fruit and vegetables (Ruel, 2000; Arimond and Ruel, 2002). Examples from IFPRI's analysis of 11 most recent DHS surveys show the consistently higher intake of milk and meat products by toddlers in urban compared to rural areas (Arimond and Ruel, 2004) (see Figures 9 to 10). Foods of animal origin are of critical importance in young children's diets because they provide essential micronutrients such as iron, zinc and vitamin A, which promote health, growth and motor and cognitive development.

Thus, the better nutritional status of urban children appears to be the result of the cumulative effect of a series of more favourable socio-economic conditions, which in turn seem to lead to better caring practices for children and their mothers. As cautioned previously, however, global comparisons between urban and rural areas can be misleading because they do not take into account the large heterogeneity within area.

Finally, it is also important to recognize that although urbanization seems to bring about positive improvements in young children's diets, it also brings a number of unhealthy diet changes such as increased consumption of saturated and trans fats, sugars, salt and processed foods that contain excessive amounts of these components. This, combined with more sedentary lifestyles is causing dramatic increases in the prevalence of overweight/obesity and risk factors for a number of chronic diseases such as diabetes, cardiovascular diseases and certain forms of cancer (WHO/FAO, 2003). Although these dietary changes affect mostly adults at first, they rapidly trickle down to other age groups such as schoolchildren and adolescents and eventually reach young children as well. This topic is addressed by Popkin and collaborators in this publication.

TABLE 1
Comparison of proximate determinants of child nutritional status across urban and rural areas, by region (pooled analysis of 36 DHS data sets) (Smith, Ruel and Ndiaye, 2003)

	South Asia		Sub-Saharan Africa		Latin America and the Caribbean	
Proximate determinants	**Rural**	**Urban**	**Rural**	**Urban**	**Rural**	**Urban**
Mother's nutritional status[1]						
Woman's body mass index (BMI)	19.1	20.5***	21.4	22.8***	23.6	24.3***
Percentage of women underweight	44.3	32.0***	11.6	8.8***	6.2	5.1***
Prenatal and birthing care for mother						
Percentage of women receiving any prenatal care	57.3	83.9***	75.4	93.4***	72.8	92.5***
Percentage of women with any prenatal care ≥3 visits	58.5	80.1***	78.8	87.9***	86.3	94.4***
Mean number of months before birth of first prenatal visit	4.9	5.6***	4.1	4.4***	5.7	6.4***
Percentage of women giving birth in a medical facility	22.5	60.9***	32.5	72.0***	66.7	90.6***
Child feeding practices						
Percentage of children breastfeeding within one day of birth	39.6	50.6***	68.6	73.3***	69.6	75.1***
Percentage of children 0-4 months exclusively breastfed	54.2	38.3***	20.0	17.7***	34.2	35.9***
Mean number of months of breastfeeding	14.8	12.1***	17.7	15.8***	8.6	7.2***
Percentage of children 6-12 months having received foods	42.3	54.6***	80.3	84.0***	79.7	84.6***
Mean number of times child >6 months eats per day	3.1	3.1	2.9	3.2***	4.5	5.0***
Percentage of children >6 months receiving high-quality food[2]	42.3	54.6***	80.3	84.0	69.5	80.3***
Health seeking behaviours for children						
Percentage of children with diarrhoea who are treated	82.7	91.4***	81.2	90.2***	78.8	89.2***
Percentage of children receiving any vaccinations	80.0	90.5***	74.2	90.2***	90.2	96.6***
Percentage of children receiving recommended vaccinations	38.6	56.7***	41.8	62.7***	53.1	66.9***
Quality of substitute child caretakers						
Percentage of children with adult caretaker as women work[3]	82.8	91.0***	79.2	87.7***	73.8	91.2***

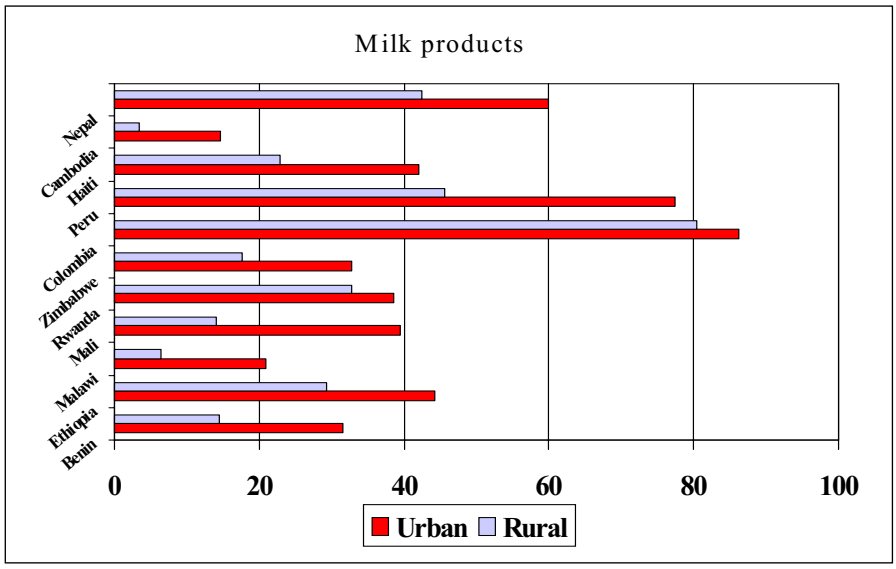
Notes: Stars indicate significant differences across rural and urban areas at the 1 percent (***), 5 percent (**) and 10 percent (*) levels.
Country level means and percentages are calculated using sample weights provided with the DHS data sets. Regional means and percentages are calculated using a population-weighted average of the country level numbers.

1 Data not available for Pakistan, Nigeria, Rwanda and Paraguay.

2 Nepal only. Data not available for Bangladesh, India, Pakistan, Burkina Faso, Côte d'Ivoire, Malawi, Namibia, Nigeria, Rwanda, Senegal, the Dominican Republic, Haiti, and Paraguay.

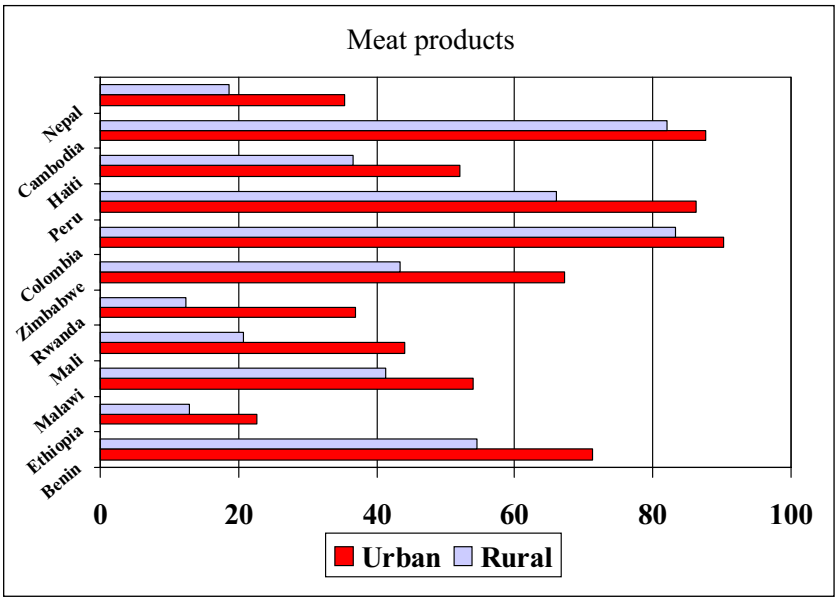
3 Data not available for the United Republic of Tanzania.

FIGURE 9
Percentage of children (12-24 months) who consumed milk products in the previous 24 hours (ongoing analysis of 11 DHS data sets)



Source: Arimond and Ruel, 2004.

FIGURE 10
Percentage of children (12-24 months) who consumed meat products in the previous 24 hours (ongoing analysis of 11 DHS)



Source: Arimond and Ruel, 2004.

FEATURES AND DETERMINANTS OF URBAN FOOD SECURITY

In this section we review key aspects of urban life that shape food security, particularly for the poor.[8] We focus on the implications of urban residents' much greater reliance, in comparison with rural dwellers, on cash income and much decreased reliance on natural resources for food and other basic needs. We also note the rising presence of supermarkets on the urban food scene and the perhaps surprising importance of the formal sector, agriculture, seasonality and links with rural areas. Finally we highlight the changing roles of women and the potential implications for child care use and care giving practices.

The urban food economy

Urban residents purchase most of their food. City dwellers in metropolitan areas as diverse as Maputo, Cairo and Lima buy more than 90 percent of their food (Table 2). Even though the figures are lower for smaller urban areas, an urban-rural division is noticeable. Even in less urbanized countries such as Mozambique or Nepal, residents of smaller and intermediary cities commonly buy 75 percent or more of their food, while rural residents purchase less than half of the food they consume.

TABLE 2
Percentage of total food consumption value that is purchased

Country	Metropolitan areas	Other urban areas	Rural areas
Egypt	98	95	85
Malawi	91	90	36
Mozambique	92	73	29
Nepal	94	78	42
Peru	92	89	58

Note: Metropolitan areas are: Egypt, Cairo, Alexandria, El Suez, Malawi, Blantyre City, Lilongwe, Mozambique, Maputo, Matola, Nepal, Kathmandu and Peru: Lima, Callao.
Source: Garrett and Ersado, unpublished.

These outlays are significant, as food expenditures are by far the largest portion of total household budgets (Table 3). Even in the largest cities, where households must also spend on housing and several other services, food is commonly close to, and sometimes even more than, half of household consumption expenditure. In secondary and intermediary cities the figure is higher – around 60 percent – but is still lower than in rural areas where food budget shares in countries such as Malawi, Mozambique and Peru reach 70 percent and higher. The poorest (the lowest expenditure tercile) allocate even more to food, and this is true across urban and rural areas (see Table 3).

Housing, which is usually the second largest budget item in urban areas, varies widely between metropolitan areas, accounting for between 6 and 28 percent of total expenditures. With the exception of Egypt, the share of the total budget spent on housing is consistently lower in rural compared to urban areas.

[8] For additional reviews see Ruel *et al.*, 1998; Ruel, Haddad and Garrett, 1999; Garrett and Ruel, 2000; Garrett and Ruel, 1999a.

TABLE 3
Food and housing expenditures as a percentage of total consumption expenditure (budget shares)

Country	Metropolitan areas	Other urban areas	Rural areas
Egypt			
Food budget share (all)	48	49	58
Lowest expenditure tercile	53	54	62
Housing budget share	6	8	8
Malawi			
Food budget share	43	53	75
Lowest expenditure tercile	53	64	78
Housing budget share	16	9	4
Mozambique			
Food budget share	59	65	70
Lowest expenditure tercile	63	67	70
Housing budget share	9	8	7
Nepal			
Food budget share	37	50	64
Lowest expenditure tercile	55	57	74
Housing budget share	28	14	7
Peru			
Food budget share	46	51	70
Housing budget share	21	16	8

Note: Metropolitan areas are: Egypt, Cairo, Alexandria, El Suez, Malawi, Blantyre City, Lilongwe, Mozambique, Maputo, Matola, Nepal, Kathmandu and Peru: Lima, Callao.
Source: Garrett and Ersado, unpublished.

Urban food prices and expenditures depend on a number of factors including: i) the efficiency of the food marketing system; ii) household purchasing patterns such as whether the family buys in bulk or in small quantities and where they purchase their food; iii) the household's ability to produce some of its own food through home garden or urban agriculture; iv) the household's access to public transfers, such as food subsidies or food aid programmes, or private transfers, such as an exchange relationship with rural or other relatives; and v) macroeconomic policies, including the availability of food subsidies.

Urban food marketing systems, especially those that serve the poor, are frequently inefficient, in terms of providing adequate quantities, good quality, or competitive prices (Aragrande and Argenti, 2001; Argenti, 2000). Wholesale markets, when they exist, frequently have not adapted to the dramatic rise in food quantities consumed by the cities that has accompanied urbanization. Most were built decades ago and now sit in central areas of cities, hemmed in by and creating congestion. Their storage facilities are often inadequate or badly managed. Traffic congestion, lack of storage (especially refrigeration for perishables) and atomization of retail outlets add to marketing costs.

More and more, however, supermarket chains are displacing traditional retailers in many countries of Africa, Asia and Latin America (Reardon *et al*., 2003), perhaps presenting a way to overcome these structural inefficiencies with new store placements and large purchasing and distribution networks. In Argentina, Brazil, Chile, Colombia, Costa Rica and Mexico, for example, supermarkets now account for 45 to 75 percent of food retailing. In the remainder of Latin America, largely lower-income and less urbanized, the share is 20 to 40 percent (Reardon and Berdegué, 2002). Supermarkets have about 50 to 60 percent of food retail sales in South Africa, and have a significant presence in Kenya. Multinational supermarket chains have expanded, at least nominally, into most other countries of southern and eastern Africa as well (Weatherspoon and Reardon, 2003).

Supermarket chains will undoubtedly grow quickly to capture more of the retail share in the future. In 1994, for example, supermarkets accounted for 15 percent of national food

retail in Guatemala and now, ten years later, account for 35 percent (Reardon and Berdegué, 2002). But even these statistics show that the traditional food retail sector, including public markets, street vendors and small shops, still dominates urban food marketing. In Africa, multinational chains do not yet extend into poor urban neighbourhoods and towns, and have a significantly reduced presence in the poorer countries (Weatherspoon and Reardon, 2003). In addition, evidence is mixed as to whether these large format "modern retail" outlets result in lower food prices (Reardon and Berdegué, 2002), especially for staples that make up the bulk of the diet of the poor.

Thus, the burgeoning of supermarkets in developing countries may not be of immediate relevance for the urban poor. Large chains are unlikely to establish a significant presence in slums or ghettoes any time soon. Even if they appear at the periphery of poor settlements, they may not be convenient for the poorest slum dwellers if they lack transport or cash to purchase in bulk. It is also not clear that the prices offered at supermarkets would be attractive enough for the poor to make them change their purchasing patterns in the short term. Supermarkets may also have a negative effect on employment, since many of the poor work as food vendors or transporters. It is likely that a purchasing pattern similar to that of some developed countries will emerge: upper- and lower-income consumers shop at chains, with lower prices and better quality, while the inner-city urban poor have limited options and continue to purchase food on a daily basis at small corner stores that may also offer credit. Although developing country producers and processors must pay attention to the new market opportunities that supermarkets present, policy-makers must continue to pay attention to improving the efficiency of traditional systems that will continue to serve the bulk of the urban poor.

Urban livelihoods

The importance of the market in urban areas means that urban dwellers, including the poor, need cash income and thus employment. Here we summarize recent findings concerning employment and income in urban areas.

The poor work in a variety of jobs, but working long hours in often precarious conditions for low wages is a constant. Jobs tend to be irregular and tenure insecure. The poor may work in clothes factories, run small shops, sell food or cigarettes in the street, scavenge in rubbish dumps, sweep streets and clean latrines, drive rickshaws, or seek day work in construction (Asian Development Bank, 1994; International Labour Organization, 1998; CARE Bangladesh, 1998; CARE Tanzania, 1998).

Many, though not all, work in the informal sector. In the 1990s, the informal sector represented 60 to 75 percent of urban employment in Guatemala, El Salvador and Honduras, but only one-third in Costa Rica (Funkhouser, 1996). It generated 60 percent of female employment in many West African cities (Meagher, 1995) and was one-third of the urban labour force in Nigeria (Simon, 1998). Once thought to be only a coping strategy or a dead end, numerous studies have now illustrated the dynamism and heterogeneity of the informal sector. Although workers tend to earn low wages, incomes of business owners in the informal sector can be 25 percent or more higher than those in the formal sector (Portes, Blitzer and Curtis, 1986).

Jobs in the informal sector are important, but formal sector jobs (government, private sector) are too. In fact, in most countries most urban residents, even poor ones, do not work in the informal sector (meaning here the self-employed). Comparing data in metropolitan areas in four countries in Latin America, Africa and Asia, Garrett (2004) found that at least as many, and often a large majority of paid urban dwellers work in the formal sector (Table 4). In Egypt and Malawi 70 percent or more of jobs paid wages or salaries.

The public sector also remains an important source of employment (Table 4). In Egypt, half of all urban residents in the major metropolitan areas of Cairo, Alexandria and El Suez, worked in the public sector, with two-thirds of working women having jobs there. According to the International Labour Organization, public sector employment still accounts for more than 20 percent of formal sector wage employment in a number of African countries, including Ghana, Nigeria and the United Republic of Tanzania (Garrett, 2004).

TABLE 4
Job sector (percentage), by country, area and gender (Living Standards Measurement Surveys [LSMS])

Country/area	Overall	By sex	
		Male	Female
Egypt			
Metropolitan areas			
Private wage/salary	34	37	27
Public wage/salary	48	44	66
Self-employed	18	20	7
Ghana			
Accra			
Private wage	27	45	14
Public wage	11	18	6
Self-employed	60	37	77
Unpaid	2	1	3
Malawi			
Metropolitan areas			
Private	44	49	29
Public	31	28	41
Self-employed	20	18	25
Other	5	5	5
Peru			
Lima			
Private	32	37	26
Public	12	9	15
Self-employed	44	48	38
Unpaid	13	6	22

Source: Garrett, 2004.

Agriculture, forestry and fishing are still important to the incomes of urban dwellers, especially outside large metropolitan areas. Even in the largest cities, many workers earn their living indirectly from agriculturally based enterprises, such as transporting, processing or selling food. Urban businesses also provide agricultural inputs such as seeds, chemicals, tools and machinery. Garrett (2004) notes that even in large metropolitan areas, 2 or 3 percent of urban dwellers earn a living from agriculture. In Lima, almost 10 percent of workers (mostly men) earn a living from farming or fishing. Outside the largest cities, the numbers jump: agriculture is the main livelihood for almost 10 percent of urban dwellers outside major metropolitan areas in Egypt and Malawi. The differences between the importance of agriculture in the metropolitan and other areas are more dramatic in Mozambique. While in Maputo, the capital city, agriculture provides 7 percent of jobs (still not negligible), agriculture is the main occupation for *63 percent* of urban residents outside Maputo – and the main occupation for about 85 percent of women (Massingarela and Garrett, 2002). Finally, in Dar es Salaam, 90 percent of all green leafy vegetables consumed are grown inside the city limits.

Women (see below) and children are also engaged in income-generating activities in urban areas. Ersado (2003) found that 10 percent of urban children in Nepal, but only 2 percent in urban Peru, and 3 percent in urban Zimbabwe, work exclusively (that is, they do not also go to school). The study suggests, however, that although working can have a negative impact on learning and may expose children to exploitive and dangerous labour practices, working does not always come at the expense of school. Five percent of children in urban Nepal and 9 percent in urban Peru both go to school and work.

A final, largely underestimated characteristic of urban life is the threat that seasonal changes pose to the livelihoods of the urban poor. The changes are often related to rains, but not necessarily to agriculture. Threats to health arise when rains cause sewers to overflow and spread disease. Rains can bring the activities of causal labourers, such as rickshaw drivers, construction workers and street vendors, to a halt. CARE Bangladesh (1998) reports that incomes decrease among casual labourers such as rickshaw drivers and construction workers in Dhaka in the rainy season, primarily because they work outdoors and may suffer from increased likelihood of illness or reduced clientele (CARE Bangladesh, 1998). An additional factor is the increased migration of rural dwellers to cities when rains take them out of a job at home, which results in increased competition for already scarce jobs in urban areas. The rainy season may also complicate transport of food from rural to urban areas, resulting in increases in food prices, which exacerbate the effects of declines in income.

Women's changing roles, food security and child care in urban areas

With current worldwide globalization trends, employment opportunities for women have been increasing – more jobs, more variety in job types and more diverse work environments are available (Johnson-Welch *et al*., 2000). It is estimated that about 50 percent of women are currently part of the formal labour force; and women constitute up to 75 percent of the informal and semiformal sectors (Mehra and Gammage, 1999 in Johnson-Welch *et al*., 2000). Unfortunately, information on the urban/rural breakdown for these numbers is not available, to our knowledge.

Even with their new employment opportunities and their increasing contribution to the labour force, women continue to face the same issues they have always faced in the labour market; they are still over-represented in less secure and irregular jobs, often getting paid less than men even for the same job (de Haan, 2000), and they often work as unpaid family labour. Also, the recently documented trend of a narrowing in the wage gap between men and women, which could suggest improvements in employment conditions for women, actually reflects a drop in men's wages, rather than an increase in those of women (UN Research Institute for Social Development [UNRISD]), 2000 in Johnson-Welch *et al*., 2000).

Furthermore, although women's participation in the labour force has grown much faster than men's in recent decades, still proportionally far fewer women work than men (de Haan, 2000). Generally, women have less access to capital, unpaid family labour and markets, social and formal networks (Ypeij, 2000; Marcucci, 2001). They also increase the resilience of the household in its ability to respond to shocks, frequently carrying the burden of having to work and devise innovative coping strategies for the household (de Haan, 2000). Pradhan and van Soest (1997) found that in Bolivia lower earnings by the husband led to more hours of work by the wife.

In some cases, religious or cultural restrictions may restrict mobility or the kinds of jobs women can have (Simon, 1998; Sutter and Perine, 1998). Other less obvious institutional discrimination also restricts women's choices. In Bangladesh, the lack of housing or

hostels for single women limits their mobility and may influence rural women's decisions to migrate to the city for work. Half of the women working in the clothes factories live less than 1 km away, whereas only 20 percent of the men live so close (Asfar, 1997). Similarly, lack of good-quality child care may restrict women's choices, forcing them to do informal work at home or not work at all (see following section on women's employment and child care).

Women working outside the home challenge traditional conceptions of women's roles held by men and the women themselves. Zhang (1999) describes a process of empowerment in China as women workers, many of whom who came to the city from rural areas, discovered new freedom. They spent their wages on their own personal items and hobbies. Their circle of social contacts widened.

Women's employment and child care use

With increased employment opportunities, however, the trade-offs women face between their role as income earners and their child care and family responsibilities become even more acute. Women are largely involved in informal jobs that are not subject to labour laws and do not offer social or medical benefits. For those in the semiformal or formal sector, they often risk losing their job when they have to skip work to attend to a sick family member, and maternity benefits are largely unavailable or minimal.

The question as to whether women's employment outside the home translates into net benefits for their children and their household remains contentious. Evidence suggests that although the overall impact of maternal employment on child health and nutrition is linked to the amount of income generated (and of control over resources), other factors such as the type and conditions of work, the availability and quality of child care alternatives and the child's age are more important (Engle, Menon and Haddad, 1997).

High-quality alternative child care is obviously key to tempering the potentially negative impact of women's labour force participation on children's well-being. Little information exists, however, on the supply and use of different child care arrangements in urban areas of the developing world and on the availability of informal alternatives such as older siblings, other relatives or neighbours.

Our analysis of 11 Demographic and Health Surveys (DHS) data sets[9] from the early 1990s (Ruel, Haddad and Garrett, 1999) provides some, albeit slightly outdated, information on this issue. In this set of countries, a smaller percentage of employed urban mothers compared to rural mothers took their child to work with them, probably because they tended to work in the streets, in markets or in factories rather than in agriculture as most rural women do. In Latin America, a greater percentage of urban than rural mothers used relatives as alternative child care givers, but no consistent pattern was found in Asia and Africa. Hired help and institutional care were consistently higher in urban areas in all three regions, although institutional care use was almost non-existent in Asia and very uncommon in three of the four African countries studied. It is likely that such low reported use of institutional care is related to the lack of availability of these services in the countries studied.

A recent IFPRI comparative study of Accra (Ghana) and Guatemala City (Guatemala) indicates that in both sites, women's employment and child care choices are highly influenced by the age of their youngest child (Quisumbing, Hallman and Ruel, 2003).

[9] This analysis included two data sets from Asia (Bangladesh, 1993; Pakistan, 1991); four countries from Africa (Ghana, 1993; United Republic of Tanzania, 1991-92; Senegal, 1992-93; Zambia, 1992); and five countries from Latin America (Brazil, 1996; the Dominican Republic, 1991; Peru, 1992; Colombia, 1995; and Guatemala, 1995).

Mothers with children under three years of age are less likely to be working and, if they do work, they are less likely to use formal child care compared to mothers with older children. In Guatemala City, another important determinant of women's decision to work is the presence of an adult woman (a potential alternative child care giver) in the household. In Ghana, where most urban women work in the informal sector, those who have to resume work for economic reasons when their infant is still young usually take the infant along to their workplace. Depending on the work environment, this may or may not be positive for the child, but at least it is likely to help preserve breastfeeding, which should confer important nutritional benefits to the child.

These findings confirm that women do adapt their work patterns to their specific family circumstances and that the well-being of their children is the overriding force behind their decisions to work and to use child care alternatives. These "adaptive strategies" by which mothers stop working, or work fewer hours, or even take their infant to work if they have to work, may be successful in protecting their infant. They may, however, seriously jeopardize the mothers' ability to generate income and to protect their household's livelihood and food security, especially if they are the sole income earner. Effective programmes and policies are urgently needed in developing countries to support working women, especially women with young children who have limited or no access to extended family networks or other affordable, yet reliable substitute child care options.

Women's employment and care giving practices

Evidence on the effect of women's employment on care giving practices such as breastfeeding, complementary feeding, preventive and curative health seeking behaviour, and psychosocial care is mixed (Engle, Menon and Haddad, 1997). But overall, there is little evidence that maternal labour supply has a negative effect on these practices or on children's health and nutritional status (Blau, Guilkey and Popkin, 1997; Glick and Sahn, 1988). For example, studies have shown that, contrary to general belief, maternal employment was not a main determinant of breastmilk substitute use in developing countries (Hight-Laukaran *et al*., 1996) nor was it systematically related to shorter breastfeeding duration (Winikoff, Castle and Hight-Laukaran, 1988).

Our study in Accra documented that child feeding, hygiene or health seeking behaviours were not affected by maternal employment (Amar-Klemesu *et al*., 2000). In this context, the key factor that was consistently associated with better care giving practices was higher maternal schooling, which in Accra is not related to whether or not mothers work. In this large urban centre, the majority of women do work, irrespective of their educational level, and they work mostly in the informal sector in petty trade, street food processing and vending. As noted above, mothers of young infants in Accra are more likely to take their young infant along when they have to resume work soon after delivery, than leave the child with an alternate care giver. This is probably the main reason why maternal employment has not resulted in poorer child care practices.

Additional, indirect evidence that women's employment in urban areas may not necessarily have a negative impact on child care practices again comes from global urban/rural comparisons. We showed previously that, with the exception of breastfeeding, child feeding practices are substantially better in urban compared to rural areas, in spite of the fact that a larger proportion of women in most developing countries are engaged in income-generating activities, often away from home (see section on why urban children are better off nutritionally than rural children, p. 38).

Overall, mothers appear to be amazingly efficient at combining their income-generating activities and their child care responsibilities, and at buffering the potentially negative

impacts of their employment patterns on their children's well-being. But at what cost – for themselves and for their household food and livelihood security? This question remains largely unanswered because whether the food security situation of poor working women is alleviated or aggravated by their participation in the labour force largely depends on their specific set of resources and constraints.

LESSONS LEARNED AND IMPLICATIONS FOR URBAN PROGRAMMING

What have we learned from this research and what are the implications for urban programming? This section summarizes our key findings with a focus on their implications for the design and implementation of effective urban programmes. We also draw from our collaborative work with CARE International on urban livelihoods in Bangladesh, Ethiopia and Peru (Garrett, 2002) and from our experience with the government-sponsored Community Daycare Program in Guatemala (Ruel *et al*., 2002)[10] and suggest some approaches to addressing the challenges and opportunities of urban programming.

Lessons learned and challenges and opportunities for urban programming

Here we provide a brief overview of some of the challenges and opportunities of urban programming, based on the results of our research and our experience collaborating with CARE in the implementation of the programmes noted above.

Heterogeneity and mobility: where are the poor, food insecure and malnourished?

Urban areas are immensely diverse and our findings confirm the wide disparities that exist in childhood malnutrition and food insecurity within an area. This heterogeneity may add complexity to the design, targeting and implementation of programmes, as social mores and networks, conditions, cultural practices and livelihood strategies change from household to household and neighbourhood to neighbourhood. The fact that the poor and the rich live side by side also complicates programme targeting. Community targeting, a popular and generally effective programme targeting approach in rural areas, may not be effective in urban areas where the poor do not necessarily cluster geographically (Morris *et al*., 2002).

Livelihood strategies are also equally diverse and programme strategies must take this heterogeneity into account. Programmes to raise employment and income, for instance, will probably be more effective if they focus on providing the context for growth (training to increase worker productivity; policies to provide firms with credit and encourage them to identify and respond to market demand; and good communications and transportation networks), rather than pursuing a sector focus, such as might be done in rural areas.

Mobility of urban residents can also add complexity to programme targeting and reduce programme impact. Evictions can erase gains due to projects, and projects may completely miss those who are most vulnerable if they are the most mobile (the homeless, for instance). But the general perception that urban residents are so mobile that projects cannot provide them with any beneficial effects seems misguided. A large proportion of the urban poor in our case study countries, for example, were not recent migrants; they were residents who sought stability and an inviting environment to establish their roots. In Peru, many of the residents interviewed in the CARE programme areas had been in the area for

[10] These programmes all aim to reduce urban food and nutrition insecurity, although they differ in their specific approach, components and operational aspects. They all involve some type of food aid, whether monetized or used directly as food.

15 to 20 years and had since been fighting for land and for later improvements, such as in water and sanitation. In Bangladesh, about 80 percent of residents in the two areas studied (one a suburb of Dhaka, the other, a good-size city) had been in the area for more than five years. In Ethiopia, with government ownership of land, there was very little movement in or out of the communities. In addition, the extent to which mobility matters depends mostly on the specific nature of the project. Infrastructure projects and community kitchens, for example, meet the needs of the community, regardless of how mobile the population is.

What can programmes do to reduce childhood malnutrition in urban areas?

Our data confirm that, although on average childhood malnutrition is lower in urban compared to rural areas, the rates of malnutrition among poor urban children often rival those of their rural counterparts. Moreover, we demonstrated that the factors responsible for poor child nutritional outcomes are the same in urban and rural areas. Thus, the same programme framework and sets of interventions developed for rural areas can be used to address childhood malnutrition in urban areas. As indicated above, however, it is likely that programme targeting will have to be done differently, i.e. either at the individual level or at the group level, but probably not at the community (geographic) level. Poor urban children deserve as much attention in the development agenda as rural children, because their health and development are equally key to national human capital formation and growth. Advocacy efforts should continue to highlight inequalities in urban areas and the heavy toll that poverty and food insecurity exert on urban children, so that resources can be mobilized to address the needs of this highly vulnerable group.

Urban livelihoods: employment and income, and women's work and child care

Livelihood security in urban areas depends on a complex set of interrelated factors, of which employment and income are crucial. Our empirical data also confirm that most food consumed by urban dwellers is purchased and that food expenditures account for more than half of the urban household budget. Thus, programmes aiming at reducing the cost of food for the urban poor – such as food aid, food subsidies, urban agriculture, technology and food policies to reduce the cost of food – are likely to be particularly important for urban livelihoods. Similarly, employment is essential because urban dwellers need money for most of their basic needs. For women, however, employment brings about yet another basic need to be fulfilled, i.e. the need for support with child care.

Our empirical data concerning women, employment and child care point to an apparently widespread and effective system of *maternal buffering*, by which mothers adapt their working patterns to the special needs of their children. Mothers use a variety of mechanisms to protect their child while they work: they work part-time; they take their child along; they work at home; or they work in the informal sector to have more flexible schedules. But at what cost do these coping strategies have for them (in terms of stress, time, famine, physical and mental health, and household food security) and for their young child (in terms of safety of the environment, and time and quality of care received)? Clearly, more research in this area is needed, but there is no doubt that urban mothers, and especially single income earners, need support with child care responsibilities. An example of a successful programme that specifically addresses the needs of urban working mothers is the government-sponsored Community Daycare Program in Guatemala (see Box on p. 55 for details). This type of programme, which is highly popular in Latin America, has the double advantage of providing affordable and reliable child care for extended hours, and allowing women to secure a more formal employment and receive employment benefits.

Land and housing security

Land and housing security are critical to project success. Infrastructure improvements, for example, may lead to increases in rent, thereby forcing the programme's beneficiaries to move to cheaper housing. Tenure security is also critical for a variety of social programmes. For example, in the context of the community kitchen programme in Peru, local authorities have on occasion tried to take over the kitchen, claiming it was a government organization that belonged to them. But by owning their own space and officially incorporating the kitchen as a community organization, the women used the legal system to defend ownership of the kitchen against these encroachments.

Tenure security is also important for employment and livelihood. Field (2003) shows that introduction of title reform in eight cities in Peru increased the numbers of hours worked by households by 17 percent on average, as a result of families no longer having to leave a member safeguarding the homestead for fear of eviction.

Crime and violence

Slums are often perceived, sometimes fairly, as centres of crime and violence. Violent crimes take away lives and livelihoods, undermine social unity and threaten project staff. In Lima, communities had to deal with local youth gangs and terrorism in the shape of Sendero Luminoso. In Guatemala City, the Community Daycare Program was unable to open day care centres in some areas because of security issues. Crime, however, is not rampant in all urban areas. In Bangladesh, outside the major metropolitan areas, violent crime appears to be rare, with petty crimes such as theft being somewhat more common. Crime in many areas tends to illegal smuggling (alcohol, for example) and prostitution. In study sites in Bangladesh domestic violence is prevalent and practically accepted by the women themselves as a legitimate way for men to express their frustrations. In developing and operating projects, working with community residents, who live with the community's crime and violence every day, can help to outline a strategy to confront crime and reduce risks to beneficiaries and project staff.

Poor social networks and lack of cohesion

All these factors (diversity, tenure insecurity, mobility and crime), may weaken community cohesion and social networks. Programmes that depend on community interest or peer pressure, such as credit groups, may fail. Projects may also suffer, if residents have limited knowledge of other members of their community.

Although it is true that some aspects of urban living encourage "independence", others, such as relatively high education levels and relative ease of communication, may actually encourage group action. Urban protests against structural adjustment policies are solid evidence that urban residents can form effective groups quickly. In cities, social relations extend beyond the geographic bounds of the community. They are founded in ethnicity and kinship as well as politics, social issues, culture, religion, sports and employment. Illegal activities also form common connections among slum dwellers. Urban dwellers do have social networks. They may be different, but they are not necessarily weaker than those in rural areas.

Urban dwellers also usually have at least some experience in working together. In Peru, the women who ran the community kitchens had decades earlier joined together to invade the land and demand public services such as water and electricity. Funeral societies are common in Addis Ababa. Projects can take advantage of the structure, or at least the experiences, that these organizations provide.

Finally, just as projects depend on community cohesion to work, they may also be important means to strengthen community ties. As with mobility, the importance of that cohesion may vary with the project. Social unity may make little difference to individually targeted programmes, for instance, but may matter a great deal to community-based maintenance of infrastructure.

Projects and politics

The nature of urban living – the crowded conditions, scarcity of natural resources and investments required for public services – practically requires government intervention. In urban areas, government authorities tend to play larger roles in daily life than in rural areas. In cities, informing local authorities and organizations about project activities is vital. Actively involving them can also be beneficial, and can help leverage resources they may have. Projects should not overlook informal authorities, including crime lords and community and religious leaders, who often exert substantial influence on community activities.

For the most part, CARE's programmes in the case study countries dealt effectively with potentially troublesome local political relations. They kept government authorities at all levels involved and informed, even taking them on as partners. Maintaining good relations with local stakeholders and educating politicians and bureaucrats about the project can counter upheaval at the top. Legal agreements clearly outlined institutional roles, responsibilities and commitments.

The project's design and management should also be flexible enough to accommodate change. Project managers should assess how potential economic and political changes can affect the project, and incorporate an ability to respond into project management. Staff should be aware of continuously evolving economic, political and social conditions, and adjust the project as necessary. Changes by donors in funding priorities proved to be the biggest challenge to the operation and sustainability of projects reviewed, not local political changes.

Responses to programmatic challenges[11]

The final part of this paper presents a series of insights from our collaborative work with CARE into potential strategic responses to challenges in urban programming. It tries to illustrate that while urban livelihoods are complex, the complexities are manageable when actions follow some general principles. These principles also permit adaptation of the programme to respond to the challenges noted above.

Adapt to challenges by appropriately identifying needs, constraints, resources and levers

Programmes should enter communities cautiously. An institutional analysis can explore the influence of different community organizations, non-governmental organizations (NGOs) and political actors and the resources – human, financial and physical – available. This allows a programme to navigate more easily tricky political relations, focus on strategic interventions, facilitate processes and mobilize community and household human and financial resources. Use of a holistic analytical framework, such as a livelihoods approach that emphasizes connections among livelihood security areas, will help programmers get out of sectoral boxes in framing problems and devising solutions.

[11] Additional information on CARE's programmes can be found on IFPRI's Web site (www.ifpri.org).

Reduce complexity by focusing on a limited set of objectives, activities and location, and exploit comparative advantages

Urban "complexity" stays manageable when programmes refrain from attempting to address all problems of poor communities and instead try to unravel the complexity by focusing on a strategically chosen strand. Organizations must identify their own strategic niche and adapt to local conditions and the leverage resources it has. In Ethiopia, for instance, CARE understood that its comparative advantage was in building and maintaining roads, while other organizations such as World Vision were more experienced in building houses. In partnership, World Vision and CARE could bring both better housing and roads to these communities, instead of working against one another.

Manage diversity complexity by starting small, scaling up, learning and being flexible

Even if programmes understand the local environment and have an initially limited focus, conditions change and programmes must develop over time. Successful programmes, then, will start small and scale up as they learn-by-doing. Management processes, however, must exist to support such an approach, which involves institutional learning and flexibility to respond to new situations as they arise. Sustainable programmes will also welcome input, support and collaboration from beneficiaries and other stakeholders, and build capacity. CARE utilized these principles in Peru. Staff and beneficiaries learned together. The programme started by using the skills that the women already had (for example, how to cook) and built capacity in other aspects over time (such as staffing and inventory management).

Confront issues of sustainability and political uncertainty by involving and empowering stakeholders, tending to facilitation, not implementation

Experience now demonstrates that empowerment of local partners and of beneficiaries improves the probability of success and sustainability of programmes. Communities and local institutions should implement projects, with outsiders serving primarily as change agents and initial sources of expertise and financial resources. Beneficiaries in Ethiopia and Peru emphasized that they valued the fact that project staff respected them and believed in their capacities, even though they were poor. They also highlighted the importance of establishing well-known, fair rules that were enforced, and not favouring one individual or another because of greater wealth or political connections.

Ensure that donors and organizations help to create the economic, political and legal environment and project monitoring systems that promote such facilitation and sustainability[12]

Developing community capacity to manage programmes and access outside resources takes time, as does helping authorities recognize their own responsibilities to vulnerable populations and to the democratic process. Creating conditions for others to implement a project usually takes longer than if the organization simply implemented a project itself, but this latter approach does not create capacity or enhance the prospects for long-term sustainability.

Innovative financial arrangements should bring funding agencies closer to communities. Generally, donor aid goes through or must be approved by a national government, providing an obstacle to true decentralization and the building of design and management capacity at the local level. Project development guidelines and monitoring and evaluation

[12] See the special issue of *Environment & Urbanization* (Brief 3, April 2001) on Rethinking aid to urban poverty reduction: lessons for donors.

tools, such as logical frameworks, generally reflect an assumption that the recipient of the funds will implement, not facilitate, the project. Donors must change this approach to promote facilitation. They should pay greater attention to time frames needed for capacity building, employ phased indicators appropriate to the time frame, identify new indicators of process, facilitation and capacity building, and incorporate flexibility in the design of the project.

The Community Daycare Program in Guatemala: an example of an effective urban programme to assist working mothers and their children

The Community Daycare Program in Guatemala was designed to assist working parents, single mothers in particular, with low-cost, quality child care within their community. In this programme a group of parents select a woman from the neighbourhood and designate her as the care provider. She then provides care, hygiene and food for up to ten children in her own home in return for a small stipend provided jointly by the parents and the programme administration. The programme also provides cash to purchase food for beneficiary children, which is complemented by monthly food donations from the World Food Programme (WFP). These are usually 44 lb (approximately 20 kg) of maize, 1 gallon (approximately 4.5 litres) of cooking oil, and 13 lb (approximately 6 kg) of black beans – or six cans of fish).

IFPRI's evaluation of the programme in Guatemala City found that overall it was operating quite effectively, in spite of a few operational constraints. These included the lack of participation of the beneficiary parents (related to their heavy work and commuting schedule), and the extra demands on the care providers to go to receive their monthly payments and the food donations. The programme, however, proved to be an effective food aid targeting mechanism because it allowed poor working parents and their children to participate in spite of their busy schedule. The programme was also found to have a substantial positive impact on the diet of beneficiary children who consumed on average 20 percent more energy, protein and iron, and 50 percent more vitamin A than non-participants. There was no evidence of substitution at home and therefore the net benefits on the quality of the diet of participating children are substantial.

The programme also seemed to reach its targeted beneficiaries, i.e. poor urban working parents, and especially single mothers. Beneficiary mothers were slightly less educated, had fewer assets, lived in more precarious conditions, and were more likely to be single, compared to non-beneficiary working mothers from the same neighbourhoods. Probably as a result of their participation in the programme, beneficiary mothers were more likely to be employed in the formal sector and to receive work-related social and medical benefits. Their income was 30 percent higher than the income of working mothers who used other child care alternatives.

The Community Daycare Program is a feasible and efficient mechanism to target and deliver food assistance to poor urban children. It is clearly a type of programme with great potential and, if implemented successfully as it is in Guatemala City, can have a significant nutritional impact on children and on their family's food security. Moreover, the programme does effectively support working parents' efforts to seek and secure paid employment away from home, which in urban areas is essential to livelihood security. Its success in reaching single women also contributes to reinforcing these women's efficiency in managing their dual role as income generators and child care givers. Thus, the model of the Guatemala Community Daycare Program is particularly well suited for an urban environment because it addresses the unique characteristics of urban livelihoods.

A constraint often overlooked in urban programming is the inability of working parents to participate in programmes that require attendance or regular contacts with programme staff during the daytime when they are at work. Typical food assistance programmes that operate through maternal and child health programmes, for example, are likely systematically to exclude the working poor and even more important, single mothers. Urban programming needs to pay more attention to the particular needs of poor working women and design innovative approaches that will help them complement their basic livelihood strategies, rather than interfere with them.[13]

[13] Additional information on IFPRI's evaluation of the Community Daycare (*Hogares Comunitarios*) Program can be found in Ruel *et al*., 2002; Ruel, 2001a; and on IFPRI's Web site (www.ifpri.org).

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Annex

Urban/rural differences in food insecurity in sub-Saharan Africa

Country	Survey year	% living in urban areas	Percentage of population that is energy deficient[1]			Number of people that are energy deficient			% energy deficient people contributed by urban areas
			National	Rural	Urban	National	Rural	Urban	
Burundi	1998	8	74.8	76.6	41.4	4 898 046	4 594 577	227 720	4.65
Ethiopia	1999	17	81.5	80.1	90.4	51 167 330	41 658 895	9 739 145	19.03
Ghana	1998	37	51.6	50.8	53.1	9 519 875	5 867 047	3 663 935	38.49
Guinea	1994	28	45.1	40.6	54.3	2 897 639	1 865 090	994 288	34.31
Kenya	1997	30	43.8	46.3	30.1	12 282 834	9 036 801	2 566 047	20.89
Malawi	1997	14	73.3	72.9	76.3	7 084 394	6 041 012	1 051 581	14.84
Mozambique	1996	35	60.4	63.0	50.7	9 802 920	6 638 005	2 886 596	29.44
United Rebuplic of Tanzania	2000	28	43.9	41.8	52.7	14 792 544	10 169 318	4 936 666	33.37
Uganda	1999	14	39.6	39.3	41.6	8 561 520	7 319 023	1 246 557	14.55
Zambia	1996	43	72.6	73.0	71.9	6 689 654	3 813 932	2 868 691	42.88

[1] In this study, household energy availability was computed using consumption/expenditure data from nationally representative data sets. Total household energy availability was calculated as the sum of energy available from foods acquired for consumption in and out of the home (see Smith and Aduayom, 2003 for additional information on the methodology used). A household was considered energy deficient if its total household energy availability was lower than its total energy requirements (calculated using WHO 1985 recommended intakes (60); and using energy requirements specific to each household member, based on his/her age and gender distribution, and using a "light" activity level). The percentage of people who are food energy deficient is then calculated as the percentage of sample individuals who live in food energy deficient households, with appropriate corrections for survey sampling designs.

Source: Smith and Aduayom, 2003.

Globalization, urbanization and nutritional change in the developing world

Michelle A. Mendez and Barry M. Popkin[1]

INTRODUCTION

Over the past 15 years, there has been increasing evidence that the structure of dietary intakes and the prevalence of obesity around the developing world have been changing at an increasingly rapid pace (Popkin, 2002b). While there is some evidence to link urbanization with these changes, less is understood about the role of globalization. Urbanization is accompanied by shifts in a broad array of elements such as access to mass media, modern technologies related to work and leisure and transportation, and enhanced access to a variety of foods across all seasons of the year. Many of these changes may be attributable as well to the increased flow of goods, services and information associated with globalization. Increased globalization may bring shifts in occupational structures as industries develop and expand in response to world markets; greater access to international mass media programming; and enhanced access to non-traditional foods as a result of changing prices and production practices as well as trade. Because of the multiple shared paths through which urbanization and globalization may influence food availability and choices in developing countries, it is difficult to unravel the effects of the two sets of forces on diet and health.

The clustering of populations in urban centres affects dietary patterns by changing the way that people interact with their environments, as well as by changing the environments themselves in ways that transform food production and distribution systems. For example, urban living is associated with occupational patterns less compatible with home food production and consumption, and often with limited land availability for cultivation. Urbanization brings infrastructure and resources such as improved transportation and refrigeration systems. Today, in developing countries undergoing rapid urbanization combined with globalization, the process includes changes in the sociocultural environment such as mass media marketing and the widespread availability of less traditional foods, which play an important role in influencing tastes and preferences (Chopra, Galbraith and Darnton-Hill, 2002; Lang, 1999; Evans *et al.*, 2001). Growing foreign investment has contributed to the rise of fast food restaurants and western-style supermarkets, which may also influence consumer food choices by offering greater variety, quality, convenience and competitive prices in high-value added foods, in addition to

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perceived higher social desirability (Regmi and Gehlar, 2001; Reardon, Timmer and Berdegue, 2003). These changes in the food environment are occurring at a rapid pace. As developing countries become more urbanized, the changes are expanding beyond large urban centres and into smaller cities and towns, mirroring the pattern that occurred over time in industrialized countries. For example, in China, western-style supermarkets are now found in smaller cities and towns along the eastern coast and in the interior (Reardon, Timmer and Berdegue, 2003).

Several studies in developing countries have shown in the past that, compared with rural diets, urban diets tended to include higher levels of milled and polished grains (e.g. rice or wheat, rather than corn or millet), foods higher in fat (more animal products), sugar, food prepared away from the home, and processed foods (Popkin and Bisgrove, 1988). Over time, migrants to urban areas tend to adopt urban dietary patterns, although the timing of such changes has not been studied (Popkin and Bisgrove, 1988). However, as infrastructure and resources typical of urban areas become more widespread, the extent to which "urban" dietary patterns are being adopted in rural towns is not known. Residents of many rural areas are likely to be increasingly exposed to environmental factors that affect food choices, particularly in highly urbanized countries. To understand fully the nutritional effects of urbanization and globalization, it may become increasingly important to examine trends in diet and overweight in evolving rural environments as well as in urban communities. Multidimensional measures that more directly capture heterogeneity and change in levels of "urbanicity" may provide insights into the effects of urbanized ecologies on diet beyond those that can be gained using prevailing measures such as static urban-rural designations or population size and density (Mendez *et al*., 2003).

Little is known about how urbanization and globalization are affecting dietary patterns in lower-income groups (Drewnowski and Popkin, 1997; Popkin, 2002a). These forces may have positive effects on the poor by increasing incomes and reducing the prevalence of inadequate energy intakes and undernutrition (Sachs and Warner, 1995; Dollar, 2001). However, these effects may not be universal: several studies suggest that the benefits of globalization have been unequal, and that in some countries globalization has had little impact on poverty alleviation (Cook and Kirkpatrick, 1997; Cornia, 2001). Furthermore, along with reduced undernutrition, rising obesity has been observed in low-income groups in some developing countries (Monteiro, Wolney and Popkin, 2002; Monteiro *et al*., 2003). This suggests that the poor are increasingly adopting obesogenic diet and activity patterns, but there are few data about the nature of changing dietary behaviour, or the extent to which behavioural changes may be attributable to living in urban or urbanizing environments. Understanding the health and nutrition effects of urban environments on the poor is increasingly important, as the process of urbanization in many developing countries has included a massive shift of less advantaged groups to urban areas. In fact, in some countries, as urban populations surpass rural ones, the number of persons defined as living in poverty is greater in urban compared to rural areas (Haddad, Ruel and Garrett, 1999). In this paper, we examine the types of shifts in food availability, dietary intake patterns and obesity that have taken place in developing countries during a period of rapid globalization and urbanization.

Between 1960 and 2000 the proportion of the developing country population living in urban areas doubled, from 21.6 to 40.4 percent (United Nations Population Division, 2002). Recent changes have been particularly rapid in China, where the urban population increased by 39.8 percent between 1980 and 1990 (from 19.6 to 27.4 percent) and by another 20.7 percent from 1990 to 2000 (reaching 35.8 percent). In the Middle East, Latin America and Oceania, the pace of urbanization is slower, but 65-75 percent of the population in these regions resided in urban areas by the year 2000. These population shifts

have been accompanied by accelerated globalization, as illustrated by factors such as large increases in foreign direct investment (from US$24 billion to $170 billion in 1990-98), and a doubling of merchandise exports and imports in the past two decades (World Bank, 2001).

The first part of this paper presents shifts in the availability of key food groups during this period of rapid change. We present information on regional shifts in edible oils, animal source foods (ASFs), fresh fruit and vegetables, and added sugars. Using case study data from China, we examine changes in food group intakes in greater detail, assessing the extent to which potentially obesogenic dietary patterns are emerging in rural as well as in urban areas. To illustrate better the effects of urbanizing environments, we present data on dietary patterns in urban and rural areas that differ in terms of infrastructure and resources. This case study also explores how food group consumption patterns have changed in low- and high-income groups in urban and rural settings. Finally, we assess some implications of these global dietary shifts by describing levels of under- and overweight in women living in urban and rural areas of developing countries. We describe how the prevalence of each type of malnutrition varies across countries at different levels of urbanization, as well as how prevalence in low versus high socio-economic status (SES) groups varies with urbanization. Aspects of urbanization and globalization that influence physical activity in addition to diet play a major role in the ongoing transition from underweight to overnutrition, but are not the focus of this paper.

DATA AND METHODS

Global shifts in food available for consumption, 1961-2000

Changes in global food availability were calculated using food balance sheet data and population estimates for developing countries between 1961 and 2000. These data were obtained from the Food and Agriculture Organization of the United Nations (FAO, 2001) (apps.fao.org). For each year, 1961, 1970, 1980, 1990 and 2000, the mean food availability per capita was calculated for each region. This was based on 118 countries of the developing world: 44 in sub-Saharan Africa, 15 in the Middle East, 34 in Latin America and the Caribbean and 25 in the Far East (including China). The added sugar category includes sugars and sweeteners; fruit excludes wine; vegetables exclude potatoes; edible oils are vegetable oils; dairy includes milk, yoghurt and cheese; meat includes bovine, sheep, pig, goat, poultry and other (but excludes animal source fats such as lard); fish includes fish and seafood. Animal source foods combine eggs, meat and poultry, fish and dairy products, but exclude animal source fats such as lard.

The China case study

The case study uses data from the China Health and Nutrition Survey (CHNS) from 1991 to 1997. The CHNS was conducted in eight provinces across China. Multistage cluster sampling was used to select communities from areas that differ substantially with respect to economic and health status, as well as geography. Details on the sample and data collection methods have been published elsewhere (Entwisle *et al.*, 1995; Guo *et al.*, 1999), and are available online (www.cpc.unc.edu/projects/china/). Individual-level dietary intake data, collected using three consecutive 24-hour recalls, are used to estimate consumption trends in key food groups among Chinese adults aged 20 to 45 years. Added caloric sweetener data are not available as they are not found in the food composition table for China. Anthropometric data collected by trained interviewers were used to calculate body mass index (BMI) (weight in kg/height in m^2), with which participants were categorized as overweight or obese (BMI $\geq$ 25.0) or as underweight (BMI $\leq$ 18.5). Income was estimated based on earnings from market and non-market activities as well as

subsidies. Urbanicity was characterized using the China urbanization index, a multidimensional index of infrastructure and resources in ten categories: population size, population density, access to markets, transportation, communications/media, economic factors, environment/sanitation, health, education, and housing quality (Mendez *et al.*, 2003). The index was developed using data from community surveys, supplemented with household level information.

Nutritional status changes

To analyse changes in under- and overweight, we used national data sets from surveys conducted between 1992 and 2000 in 36 developing countries: 20 in sub-Saharan Africa, eight in Latin America and the Caribbean (including Brazil and Mexico), five in Asia (including China and India), and three in North Africa and the Middle East. Many demographic health survey (DHS) data sets are not used because of a lack of appropriate maternal anthropometry data. The China and Mexico data sets are from national health and nutrition surveys conducted by these countries in 1997 and 1999, respectively (see for references on these two survey systems: Rivera *et al.*, 2002; Popkin *et al.*, 1993). All other national data sets correspond to standardized USAID/Macro DHSs conducted between 1992 and 2000 (Boerma and Sommerfelt, 1993). We used only the most recent data for countries in which two or more DHSs were conducted in this period. DHS data sets were downloaded from www.macroint.com/dhs/ or obtained directly from the state statistical offices (SSOs) that conducted the surveys.

We restricted analyses in all data sets to non-pregnant women aged 20 to 49 years. The average sample size was 4 266, ranging from 1 460 in Bolivia to 21 171 in Peru, with a total of 157 844 women studied. Average non-response rates were less than 0.2 percent for weight and height measurements and less than 0.7 percent for questions on SES. In the case of the DHS data, most women were mothers of children under five years of age. All analyses presented in this article were age-adjusted to allow for differences in age distribution between, and within, countries (Ahmad *et al*., 1999).

The overall prevalence of underweight (BMI $\leq$ 18.5) and overweight-plus-obesity (BMI $>$ 25) was calculated for women in each country based on weight and height measurements. Prevalences were estimated for both urban and rural areas. We also calculated the social distribution of underweight and overweight-plus-obesity for each country, using country-specific indicators of SES – namely, the country's quartiles of the women's years of formal education. Since years of education are a numeric non-continuous variable, close to 25 percent of women in each country fall in the education quartiles. However, in some countries, women were highly concentrated in some education categories, and it was necessary to combine one or more quartiles. Prevalence figures were age-adjusted by the direct method, using the age distribution of the world population as a reference (Ahmad *et al.*, 1999). We used survey-specific sample weights, so all estimates are nationally representative (except for the China survey, which only represents eight provinces).

We first tested the significance of differences in overweight (and underweight) prevalence in urban versus rural areas. Next, we tested the differences in overweight versus underweight prevalence within both urban and rural areas. Finally, we examined the magnitude and direction of the associations between SES and prevalence of malnutrition (underweight or overweight-plus-obesity) in each country, by calculating age-adjusted prevalence ratios (with 95 percent confidence intervals), comparing the highest to the lowest education quartile within urban and rural areas.

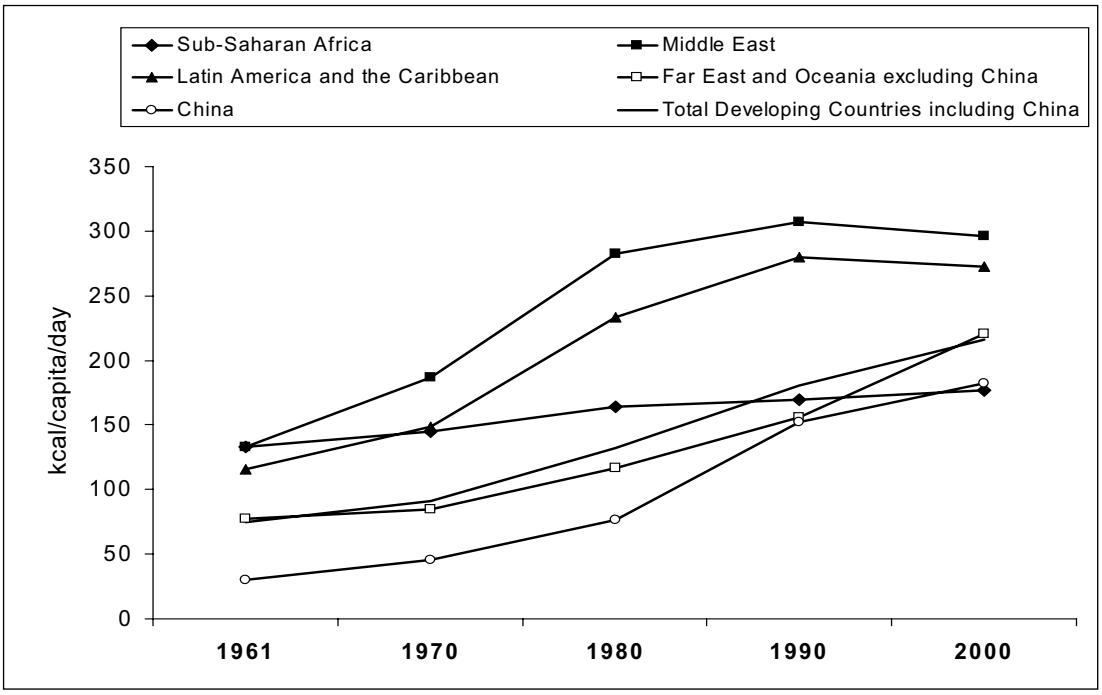
RESULTS

Global shifts in food available for consumption, 1961-2000

Edible oils

Throughout the developing world, the availability of edible vegetable oils for consumption has nearly tripled (Figure 1). In some countries, the increase has been even more marked. For instance, availability of edible oils for consumption in China has risen sixfold over this period, while intakes in the rest of Asia and Oceania tripled. In the past two decades, edible oil availability continued to rise in Asia and Oceania. However, availability of oils in Latin America and the Middle East – already more than 65 percent higher than in other regions by 1990 – appears to have levelled off.

FIGURE 1
Regional trends in availability for consumption of edible oils, 1961-2000

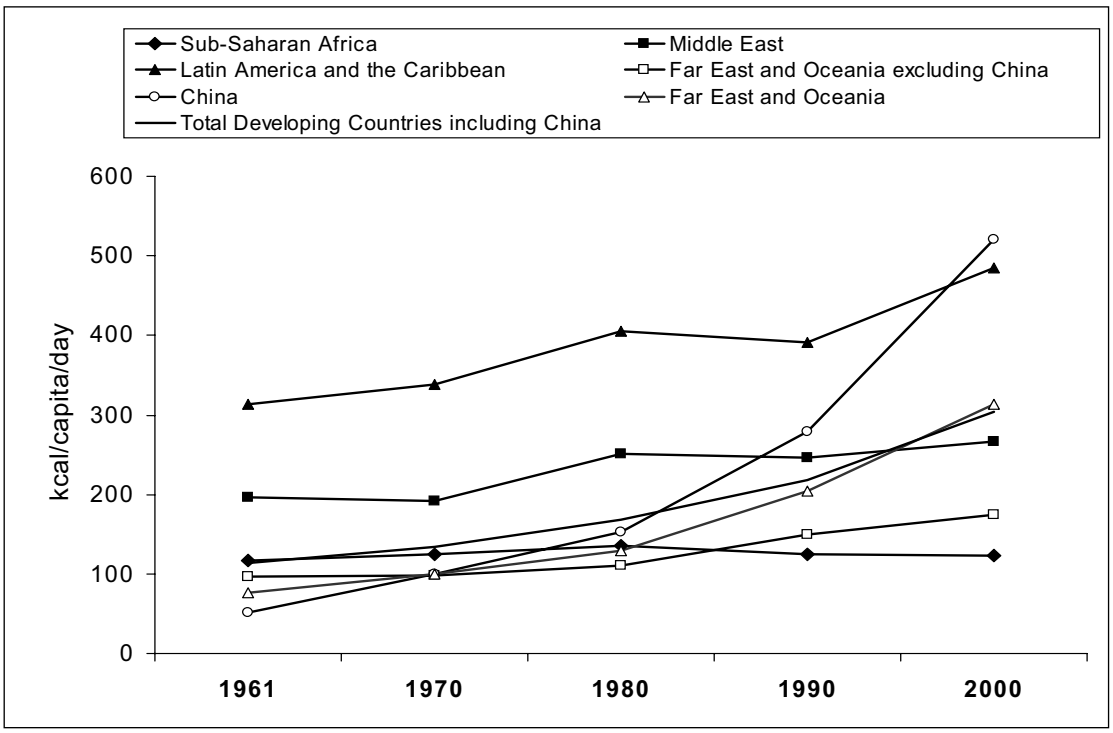


Source: FAOSTAT data.

Animal source foods

Figure 2 illustrates changes in world production of animal source foods (ASFs) available for human consumption, including eggs, meat (pork, all others), poultry, dairy and fish. There was an almost tenfold increase of ASFs in China, and overall a tripling of the amounts available for consumption in the developing world. In most regions, ASF intakes continued to increase rapidly in the past two decades: only sub-Saharan Africa and the Middle East did not experience substantial changes in animal food consumption over that period. However, levels of ASF consumption in the Middle East were already consistently higher than those in most other developing regions.

FIGURE 2
Regional trends in availability for consumption of total animal source foods, 1961-2000

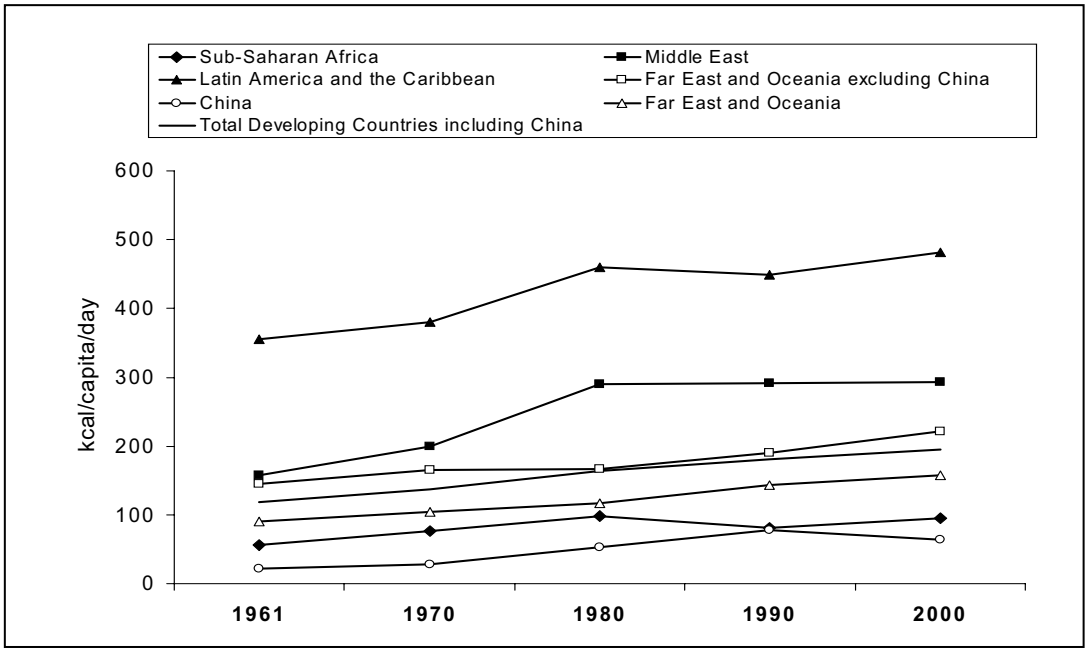


Source: FAOSTAT data.

Added caloric sweeteners

Added caloric sweeteners have become increasingly a component of the diet of persons throughout the developing world (see Figure 3) (Galloway, 2000; Mintz, 1977; Popkin and Nielsen, 2003). Latin America in particular has very high levels of added caloric sweeteners available for food consumption; levels are also high in the Middle East.

FIGURE 3
Regional trends in availability for consumption of total caloric sweeteners, 1961-2000



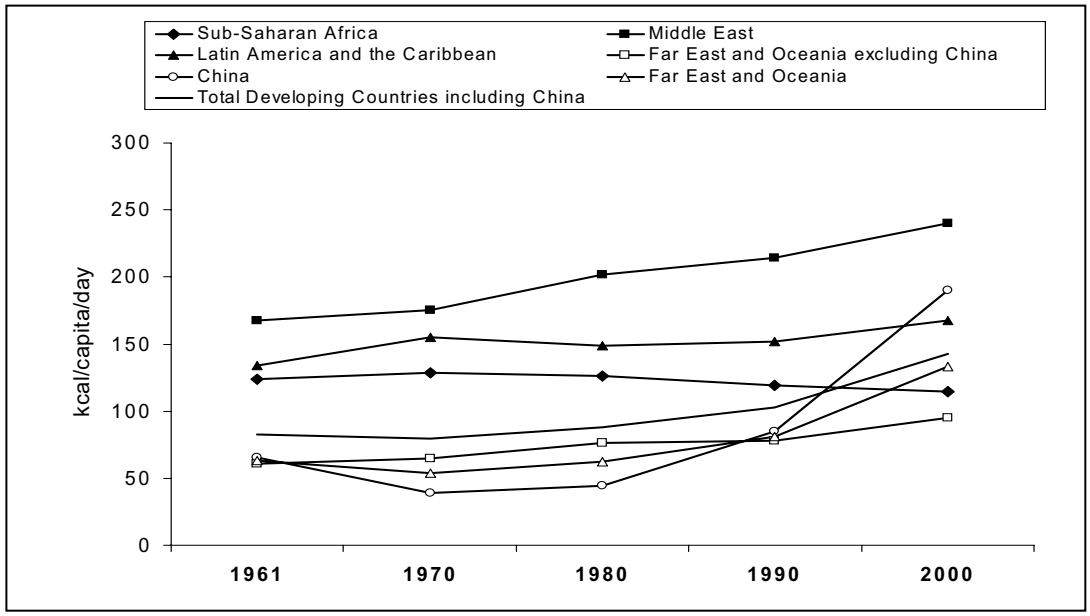
Source: FAOSTAT data.

Fruit and vegetables

Mean levels of fruit and vegetables (F&V) available for consumption in developing countries increased by about 72 percent, from 83 kcals/day in 1961 to 143 kcals/day in 2000 (Figure 4). Thus, changes in F&V availability were much less marked than shifts in edible oils (189 percent) or ASFs (169 percent).

FIGURE 4

Regional trends in availability for consumption of total fruit and vegetables (excluding potatoes), 1961-2000



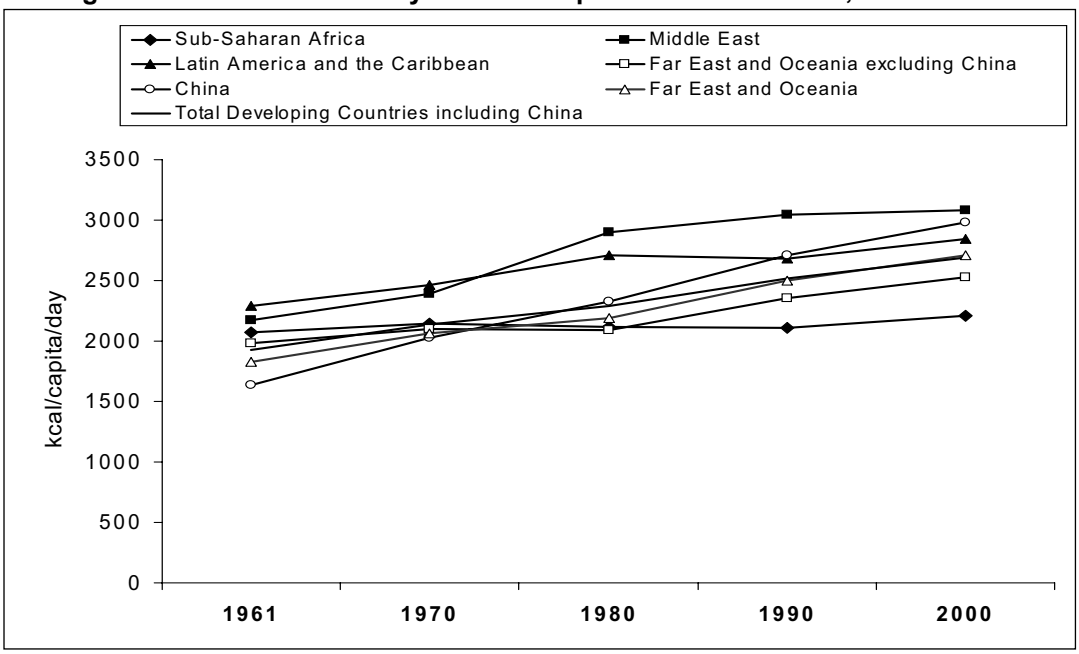
Source: FAOSTAT .data.

Energy

There is an increasing trend in the amount of energy available for consumption. Overall, the highest levels of energy available for consumption are found in the Middle East (see Figure 5). There has been a remarkably large increase in China over the past ten to 20 years: China now ranks second in terms of energy available for consumption, followed by Latin America and the rest of Asia and Oceania. Mean levels of food energy available are lowest in sub-Saharan Africa, by a considerable margin.

FIGURE 5

Regional trends in availability for consumption of total calories, 1961-2000



Source: FAOSTAT data.

Urbanization and dietary shifts in developing countries: the China case study

In only six years, between 1991 and 1997, there have been marked changes in the dietary intakes of Chinese adults, reflecting the large changes taking place in food availability (Table 1a; see also Du *et al*., 2002a,b). Shifts in intakes of animal source foods have been especially pronounced, increasing by 23 percent in urban areas and by 27 percent in rural areas. Edible oil consumption has also increased substantially, again with larger increases in rural (19 percent) than in urban (11 percent) areas. As a result of these changes, the proportion of adults consuming high-fat (> 30 percent calories from fat) diets increased from 33.0 to 60.8 percent in urban areas, and from 13.5 to 29.3 percent in rural areas. Vegetable intakes have remained steady, changing very little in both urban and rural dwellers. Fruit intakes have more than doubled in both urban and rural areas, although intakes in both areas remain extremely low. As changes in fruit and vegetable intakes have been small, animal foods and oils – rather than healthier food choices – appear to have displaced cereals in both urban and rural communities. While the proportion of calories from cereals has fallen from 63.2 to 55.0 percent (-8.2 percent) and from 71.8 to 63.2 percent (-8.6 percent) in urban and rural areas respectively, calories from animal foods have increased by 1.6 and 2.5 percent, and from fats and sugars by 7.0 and 5.6 percent.

TABLE 1a
Shifts in consumption in the Chinese diet (China Health and Nutrition Survey, 1989-1997) for adults aged 20 to 45 (mean intake g/per capita/day)

	Urban			Rural		
	1991	1997	% change	1991	1997	% change
Animal foods (g)	151.1	185.8	23.0	84.9	107.8	27.0
Meat	71.1	83.3	17.2	39.9	45.3	13.5
Poultry	7.7	15.3	98.7	5.1	8.9	74.5
Fish	24.5	28.4	15.9	15.4	21.3	38.3
Eggs	44.3	47.6	7.4	38.4	45.5	18.5
Edible vegetable oils (g)	41.1	45.5	10.7	35.0	41.8	19.4
Vegetables (g)	304.4	309.5	1.7	360.9	363.5	0.7
Fruit (g)	17.2	35.2	104.7	7.8	15.9	103.8

Although some changes in food group intakes have been larger in rural than in urban areas, urban diets have remained consistently richer in ASFs and oils, and poorer in quantities of vegetables. As a result of the greater shifts in rural areas, however, urban-rural disparities in ASF and vegetable oil intakes have narrowed over time. Nevertheless, urban dwellers consume more than twice as much fruit as rural residents, and this disparity has not changed.

We conducted additional analysis using the CHNS urbanization index to take the level of urbanicity of both urban and rural areas into account (Table 1b). Dietary patterns across communities at different levels of urbanicity are explored in greater depth in a companion paper (Mendez *et al.*, 2003), but selected findings are presented here. In this analysis, it became clear that simple urban-rural disparities masked substantial heterogeneity in dietary patterns across differing environments. Dietary patterns in rural areas with very high urbanicity scores closely resemble diets in areas formally designated as urban, with high intakes of animal foods and oils. Only rural communities with very low levels of urbanicity have maintained low intakes of animal foods and edible oils.

TABLE 1b
Shifts in consumption in the Chinese diet (China Health and Nutrition Survey, 1989-1997) for adults aged 20 to 45 by level of urbanicity (mean intake g/per capita/day)

	Urban	Rural	Urban		Rural	
1997 dietary intakes			Low	High	Low	High
Animal foods (g)						
Low income	123.1	73.0	90.0	135.6	64.5	145.7
Middle income	176.1	104.6	160.5	182.4	93.8	170.5
High income	213.7	160.8	205.4	218.0	127.6	246.1
All	185.8	107.8	174.3	191.0	89.6	200.0
Plant fats (g)						
Low income	41.6	37.2	51.6	37.5	37.1	37.4
Middle income	43.8	43.4	49.8	41.2	43.9	40.7
High income	47.9	46.4	52.5	45.3	45.2	49.6
All	45.5	41.8	51.5	45.3	41.3	44.1

Over time, intakes of animal foods and oils increased much more quickly in lower- than in higher-income groups (see Table 2). Consumption of ASFs by adults in the lowest

income tertile increased by 44 percent in both urban and rural areas, but by 20-25 percent in the highest income tertile. Similarly, consumption of vegetable oils increased several times faster in low- than in high-income adults. Thus, although higher-income groups have maintained higher intakes of these foods, the income disparity has narrowed considerably. In contrast to the large shifts for these foods in low-income groups, there was little change in vegetable intakes at any income level, and fruit consumption increased largely in high-income adults.

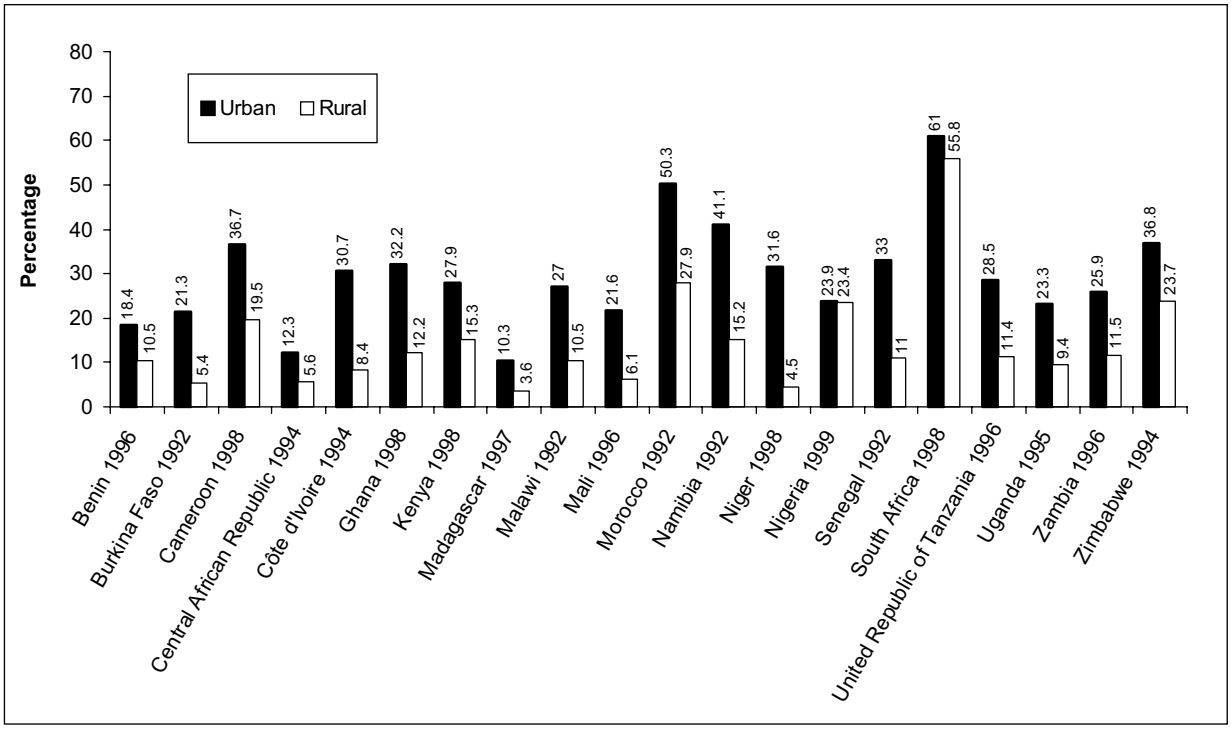
TABLE 2
Shifts in consumption in the Chinese diet (China Health and Nutrition Survey, 1989-1997) for adults aged 20 to 45 by income level (mean intake g/per capita/day)

	Urban			Rural		
	1991	1997	% change	1991	1997	% change
Animal foods (g)						
Low income	85.7	123.1	43.6	50.7	73.0	44.0
Middle income	150.3	176.1	17.2	89.4	104.6	17.0
High income	171.7	213.7	24.5	133.6	160.8	20.4
Edible oils (g)						
Low income	30.2	41.6	37.7	30.6	37.2	21.6
Middle income	40.1	43.8	9.2	34.7	43.4	25.1
High income	44.8	48.0	7.1	41.8	46.4	11.1
Vegetables (g)						
Low income	312.7	323.9	3.6	357.0	351.8	-1.5
Middle income	303.0	308.3	1.7	363.4	386.5	6.4
High income	303.0	305.5	0.8	364.1	352.5	-3.2
Fruit (g)						
Low income	8.7	7.8	-10.3	6.8	10.2	50.0
Middle income	9.6	19.0	97.9	8.4	20.7	146.4
High income	25.2	55.9	121.8	8.6	18.1	110.5

Global nutritional status changes

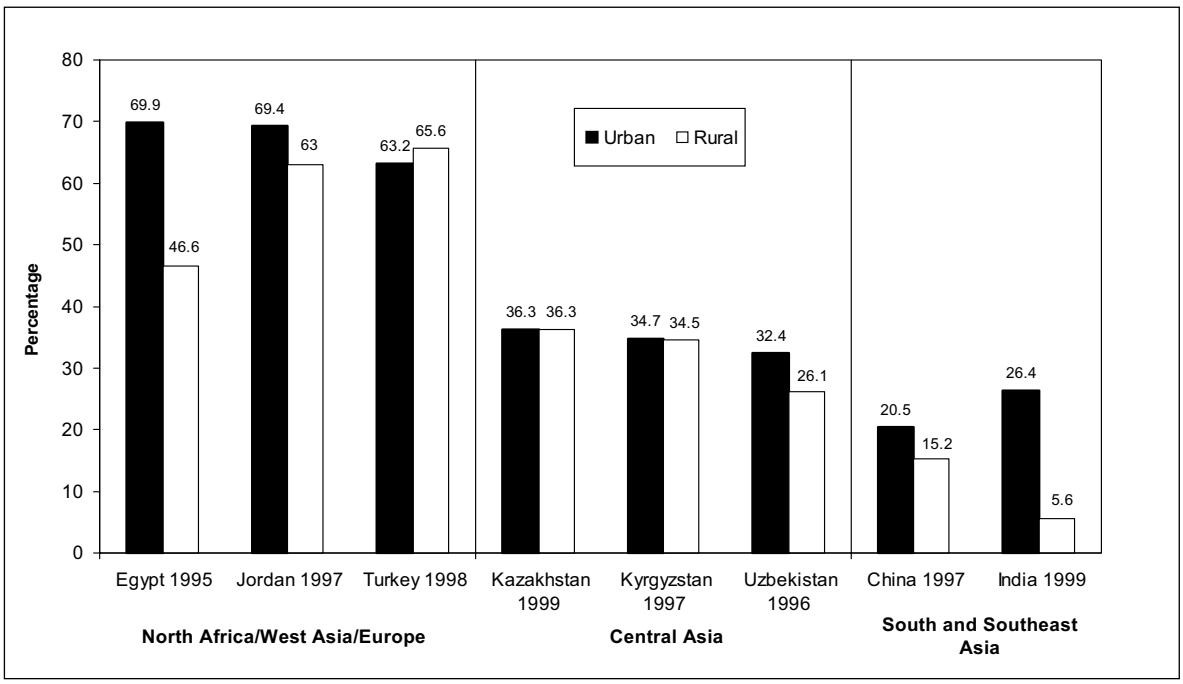
Current levels of overweight-plus-obesity (hereafter "overweight") among women in developing countries from different regions are shown in Figures 6 to 8, and in Table 3. In most countries, overweight has reached levels that are quite troubling, particularly in urban areas, where prevalence is generally highest. Among urban women across the developing world, overweight ranges from 10 to 70 percent of the population; levels are well over 20 percent in most countries. Prevalence of overweight in rural women ranges from 4.5 to 65.6 percent. There are, however, four countries where rural overweight exceeds urban overweight (Colombia, Kyrgyzstan, Turkey and Nigeria).

FIGURE 6
Prevalence of overweight in urban and rural areas of sub-Saharan Africa in women aged 20-49 years (BMI ≥25 for overweight)



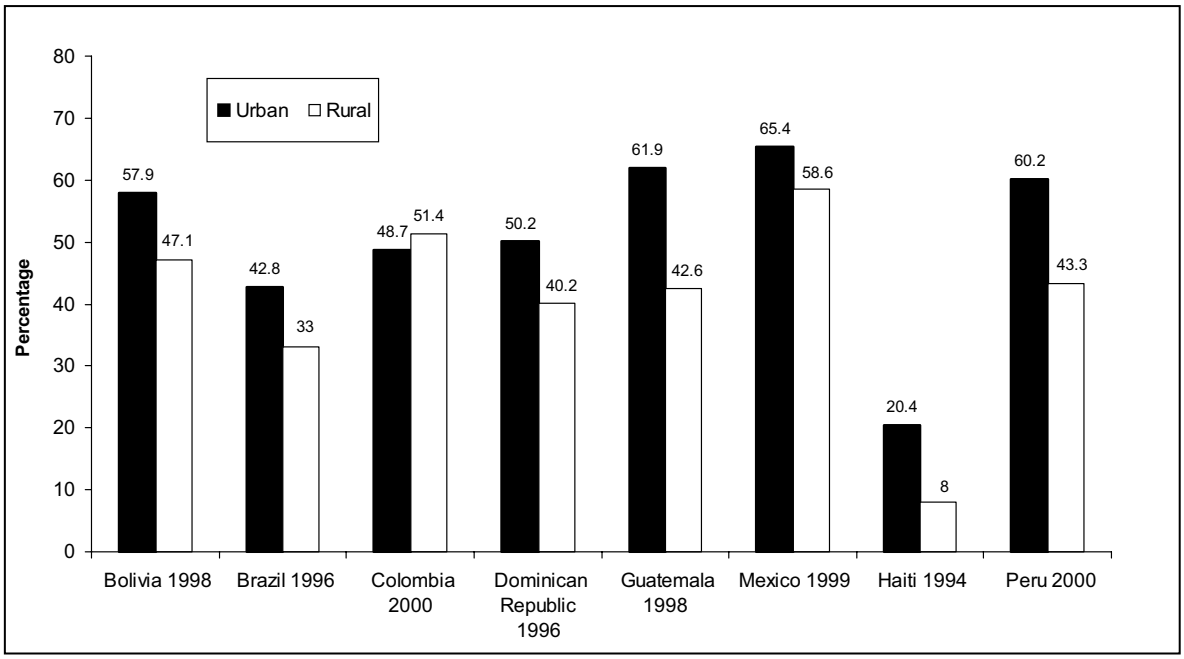
Source: Demographic and Health Surveys, weighted to be nationally representative. Age-standardized on the world population.

FIGURE 7
Prevalence of overweight in urban and rural areas of North Africa/WestAsia/Europe, Central Asia and South and Southeast Asia in women aged 20-49 years (BMI ≥25 for overweight)



Source: Demographic and Health Surveys, weighted to be nationally representative. Age-standardized on the world population.

FIGURE 8
Prevalence of overweight in urban and rural areas of Latin America and the Caribbean in women aged 20-49 years (BMI ≥25 for overweight)



Source: Demographic and Health Surveys, weighted to be nationally representative. Age-standardized on the world population.

Throughout the developing world, overweight prevalence among women tends to be highest in countries where the greatest proportion of the population lives in urban centres (Figure 9). Furthermore, in highly urbanized regions – the Middle East and Latin America – the urban-rural disparity in overweight prevalence is relatively small. This disparity is also relatively small in many sub-Saharan African countries with high levels of urbanization (> 35 percent urban), including Benin, the Central African Republic, Morocco, Nigeria, South Africa, Zambia and Zimbabwe.

TABLE 3
Comparing overweight versus underweight prevalence by urban and rural areas

	Overweight	Underweight		Overweight	Underweight	
	Urban	**Urban**	**P-value**	**Rural**	**Rural**	**P-value**
Sub-Saharan Africa						
Low urbanization						
Burkina Faso 1992	21.3 (23.5, 19.1)	8.7 (10.2, 7.1)	0.00000	5.4 (6.4, 4.5)	15.5 (17.0, 14.1)	0.00000
Ghana 1998	32.2 (36.2, 28.2)	5.5 (7.5, 3.6)	0.00000	12.2 (13.8, 10.7)	12.6 (14.2, 11.1)	0.35647
Kenya 1998	27.9 (31.7, 24.0)	7.0 (9.2, 4.8)	0.00000	15.3 (16.6, 14.0)	12.1 (13.3, 11.0)	0.00029
Madagascar 1997	10.3 (12.8, 7.8)	14.1 (16.9, 11.2)	0.02548	3.6 (4.4, 2.8)	21.5 (23.3, 19.7)	0.00000
Malawi 1992	27.0 (30.4, 23.6)	5.8 (7.6, 4.0)	0.00000	10.5 (11.9, 9.1)	9.2 (10.5, 7.9)	0.09434
Mali 1996	21.6 (23.8, 19.4)	13.5 (15.3, 11.6)	0.00000	6.1 (7.0, 5.3)	14.6 (15.8, 13.4)	0.00000
Namibia 1992	41.1 (44.5, 37.6)	6.2 (7.9, 4.5)	0.00000	15.2 (17.0, 13.4)	16.5 (18.4, 14.7)	0.15984
Niger 1998	31.6 (34.7, 28.6)	12.1 (14.2, 10.0)	0.00000	4.5 (5.3, 3.7)	19.6 (21.1, 18.1)	0.00000
United Republic of Tanzania 1996	28.5 (31.5, 25.4)	8.6 (10.5, 6.7)	0.00000	11.4 (12.6, 10.3)	9.6 (10.6, 8.5)	0.00777
Uganda 1995	23.3 (25.9, 20.6)	6.6 (8.2, 5.0)	0.00000	9.4 (10.6, 8.3)	9.8 (11.0, 8.7)	0.31682
Zimbabwe 1994	36.8 (41.2, 32.3)	1.9 (3.2, 0.6)	0.00000	23.7 (25.8, 21.5)	4.9 (5.9, 3.8)	0.00000
High urbanization						
Benin 1996	18.4 (21.5, 15.4)	9.7 (12.0, 7.4)	0.00000	10.5 (11.9, 9.1)	15.5 (17.1, 13.8)	0.00001
Cameroon 1998	36.7 (32.9, 40.5)	5.2 (3.5, 7.0)	0.00000	19.5 (17.1, 21.9)	5.9 (4.4, 7.3)	0.00000
Central Afr. Rep. 1994	12.3 (14.6, 10.0)	13.6 (16.0, 11.2)	0.22467	5.6 (6.9, 4.4)	16.7 (18.8, 14.7)	0.00000
Côte d'Ivoire 1994	30.7 (33.3, 19.3)	5.0 (6.3, 3.8)	0.00000	8.4 (9.7, 7.2)	12.0 (13.5, 10.5)	0.00021
Morocco 1992	50.3 (53.1, 47.6)	2.6 (3.5, 1.8)	0.00000	27.9 (29.9, 26.0)	4.5 (5.4, 3.5)	0.00000
Nigeria 1999	23.9 (27.2, 20.7)	13.6 (16.2, 10.9)	0.00000	23.4 (25.4, 21.3)	13.3 (14.9, 11.6)	0.00000
Senegal 1992	33.0 (35.7, 30.2)	8.5 (10.2, 6.9)	0.00000	11.0 (12.4, 9.7)	14.4 (15.9, 12.9)	0.00062
South Africa 1998	61.0 (62.9, 59.1)	4.3 (5.0, 3.5)	0.00000	55.8 (58.1, 53.6)	5.7 (6.1, 4.1)	0.00000
Zambia 1996	25.9 (28.1, 23.6)	5.9 (7.2, 4.7)	0.00000	11.5 (12.7, 10.3)	9.9 (11.1, 8.8)	0.03174
North Africa/West Asia/Europe						
Egypt 1995	69.9 (71.6, 68.2)	0.7 (1.0, 0.4)	0.00000	46.6 (48.0, 45.1)	1.8 (2.2, 1.4)	0.00000
Jordan 1997	69.4 (71.1, 67.7)	1.6 (2.1, 1.2)	0.00000	63.0 (66.4, 59.6)	1.8 (2.7, 0.9)	0.00000
Turkey 1998	63.2 (66.0, 60.4)	2.1 (2.9, 1.3)	0.00000	65.6 (69.6, 61.6)	1.5 (2.6, 0.5)	0.00000

(*cont.*)

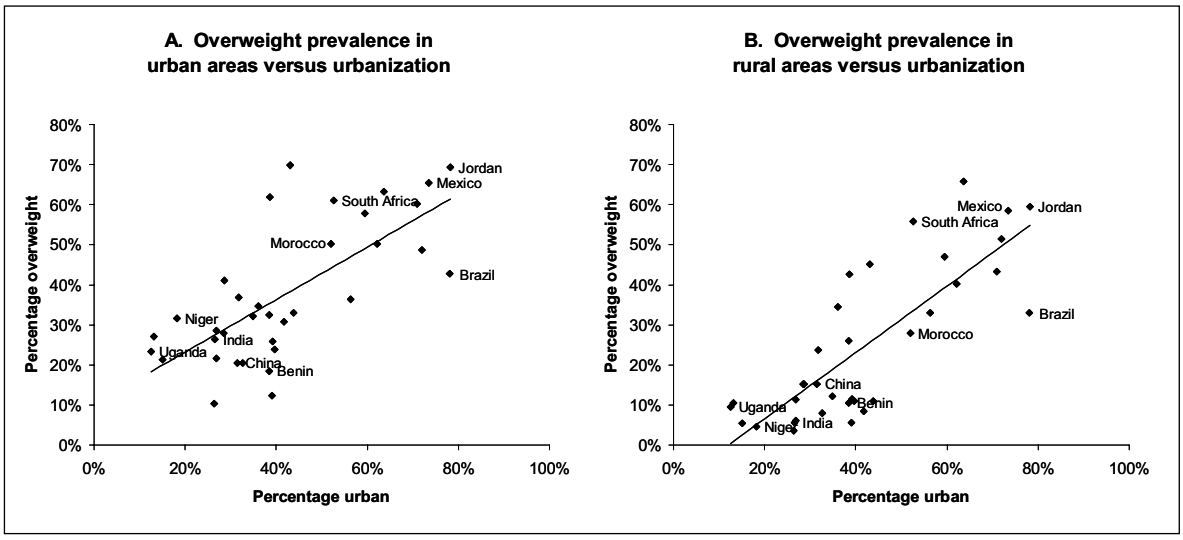
	Overweight	Underweight		Overweight	Underweight	
	Urban	Urban	P-value	Rural	Rural	P-value
Central Asia						
Kazakhstan 1999	36.3 (39.0, 33.6)	6.3 (7.6, 4.9)	0.00000	36.3 (39.8, 32.9)	6.0 (7.7, 4.3)	0.00000
Kyrgyzstan 1997	34.7 (37.3 32.0)	4.9 (6.1, 3.7)	0.00000	34.5 (36.6, 32.3)	4.4 (5.3, 3.5)	0.00000
Uzbekistan 1996	32.4 (34.6, 30.3)	7.0 (8.1, 5.8)	0.00000	26.1 (28.2, 23.9)	7.4 (8.7, 6.1)	0.00000
South and Southeast Asia						
China 1997	20.5 (23.0, 18.0)	7.4 (9.0, 5.7)	0.00000	15.2 (16.8, 13.6)	6.1 (7.2, 5.0)	0.00000
India 1999	26.4 (27.9, 24.8)	23.1 (24.6, 21.6)	0.00178	5.6 (6.2, 4.9)	48.2 (49.6, 46.7)	0.00000
Latin America and the Caribbean						
Bolivia 1998	57.9 (61.2, 54.5)	0.7 (1.2, 0.1)	0.00000	47.1 (51.0, 43.3)	0.6 (1.2, 0.0)	0.00000
Brazil 1996	42.8 (44.7, 40.8)	5.2 (6.0, 4.3)	0.00000	33.0 (36.5, 29.6)	9.3 (11.4, 7.2)	0.00000
Colombia 2000	48.8 (50.7, 46.7)	2.0 (2.6, 1.5)	0.00000	51.4 (54.5, 48.3)	2.1 (3.0, 1.3)	0.00000
Dominican Rep. 1996	50.2 (51.7, 48.6)	4.5 (5.2, 3.9)	0.00000	40.2 (42.1, 38.3)	6.2 (7.1, 5.2)	0.00000
Guatemala 1998	61.9 (65.5, 58.2)	1.5 (2.5, 0.6)	0.00000	42.6 (44.8, 40.3)	1.6 (2.2, 1.0)	0.00000
Mexico 1999	65.4 (66.4, 64.4)	1.5 (1.8, 1.2)	0.00000	58.6 (60.0, 57.1)	2.2 (2.6, 1.8)	0.00000
Haiti 1994	20.4 (23.2, 17.7)	16.5 (19.0, 13.9)	0.01855	8.0 (9.5, 6.5)	20.8 (23.1, 18.6)	0.00000
Peru 2000	60.2 (61.0, 59.4)	0.8 (0.9, 0.6)	0.00000	43.3 (44.3, 42.2)	0.7 (0.8, 0.5)	0.00000

Note: The statistical test compares overweight (% BMI ≥25) versus underweight (% BMI ≤18.5) in urban and in rural areas separately.

We compared the prevalence of underweight in urban versus rural areas (see Table 3). The overall pattern was to find more underweight in rural than in urban areas, although in many parts of the world these disparities were small (Central Asian Republics and Latin America, with the exception of Haiti, China and North Africa). In a large part of sub-Saharan Africa, as well as in India and Haiti, there was much more underweight in rural than in urban areas.

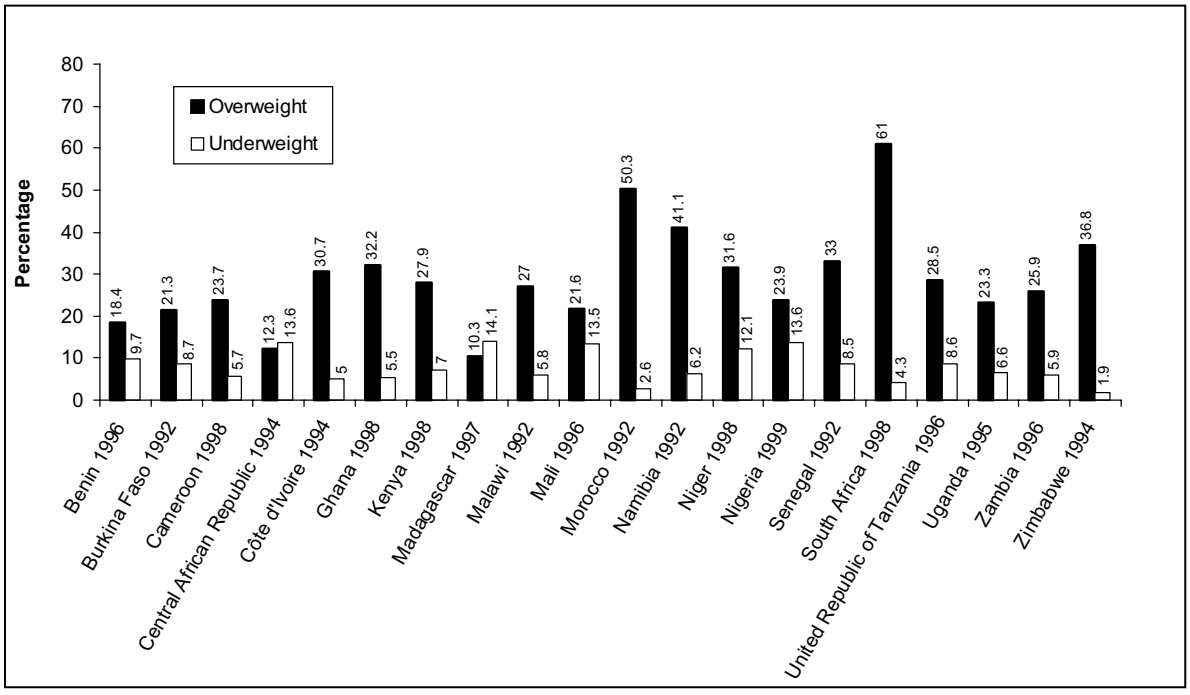
Perhaps the most notable finding in these recent data is that there is far more overweight than underweight among women in most developing countries (Figures 10 to 15).

FIGURE 9
The relationship of overweight prevalence with the proportion urban (BMI ≥25 for overweight)



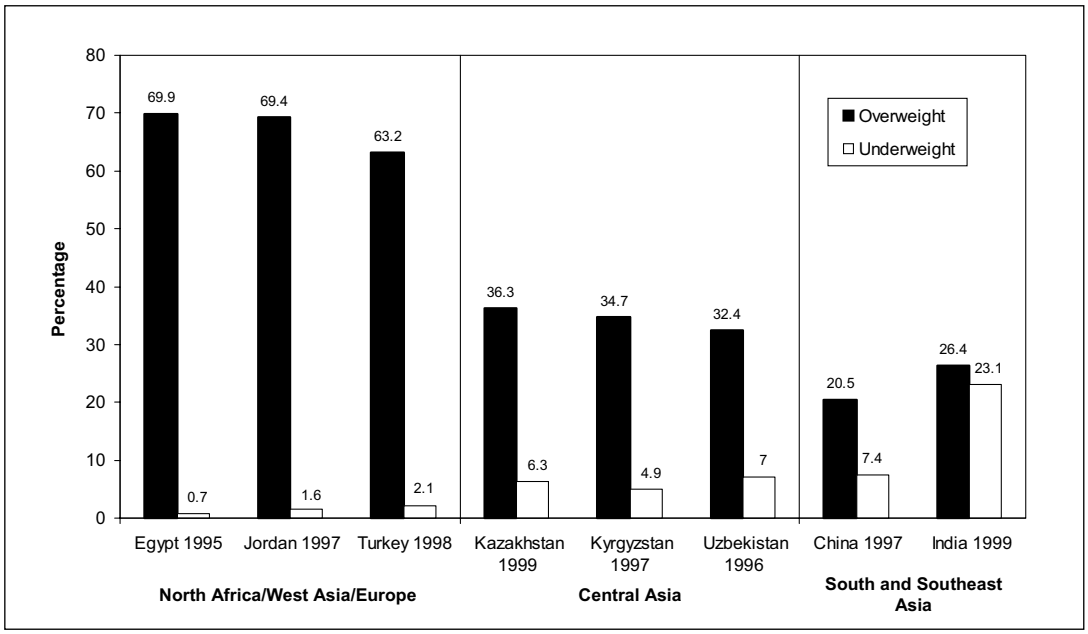
Source: Demographic and Health Surveys, weighted to be nationally representative. Age-standardized on the world population.

FIGURE 10
Comparison of overweight and underweight prevalence in urban areas of sub-Saharan Africa in women 20-49 years old (BMI ≥25 for overweight and BMI ≤18.5 for underweight)



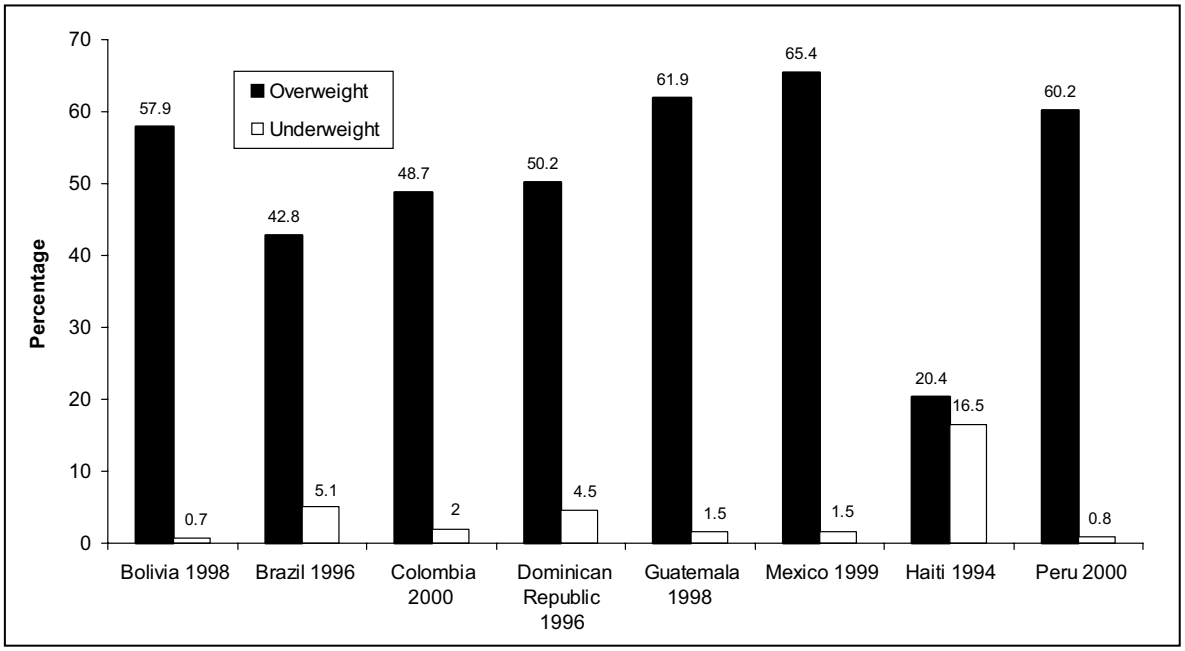
Source: Demographic and Health Surveys, weighted to be nationally representative. Age-standardized on the world population.

FIGURE 11
Comparison of overweight and underweight prevalence in urban areas of North Africa/WestAsia/Europe, Central Asia and South and Southeast Asia in women aged 20-49 years (BMI ≥25 for overweight and BMI ≤18.5 for underweight)



Source: Demographic and Health Surveys, weighted to be nationally representative. Age-standardized on the world population.

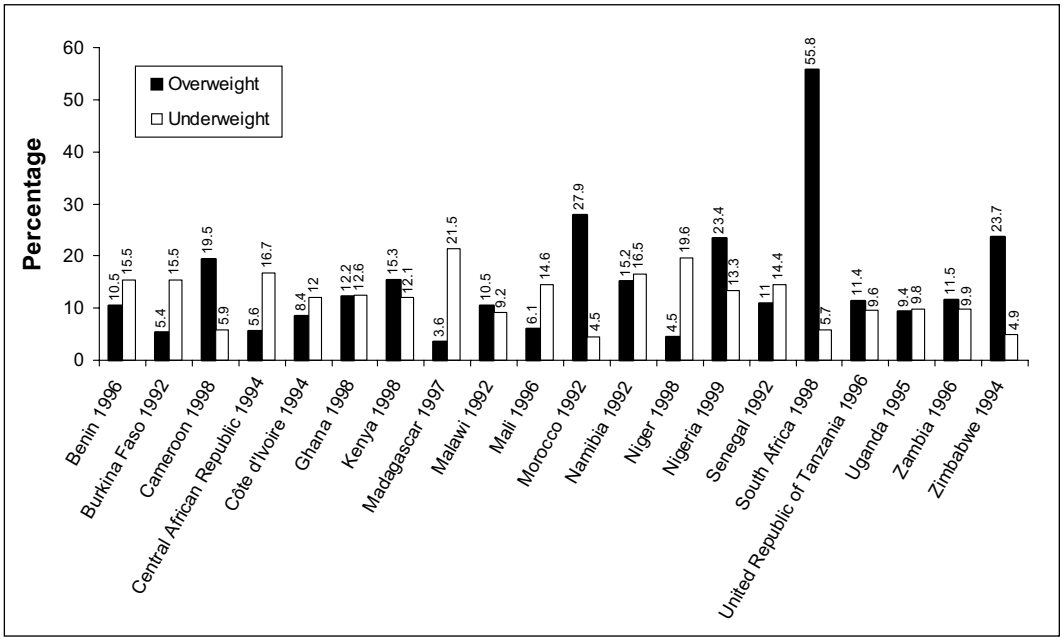
FIGURE 12
Comparison of overweight and underweight prevalence in urban areas of Latin America and the Caribbean in women aged 20-49 years (BMI ≥25 for overweight and BMI ≤18.5 for underweight)



Source: Demographic and Health Surveys, weighted to be nationally representative. Age-standardized on the world population.

FIGURE 13

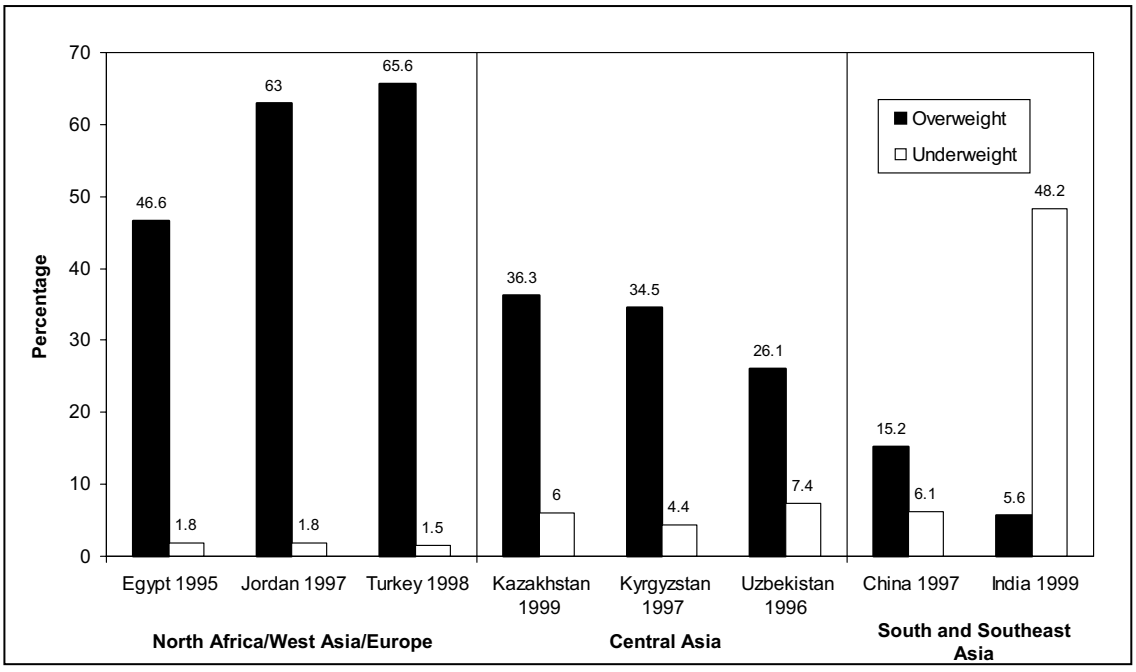
Comparison of overweight and underweight prevalence in rural areas of sub-Saharan Africa in women aged 20-49 years (BMI ≥25 for overweight and BMI ≤18.5 for underweight)



Source: Demographic and Health Surveys, weighted to be nationally representative. Age-standardized on the world population.

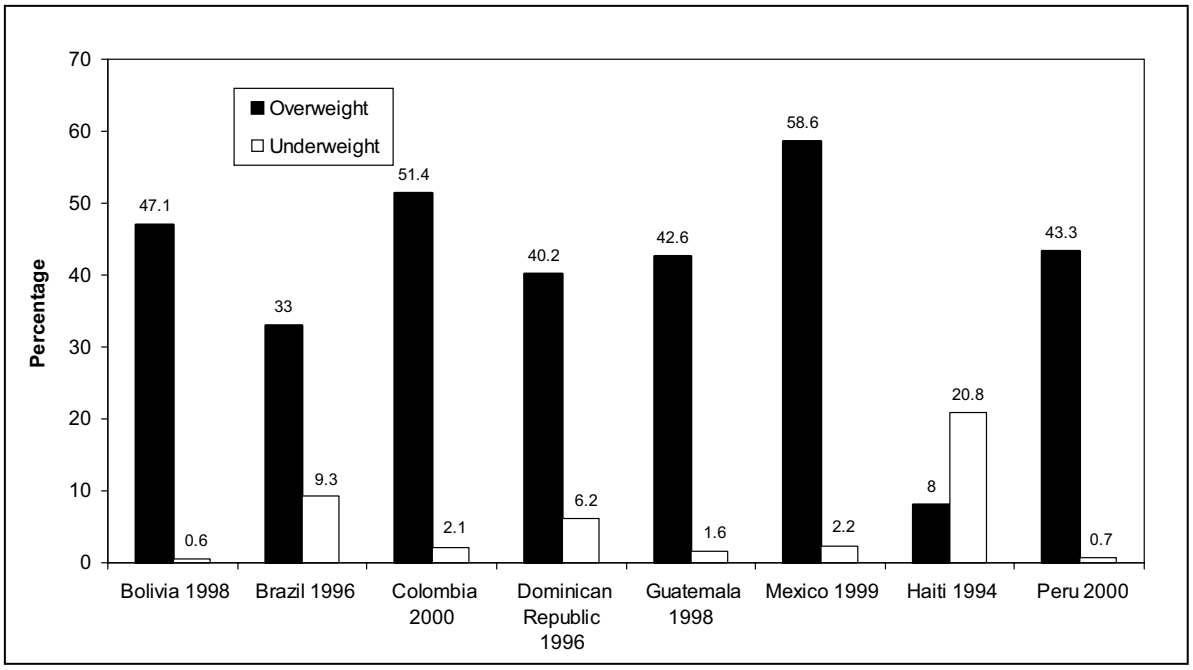
FIGURE 14

Comparison of overweight and underweight prevalence in rural areas of North Africa/WestAsia/Europe, Central Asia and South and Southeast Asia in women aged 20-49 years (BMI ≥25 for overweight and BMI ≤18.5 for underweight)



Source: Demographic and Health Surveys, weighted to be nationally representative. Age-standardized on the world population.

FIGURE 15
Comparison of overweight and underweight prevalence in rural areas of Latin America and the Caribbean in women aged 20-49 years (BMI ≥25 for overweight and BMI ≤18.5 for underweight)

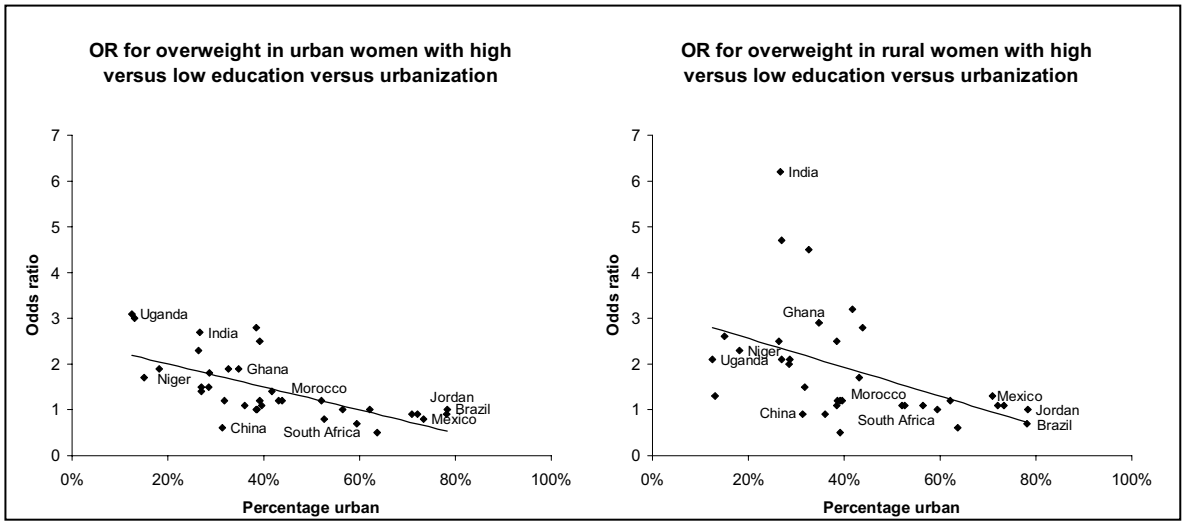


Source: Demographic and Health Surveys, weighted to be nationally representative. Age-standardized on the world population.

This predominance of overweight is found in most urban areas, and in many rural areas. The main exceptions are India, where close to half the rural women are underweight, and several countries in sub-Saharan Africa – especially in rural areas. In only two countries is there more underweight than overweight in urban areas, and these differences are small. By far, the primary problem of malnutrition found in urban women throughout the developing world is that of overnutrition.

We also explored the social distribution of overweight and underweight in urban and rural areas, using education as an indicator of SES. As expected, underweight status is predominantly a problem among low SES groups (not shown). In many countries, however, overweight status is now highly prevalent in low as well as in high SES groups. Indeed, especially in the most urbanized countries, overweight prevalence in the lowest SES women is similar or greater than in the higher SES groups (Figure 16).

FIGURE 16
The odds ratio of overweight prevalence among high education versus low education women
(BMI ≥25 for overweight)



Source: Demographic and Health Surveys, weighted to be nationally representative. Age-standardized on the world population.

In the relatively short time frame between 1991 and 1997 (Table 4), there have been large increases in overweight prevalence in Chinese adults living in both urban and rural areas. Conversely, there were substantial declines in underweight throughout China; prevalence was < 5 percent in all areas by 1997. Overweight has increased in women and men in both urban and rural areas, although levels remained lower in rural China. Income disparities in overweight prevalence are very small in urban areas, although there is substantially more overweight in high-income than in low-income rural residents.

TABLE 4
Shifts in overweight and underweight prevalence in Chinese adults aged 20-45 years, 1991-1997 (overweight [% BMI ≥ 25]; underweight [% BMI ≤ 18.5])

	Overweight				Underweight			
	Urban		Rural		Urban		Rural	
	1991	1997	1991	1997	1991	1997	1991	1997
Male	12.4	27.4	6.4	13.1	5.7	2.0	4.4	2.4
Female	15.7	24.5	10.8	17.6	5.7	2.5	4.7	3.4
By income group								
Male								
Low	14.7	25.9	3.8	9.3	2.8	2.8	6.0	3.5
Middle	10.5	25.5	6.7	12.1	7.9	2.0	2.5	1.7
High	13.0	29.1	10.4	19.8	5.0	1.7	4.1	1.6
Female								
Low	14.7	24.4	8.2	14.4	5.4	3.4	6.5	4.9
Middle	18.4	25.5	12.2	18.1	6.0	2.0	4.0	3.8
High	14.0	23.9	13.3	24.1	5.6	2.7	2.7	1.2

CONCLUSIONS AND POLICY RECOMMENDATIONS

The effects of urbanization and globalization on dietary patterns and nutritional status in developing countries are complex. These forces are associated with potentially beneficial dietary shifts such as increases in energy sufficiency and greater consumption of fruit, but also appear to promote potentially obesogenic shifts such as increased intakes of edible oils, animal foods and caloric sweeteners. While there have been substantial reductions in undernutrition in this period of rapid development and social change, overweight has become an increasing problem. Among adult women, overweight now exceeds underweight in almost all developing countries, particularly in the most urbanized ones. Food availability and intake data suggest that adverse shifts in dietary composition are taking place at a much higher speed than potentially beneficial changes: there has been relatively little change in the levels of fruit and vegetables, but very large increases in edible oils, ASFs and added sugar and caloric sweeteners over short periods of time. Numerous studies have shown that consumption of energy-dense (high-fat, added sugar) foods tend to promote excessive energy intakes (Rolls, 2000). These adverse dietary shifts have undoubtedly contributed to the rise in overweight and obesity observed throughout the developing world.

Case study data from China indicate that consumption patterns closely reflect changes in food availability. There were large increases in dietary fats, oils and ASFs in the 1990s. As a result of these changes, mean intakes of ASFs in China have reached levels similar to the maximum amounts recommended in the United States guidelines and food pyramid (United States Department of Agriculture [USDA], 2000). In contrast, intakes of fruit and vegetables fall below recommendations, which would be in the range of 500-700 g/day (authors' calculations based on three fruit and four vegetable servings/day) – levels comparable to those reported for some Mediterranean countries (Moreno, Sarría and Popkin, 2002). In the past two decades, levels of fruit and vegetable availability in most regions have been relatively flat, with the exception of large increases reported for China. However, it is not clear to what extent the rise in reported availability of fruit and vegetables in China reflects patterns of human consumption. Between 1991 and 1997, fruit and vegetable availability in China nearly doubled, increasing from 324 to 580 g/day (88 to 152 kcals/day), while reported consumption in adults in the CHNS changed very little – from 354 to 369 g/day. This raises questions about the accuracy of the Chinese fruit and vegetable availability data. Worldwide, current availability of fruit and vegetables, especially in sub-Saharan Africa and the Far East, remains well below availability levels in Mediterranean countries such as Spain (249 kcals/day) and Greece (359 kcals/day) (FAO, 2001).

With globalization, many developing countries are experiencing large shifts in food imports. Between 1990 and 1998, there were large increases in trade in processed grain products, while trade in unprocessed bulk grains has declined (Regmi and Gehlar, 2001). Similarly, there have been large increases in trade in oils (Williams, 1984). At the same time, foreign direct investment in the food industry, notably supermarkets and fast food restaurants, has expanded several-fold in many countries (Reardon, Timmer and Berdegue, 2003; Bolling and Somwaru, 2001). For example, between 1989 and 1998, sales by food processing affiliates owned by the United States in South America grew from US$5 billion to $15 billion, and sales in Asia increased from $5 billion to $20 billion (Bolling and Somwaru, 2001). These shifts have been accompanied by marketing of brands and shifts in cultural norms that have influenced tastes (Chopra, Galbraith and Darnton-Hill, 2002). Urbanization is associated with occupations that involve spending more time away from home (Popkin and Bisgrove, 1988). Thus, in many urbanized countries, intakes of processed foods, ready-to-eat meals and snacks, and street vendor, restaurant and fast food

meals have increased (Regmi and Gehlar, 2001). These eating patterns are associated with higher intakes of fat, sugars and energy.

Some of the reasons for the large shifts in edible oil consumption in developing countries have been written about elsewhere (Drewnowski and Popkin, 1997). Technological breakthroughs in the development of high-yield oilseeds and in the refining of high-quality vegetable oils greatly reduced the cost of baking and frying fats, margarine, butter-like spreads, and salad and cooking oils in relation to animal-based products (Williams, 1984). Worldwide demand for vegetable fats was fuelled by health concerns regarding the consumption of animal fats and cholesterol. Furthermore, a number of major economic and political initiatives led to the development of oil crops not only in Europe and the United States, but also in Southeast Asia (palm oils) and in Brazil and Argentina (soybean oils) (USDA, 1966).

Delgado has written perceptively about the ASF revolution in low-income developing countries, or the increase in demand for and production of meat, fish and milk (Delgado *et al*., 1999, 2001; Delgado, 2003). As relative commodity prices decrease and incomes increase, people usually diversify their diets and shift towards higher priced commodities and processed convenience foods. While average income growth explains overall growth, urbanization and population growth also helps to explain the greater increase in ASF demand in developing countries relative to developed countries. From 1975 to 1999, animal products drove the expansion of production in developing countries, which now account for more than half of the world's meat production (Delgado, 2003). In contrast, growth in ASF production in the developed world is now flat – the market is saturated. Given that 81 percent of the world's people live in developing countries, small shifts in their diets result in huge changes in the world market. Since 1970, relative prices of food have dropped considerably, most dramatically for beef (Delgado, 2003). Because of market saturation and technological changes that increase productivity, the ASF revolution is projected to level off by 2020.

In many countries, large increases in the consumption of sugar have also been observed. Sugar is the world's predominant sweetener but there are marked increases in the consumption of high fructose corn syrup as well (Bray, Nielsen and Popkin, 2004). Increasing sugar and sweetener use has been linked with industrialization, and with the proliferation of processed foods and beverages that have sugar added to them (e.g. tea, coffee, cocoa and soft drinks). Elsewhere we review in far more detail the way the world's diet has changed with respect to added caloric sweeteners (Popkin and Nielsen, 2003).

As shown using data from China these emerging, potentially adverse dietary patterns are especially marked in urban areas. Compared to rural dwellers, urban residents continue to consume higher levels of fats and animal foods, together with lower intakes of vegetables. However, the dietary effects of urbanization and globalization appear to be expanding into areas designated as rural. With marked increases in oils and ASF consumption in rural areas, the disparity between urban and rural intakes has become smaller over time. Rural consumption of these foods is particularly high in areas that are highly urbanized in terms of infrastructure and resources. In a companion paper, we explore dietary patterns in different urban contexts in greater detail (Mendez *et al.*, 2003). Only areas with very low levels of urbanicity have maintained traditional diets that are low in fat and animal source foods. "Urban" dietary patterns are likely to become more common throughout developing countries as the process of rural development, or increased urbanicity in rural areas, continues.

Disturbingly, there is evidence that the adverse changes in dietary intakes associated with urbanization are taking place at all levels of SES, and probably contribute to the rising levels of low-income obesity observed in some developing countries. In China, although

low-income adults consumed lower levels of animal foods and oils than higher-income adults, the rate of increase in ASFs and edible oil consumption is, overall, faster in low-income groups. Relatively high levels of overweight were observed in low SES women in numerous developing countries, resulting in relatively small disparities in overweight between high and low SES groups.

These dietary shifts have occurred together with increased sedentarism in occupational activity and commuting, as well as in the nature of leisure-time activity (e.g. from increased television watching) (Bell, Ge and Popkin, 2001, 2002; Hu *et al.*, 2002; Tudor-Locke *et al.*, 2002). Because of their tendency to promote overconsumption, the dietary changes currently taking place in developing countries may help to explain energy imbalance and obesity, as individuals fail to adapt their energy intakes to match reduced energy expenditure levels. Together, these shifts in diet and activity have contributed to the rising obesity observed throughout the developing world at all income levels and increasingly in rural areas. The high speed of change is also a concern, as individuals exposed to undernutrition earlier in life are also making these dietary shifts. Individuals with very poor nutrition in early life may be at greater risk of adverse consequences, including diabetes, cardiovascular disease or weight gain (Barker, 2001; Schroeder, Martorell and Flores, 1999; Sawaya *et al.*, 2003; Reddy, 2002).

In addition to obesity, the dietary changes associated with urbanization and globalization are of great concern because of the implications for risk of obesity-related chronic disease. Large increases in the prevalence of numerous obesity-related chronic diseases have been documented around the developing world, including diabetes and cardiovascular diseases (Kumanyika *et al.*, 2002; Yusuf *et al.,* 2001). A large body of evidence, including data from clinical trials, shows that diets lower in meats and fats, and richer in fruit and vegetables, reduce blood pressure and risk of diabetes incidence as much or more than costly pharmacological treatments (Knowler *et al.*, 2002; Vollmer, Sacks and Svetkey, 2001).

Researchers working in many developing countries have begun to move beyond documenting shifts in obesity to documenting the dietary and activity shifts underlying the ongoing nutrition transition as well. Studies in several other developing countries have described dietary trends similar to those described here (e.g. Shetty, 2002; Kosulwat, 2002). The need to develop policies appropriate for the current nutrition climate, in which overweight has become a major health issue in developing countries, has been highlighted (Uauy and Kain, 2002). In a few countries, policies and programmes to shift dietary practices in developing countries to address obesity in addition to undernutrition are being put in place, although the effectiveness of these efforts is as yet unknown (Coitinho, Monteiro and Popkin, 2002; Zhai *et al.*, 2002).

As part of its National Plan of Action for Nutrition, China has developed important educational tools such as the “Chinese pagoda”, a set of dietary guidelines for Chinese residents (Zhai *et al.*, 2002). Schools have been asked to increase time allotted to physical activity. The government has used subsidies to promote urban vegetable consumption in northern areas of China, and to promote rural gardens. Promotion of pulse consumption has been identified as a strategy for maintaining protein quality, while providing an alternative to meat as a source of protein (Leterme and Carmenza Munoz, 2002). As part of its nutrition plan, China has developed policies to increase soybean production and consumption (Zhai *et al.*, 2002). While meat production has nearly kept pace with rising demand and consumption, increases in soybean production and consumption to date have been relatively small (Geissler, 1999). Despite the large shifts in consumption and availability, meat imports were 1.7 percent of the total supply in 1990, and 3.6 percent in 2001 (FAO, 2001). Meanwhile, estimated availability of pulses in China remains fairly low

(36.6 g/capita/day in 2001; FAO, 2001), similar to mean reported intakes of pulses in recent surveys (39 g/day in 1991 and 44.6 g/day in 1997, among CHNS adults).

Brazil has also developed a new national food nutrition policy, addressing the emergence of obesity rather than underweight as the major problem of adult malnutrition (Coitinho, Monteiro and Popkin, 2002; Monteiro, Conde and Popkin, 2004). In addition to continuing efforts to combat malnutrition, components of this policy include development of nutrition labels, regulation of health claims about foods, and the regulation of school meals, but their effectiveness remains unknown. However, even before these policies were implemented, there was a marked decline in the rates of increase in obesity among high SES women (Monteiro *et al.*, 2000). The researchers suggested that intensive mass media attention paid to the epidemic of obesity may have contributed to the decline. Television and print media programmes provided extensive information on the consequences of obesity, as well as on obesity prevention measures.

Developing countries may benefit from preventive measures that minimize further adverse shifts in diet, rather than attempting to reverse shifts after new dietary patterns are even more established as cultural norms. Given that adverse dietary and activity patterns appear to be widespread geographically and socio-economically, strategies with broad outreach are appropriate, for example by exploiting the use of mass media. The experience in Brazil suggests that mass media nutrition education efforts may be effective in reaching some population groups. Another important component of obesity prevention may involve working with the food industry. In the United States, increases in portion sizes in commercial food products may have contributed to higher intakes of energy-dense foods and exceed standard serving sizes (Young and Nestle, 2003; Nielsen and Popkin, 2003). Working with or regulating the restaurant and supermarket industries to maintain appropriate portion sizes may help to minimize excess intakes. Pricing has also been shown to play a key role in food choices in both developed and developing countries (French, 2003; Guo *et al.*, 1999). The use of subsidies or other incentives to ensure that fresh fruit and vegetables are affordable may help to promote healthier food choices. Since high intakes of meat are associated with increased risk of hypertension and cardiovascular disease, developing countries should continue to explore more effective agricultural and educational policies that promote the production and consumption of pulses as protein substitutes. Tastes and preferences begin to be established in early life (Hill, 2002). Therefore, schools may provide an important opportunistic venue through which preferences for more healthy options can be encouraged. Workplaces also provide an opportunity to encourage or provide opportunities for exercise and healthier diets, and efforts in some countries have targeted work sites (Doak, 2002). Dietary policies should be accompanied by programmes to address country-specific barriers to maintaining high levels of physical activity, such as efforts to facilitate safe active commuting, and the promotion of physical activity during leisure time.

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The growing global obesity problem: some policy options to address it

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INTRODUCTION

The last two centuries have seen a fundamental transformation of diets in essentially all affluent countries. At the beginning of this transformation was the agro-industrial revolution of the nineteenth century, which provided people with the expertise to produce more, the income to consume more, and increasingly sophisticated food products. The modernization of agriculture has played a pivotal role in bringing about change. The rigorous application of scientific advances to traditional agriculture, mechanization, genetic improvements and the development of fertilizers and pesticides enabled a doubling and redoubling of food production within the time span of a few decades. In fact, productivity growth was so strong that growth in production comfortably exceeded growth in demand and afforded a rapidly growing population more and better food at declining real prices. Agricultural productivity growth also promoted the industrialization of the then largely agrarian societies. It helped accumulate capital, free up labour and provide ever more and more nutritious food. Eventually, a virtuous circle was created where productivity growth, rising incomes and better nutrition became mutually supportive and thus spurred overall economic development[2]. At least for the nineteenth century, however, these developments remained largely limited to industrial countries.

It took more than a century before the agro-industrial revolution started to reach the first developing countries. With the beginning of the 1960s, the same factors that had initiated the agro-industrial revolution in the developed world in the previous century got a foothold in the food and agricultural sectors of parts of the developing world. The combination of modern varieties, expansion of irrigation, more and improved input supplies and the widespread mechanization of production made more food available to consumers in developing countries. Since the early 1960s, the average calorie availability in the developing world has increased from about 1 950 to 2 680 kcals/person/day while protein availability nearly doubled from about 40 to 70 g/person/day. The prevalence of undernourishment declined from 37 percent in 1970 to 17 percent in 2000 and, while more than 840 million of people (FAO, 2003) are still food insecure, this is more often the result of adverse local production conditions, war and civil strife, a lack of income and of access to food rather than the inability of the world as a whole to produce and provide enough food.

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[2] Fogel (1994) estimates that half of the overall economic growth in France and England in the nineteenth century was a result of better nutrition.

As in the industrial world of the nineteenth century, consumers in developing countries have benefited the most from advances in agricultural productivity. In real terms, food prices have declined to the lowest levels in history and, together with gains in broader economic growth, have enabled consumers today to eat better while spending less and less of their budget on food. However, not all countries and regions have benefited from these advances. In parts of the developing word, notably in sub-Saharan Africa, these advances have not even started to yield a meaningful impact. But in many developing countries, the progress in access to providing more, better and cheaper food has been impressive.[3] The rapid decline in real food prices has allowed consumers in developing countries to embark on food consumption patterns that were reserved for consumers in industrialized countries at much higher gross domestic product (GDP) levels. Today, a consumer in a developing country can purchase more calories than ever before and more than consumers in industrialized countries ever could at comparable income levels. In China, for instance, consumers today have about 3 000 kcals/day and 50 kg of meat per year (FAO, 2004) at their disposal – at less than US$1 000 nominal income per year (World Bank, 2002).

In addition to falling real prices of food, rapid urbanization has affected and will continue to affect consumption patterns. Essentially the entire population growth over the next 30 years will be urban. Urbanization creates a new and improved marketing and distribution infrastructure; attracts supermarkets and their sophisticated food handling systems (cold chains, etc.); makes for better roads and ports, thus improving the access of foreign suppliers and the importance of imports in the overall food supply; and, all in all, will promote a globalization of dietary patterns. Most important from a nutrition perspective, these changes include not only a shift towards higher food energy supplies but also a shift towards more fats and oils and more animal-based foodstuffs, and thus higher intakes of saturated fat and cholesterol.

The shifts in consumption patterns and lifestyles have resulted in a rapid increase in the prevalence of obesity and related non-communicable diseases (NCDs) in developed countries. Many developing countries are in the process of undergoing a similar nutrition transition (see WHO, 2003), with probably even more adverse health impacts. The main compounding factor of these nutritional changes is a phenotypic and genotypic predisposition towards developing obesity and NCDs. The phenotypic predisposition is the result of rapid transition from hunger and undernourishment towards overnutrition and affluence. There is ample empirical evidence that hunger and malnutrition "programme" the next generation to develop a more efficient energy metabolism and thus to have a higher propensity to develop obesity and related NCDs (see Delisle, 2002 for a comprehensive discussion). In addition, populations of developing countries have on average a genetic predisposition towards developing obesity and NCDs (thrifty *genotype,* Miller and Colagiuri, 1994).

The combination of: (i) the rapid nutrition transition with a rapidly declining share of expenditure on food as a percentage of total expenditure/income; (ii) urbanization; (iii) the shift in diet towards more animal products; and (iv) the phenotypic and genotypic predisposition towards a more efficient metabolism and NCDs could spark a rapid increase in the prevalence of obesity and NCDs in developing countries over the next generations.

[3] While not all developing countries have benefited from rapid income growth and nor have they experienced the same rapid socio-economic transformations that come with rapid industrialization and urbanization, the number of countries that are in the process of a profound transformation of their food economies is steadily increasing. As population giants such as China, India, Indonesia, Brazil and Mexico are among the most rapid transformers, the nutrition transition affects a large and growing share of the developing world's population.

The human and economic toll could be dramatic and, for many, the exit from food poverty may be associated with a straight entry into health poverty. This means that, while fewer people will suffer from hunger and chronic undernourishment, more will have health problems related to obesity and NCDs. The impacts will be felt more strongly than in developed countries as fewer consumers in developing countries will be able to afford the needed medical treatment even if they can afford more food. Many NCDs have a lethal impact if left untreated.

The rapid increase of NCDs also suggests that some of these concerns have already become a reality, at least in *developed* countries. Phenotypic and genotypic predisposition for obesity and NCDs in *developing* countries, in conjunction with the rapid nutrition transition towards higher calorie availabilities in general and more livestock products in particular, suggest that their populations may have to cope with an even bigger problem in a shorter period of transition. The policy messages emerging from these links are straightforward. First, all efforts that help fight hunger today and improve the nutritional situation of women of child-bearing age have the potential to yield an extra dividend for coming generations. Second, nutritional education and supplementary feeding programmes for pregnant women that ensure a balanced and healthy diet are even more important than hitherto assumed.[4] Third, policy-makers in developed and developing countries alike have to think about possible policy measures that can help contain a growing obesity problem without thwarting progress in fighting hunger.

As far as the fight against hunger is concerned, there is no shortage of programmes and projects that could provide or at least promise success. But policy approaches that could help contain or reverse the global obesity problem are rather new. The various proposals and their pros and cons are being discussed at the moment in many developed countries (for example, Australia, the United States of America and the United Kingdom of Great Britain and Northern Ireland).[5] The remainder of this paper aims to shed some light on the various proposals and will also try to assess possible interactions and incompatibilities with other policy measures. It will first look at the effects of price interventions, both at the level of primary commodities and final consumer goods (tax on fat food), then examine the possibilities of tax on excess body weight (tax on fat people), and finally present some experience gathered with a combination of various measures in integrated nutritional programmes. The discussion of the various policy options includes an examination of their effectiveness and efficiency, and an evaluation of their pros and cons and their compatibility with other policies. However, the presentation and discussion of possible policy measures will be limited to a few instruments; the focus will be placed on policy measures that have received particular prominence in the current public discussion in developed countries and in developing countries in rapid economic and nutrition transition; no claim is being made that the selection of instruments is comprehensive or representative.

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[4] They could be of critical importance in those developing countries where the prospects for a rapid increase in calorie availability combined with a more efficiently "programmed" metabolism could result in a disproportionate increase in obesity and related NCDs.

[5] For the United Kingdom, see for instance: news.bbc.co.uk/1/hi/uk/2988314.stm; for the United States: www.usatoday.com/life/2002/2002-02-19-diet.htm; for Australia: www.consumerfreedom.com/headline_detail.cfm?HEADLINE_ID=1960.

FOOD PRICE INTERVENTIONS

One of the most popular proposals to come to grips with the growing obesity epidemic and associated public health costs has been the proposal of a tax on energy-rich foodstuffs.[6] These proposals are now being discussed by health officials and public policy-makers with a view to identifying their *effectiveness* in reaching their stated objectives, their *efficiency* relative to other measures, and their shortfalls and side-effects. In principle, interventions could take place at two different levels. The first would be to influence producer prices for food, i.e. interventions at the agricultural producer level. There is a long history of such interventions in Organisation for Economic Co-operation and Development (OECD) countries and an equally long debate about the effects and problems that have emerged with such interventions on agriculture, but relatively little has been said about consumers and food consumption. The second entry-point for price interventions would be at the consumer price level. These interventions are currently largely limited to surcharges in the form of value-added tax (VAT) and total or partial exemptions from such VAT surcharges. The following will try to shed some light on possible impacts of the two types of intervention and will try to provide answers that arise in the context of policy interventions.

The case for food price interventions

The basic case for food price interventions rests on the notion that higher prices could provide a means to reduce excess food consumption, which is in turn associated with significant societal externalities. Put differently, the price of food energy set by a free market reflects the cost of producing the food rather than true cost (which is the production cost plus the external costs of treating NCDs such as coronary heart disease (CHD) or non-insulin dependent diabetes mellitus (NIDDM)). If food markets fail to capture the full costs of excess consumption, a tax – set at the level where production cost plus tax will equal the production cost plus external costs – would provide an economically efficient solution.

But there may be important rejoinders to the tax argument. For instance, that a tax on excess food consumption could be a regressive tax as it creates an extra burden on people with higher calorie needs or lower incomes. Moreover, interventions on food prices in a system of increasingly freer trade in food and agriculture are likely to create incompatibilities with commitments taken elsewhere, notably those taken within the World Trade Organization (WTO). Not liberalizing trade means foregoing efficiency gains to be had from a better allocation of production, which would need to be taken into account in the overall cost-benefit analysis of such a tax. How effective and efficient these taxes are in practice, and how compatible they are with other policy reforms will be discussed in the following section.

Price interventions at the producer level: "a tax on primary products"

As already mentioned, producer price interventions for food products are a commonly used tool of agricultural policies in developing and developed countries alike. Numerous studies have analysed their impacts on agriculture, farm households, incomes, the environment or rural development. But relatively little is known about their impacts on consumers and food consumption patterns. In fact, many analyses simply assume that changes in producer

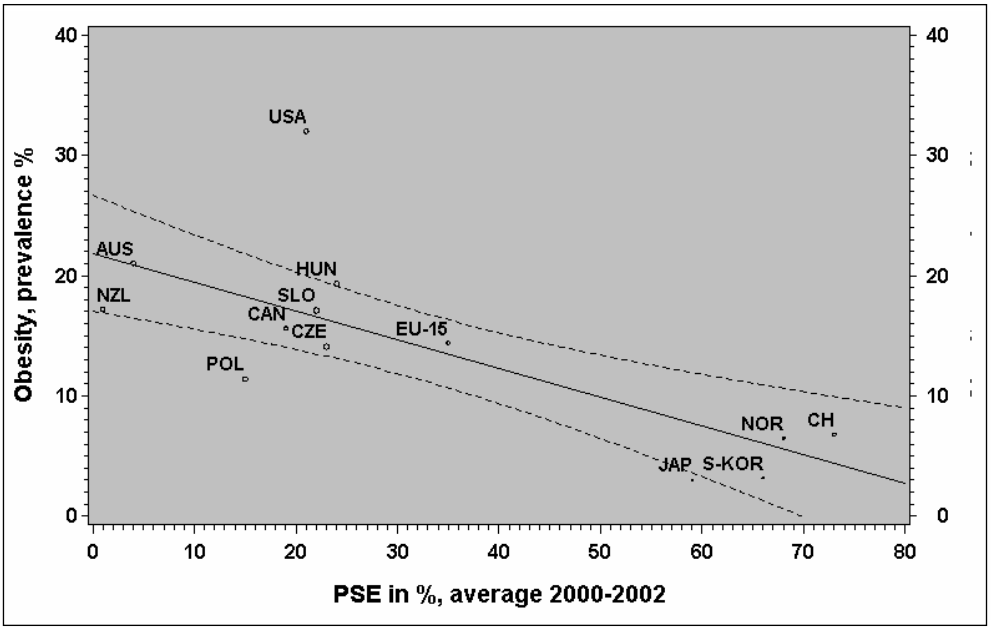
[6] For details of a recent debate at governmental level on a tax on fatty foods in the United Kingdom, see for example: www.theage.com.au/articles/2004/02/19/1077072753005.html?from=storyrhs or news.bbc.co.uk/1/hi/health/3502053.stm.

prices are fully transmitted to the consumer level or that consumers are implicitly assumed to change their consumption patterns according to a change in producer prices.

Interventions at the producer level have been subject to controversial policy debates, particularly those associated with higher border protection, intervention price systems and export subsidies. Any suggestion to increase such measures for the sake of possible health benefits would therefore add to an already contentious debate and should be most carefully vetted before any inference is drawn.

Much of the rationale put forward by the proponents of agricultural price interventions rests on the observations that countries with massive support to agriculture, high producer prices and high border protection are benefiting from relatively moderate prevalence levels for obesity. This relationship is depicted in Figure 1, which in fact suggests that the OECD countries with the highest Producer Support Estimate rates (PSE) (Japan, the Republic of Korea, Norway and Switzerland) have the lowest prevalence rates of obesity, while Australia, New Zealand and the United States, all with low or middling levels of protection, are burdened with relatively high prevalence rates of obesity. The question that arises in this context is whether this relationship is of a causal nature, i.e. whether it is a matter of correlation or causation.

FIGURE 1
Support for agriculture and the prevalence of obesity



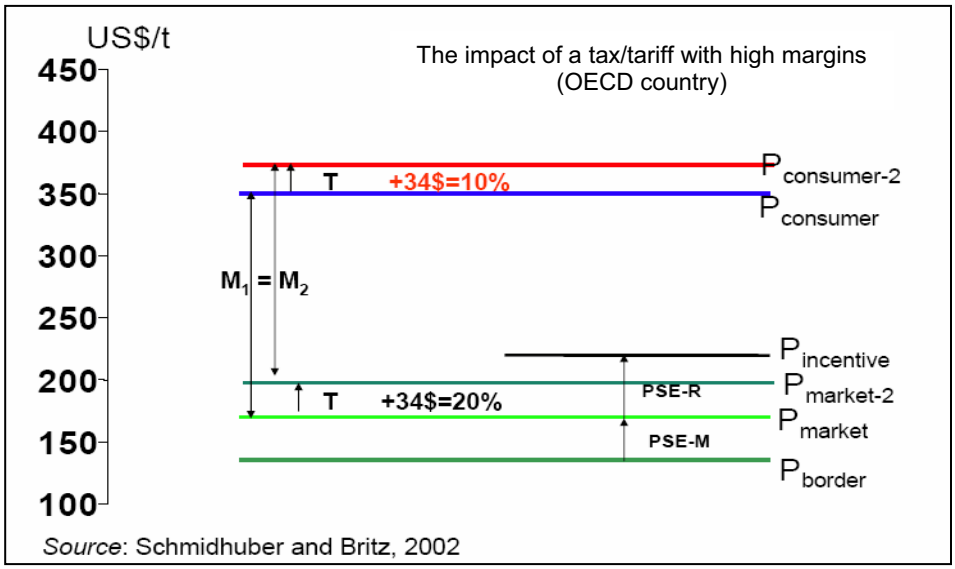
Source: International Obesity Task Force (IOTF) and OECD; FAO, Global Perspectives Studies Unit, 2003.

A necessary condition for a causal relationship is that a price increase at the level of the protected agricultural product has a substantial impact on final consumer prices. The question therefore is how and to what extent prices are transmitted along the food chain and to what extent the value share of farm products affects the final consumer price. A number of empirical studies help to find an answer to this question (e.g. Wohlgenant). These studies show that: (i) the value share of primary products in the final consumer good has been declining over time (with rising value share of services included in the product); and (ii) that there are considerable differences across commodities (for example, very low for wheat/bread and high for eggs). The high service element in the differences also means that the margins between producer and consumer prices are typically much higher in

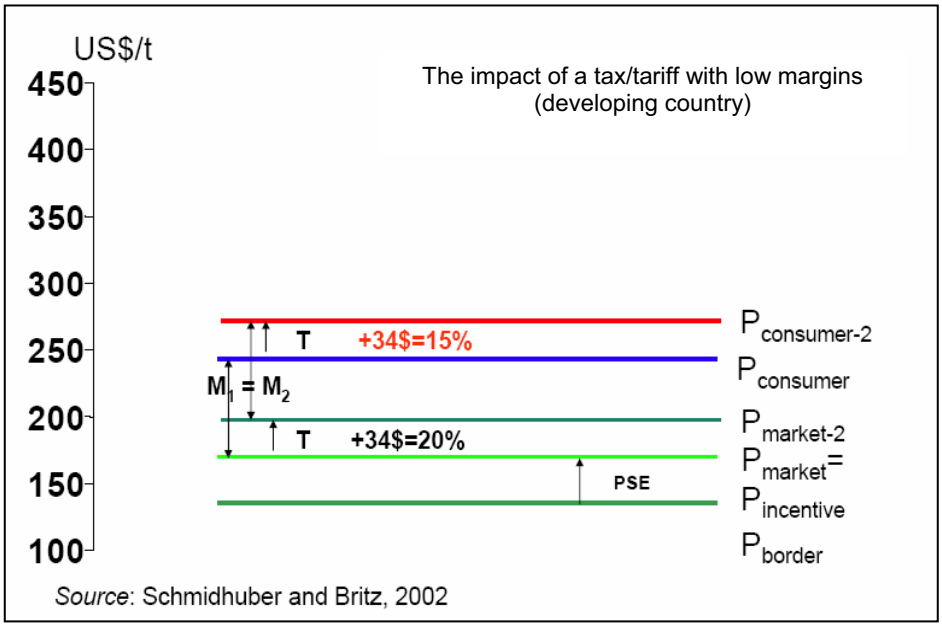
developed than in developing countries. For some products at least, an increase in the producer price in a developed country (regardless of whether through higher border protection, higher support prices or a combination of the two) may therefore not create a sizeable increase in consumer prices. This suggests that a change (increase) in producer prices for food would in general be a rather blunt tool to change food prices at the consumer level and thus have little influence on food demand. Figure 2 should help explain the channels that affect the transmission of prices from producers to consumers.

FIGURE 2

Examples of the agricultural price formation at support levels and processing margins



Source: Schmidhuber and Britz, 2002



Source: Schmidhuber and Britz, 2002

The upper pane of Figure 2 depicts the main factors that affect the *horizontal* and *vertical* price transmission for food products in a *developed* country (Schmidhuber and Britz, 2002). What is referred to as the horizontal transmission is essentially the transmission of primary product prices across the border from international markets to the domestic commodity market. In many OECD countries, this process is often heavily

affected by agricultural policy measures. In this process, the internal price formation starts from a (low) border price that is raised, e.g. through a tariff, to the level of the domestic market price. For producers, this market price is further increased (e.g. through a direct transfer) to the level of the farm incentive price, which drives the level of input applications and allocated area. The domestic market price is where the vertical price transmission process starts. It starts with a wholesale operation (cooperative), pooling supplies from farmers; the primary products (cereals) are then further processed at various stages (flour, bran, etc.); intermediate products are further refined (different types of flour), added to other products and eventually sold as the final consumer good (bread, breakfast cereals, etc.) by a retailer (supermarket, bakery). In this multistage process, the various agents often add considerable margins for the processing or marketing services they provide. As a result, the value share of primary good (wheat) eventually accounts for only a small share of the final value of consumer good (bread)[7,8].

The situation is quite different where primary products account for a larger value share in the final consumer good (Figure 2, lower pane); not an atypical case for the price formation in many *developing* countries. Any price increase at the producer level would translate into a more substantial increase in consumer prices and, where consumers are price responsive, result in a reduction of consumption. Higher consumer prices for food in developing countries, however, may also mean that – other things being equal – undernourishment may increase. It also explains, although does not justify, why many developing countries have chosen to tax their agriculture to the benefit of (urban) consumers rather than protecting it.

From the consumer point of view, the impacts of low shares on the final product is in effect described by Marshall's theory of derived demand (Marshall, 1920), i.e. that demand is typically fairly inelastic where the primary commodity forms only a small component of the final good. It may therefore be more efficient to levy a tax directly at the consumer level, again distinguishing the impacts of low and high price elasticities of demand.

Price interventions at the consumer level: a tax on "fat food"

A similar, although in its impacts somewhat different, approach to address the growing obesity problem is the proposal to levy a tax directly on consumer prices of food. Particularly in developed countries, the discussion has recently advanced from the theoretical proposition to examining actual and operational issues. Public health officials[9] in particular have been proposing concrete measures to increase the costs of energy-dense and "saturated fat rich" foods by adding an extra tax on energy-rich food or reducing the food VAT exemptions that are still in place in many countries.

While enthusiasm among public health advisors for such a tax is understandable, issues pertaining to the economic effectiveness and the operational efficiency of such measures in reducing obesity are less clear. Again, the effectiveness of such a measure depends crucially on how responsive consumers of these foods are to price changes induced by

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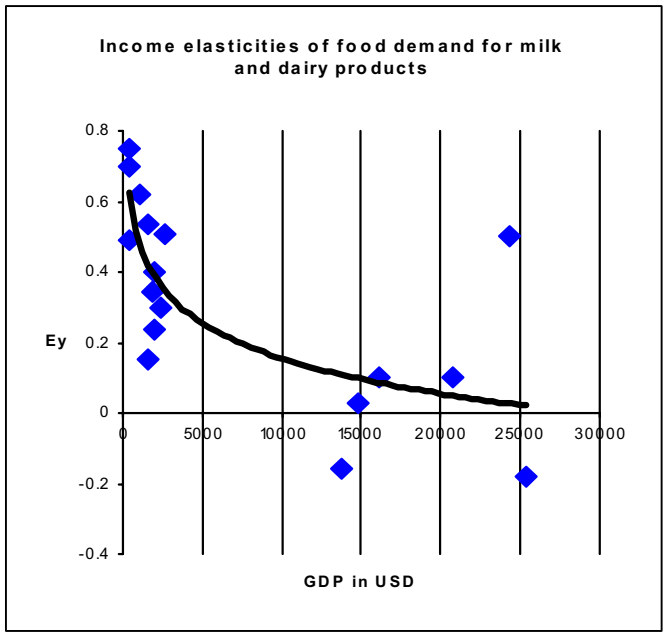
[7] Notable consumer price impacts are only likely if tariffs are extraordinarily high and/or processing and marketing margins are very small. Rice in Japan could be a case for more significant impacts on consumer prices, except that consumers in Japan have shown little responsiveness in their consumption of rice.

[8] In Figure 2 (upper pane), the margin between producer and consumer prices is assumed to be 100 percent. For cereals, the margin may exceed 500 percent and more, while it should be less than 100 percent for eggs.

[9] Dr Martin Breach, spokesperson for the British Medical Association, for instance, proposed a 17.5 percent VAT on high-fat foods. The Australian Medical Association is promoting similar measures.

(higher) taxes. The elasticities used in the FAO@2030 model[10] in Figure 3 give an idea of the general link between income levels and the responsiveness of demand with respect to income levels. They show a clear and strong decline of income elasticities with rising incomes and thus suggest that rich consumers are likely to react much less to a tax on certain foods than poor consumers.

FIGURE 3
Income elasticities at different income levels



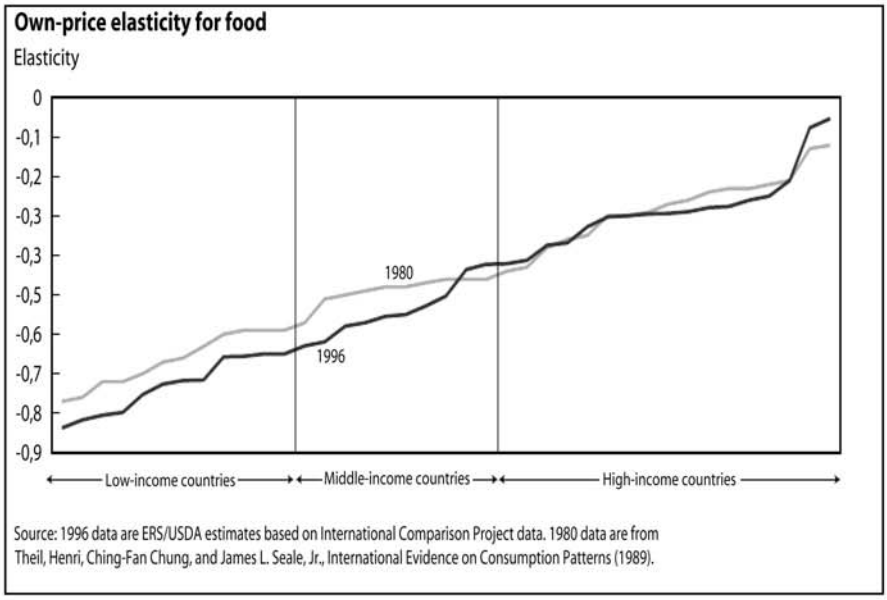
Source: Schmidhuber and Britz, 2002.

In general, income elasticities decline with rising incomes and even become negative (inferior goods) once a certain income level is exceeded. In tandem with lower income elasticities, price elasticities tend to decline (in absolute values) with rising incomes.[11] A detailed study by the US Department of Agriculture (USDA) (Regmi *et al.*) fully confirms the theoretical expectation with ample evidence from more than 100 countries. As depicted in Figure 4, rising incomes are associated with a sharp decline in own price elasticities from -0.9 in low-income countries to close to zero in the top range of the high-income countries.

[10] A description of the model is available in Schmidhuber and Britz, 2002.

[11] Falling income elasticities do not necessarily mean that price elasticities are also falling with higher incomes. In fact, it is possible to construct a globally well-behaved demand system with low-income elasticities as well as high own and cross-price effects. In reality, however, low-income elasticities for food are also associated with low price and cross-price effects.

FIGURE 4
Price elasticities for food across income ranges



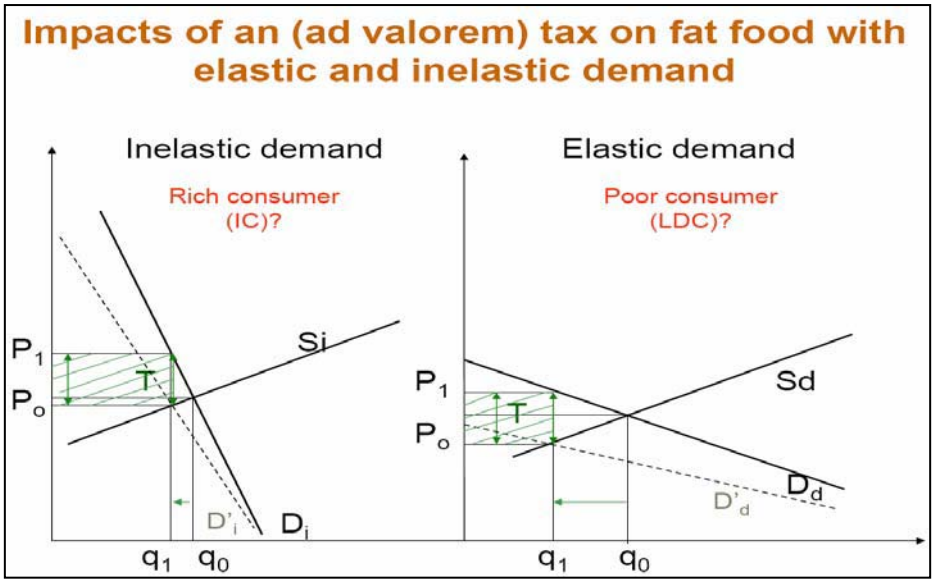
Source: Regmi et al, 2001.

The results of this research are summarized in Seale, Regmi and Bernstein (2003). They confirm many of the results obtained and established by earlier studies, notably that: (i) low-income countries spend a greater portion of their budget on necessities, such as food, while richer countries spend a greater proportion of their income on luxuries, such as recreation; (ii) low-value staples, such as cereals, account for a larger share of the food budget in poorer countries, while high-value food items, such as dairy and meat, constitute a larger share of the food budget in richer countries; and (iii) low-income countries are more responsive to changes in income and food prices and, therefore, make larger adjustments to their food consumption pattern when incomes and prices change. However, Seale, Regmi and Bernstein (2003) also found that adjustments to price and income changes are not made uniformly across all food categories. Staple food consumption changes the least, while consumption of higher-value food items such as dairy and meat changes the most. Additionally, the results indicate that when price changes are accompanied by equivalent income changes, wealthier low-income countries and middle-income countries make the most adjustments to their food demand (Seale, Regmi and Bernstein, 2003).

Assuming the basic relationships between food demand, incomes and prices, the principal impacts of a change in food prices, e.g. through a tax, can be examined. Figure 5 depicts the demand response to a tax on excess calories with price elastic (right pane) and price inelastic (left pane) demand. Where demand is inelastic (rich consumers, left pane of Figure 5), a tax on fat food will bring about only a small reduction in demand, thus only providing a small contribution to reducing food intakes and possibly obesity. In fact, the impact of the tax on demand will decline with the elasticity, while the tax revenues will increase. This low-responsiveness situation characterizes many food markets in developed countries, particularly where income differences within an economy are relatively small. The effect could be quite different in middle-income developing countries or in developed countries where incomes are less evenly distributed. Here a tax on excess calorie consumption – applied uniformly across all income strata – would do little to reduce

obesity in the high-income-low elasticity strata but could have a consumption-contracting effect on poor elastically reacting consumers.

FIGURE 5
Impacts of a tax on food with elastic and inelastic demand



There is empirical work that – by and large – confirms these theoretical expectations. In China, for instance, Guo *et al.* (1999) documented the possible reactions of consumers to price changes in various food items across a range of income strata. They found that: (i) consumers in low-income strata are more responsive to price changes for certain food items than rich consumers. For example, pork consumers in the poorest strata are reacting three times as elastically as consumers in the richest strata; and (ii) "an increase in the price of a food tends to drive consumption away towards its substitutes". They finally conclude that "increases in food prices have much less favourable effects for the poor" (Guo *et al.,* 1999).

Where income elasticities are low but substitutability between the various foodstuffs is high, a price-induced reduction of consumption in a given good is associated with higher consumption of its substitutes. In such a situation, taxes may well help to direct consumption of single food components in the desired direction, but the impacts on overall energy intake are likely to be limited. If, for instance, calories from animal fats are being taxed, consumption of vegetable oils and fats is likely to increase.[12] Numerous other side-effects could result.

A tax on animal fats, for instance, should promote the production and consumption of so-called "light" products (light yoghurts, low fat milk, etc.), while consumers would tend to reduce foodstuffs with high calorie contents. But the excess fat is likely to surface elsewhere in the food chain either domestically or abroad. One vent for surplus in many developed markets is the fast food and snack food industry that adds extra fat and sugar to many of its products, including ice cream, hamburgers and French fries. If these "junk" foods were to be taxed, the fat and sugar added currently to ice creams and hamburgers would occur elsewhere in the food chain. If not domestically, the high calorie parts of a

[12] As King (2002) puts it: "If the government regulates the content of, say, fast food, people will find fat elsewhere".

foodstuff could be exported and end up in developing countries. A case in point is poultry meat, where rich economies already consume predominantly the lean parts (breasts), while the fattier parts (leg quarters, wings) are primarily exported, with possible adverse effects on the food consumption patterns and agricultural economies of those countries that import them.

Another problem with a tax on excess calorie consumption is that in practice such a tax would have to be imposed on food items rather than on nutrients (energy) directly. As food items typically contain a group of different nutrients, a tax on a food item rather than on a nutritional component could bring about undesired side-effects. Guo *et al.* (1999), for instance, found that higher pork prices in China may indeed help reduce the intake of energy and saturated fatty acids of rich consumers but may cause an undesired fall in protein consumption by the poor.

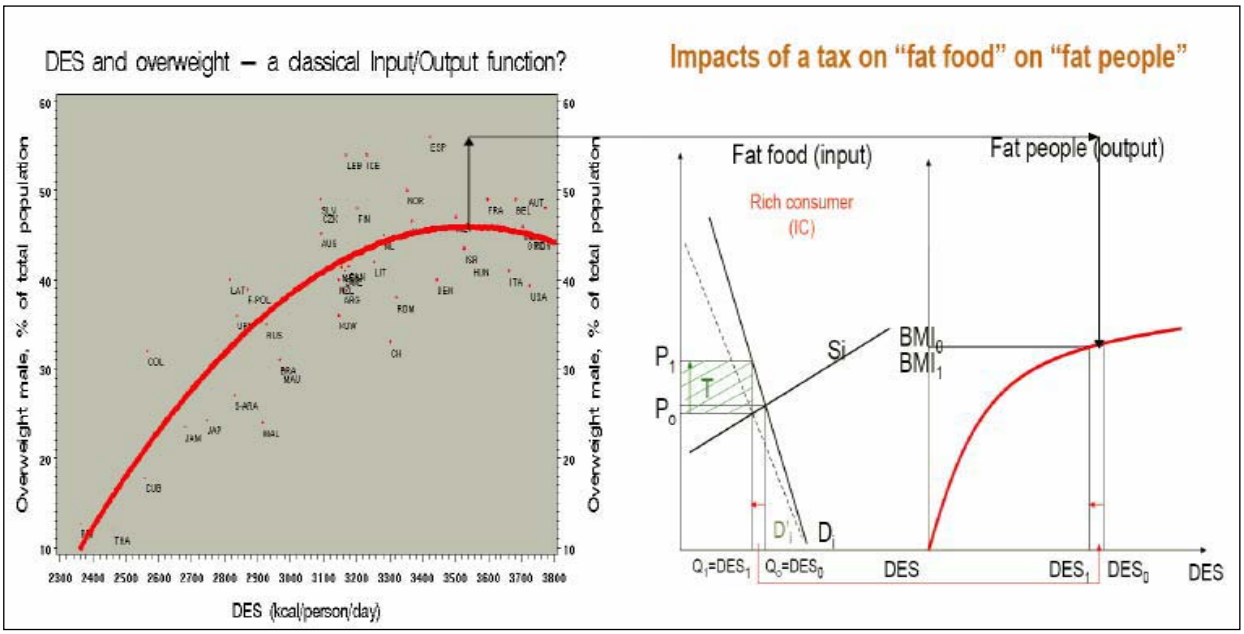
A look at excess body weights and dietary energy supply (DES) levels across countries seems to confirm the described impacts of a food tax on overweight and obesity. The left pane of Figure 6 depicts the DES levels and *male overweight*[13,14] in those countries for which OECD and the International Obesity Task Force (IOTF) provide information. It may help to illustrate a number of different issues that characterize the relationship between dietary energy supplies and excess body weight across different populations. First, it suggests that a considerable overweight/obesity problem can exist even where food supply levels are low on average. Second, the prevalence of excess body weight increases with the average food availability. Third, once the DES exceeds a certain level (about 3 300 kcals/person/day), there is no more increase in the prevalence of overweight. In fact, if obesity estimates were included, the curve would be flatter. The latter reflects the fact that a large share of calories above 3 300 calories is likely to be wasted. All in all, the relationship between food availability and excess body weight resembles a typical input-output function (agricultural production function, diminishing production increments per unit of additional applications of an input, e.g. fertilizer, beyond a certain level).

The tax on fat food (input) – in the context of an input-output function – helps to illustrate the possible impact of a change in input prices (tax on fat food) on the level of output (excess body weight). The right pane of Figure 6 combines the impacts of a tax on excess food energy intake in the input market with the likely effects on the output market (excess body weight). It underlines that the small impacts of the tax on actual food availability are even further reduced as the tax is effective in the flat part of the food energy/body weight curve. The flat part of the curve reflects the fact that a high DES is associated with high levels of waste; societies with more than 3 300 kcals also waste a lot more food and may thus not experience such a rapid increase in the prevalence of excess body weight.

[13] Male overweight was chosen because of the larger sample size, which also included low-income countries.

[14] A look at the prevalence of excess body weight across different income strata within a country would have been preferable, but was – in the absence of data - impossible.

FIGURE 6
Impacts of a food tax on excess body weight



Source: OECD/FAO/IOTF, years vary from 1994 to 2001
FAO, Global Perspectives Studies Unit, 2003

Waste is in fact usually the most elastic form of utilization and may therefore be the first to be reduced when prices rise (through tax). Again, this buffer is likely to be more (less) pronounced where incomes and food availability are high (low). As DES levels climb above the 3 300 kcals threshold, the largest part of the incremental food availability is likely to be wasted. This means that a tax on excess calorie consumption (e.g. on calorie-rich foods) may primarily reduce the level of waste in rich countries/for rich consumers while it may affect more directly the poorer consumers with lower waste levels. In the worst case (elastic poor and inelastic rich consumers and large income disparities), a tax on food may do little about obesity and increase undernourishment. In the best case (high level of equality, low food demand responsiveness), it will have a small impact on obesity, reduce waste to a certain extent and be an effective means to collect money that could be used to finance programmes for nutrition education.

As shown above, the link between calorie availability and excess body weight of Figure 6 is based on a cross-country (intercountry) analysis of available data. It was also mentioned that an intracountry analysis of excess body weight would have been preferable but had to be dismissed because of a lack of income-stratified obesity data. The problem with the cross-country data is that they may not be representative of the obesity distribution within a country. In fact, there is growing evidence that – within rich countries – excess body weight is increasingly a problem for poorer consumers, who rely heavily on the cheap but empty calories of the fast food industry. Nestle (2003), for instance, claims that obesity is increasingly becoming a problem of the poor who are disproportionately high consumers of cheap dietary energy. In this case, a tax on certain energy-rich food items ("junk food") could in fact have a curbing impact on consumption. The problem is of course whether poor consumers in developed countries have alternatives that they could resort to in the case of an extra tax on such food items.

Nevertheless, the disadvantages of food price interventions are likely to outweigh their advantages in reducing or reversing the trend towards a higher prevalence of obesity. For rich consumers, inelastic demand will limit the desired impacts on food demand, while for poor consumers high prices may create an added food insecurity problem. That said, targeted price interventions at the consumer level can have an impact on food consumption patterns if: (i) they are targeted; (ii) demand is reasonably elastic; and (iii) consumers have a choice to shift to healthier foods. Where marketing and processing costs are high and taxes are applied to the final consumer good, the tax revenues could be considerable, the impacts on primary agriculture would be small and thus the trade distortions would be minimal. Where processing margins are small and demand is elastic, tax revenues would be small and the risk of creating adverse impacts on food security could be considerable.

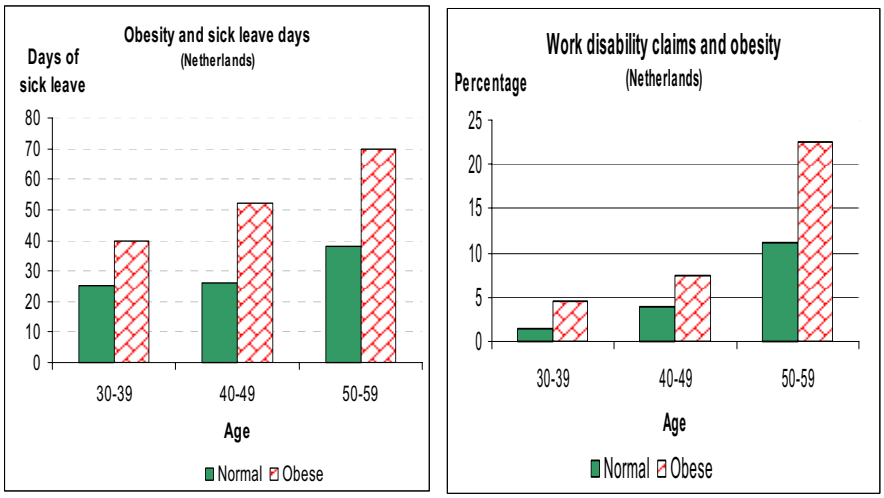
A TAX ON EXCESS BODY WEIGHT: "TAX ON FAT PEOPLE"

The low effectiveness and efficiency of a tax on energy-dense foods in reducing excess body weight in affluent societies, its potential for creating added trade problems and the risk of increasing food insecurity in poor societies or poor segments of rich societies pose the question of a more effective alternative. One of the most frequently discussed options is a tax on excess body weight rather than on excess calorie consumption. Colloquially, this proposal is being referred to as a tax on "fat people" as opposed to a tax on "fat food".

While such a proposal may sound exotic at first, in practice it is not. In fact, there are already various forms of incentives or disincentives in place that aim to reduce excess body weight (or prevent increases in excess body weight). However, none of these measures are referred to as a tax on fat people. Health insurances, for instance, offer discounts on premiums for clients with normal body weights. Car insurers have started to offer discounts to normal weight customers as there is growing evidence that obese drivers have a higher risk of causing an accident. Even fast food chains introduce implicit taxes on overweight people by rejecting obese job applicants (Greenhouse, 2003). On the incentive side, employers offer free access to gyms to their employees even during working hours as there is ample evidence that excess body weight reduces the productivity of their staff and increases disability and sick leave claims (Figure 7). In the United States, probably the most important incentive to reduce excess body weight was brought about by a new policy of the Internal Revenue Service (IRS, 2002), stating that "obesity is medically accepted to be a disease in its own right". For taxpayers, this now means that treatment specifically for obesity can be claimed as a medical tax deduction.[15]

[15] "Uncompensated amounts paid by individuals for participation in a weight-loss program as treatment for a specific disease or diseases (including obesity) diagnosed by a physician are expenses for medical care that are deductible under §213, subject to the limitations of that section."

FIGURE 7
Economic costs of obesity



Source: Narbro *et al*., 1996.

The basic case for these measures rests on the social costs that overweight people cause for society (Figure 7). To the extent that obesity creates external costs for society, a tax on fat people could be perceived as a "Pigouvian" tax that helps bring private costs (low premium and low perception of personal health damage) in line with the social costs for society, i.e. higher health expenditures, lower productivity or more disability claims. To the extent that obesity is a question of nurture rather than nature, such a tax would essentially reflect the application of the "polluter pays principle" for obesity. The crucial questions for practical policy implementation are: (i) whether such a tax on the "output" (excess body weight) would be more efficient and more effective than a tax on the "input" (excess food consumption); (ii) what differential impacts such measures would have on rich and poor consumers, food availability and food security; and (iii) to what extent obesity is a condition caused primarily by phenotypic and genotypic predisposition or whether it is predominantly the result of a food energy imbalance (calorie intake in excess of calorie expenditure).

There are a number of reasons that suggest that a tax on excess body weight would be both more effective and more efficient than a tax on excess food energy intake. First, a tax on excess food energy would address only the calorie intake side of the dietary energy imbalance but leave the calorie expenditure side completely unaddressed. When calorie requirements are high because of physical work, exercise or a less efficient metabolism, a tax on food may create additional private costs without creating a societal benefit. On the contrary, the extra food costs may reduce workers' productivity, lower their physical activity and thus create an extra cost for society. Poor consumers would be hardest hit. A tax on fat people would avoid that problem as it directly taxes the result of the dietary energy imbalance rather than only the energy input side. Moreover, a tax on excess body weight should not have any trade distorting impact, as there is simply no need to maintain the food tax distortion through a price wedge for food at the border. Finally, to the extent to which the tax on excess body weight lowers food demand, food prices may actually fall and thus afford an added advantage to poorer consumers. But a tax on excess body weight may not be without pitfalls. Most important, lower body weights *per se* are not a guarantor for a healthier diet and lifestyle. In fact, there is no shortage of unhealthy ways to reduce excess body weight.

The discussion on the various price and tax intervention mechanisms suggests that there are considerable differences in the efficiency and effectiveness of these measures in helping to reduce the prevalence of obesity. Probably the least efficient and least effective measure would be an intervention at the producer price level. It would also be the measure least compatible with other policy objectives, notably freer trade. While probably more efficient, a tax on consumer prices of food may also cause undesirable side-effects, notably where income inequality is large and where low-income strata react elastically to changes in food prices. A direct tax on excess body weight should be the most efficient and effective measure, but will not be sufficient on its own.

There is also growing evidence (Barker, 1994) that the effect of a phenotypic or genotypic predisposition can crucially affect the occurrence and degree of obesity. Moreover, a high prevalence of obesity in a given generation can be the result of a higher prevalence of undernourishment in the parent generation, and countries that undergo a rapid nutrition transition may suffer most. In this case, the "polluter pays" principle would certainly not apply and could in fact represent a grossly unfair policy measure.

INTEGRATED HEALTH AND NUTRITION PROGRAMMES

The preceding discussion suggested that there is no simple or single solution. Instead, there is growing evidence that it will take a combination of policy instruments to address the problem of obesity and related NCDs successfully. Such an integrated programme has, for instance, been launched in Norway and has – overall – yielded very positive results. The details of the programme are available from Norum (1997). Without repeating the details, the correlates of success were: (i) a strong legal and institutional foundation of a population-wide effort in a national organization, i.e. the National Nutritional Council (NNC); (ii) a robust scientific and empirical backing;[16] and (iii) a combination of measures (from food price interventions to nationwide food education programmes) embracing a great number of stakeholders. Practical experience in Norway also suggests that there can be a considerable time-lag between the implementation of various measures and the first measurable success.

The Republic of Korea provides another example of a successful nutrition programme. Details are available from Lee, Popkin and Kim (2002). Kim, Moon and Popkin (2000) find that food energy intake and obesity levels in the Republic of Korea are approximately half of what might be expected in a country at that economic level, while vegetable intake is much higher than might be expected. Lee, Popkin and Kim (2002) suggest that a number of factors have contributed to this outcome. First, there has been a strong movement to retain traditional diets and food preparations. At the heart of this movement is a training programme, which has been offered by the Rural Development Administration since the 1980s. The Home Management Division of the Rural Living Science Institute (Suwon, Republic of Korea) has trained thousands of extension workers to provide monthly training sessions in cooking methods for traditional Korean foods, such as rice, *kimchi* (pickled and fermented cabbage) and fermented soybean products. The programme appears to reach a significant component of the newly married women in the Republic of Korea, but exact statistics are not available. At least to a certain extent, food consumption was also curbed by higher food prices, which were backed by domestic producer price support and border measures. The same combination of food traditions, educational programmes and higher food prices may help to explain the positive nutritional outcome in Japan where, as in

[16] For example, the "Oslo Study" or the health surveys of the National Health Screening Service.

Norway and the Republic of Korea, the prevalence of obesity and NCDs remained much lower than in other countries of comparable development and income levels (see Figure 1).

SUMMARY AND CONCLUSIONS

This paper has analysed some of the currently discussed policy options to reduce or avoid food-related causes of excess body weight and NCDs. The analysis included various options, from food price interventions at various levels to integrated nutrition programmes. Interventions at the producer price level have been identified as the least efficient and the least effective in changing nutritional outcomes and reducing excess body weight. They are also unlikely to be compatible with efforts to liberalize agricultural trade. Consumer price interventions are likely to be more efficient – at least in developed countries – particularly as their effects are not diluted by huge processing margins. But what plagues all price interventions is the fact that those consumers who should reduce excess energy intake are likely to be the least responsive to price increases and will thus not alter their consumption patterns only because food is more expensive. Alas, the opposite holds for poor countries or poor consumers in rich countries where higher food costs could bring about or aggravate undernourishment problems.

Probably more effective and efficient than a tax on food would be a direct tax on excess body weight, i.e. a tax on obesity itself. In fact, many developed countries have already instituted such taxes, mostly in the form of penalties for extra body weight or incentives (premiums/tax brakes) to lose excess body weight. The main advantages are: (i) no negative side-effects on food markets; (ii) compatibility with other policy measures; and (iii) no penalty for consumers who need high-energy intake levels because of a higher calorie expenditure. Moreover, the tax would not only have fewer side-effects but be more effective and efficient as it addresses the excess body weight problem from both sides of the energy balance: the calorie intake side and the calorie expenditure side. The main drawbacks are possible difficulties in the actual implementation and the fact that a lower body weight in itself is no guarantor for a healthier diet.

The discussion of the various price intervention mechanisms also underlined that there is no single measure that is sufficient to address the problem. Where progress towards a healthier diet – and in the sequel a healthier population – has become reality, the underlying policy changes included a broad spectrum of measures. These measures encompassed not only price interventions and premiums but also measures to enhance nutrition transparency and education. But even for such integrated programmes, progress is not immediate and even in developed countries decades may pass before tangible impacts are produced. The diversity and complexity of successful approaches, the time-lag between policy measures and their impacts, the accelerating nutrition transition and predisposition to develop obesity and NCDs underline the urgency for action in developing countries.

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