

Effects of Urbanization on Global Food Demand

Anita Regmi and John Dyck¹

Abstract: Urbanization, by affecting caloric requirements, food availability, and female labor status, impacts the structure of food consumption. Urbanization, associated with economic development and income growth, has already largely occurred in developed countries, while continuing strongly in developing countries. Food demand projections may differ if they account for urbanization.

Introduction

The four decades since 1960 have witnessed rapid growth of the global economy and a doubling of the world population. At the same time, global food consumption has kept pace with income and population growth, leading to increased demand for most food commodities. Will this food consumption growth continue? Studies of the world's population have consistently shown that the rate of growth in population is slowing, and that global population may even cease growth sometime in the 21st century. Projections of global food demand have already taken into consideration this slowing of the rate of population growth. In most projections, the other main determinants of food consumption have been income and prices.

Recent research has suggested that other demographic variables also determine the rate and composition of changes in food consumption. Among the most important is the shift of much of the world's population from a rural existence, centered around farming, to urban life centered around non-agricultural occupations. Urbanization, defined as the proportion of urban residents in the total population, has been closely related to economic growth. While economic growth can continue indefinitely and go in cycles, urbanization has so far been a one-way process, and, as in developed countries, eventually the rural share of the population

becomes so low that urbanization is no longer an important factor in projecting food balances. In considering what food consumption will be like in the first half of the 21st century, the extent of urbanization and its interaction with income changes are important.

Reasons Why Rural and Urban Food Consumption May Differ

Urbanization can lead to structural changes in food consumption patterns for several reasons. First, given different lifestyles, calorie requirements of urban and rural residents differ, with sedentary urban lifestyles requiring fewer calories to maintain a given body weight. The decrease in calorie consumption per person related to urbanization has been well illustrated by Clark, Huberman, and Lindert (1995), who examined Britain's food consumption pattern between 1770 and 1850, a period of rapid urbanization. Given a dramatic 65 percent increase in income per person during this period, food demand should have significantly increased, assuming even a modest income elasticity of demand for food. However, data indicate that food consumption per person may have stagnated or even declined in Great Britain during this period. The authors point out that different calorie requirements for urban and rural residents may be one of the factors leading to lower calorie consumption in urban areas which is reflected in the overall lower average per capita consumption.

In modern times, urbanization appears to have a greater impact on composition rather than the overall

¹ Agricultural economists with Market and Trade Economics Division, Economic Research Service, USDA.

level of per capita food consumption. For example, an empirical study using 1960-1988 data illustrates that urbanization leads to significantly reduced urban demand for cereals in higher income Asian countries (Huang & David, 1993). Other data, that will be discussed later, indicate greater meat, fruit, and vegetable consumption in urban areas.

Second, food availability and an individual's ability to purchase food differ in urban and rural areas. Given the subsistence nature of agriculture in many developing countries, the composition of food consumption in rural areas is generally constrained by residents' ability to sell their produce as well as purchase other food. For example, Wu (1999) indicates that on average, rural households in China still produce 50 percent of their own food. Urban residents on the other hand, generally do not grow their own food and are exposed to a wider array of food from which to choose.

Finally, urban areas are centers of economic opportunity and have a greater percentage of women working outside the home. Studies have indicated that increased opportunity cost of women's time increases the demand for non-traditional 'fast food' in many countries. For example, the demand for rice, a non-traditional imported product, has increased significantly in the urban areas in West Africa (Reardon, 1993; Kennedy & Reardon, 1994). The processing and cooking costs of rice in West African cities are lower than for the traditional coarse grain cereals. Rice, particularly "fast-food" or street-vendor rice has become very attractive, even to poor urban consumers. Similarly, the increased value of women's time appears to be an important factor raising demand for bread in quasi-urban households in Kenya (Kennedy and Reardon, 1994) and urban households in Sri Lanka (Senauer, Sahn, and Alderman 1986).

The Interaction of Urbanization and The Level of Economic Development

The influence of urbanization in determining future food demand is dependent on the degree to which urbanization has occurred. If urbanization is largely over, and the country has reached a stable level of economic development, the effect of further urbanization on future dietary patterns will be small. If the rural population is still a large share of the total, urbanization's effects on consumption differ depending on economic conditions. For poorer countries, urbanization may initially lead to the substitution of

marketed staple cereals and processed foods for basic rural staples such as rice and cassava. With further increases in income levels, food consumption expenditures may increase as more and more expensive sources of nutrients such as meat, fruit, and vegetables are increasingly consumed, while the consumption of staples, such as cereals prepared at home, may decrease. Specific impacts of urbanization, however, may still differ from one region to the other based on inherent socio-economic factors present in the region. For example, increased urbanization may lead to reduced rice consumption in Asia, while it may actually increase rice consumption in Sub-Saharan Africa.

Urban areas typically offer residents a wider choice of dietary patterns from foreign cultures than do rural areas. Some argue that as countries become more developed, given the current trend towards globalization, there is a tendency for dietary structure to become increasingly similar across similarly developed countries. This is facilitated by multinational food processing and distribution industries that operate globally as well as changing demographics within the countries. The presence of U.S.-style fast food restaurants in other countries has greatly affected food consumption in these countries.

Blandford (1984) points out that the dietary patterns across the majority of the Organization for Economic Co-operation and Development (OECD) countries had become increasingly similar by 1984. As income levels increase in developing countries, exposure to the global 'urban' eating pattern increases, resulting in the consumption of many Western-style foods.

In addition to urbanization, the relative size of different age cohorts in the world population may also affect future food consumption (see box). At present, this factor appears to be somewhat correlated with urbanization since a large proportion of the population in the less-urbanized developing world is young, while that in the more-urbanized developed world is aging. As the younger and rapidly urbanizing population in developing countries increasingly embraces Western food habits, the growth and composition of global food consumption and trade will continue to undergo changes.

Urbanization and changes in dietary pattern do not necessarily indicate improved nutritional patterns. Clark, Huberman, and Lindert (1995) note that poor eating habits of urban dwellers were evident in Great Britain 150 years ago. Despite corrections for income

and family composition, rural workers were found to consume more calories and proteins from grains and dairy products and vitamins from green vegetables, while urban residents consumed more tea, coffee, sugar, and treacle². According to the authors, the diet differences were reflected in the general health of the population, with data indicating the rural population to be consistently taller than the urban dwellers. In modern times, urbanization and the associated greater component of animal protein in the diet of urban residents may actually lead to a taller urban population. However, research indicates that the sedentary lifestyle and high consumption of fats and sugar associated with modern urban society are damaging to human health (Grundy 1998).

Trends in Urbanization and Food Consumption

During the past three decades, the urban population increased from 34 percent of total world population in 1960 to 46 percent in 1998 (World Bank, 2000). In 1960, developed countries accounted for about a third of all urban population in the world (fig. C-1). However, in 1998, developed countries accounted for only about one fifth of the 3.4 billion global urban population. Urban population growth in low- and middle-income developing countries has outpaced both the urban population growth in high-income developed countries, as well as the rate of growth of the rural

population in developing countries. While the urban population in developing countries totaled about 574 million in 1960, it exceeded 2 billion in 1998, growing at the annual rate of about 3 percent in the 1990s. By contrast, the rural population in these countries grew less than 1 percent per year during the 1990s. Assuming the 1990's rates of growth for urban and rural areas continue, the urban population in developing countries can be expected to double to nearly 4 billion by 2020.

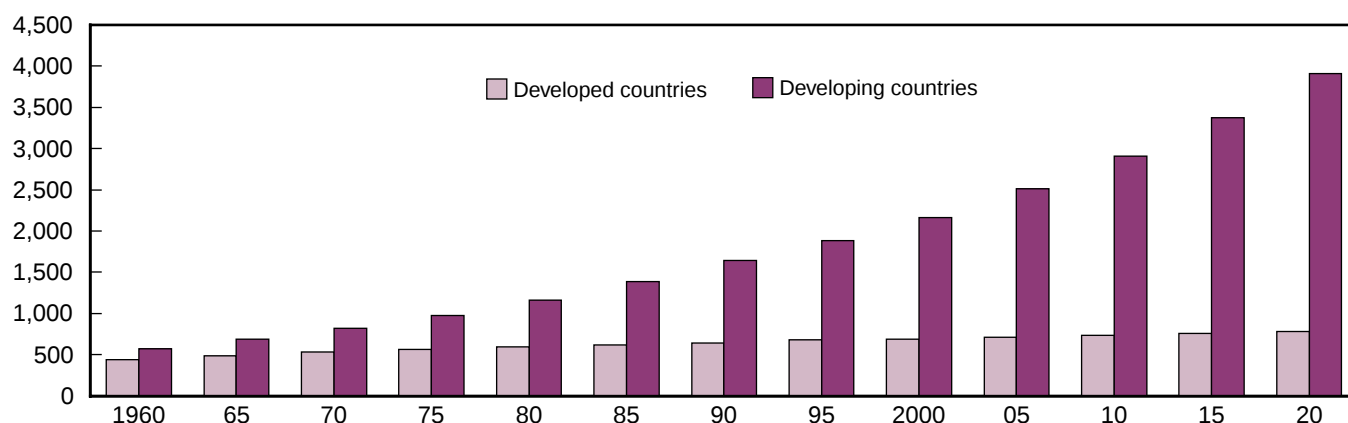
Urbanization in developing countries has generally been associated with increasing per capita income and changing lifestyles and consumption patterns. As illustrated in Figure C-2, during 1961-1998, when the urban population in developing countries quadrupled, the average income in the region measured by per capita gross national product (GNP) in constant U.S. dollars doubled. Although per capita income levels greatly increased for countries at all income levels, major differences in per capita income exist between the low- and middle-income countries. The average per capita income level (in 1995 US\$) for low-income countries grew from about \$145 in 1961 to \$530 in 1998, while that for middle-income countries ranged from about \$1,400 in 1961 to over \$3,000 in 1998 (World Bank, 2000).

Urbanization in many developing countries accompanied rapid industrialization and economic development. For example, based on the World Bank's development indicators, between 1985 and 1998, productivity, foreign direct investment, and transport and infrastructure services increased considerably in

² A sweet syrup often made from a blend of molasses, invert sugar, and corn syrup.

Figure C-1
Projected urban population

Millions



Source: The World Development Indicators, The World Bank, 2000.

Food Consumption in an Aging World

by Hiroshi Mori and John Dyck

In studies of food consumption over time, it is important to include age-related variables, or at least to control for age-related effects. If this is not done, estimates of price and income effects may be biased. In the coming decades, demographic studies project an older age profile for most regions of the world. Data indicate (World Bank, 2000) that during the last four decades, the number of individuals below 14 years of age declined in countries across all income levels. Nevertheless, on an average, this age group still accounts for over 30 percent of the population in developing countries compared with 19 percent in developed countries. Both to properly explain past changes in food habits and to project future levels of food consumption, economists need to think through and empirically test linkages from the demographic shifts to the observed changes in food consumption.

This is particularly important in countries in which the population is not evenly distributed by age and where the age distribution may have changed rapidly over a given period. Japan, in particular during the period 1960-1998, is a major example of such a shift in the age structure of the population. Because of a very low birth rate, Japan has moved from a relatively youthful population distribution in 1960, with 30 percent below 14 years and less than 6 percent above 65 years, to a population with over 16 percent 65 years or older and 15 percent 14 years old or younger in 1998 (World Bank, 2000). Factors related to age and age distribution could have affected food consumption patterns in the country.

Age-related variables include the chronological age of an individual. Food consumption by an individual can change as he or she ages over a lifetime. Blisard and Blaylock found important differences in food consumption according to ages in the United States (1988-89 data), with older people consuming higher levels of fruits, vegetables, and other foods at home. As the U.S. population ages, this suggests higher at-home consumption of such foods in the future.

Another age-related variable to consider is the birth cohort, or generation, to which individuals belong. A cohort of people of the same age may adopt a dietary

pattern that differs from the cohorts above and below them, and they may keep this eating pattern through their lives. For instance, U.S. consumption of coffee may be greater in some older cohorts, and now again in the new cohorts, with cohorts in the middle more attached to soft drinks. A cohort born in 1940 may show above-average coffee consumption throughout the life span of its members.

Recent research by Mori and others (1997 and 1999) found large age-related differences in food consumption among consumers in Japan. Using a time series of cross-section data on household food consumption, they examined the differences in at-home consumption of particular foods among consumers according to the 5-year birth cohort to which they belonged. In addition, variables for the age of the individuals and for the year of the annual survey were included. The study found that consumption of rice, sake, fresh fish, and fresh fruit varied according to cohort: the older cohorts consumed greater amounts of these foods, and newer cohorts less. For beef and beer, the opposite case was true: newer cohorts consumed more. Much of the overall change in at-home food consumption could be explained by the replacement of older cohorts by newer ones. Further research is needed to investigate the role of economic variables (income and price) in models that include age-related variables.

Reference

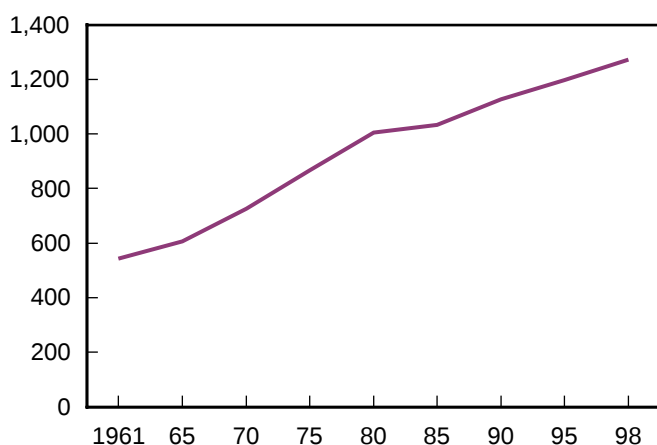
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low- and middle-income countries. In developing countries, this period witnessed a growth of 50 percent in passenger air travel, telephone mainlines per 1,000 people grew by almost 70 percent and, on an average, the use of international telecommunications services grew by about 40 percent. As in the case of per capita income growth, although low-income countries witnessed tremendous growth in various economic indicators, they lag far behind developed and middle-income countries when comparing actual indicators.

Figure C-2

Developing country GNP per capita

1995US\$



Source: The World Development Indicators, The World Bank, 2000.

Increased urban economic activity and income during the last two decades have led to changes in global food consumption patterns. Often the best available measure of food consumption is the supply or availability of food in a market. Global food availability has undergone structural changes as evident from changes in the composition of food availability between 1961 and 1998 (table C-1). At the highest income levels, per capita consumption (as indicated by food availability) of cereals and roots and tubers decreased, while that of meat and fruit and vegetables increased substantially. In low-income countries, where food security remains a concern despite recent economic gains, decreases in root and tuber availability were more than offset by dramatic increases in per capita supply of all other food types. Despite these gains, per capita availability of meat and fruit and vegetables in low-income countries continues to remain far below that of middle- and high-income countries. With the exception of roots and tubers, food supply also substantially increased in middle-income countries.

Structural changes in food consumption associated with urbanization are visible in developing countries. Individual country food consumption data illustrate the fact that the trends observed in food consumption at the national level can be attributed in part to urbanization and associated changes in lifestyles and incomes. Urban dwellers consume more meat compared with the rural population in China, Indonesia, and Pakistan,

Table C-1—Global food availability

	1961	1965	1970	1975	1980	1985	1990	1995	1998	1961-98
	Kgs/capita/year									% change
Cereals										
Low-income countries	138.7	141.2	145.7	136.4	136.2	141.5	148.7	153.9	156.2	12.6
Middle-income countries	125.0	129.4	131.0	136.0	139.9	142.0	142.2	140.4	139.8	11.8
High-income countries	122.3	118.1	111.7	109.0	107.3	107.4	108.1	109.9	112.9	-7.7
Roots & tubers										
Low-income countries	46.6	48.8	53.3	54.1	51.1	51.7	54.6	58.8	59.3	27.3
Middle-income countries	14.6	14.5	14.1	13.0	12.4	12.3	11.7	13.0	13.1	-10.3
High-income countries	17.4	16.0	15.4	14.4	14.6	14.6	14.6	14.7	14.8	-14.9
Fruit & vegetables										
Low-income countries	101.8	106.9	112.5	114.4	121.4	121.0	127.8	121.9	124.2	22.0
Middle-income countries	117.5	124.8	128.3	137.0	150.8	152.2	156.9	156.2	161.9	37.8
High-income countries	152.7	160.9	176.9	184.8	186.8	194.6	216.2	221.7	223.7	46.5
Meat										
Low-income countries	7.6	7.6	7.7	7.4	8.1	8.4	8.7	9.3	9.6	26.3
Middle-income countries	22.7	24.0	26.9	30.0	33.6	35.3	37.7	40.3	39.8	75.3
High-income countries	54.2	58.2	64.8	71.1	76.1	77.9	80.7	83.7	85.8	58.3

Source: FAO Food Supply data. Note countries are grouped according to the World Bank definition.

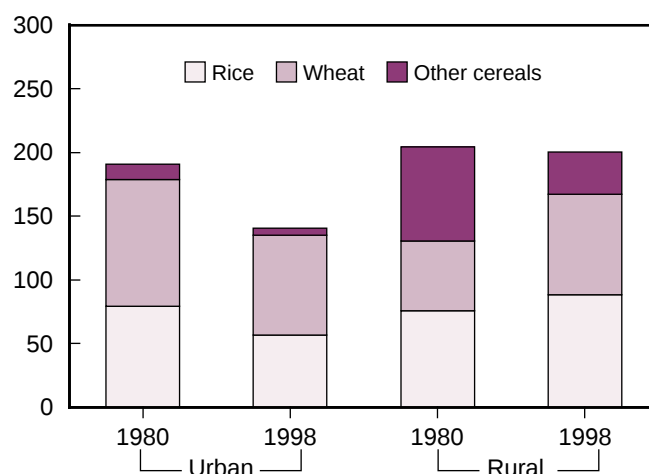
and more fresh fruits and vegetables in China and Indonesia (table C-2). Additionally, consumption per person of meat and fruits and vegetables has grown at a faster rate in most urban centers of the developing world than in rural areas.

As mentioned earlier, individuals in rural areas tend to consume more energy-rich carbohydrates, such as cereals, starchy roots, and tubers than individuals in urban areas. However, data indicate that within the rural sector, increased availability and greater purchasing power have led to definite shifts in consumption among these energy-rich staple foods. For example, root consumption declined significantly in rural Indonesia between 1978 and 1987 (table C-2). Similarly, with changes in availability and greater disposable income, individuals tend to shift cereal consumption away from less expensive coarse grains and other less preferred grains to increased consumption of rice and wheat. Although between 1980 and 1998 per capita cereal consumption in urban China declined, cereal consumption in rural China remained fairly stable (fig. C-3). Rice consumption per person remained somewhat stable, while per capita consumption of wheat increased and use of other cereals such as corn, sorghum, barley, and millet declined. Data from India indicate similar results (fig. C-4). Rice consumption was fairly stable in both urban and rural areas between 1972/73 and 1986/87, while wheat consumption per person increased in India, replacing consumption of coarse grains and millets.

Figure C-3

Per capita cereal consumption in China

Kgs/capita/year



Source: Economic Research Service, USDA, unpublished data.

Food Demand Forecasts and The Impact of Urbanization

Food demand analysis conducted without taking into consideration the underlying structural shifts resulting from urbanization can sometimes lead to misleading results and erroneous food demand forecasts. The analysis of food expenditure data from 14 Asian countries between 1961 and 1985 indicated that rice consumption in Asia declined with increases in income (Ito, Peterson, and Grant, 1989). This may be a plau-

Table C-2—Food consumption patterns in selected countries

	Urban				Rural			
	Cereals	Roots & tubers	Fruits & vegetables	Meats & offals	Cereals	Roots & tubers	Fruits & vegetables	Meats & offals
<i>Kg/capita/year</i>								
China 1/								
1988	199	NA	195	29	208	NA	135	12
1998	140	NA	166	30	200	NA	128	16
<i>Grams/capita/week</i>								
Indonesia 2/								
1978	2,165	275	1,005	64	2,560	810	975	36
1987	2,182	279	1,275	108	2,579	612	1,364	16
<i>Kg/capita/month</i>								
Pakistan 2/								
1979	10.59	0.73	NA	0.85	13.66	0.72	NA	0.46
1987/88	9.75	0.68	NA	0.76	12.69	0.68	NA	0.51

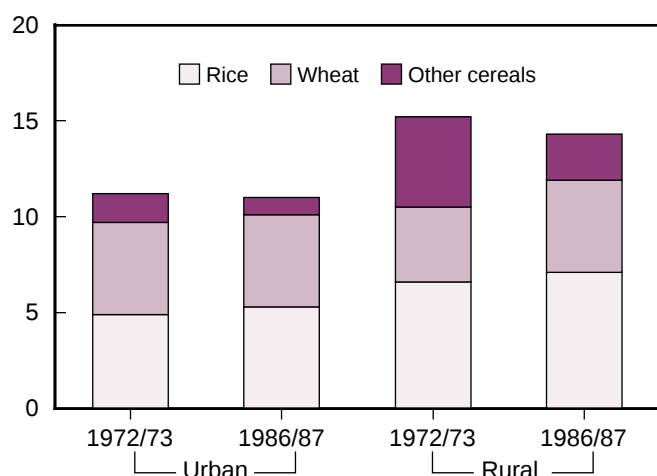
1/ Economic Research Service, USDA.

2/ FAO 1993.

Figure C-4

Per capita cereal consumption in India

Kgs/capita/month



Source: FAO, 1993.

sible finding for a high-income country such as Japan, but seems improbable for a poor country like Bangladesh where Ito *et al.* also estimated a negative response to rice consumption with income increases. When urbanization was included in the analysis (Huang and David, 1993), rice consumption in Bangladesh was shown to increase with income increases, and rice consumption in Japan was expected to decline by a smaller proportion than indicated in the first study. Thus the factor associated with declining consumption in Bangladesh was the shift to urban living; income increases, either in rural or urban settings, were associated with rising rice use. Huang and David found urbanization to have a negative effect on rice, but a positive effect on wheat consumption in Asia.

The above studies illustrate how as developing countries become increasingly urbanized, the effects of urbanization may need to be taken into consideration in forecasting future food demand. Generally, incomes and urbanization tend to rise together, and the exclusion of urbanization in the estimation process may not be problematic as long as the two variables continue to move together. When analyzing aggregate demand systems that include broad food categories at national levels (as described in Chapter 2), the inclusion of urbanization in the estimation process may not significantly improve the projecting ability of the estimated parameters. However, when food demand is analyzed at a more local level and includes fairly disaggregated

commodities, it may be critical to account for urbanization and other demographic variables. Also, once most of a population is urban, further changes in food consumption associated with urbanization become less important, while income changes continue to affect consumption. If urbanization is not included as a variable, food consumption response to income changes may appear to decrease as urbanization becomes complete. In this case, a declining shift in consumption patterns may actually reflect the declining impact of an omitted variable, the rural-urban shift, while the effect of income by itself may not change much.

Conclusions

Urbanization over the next century will chiefly be a phenomenon in the developing countries. In these countries, rural and urban consumption patterns tend to differ. Among basic food groups, rural residents eat more cereals and tubers and roots, and urban residents eat more meat, and fruits and vegetables. As urbanization progresses, it will tend to increase overall meat, fruit, and vegetable consumption/person, and to reduce overall cereal, root, and tuber consumption. The level and rate of urbanization will have important commodity impacts. Since diets rich in meats require feedgrains and meals, they actually demand more cereal than diets based on direct cereal consumption. This and other changes in consumption patterns brought about by urbanization can significantly affect global food supply, markets, and trade.

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