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## **Is urbanization contributing to higher food prices?**

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## **Abstract**

The recent spike in food prices has led to a renewal of interest in agricultural issues and in the long-term drivers of food prices. Urbanization has been mentioned as one possible cause of higher food prices. In this paper we examine some of the links through which urbanization is considered to be contributing to higher food prices and conclude that in most cases urbanization is being conflated with other long-term processes, such as economic growth, population growth and environmental degradation, which can more fruitfully be seen as related but separate processes. We discuss long- and short term factors affecting food prices, and conclude that the one important way in which urbanization in poor countries may affect food prices, at least potentially, is that it increases the number of households who depend on commercial food supplies, rather than own production, as their main source and hence are likely to hoard food if they fear future price increases. The best policy option for managing this is larger food reserves. Attempts to curb urbanization, on the other hand, would be ill advised.

## **1 Introduction**

After many years out of the political limelight, agricultural issues returned with a vengeance during 2007. The explosive increase in food prices led to a similarly explosive increase in interest in agricultural policy and agricultural research. This interest has since subsided with the subsequent fall in food prices and with attention being drawn to the financial crisis. However, even though food prices have fallen from their peak levels, they still remain higher than they have been for a decade.

The recent boom in food prices has led to a renewal of interest in factors affecting agricultural production and markets for agricultural products. One concern that has been raised is that the rapid urbanization taking place in many developing countries has contributed to higher food prices. Thus, the Chinese government has set in place a policy to safeguard the overall area of agricultural land available in the country, one part of this policy being to limit the amount of land converted to urban use. Research reports with titles such as 'Soil degradation caused by industrialization and urbanization' (Blum, 1998) or 'Rapid urbanization in China: A real challenge to soil protection and food security' (Chen, 2007) similarly suggest that urbanization is contributing to loss of agricultural land. A recent UNCTAD policy brief lists the causes of higher food prices as 'population growth, urbanization, and rapid economic development...amplified by recent droughts, slow supply response, the fall in the dollar, high energy prices, and...increased demand for biofuels' (UNCTAD, 2008).

Urbanization is clearly seen as one of the drivers of food prices, by policymakers, researchers, and others across the world. Perhaps surprisingly, little empirical evidence of a link from urbanization to food prices has ever been presented; the link is apparently seen as so obvious that no research is needed to explore it. But on closer examination, the link is less obvious than it might seem. Urbanization does lead to land being converted from farming to urban use; however, urban built-up area is estimated to cover only a couple of per cent of the world's arable land, so it should not be impossible to replace this relatively limited area through new agricultural development elsewhere or through improved agricultural productivity. Similarly, other perceived links from urbanization to food production are less clear-cut than they are often believed to be.

In this paper, we study whether urbanization is in fact likely to be an important driving force for food prices, in the short or long term. We identify one important way in which urbanization may have affected food prices, albeit indirectly. Urbanization has meant that the number of urban

poor is now the highest it has ever been, both in absolute terms and as share of the world's population. These urban poor are heavily dependent on commercially traded food as their main source of food supply and – because of the huge share of their budget devoted to food – are highly sensitive to variations in prices. This can lead them to stockpile food when prices are expected to go up, which can in itself contribute to higher prices. This also makes many governments more likely to attempt to keep prices low through short-run emergency measures that raise prices even further for other countries, and that may also disrupt local food markets. Government intervention definitely played a role in the recent price spike, and there is some indication that hoarding by households may also have contributed to the spike.

Apart from this, we review the existing literature on the causes of the recent price boom, to see whether urbanization has been identified as one of the causes of the short-run price boom in the studies made so far. Much of the literature on the recent term 'food price boom' is still at the working paper stage, and there are few peer reviewed publications on the topic, but the research results so far do not indicate an important role for urbanization as a trigger of the acute food crisis of 2007, apart from the channel identified above.

We also study some of the long-term factors affecting food production and food prices, and examine whether the suggested links from urbanization are likely to have been important in practice. We find no real indication that urbanization *per se* has been an important driving factor of food prices in the longer term.

We do find that other trends often linked to urbanization – such as increased industrial production, rising incomes, and increased pollution – have almost certainly played an important role. One significant reason why urbanization is blamed for the rising food prices is probably that it tends to be linked to these other factors, which do drive food prices. However, it is important to disentangle the effects of urbanization from the effects of these other trends because there is an obvious risk that policies aimed at lowering food prices will fail if they address the wrong cause.

This report is structured as follows. We start by providing an overview of the long- and short-term developments in food prices. This is followed by a section explaining the definition of urbanization used in this paper and discussing some of the related but separate concepts that are often mixed in with urbanization in the general debate, by policymakers, researchers and the general public. We follow this with sections on the long- and short-term drivers of food prices identified in the literature, and discuss to what extent urbanization can be seen as one of these drivers. We conclude with a discussion of policy implications, both with regard to urbanization policies but also with regard to other policies aimed at restoring the downward trend in food prices.

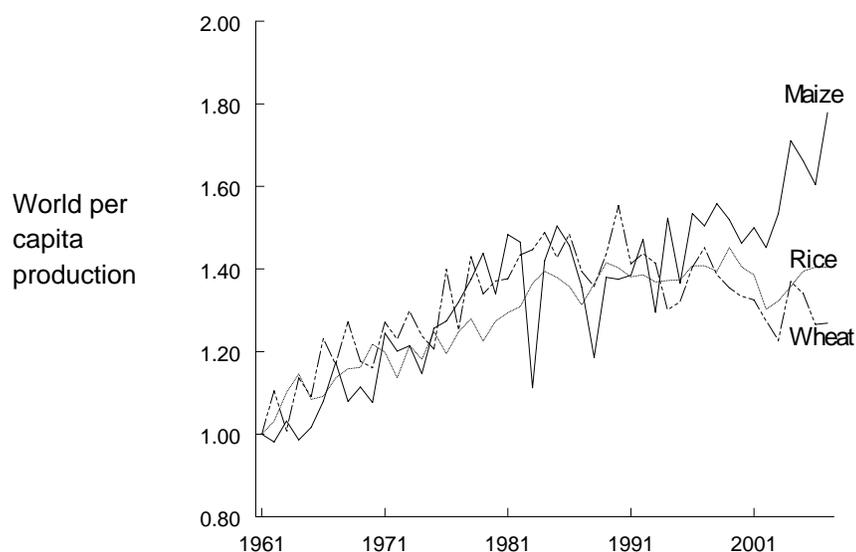
## 2 Food prices in the long and short term

### Summary

- Agricultural production, both per capita and in absolute terms, has increased considerably since 1960.
- This has led to lower food prices overall.
- However, productivity increases have slowed down since 1990.
- Food prices rose slowly during 2006, and dramatically in late 2007 and early 2008.
- Food prices have since declined, but remain higher than in recent years; projections indicate that they will remain higher than usual.

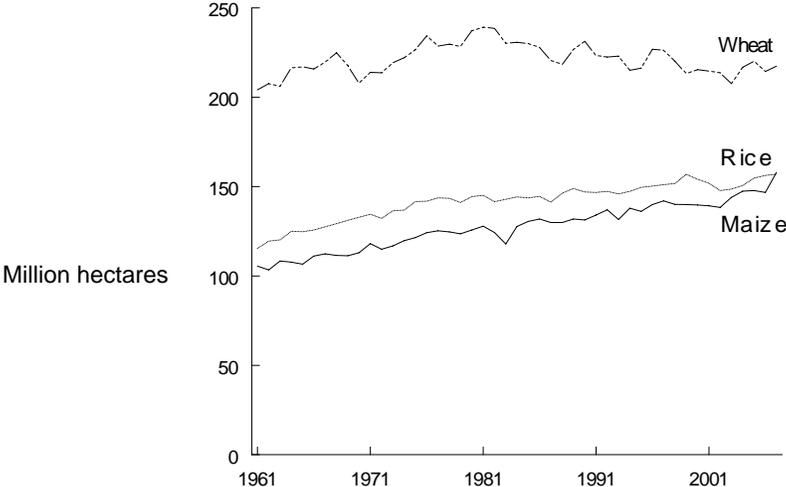
Between 1960 and 1990, world agricultural production per capita increased almost constantly (see Figure 1). This was partly because of an increase in the quantity of land farmed (Figure 2), but largely because of a huge increase in agricultural productivity (Figure 3). Apart from a peak in the early 1970s, perceived by most analysts to be linked to the simultaneous boom in the price of oil and other commodities, prices have been declining in parallel with the increase in food production (see Figure 4).

**Figure 1: World per capita production of the three main staple crops, 1961–2007, with 1961 as the index year.**



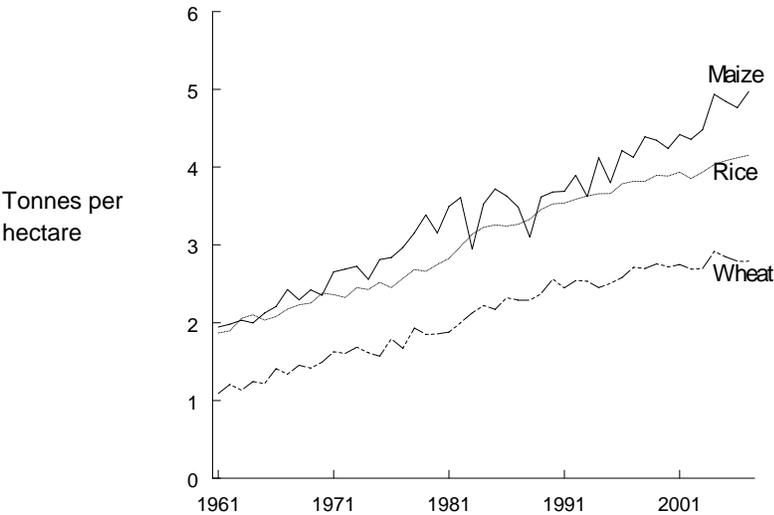
Source: FAO online database.

**Figure 2: World land area devoted to production of the three main staple crops, 1961–2007.**



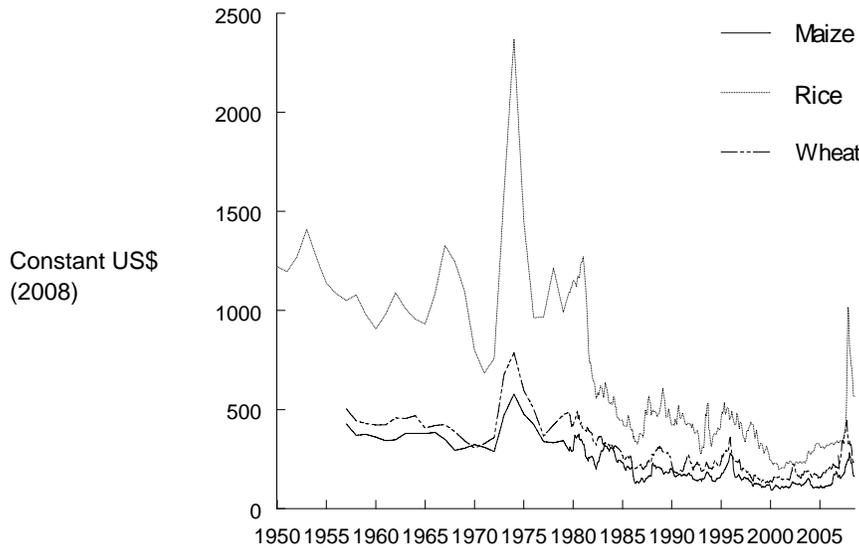
Source: FAO online database.

**Figure 3: Productivity per hectare farmed for the three main staple crops, world averages 1961–2007.**



Source: FAO online database.

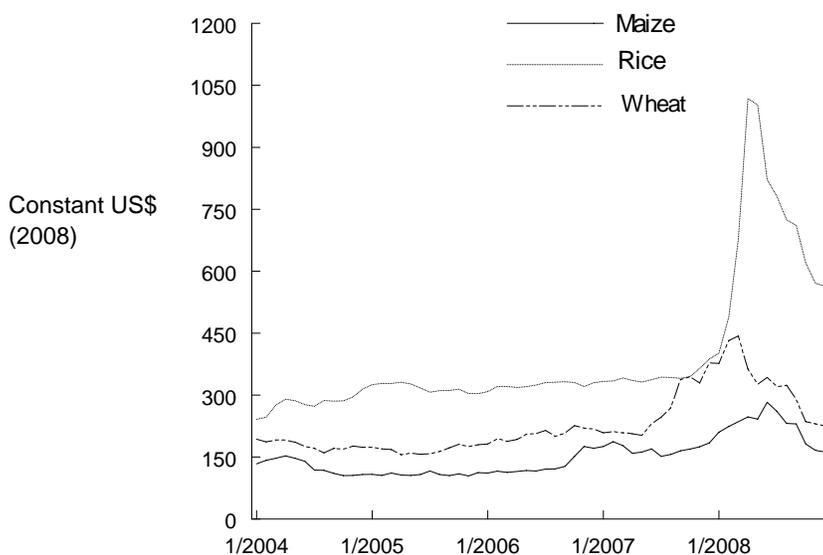
**Figure 4: Price per tonne of the three main staple crops, 1950 – 2008.**



The price of maize is measured as the price of US No. 2 Yellow, free on board Gulf of Mexico; the price of rice is measured as the price of Thailand white milled rice, 5% broken, free on board Bangkok; the price of wheat is measured as the price of No. 1 Hard Red White, ordinary protein, free on board Gulf of Mexico. Source: IMF data.

These long-term trends have, to some extent, reversed in the last few years. Productivity growth has slowed for wheat and rice after 1990, and per capita production has stagnated or declined. World market food prices rose slowly during 2006 and then rose sharply during 2007 (see Figure 5). Even during the peak months, food prices remained lower in real terms than they had been at any time prior to the early 1980s. Nevertheless, the swift reversal of the long-term trend raised concern among both policymakers and the public that food prices would continue to be high and perhaps even continue to increase.

**Figure 5: Price per tonne of the three main staple crops, January 2004 – December 2008.**



The price of maize is measured as the price of US No. 2 Yellow, free on board Gulf of Mexico; the price of rice is measured as the price of Thailand white milled rice, 5 % broken, free on board Bangkok; the price of wheat is measured as the price of No. 1 Hard Red White, ordinary protein, free on board Gulf of Mexico. Source: IMF data.

In many countries, the rise in food prices, together with the rise in oil prices, played havoc with macroeconomic stability (see, for example, IMF, 2008). Responses to the food price spike varied between countries; a number attempted to contain the shock through price controls, export restrictions or other regulatory measures. In many cases, the pass-through from world market prices into domestic market prices was not complete, so that domestic market prices did rise but not by as much as the world market prices had (see Timmer, 2008, for some Asian examples). In other cases, the regulatory measures managed to dampen the price shock, but at the expense of higher domestic food prices once the world market price spike had subsided (see Dorosh, 2008, for the Ethiopian example). In many countries where food is a large share of many households' expenditure, the dramatic rise in food prices became a major policy issue.

Food prices have now declined from their peak levels. Despite this they remain higher than they have been in recent years. Moreover, there are important differences between the current food price boom and that of the early 1970s. Then, futures prices of food (i.e. prices of food sold for delivery at specified points in the future) were substantially lower than the spot prices of food sold for more or less immediate delivery. This indicated that most people in the food business expected prices to fall; and, in fact, the futures prices predicted the subsequent fall in the spot prices of food quite well. At the moment, on the other hand, the futures prices of food are lower than the spot prices of 2007 but remain considerably higher than the spot prices of the 2000–2005 period. This suggests that the general belief among people with insight into agriculture is that prices will not decline to their past levels. This belief is supported by most researchers and analysts; see, for example, OECD/FAO (2008) or Rosegrant (2008). Food prices are therefore unlikely to decline to their previous levels of their own accord any time soon, so exploring the long-term drivers of food prices remains an important issue.

### 3 Urbanization and its close relatives: some conceptual clarification

#### Summary

- The demographic definition of urbanization is the increasing share of the population living in urban areas.
- Many other definitions of urbanization are used by researchers and policymakers, leading to confusion about the concept.
- Urbanization often takes place at the same time as, but is not the same thing as, population growth; it is more informative to see these as two separate processes.
- Urbanization often takes place at the same time as, but is not the same thing as, economic growth and income growth; it is more informative to see these as two separate processes.
- Urbanization often takes place at the same time as cultural change, but cultural change is also linked to population growth, income growth and other processes, and is often difficult to quantify meaningfully.
- Half of the world's population now lives in urban areas; the urban poor now outnumber the rural poor in many middle-income countries.

In order to examine whether urbanization is in fact contributing to higher food prices, we must first be clear about what we mean by the term. There is considerable terminological confusion about urbanization as a concept, particularly when used by people who are not specialists on urban issues. Demographers and compilers of urban statistics normally define the level of urbanization as the share of the population living in urban areas; the rate of urbanization is then the rate at which the level of urbanization changes over time. As such, urbanization is driven primarily by rural–urban migration, and secondarily by rural areas becoming urban. However, the term is often used loosely to cover a number of different concepts, such as the (increasing) number of people living in urban areas, the share of land considered urban, or indeed cultural changes linked to populations moving from rural areas into cities. We will employ the demographic definition for consistency and because it provides a relatively clear basis for distinguishing urbanization from other changes such as population growth, declining urban density or cultural change (all of which may be influenced by, but are distinct from, urbanization, demographically defined).

The remainder of this section looks first at the demographic definition of urbanization and then at some of the problems involved in conflating urbanization with (urban) population growth, urban expansion, income growth or cultural change.

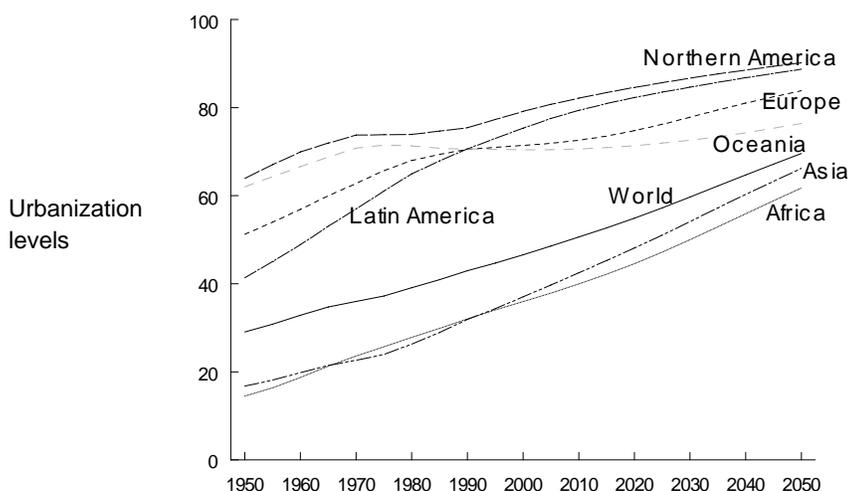
#### 3.1 Urbanization: the demographic definition

As noted above, the standard definition of the level of urbanization used by demographers is the share of people living in urban areas, and the rate of urbanization is the annual percentage increase in this level. A high rate of urbanization generally reflects rapid rural to urban migration. If a country or region's rate of urbanization is 1 per cent, then even if its total population is not changing, the urban population will also increase by 1 per cent. Alternatively, if the total population is increasing by 2 per cent, then urban population will increase by 3 per cent.

Unfortunately, different countries define urban areas in different ways and change their definitions from time to time. Montgomery (2008) provides an overview of some of the problems surrounding the statistical classification of urban and rural populations in the UN Population Division's database. Despite these problems, the UN database is by far the best for cross-country comparisons, national databases often being plagued by even worse inconsistencies and even less comparability to the data of other countries.

In virtually all countries, the definition of urban ensures that settlements with populations over 20,000 and densities over 1,000 people per square kilometer are considered urban (McGranahan et al., 2005; Satterthwaite, 2007). The varying definitions mainly affect small settlements and less densely populated areas. In the 2001 revision of the United Nations report on urbanization prospects, 109 of the 228 countries covered used administrative criteria, with 89 using them as the sole criteria (United Nations 2002, cited in McGranahan et al., 2005, page 788). Population size or density criteria were used by 96 countries, with 46 using them as the sole criteria. The cut-off points varied considerably, but in most cases population size criteria fell between 1,000 and 5,000 people and density criteria fell between 400 and 1,000 people per square kilometre. However, the variations in urban criteria can make it difficult to compare urbanization levels between countries and regions and changes in the criteria of 'urban' used by large countries such as India and China can have a significant impact on global aggregates.

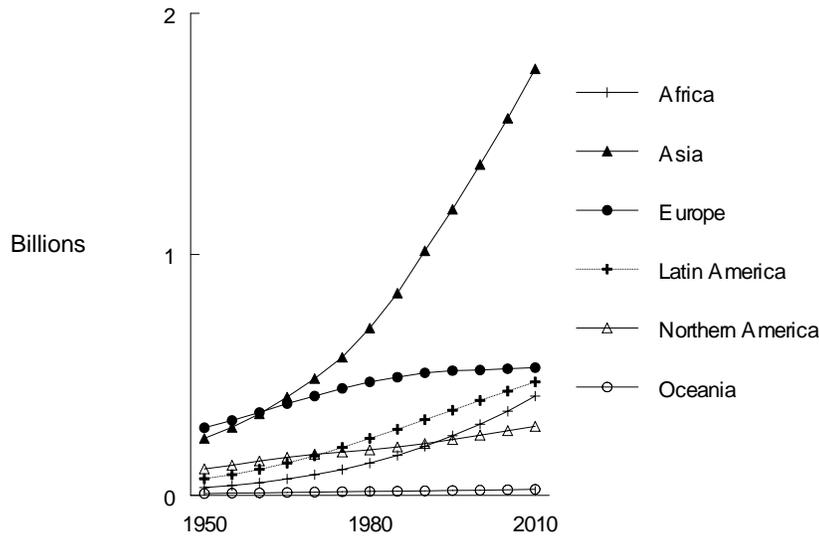
**Figure 6: Urbanization levels in different continents, 1950–2050 (projected from 2006 onwards).**



Source: UN Population Division (2008).

Keeping these caveats in mind, it is nonetheless safe to assume that urbanization involves the increasing concentration of population in larger and denser settlements. Moreover, it is indisputable that the share of the population living in urban areas has increased dramatically all over the world in recent decades. In some parts, three-quarters of the population now lives in urban areas. Even in the least urbanized continents, Asia and Africa, well over a third of the population does so (Figure 6). In total, approximately half of the world's population lives in urban areas. It is also clear that urban populations have increased rapidly in recent decades, especially in Asia (Figure 7).

**Figure 7: Number of people living in urban areas in different continents, 1950–2010 (projection for 2010).**

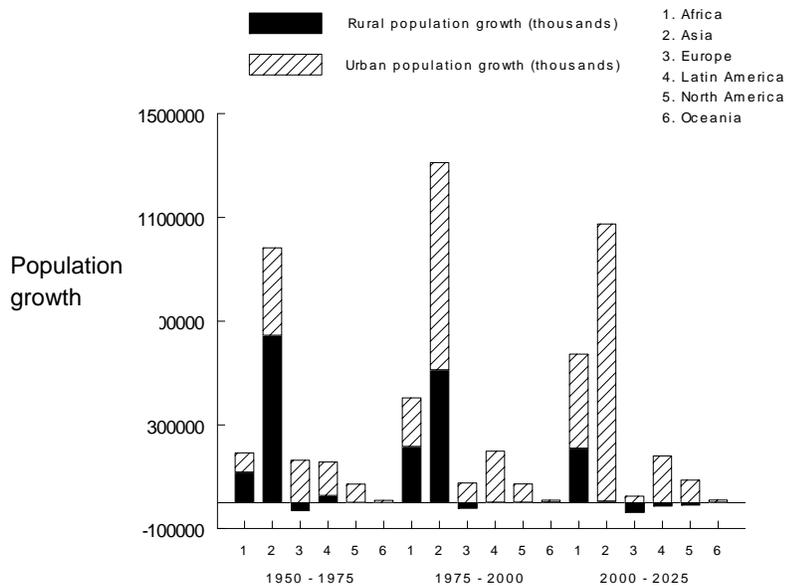


Source: UN Population Division (2008).

### 3.2 Urbanization and population growth

Currently, the great majority of the world's population increase is taking place in urban settlements (Figure 8). It would be easy to conclude from this that urbanization, and rural–urban migration in particular, is what is driving urban population growth, and to blame the increasing impacts of urban populations on urbanization. This, however, is incorrect for several reasons.

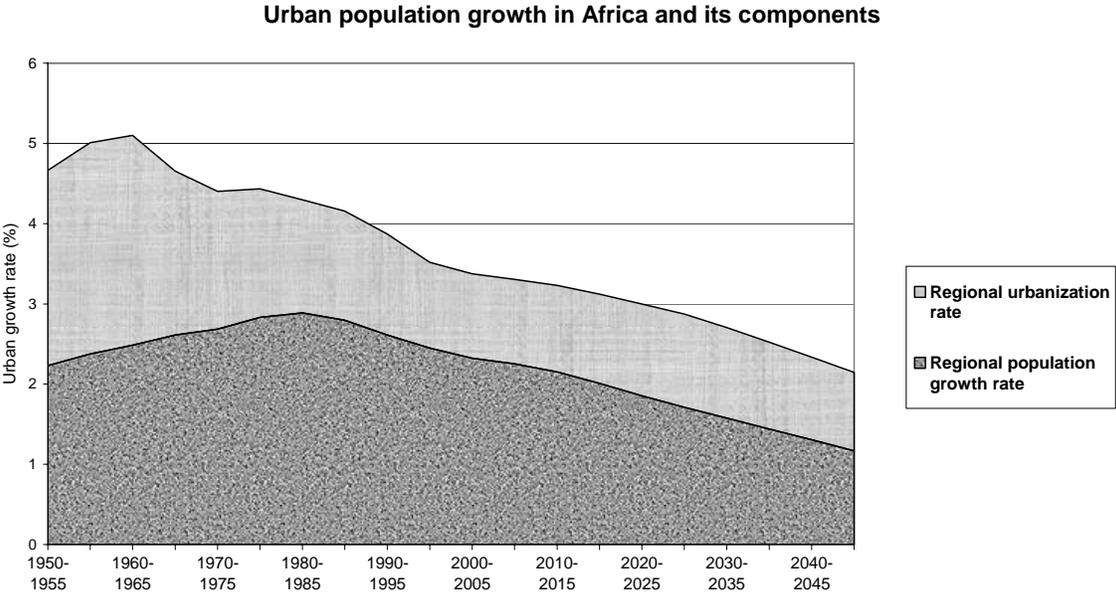
**Figure 8: Population growth in urban and rural areas in different continents, 1950– 025 (projected for 2000–2025 period).**



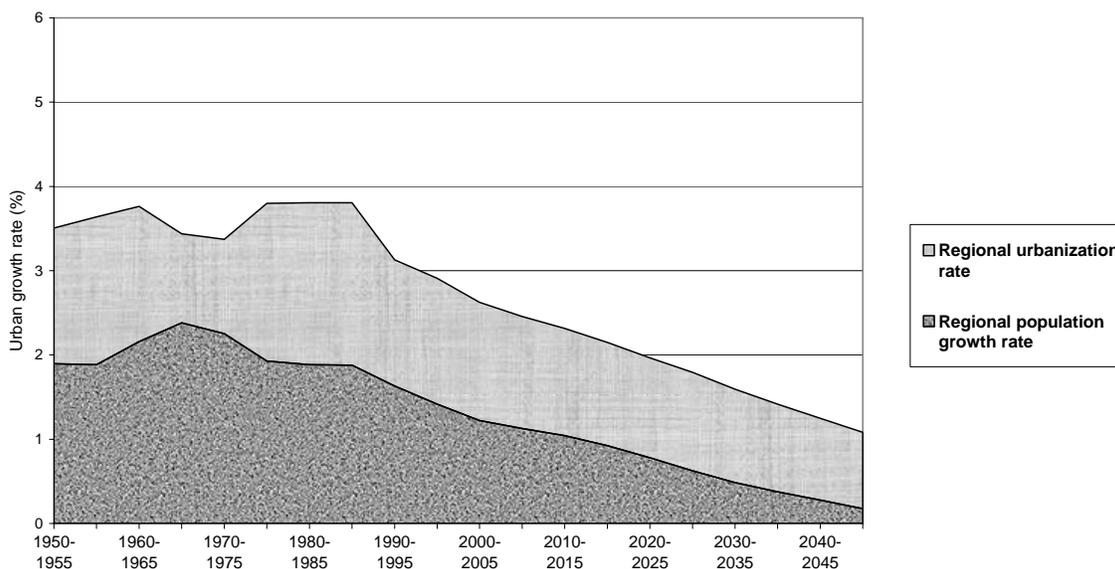
Source: UN Population Division (2008).

As already indicated, a country or region's urban population growth rate is equal to the sum of its urbanization rate (i.e. the rate of increase in its urban population share) and its overall population growth rate. Figure 9 summarizes past and projected urban growth rates from Africa, Asia and Latin America for the period 1950 to 2050, distinguishing between that part of the urban growth rate resulting from urbanization and that part resulting from population growth. As indicated, urban growth rates have been declining in all of these regions. The highest urban growth rates are in Africa, but Africa's urbanization rate currently accounts for only about a third of the overall urban growth rate of 3.3 per cent. Even in Asia where the urbanization rate is currently about 1.3 per cent, this is still only slightly more than half of the overall urban growth rate of 2.5 per cent. In Latin America, the urban growth rate is only 1.3 per cent, with urbanization contributing 0.6 per cent; back in the 1960s, however, the growth rates looked far more like the contemporary Asian figures.

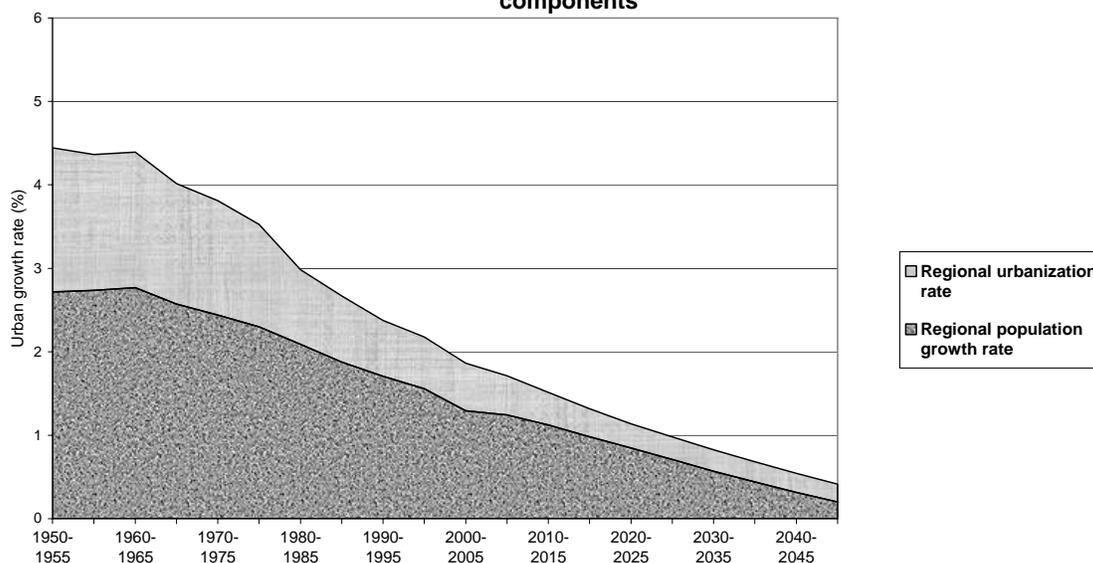
**Figure 9: Past and projected urban growth rates in Africa, Asia and Latin America and the Caribbean, and the contribution of population growth and urbanization 1950–2050.**



### Urban population growth in Asia and its components



### Urban population growth in Latin America and the Caribbean and its components

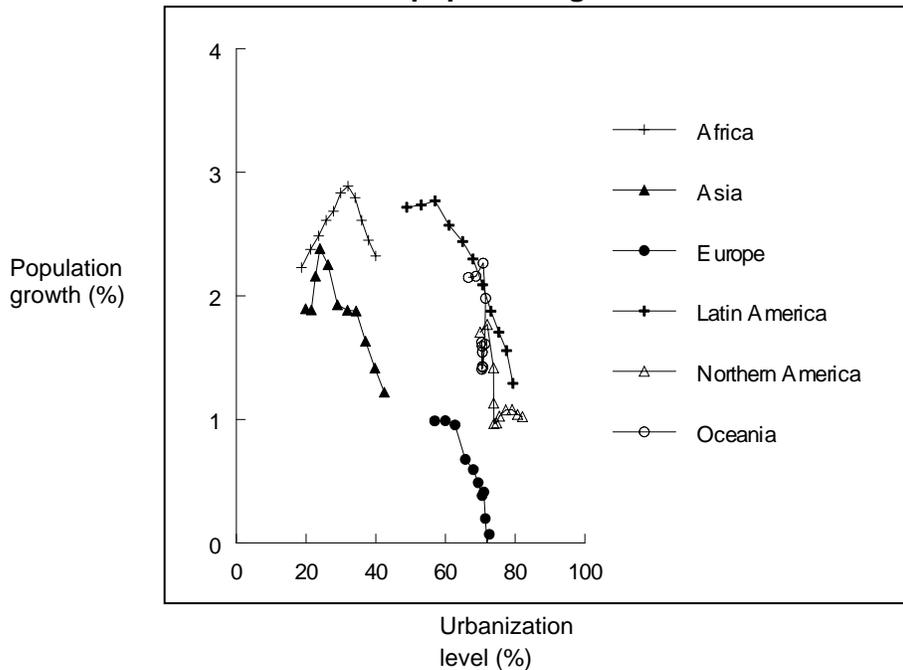


Derived from statistics in United Nations (2008), *World Urbanization Prospects: The 2007 Revision*, Department of Economic and Social Affairs, Population Division, New York.

In effect, all of these regions are going through both demographic transitions (with mortality rates falling first, and fertility rates falling subsequently after a period of very rapid population growth) and urban transitions (with populations becoming increasingly urban). The two transitions typically overlap in time and particularly high urban growth rates are experienced when rapid phases of the two transitions coincide (Figure 10 compares population growth and urbanization levels for different continents over time). But demographers widely believe that urbanization leads to slower population growth; they argue that this might be because the benefits of having additional children tend to be lower in cities than in rural areas (Mace, 2008;

Montgomery, 2008). Some rural–urban differences in age-specific fertility rates may be due to income differences rather than urban versus rural location. Nevertheless, given that urbanization only explains part of urban growth, and may have a negative effect on overall population growth, it would be doubly misleading to blame population-induced increases in food prices on urbanization.

**Figure 10: Urbanization levels and population growth in different continents, 1950–2005.**



Source: UN Population Division (2008).

What this suggests is that when considering the impacts of urbanization, the issue is not the impacts of urban population growth, but the impacts of having population growth in urban rather than rural areas. While population growth will, all other things being equal, have important effects on factors such as food demand and environmental degradation, the core question is whether these effects would be smaller or larger if the population growth were mostly to take place in rural areas rather than in urban. This is the question addressed in later sections of this paper. Unfortunately, simply comparing the impacts of rural and urban populations does not provide an answer, since the differences between these populations are not necessarily the result of their locations. For example, while more affluent people may live in urban areas, this does not necessarily mean that urbanization made them affluent. Nevertheless, rural–urban comparisons must at least be part of any assessment of the impacts of urbanization.

### 3.3 Urbanization and urban expansion

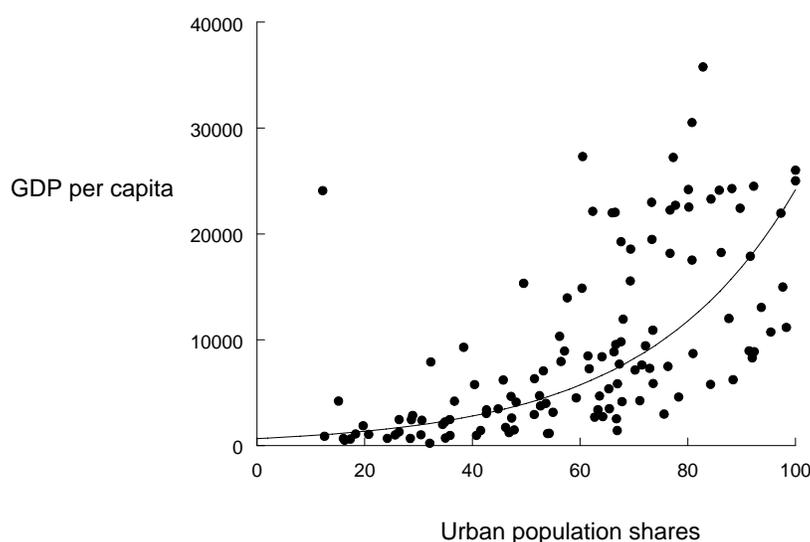
When considering the consequences of urbanization on food prices, it is also important not to conflate urbanization with urban expansion. As with urban population growth, urbanization can contribute to the expansion of urban built-over land, and some of this urban expansion is likely to cover land that would otherwise be used to grow food. On the other hand, although urbanization increases the arable land covered by urban construction, it also reduces the arable land covered by *rural* construction. Even more importantly, urban expansion is not merely occurring because of urbanization and population growth, but also because of declining urban densities. Indeed, urban densities globally are declining at an estimated annual rate of 1.7 per

cent (Angel et al., 2005), which is about twice the global urbanization rate of 0.8 per cent, and only slightly below the global urban population growth rate of 2 per cent. As such, it would be misleading to ascribe the effects of urban expansion on urbanization. Since urbanization almost invariably involves the movement of people from less to more dense settlements, ascribing the effects of declining settlement density to urbanization would be doubly misleading.

### 3.4 Urbanization and income growth

Urbanization and income growth frequently occur at the same time (see Figure 11), but are nonetheless separate processes. Income growth is frequently linked to changes in the economic structure of a country (such as a shift in employment from agriculture to manufacturing), which may encourage urbanization, but income growth may also occur in societies that are already predominantly urban, and when incomes grow in the cities this frequently spills over into income growth in rural areas as well.

**Figure 11: GDP per capita (measured at PPP prices) and urban population shares for 180 countries in 1990.**



Source: UN Population Division (2008) and Wageningen Growth Center.

There are several reasons why it is important to keep urbanization and income growth conceptually distinct when considering the impacts of urbanization on food prices. First, while they are related, their interrelations are contingent and complex and it is misleading to imply that urbanization causes the economic changes that often accompany it (Bloom et al, 2008). Second, if the impacts on food prices are in fact caused by income changes rather than by urbanization itself, this needs to be made explicit. From a policy perspective, it makes an enormous difference whether the alternative to urbanization is rural affluence or rural poverty. Third, there is often more economic inequality in urban than rural settlements, and this too needs to be made explicit when making rural–urban comparisons (Tacoli et al., 2008). Measures to prevent rural–urban migrants from settling in urban areas are most likely to target informal settlements and slums, but this is not where the affluent urban dwellers with ‘urban’ diets are likely to live.

### 3.5 Urbanization and cultural change

Urbanization has long been associated with a range of cultural and behavioural shifts. However, income changes, changes in economic structure, and changes in population size can all be expected to have an impact on cultural mores as well. It is an unenviable task to attempt to attribute individual cultural changes to these different underlying causes, and to ascertain to what extent a specific cultural change is caused by one of these factors rather than another. We shall not pursue the issue of cultural change and urbanization further in this paper except to look at dietary change, something that does lend itself reasonably easily to quantitative analysis. Other than this, however, we merely note that before ascribing the effects of cultural change to urbanization, it is important to consider the specific mechanisms through which urbanization is believed to be having these effects, and to be clear both about the underlying assumptions as well as about the policy implications if these assumptions are correct.

## 4 What are the long-term drivers of food prices?

### Summary

- People often change diets when they move into urban areas, but this is largely because their incomes often increase at the same time (leading to a larger share of meat) and because they get access to a wider range of foodstuffs (leading to a more varied diet).
- Income growth often leads to increased demand for meat; this leads to land being shifted from production of food crops into production of feed for livestock, which contributes to higher prices for food crops.
- Population growth leads to increased demand for food.
- Urbanization is often linked to consolidation of farms into larger farming plots; this, in turn, is often linked to increased agricultural productivity.
- Urbanization has led to some loss of farmland, but urban dwellings cover only a few per cent of all arable land; this can be replaced by a few years' worth of agricultural productivity growth, at the average 1960–2007 rate of growth in productivity per hectare. The world's overall farmland area has not decreased since 1960.
- Agricultural research funding has declined in the last 20 years; agricultural productivity is now increasing at a slower pace than it did in the 1960–1990 period.
- Agricultural productivity has increased at a far slower pace in sub-Saharan Africa than in most other parts of the world.
- Environmental degradation, linked partly to economic growth and partly to poor soil management, has led to losses in agricultural productivity.
- Land is being shifted from food production into biofuel production.
- Food stocks have declined over the past 20 years, and especially the last ten; this makes it more difficult to meet temporary supply shocks in the world market with sales from food reserves.
- Urbanization has meant that the absolute numbers of urban poor, and the urban poor's share of the global population, are now far larger than before; these urban poor depend on commercial supplies as their main source of food and are highly vulnerable to price increases.

Having attempted to clarify the differences between urbanization and some other related processes, we shall now discuss whether long-term food prices can be said to be driven by any of these processes or by other factors. Food prices came into the limelight with the sharp price spike of 2007–2008; it is nonetheless useful to first consider the long-term issues as it seems likely that part of the price spike may have been caused by more long-term trends that came to a climax, in terms of their price effects, during 2007. As noted earlier, prices had been rising (although more slowly) during 2006 as well, so the spike of 2007 cannot be explained exclusively by events during, or shortly before, that year.

#### **4.1 Demand-side factors affecting food prices**

##### **4.1.1 *Diets in rural and urban areas***

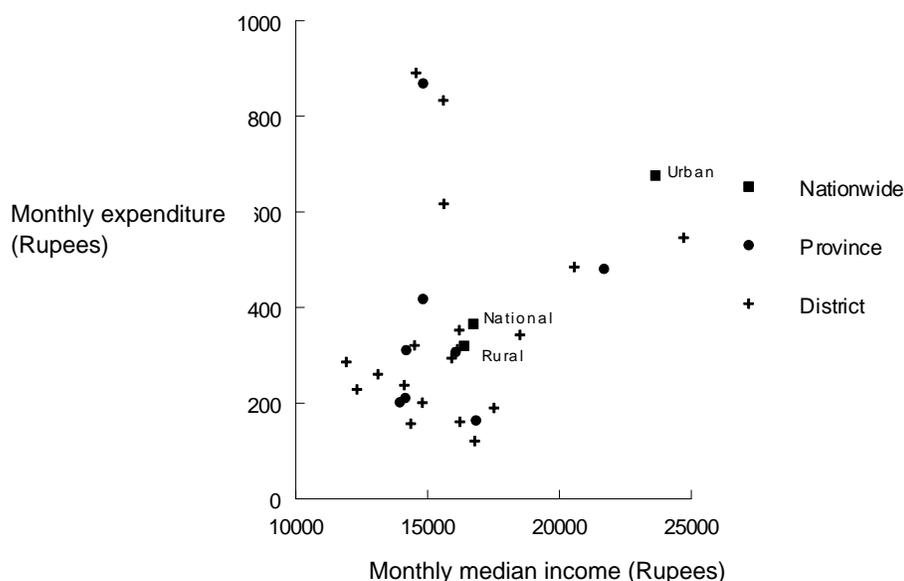
Diets differ considerably between rural and urban areas, with urban households usually eating a more varied diet that includes more expensive food such as meat. Moreover, households tend to change their diets after moving from rural areas into cities. This is frequently seen as an example of a cultural shift induced by urbanization.

To some extent this is correct. Urban areas provide larger markets for food retailers and more options, both for specialization among retailers and for individual retailers marketing a more diverse range of foods. There are also fewer households in urban areas who are dependent on own production of food. The variety of foods available to consumers therefore tends to be greater in urban areas (Regmi and Dyck, 2001). It is therefore not surprising that urban households tend to have more varied diets.

But the frequently seen shift towards more expensive food is not caused by urbanization *per se*; the reality is more straightforward. Households frequently move into cities in the hope of getting higher incomes. If they succeed, their consumption patterns change and they consume more high-priced goods, including meat, just as higher-income households in rural areas do.

In this case, it is relatively easy to disentangle the effects of higher income from the effects of urbanization. Data from household expenditure surveys in various countries permit us to see what expenditure patterns look like for different household categories in these countries. Different countries publish statistics at different levels of detail; however, looking at some Asian and African countries, we do not see any indication that urbanization *per se* is causing diet shifts that cannot be explained by changes in income.

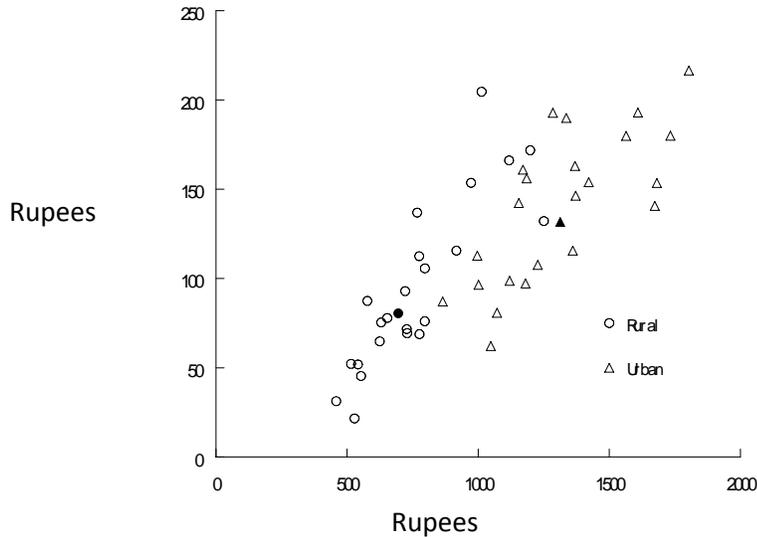
**Figure 12: Sri Lanka: Average monthly expenditure on meat per household as a function of monthly median income per household, for the nation as a whole, for individual regions, for individual districts and for average urban and rural households.**



Based on data from the Sri Lankan household income and expenditure survey of 2006–07. Source: Department of Census and Statistics, 2008.

Data from Sri Lanka are displayed in Figure 12. We see that a median urban household consumes considerably more meat than a median rural household does; but we also see that a median urban household has far higher income than a median rural household, and that higher income is linked to higher meat consumption for all types of households. Regional variation, linked to differences in religious beliefs and to income matter far more for meat consumption than whether people live in urban or rural areas. Looking at average meat consumption by households in various districts and provinces, and how this is related to their income, both the median urban and the median rural households have consumption patterns that correspond to what we would expect, given their income levels. The expenditure on meat depends more on a household's income than it does on whether the household lives in a city or not.

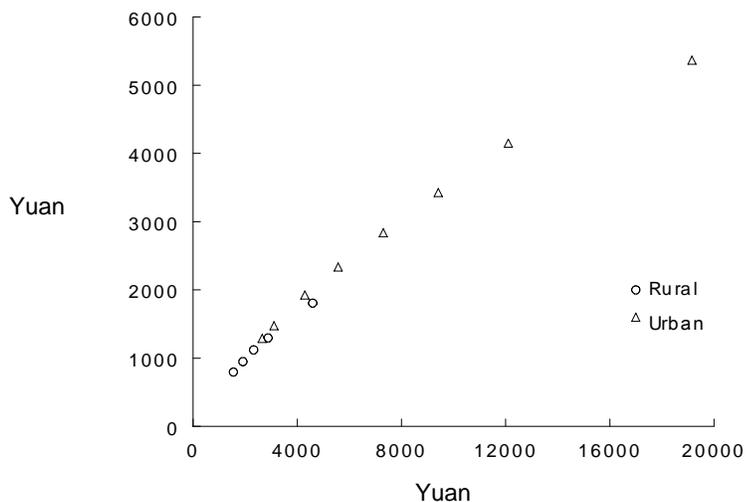
**Figure 13: India: Average monthly expenditure per household on meat, fish, eggs, milk and milk products as a function of average monthly expenditure per household, for average urban and rural households in each Indian state.**



Filled symbols denote national rural and urban averages, respectively. Based on data from the Indian household consumer expenditure survey for 2006–07. Source: National Sample Survey Organisation, 2008.

Similarly, looking at Indian data (Figure 13) on consumption of meat and dairy products (meat consumption is low overall in India, but consumption of dairy products is widespread), we see that although the urban areas mostly have higher consumption levels, they also have higher incomes, and for those areas where incomes are comparable to rural incomes, the difference is negligible.

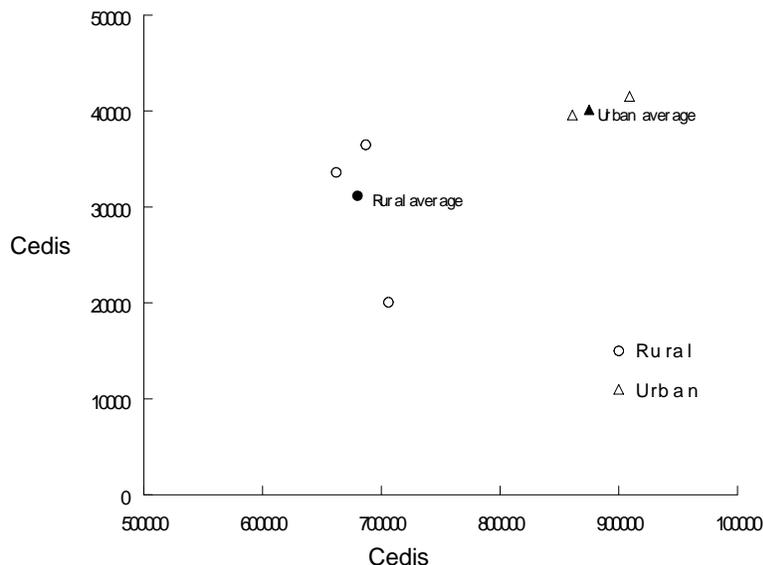
**Figure 14: China: Average food expenditure per year as a function of overall expenditure for various income quintiles and deciles in rural and urban areas.**



Based on data for 2005 from the China Statistical Yearbook. Source: National Bureau of Statistics of China, 2006.

Published Chinese statistics provide different levels of detail for rural and urban areas and do not permit this type of comparison; however, looking at overall food expenditure (Figure 14), we see that rural and urban households with the same levels of income have the same expenditure on food. There is no indication that urban households tend to spend their money on more expensive foodstuffs than rural households at the same level of income.

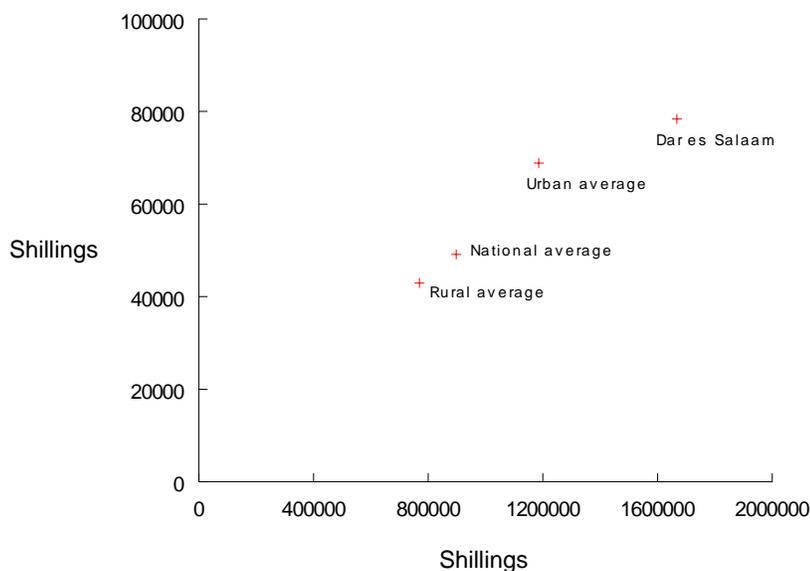
**Figure 15: Ghana: Average annual household expenditure on meat as a function of overall expenditure for different rural and urban areas.**



Based on data from the Ghana living standards survey of 1991–92. Source: Ghana Statistical Service 1995.

Ghanaian data for average households in selected locations (Figure 15) do not permit comparisons between rural and urban households at the same levels of income, because the average urban households all have higher incomes than any of the average rural households. However, although urban households consume more meat, the difference is not dramatic. Similarly, looking at Tanzanian data (Figure 16), we see that average meat expenditure is slightly higher for urban groups but that average incomes are considerably higher. Mafuru and Marsh (2003), studying urban and rural Tanzanian households at comparable levels of income, found little difference in meat or fish consumption; the main difference was that the urban households tended to consume more rice and less maize than the rural households.

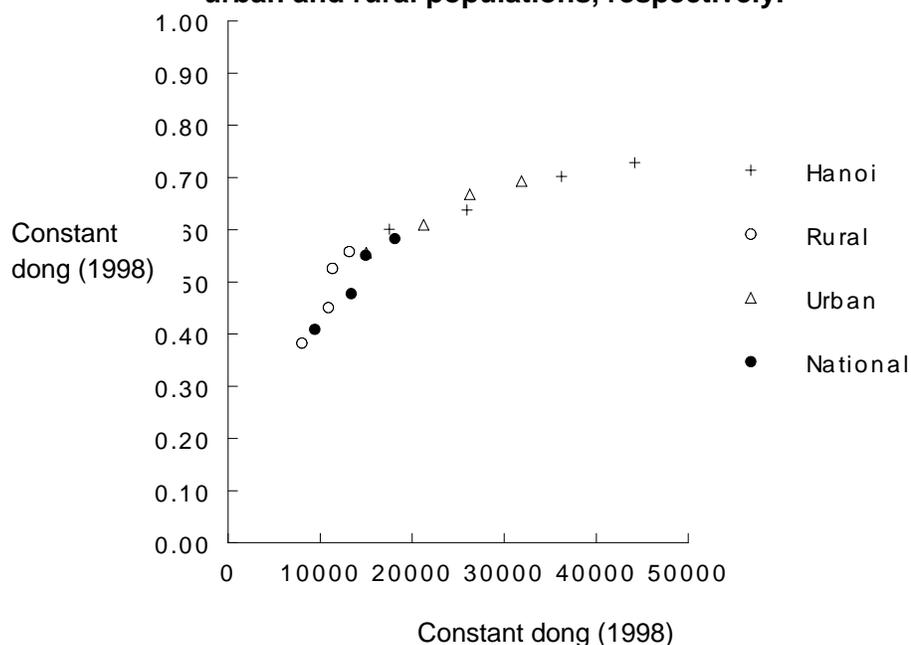
**Figure 16: Tanzania: Average expenditure on meat as a function of average income for the country as a whole, for the capital and for all urban and rural populations, respectively.**



Based on data from the Tanzanian household budget survey of 2000–01. Source: National Bureau of Statistics 2008a.

Finally, looking at Vietnamese data from 1993 to 2004 (Figure 17), during which period all parts of the country experienced rapid income growth, consumption patterns have shifted overall but the shift is more or less identical everywhere. The available data do not provide separate information for meat, but looking at 'luxury' foods' share of overall food expenditure (the expenditure not spent on staple foods but, rather, on meat, fish, fruit and other 'luxury' items), the share as a function of income has increased with increasing prosperity no matter whether households live in urban or rural areas. With higher incomes, households move away from staple crops.

**Figure 17: Vietnam: ‘Luxury’ foods’ average share of overall food expenditure as a function of average annual income, for the country as a whole, for the capital and for all urban and rural populations, respectively.**



Based on data from Vietnamese living standard surveys and household living standard surveys of 1993, 1998, 2002, and 2004. Source: Hoang et al. 2008.

Thus, the driving force behind the shift in diet is not the urbanization *per se*; the driving force is the higher income that households secure by moving into cities. The difference between urban and rural households' patterns of food consumption is not caused by urbanization and cultural change; it is caused by income differences. Changes in income in rural areas have the same impact on consumption as they would in urban areas.

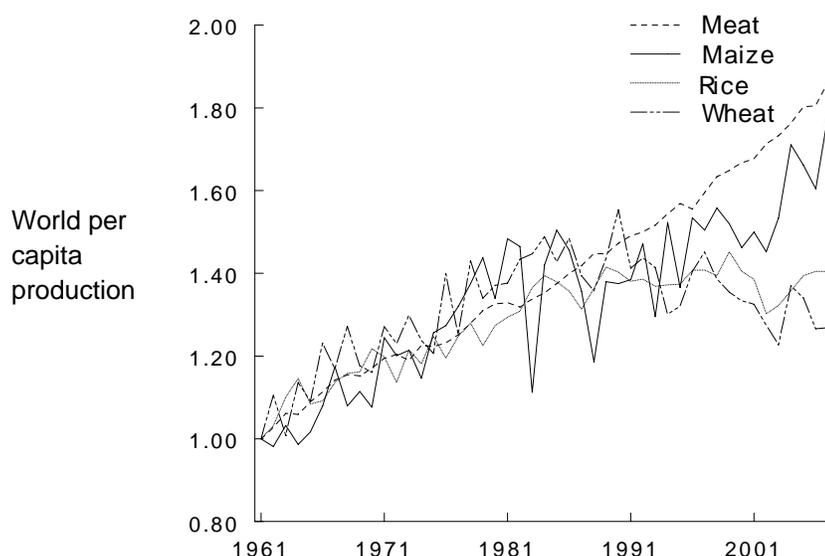
When a household's income increases, time spent on activities other than work – such as cooking – is perceived as more costly than before. We therefore often see a shift in diet towards pre-processed food and foodstuffs that take less time to cook (for detailed studies of this issue see Huang and David, 1993; Kennedy and Reardon, 1994; or Senauer et al., 1986.). Again, however, the driving force is the increased income and increased earning potential rather than the urbanization *per se*. In policy terms, there is no evidence that development trajectories that favour rural rather than urban income growth avoid the dietary shifts that have been putting pressure on food systems.

#### **4.1.2 Income growth**

Yet this does mean that income growth leads to changes in consumption patterns. The increased incomes seen in China over the past two decades have led to a huge shift in food consumption towards increased meat consumption. In India, where income growth has been less rapid and where a smaller share of the poor have seen their incomes rise, a similar but smaller shift has been seen towards increased consumption of milk and dairy products (meat consumption has also increased, but remains low). These income increases have also meant that lower income Chinese and Indian households have ceased acting as 'buffers' in world food markets. Historically, these groups have tended to be highly sensitive to price variations, cutting down on food, and especially on meat and livestock products, when food prices were high. However, with higher incomes, these groups are no longer as sensitive to price variations in

food as they have been because, even with higher prices, food is a smaller share of their overall expenditure than before.

**Figure 18: World per capita production of meat compared to per capita production of the three main staple crops, 1961–2007, with 1961 as the index year.**



Source: FAO online database.

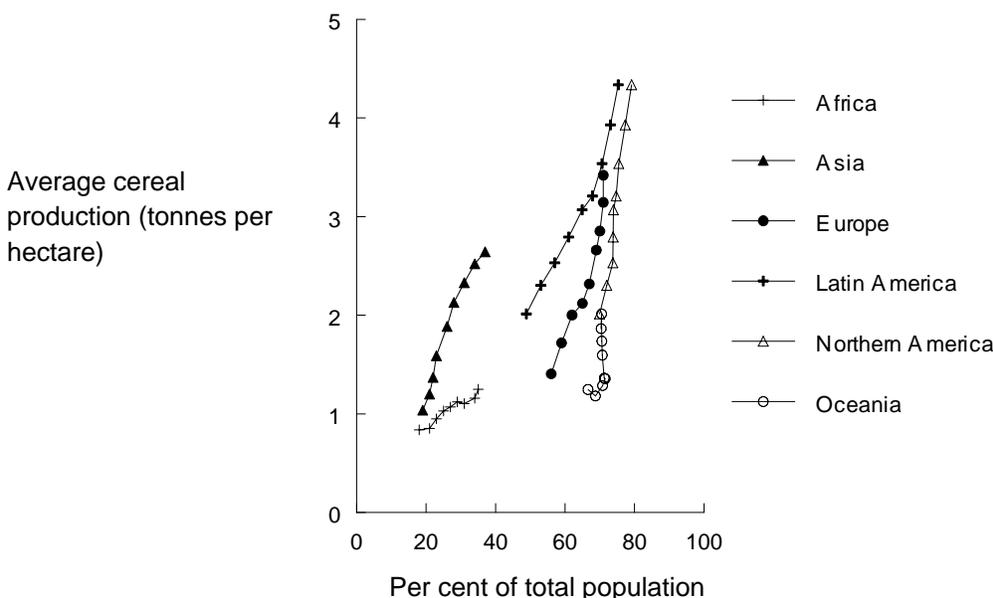
This also means that although productivity per hectare has gone up for all major staple crops, at the same time there has been a shift of agricultural land away from staple crops to other crops, valued by high-income households, and to the growing of livestock feed for use in meat production. Meat production in particular is highly land intensive compared to crop production; on average, producing one calorie's worth of meat demands seven calories' worth of crops. Thus, although the land is not lost to agricultural production (and indeed is transferred to agricultural production that yields higher monetary returns), it is transferred to uses that are less productive in terms of calories per hectare. As we can see in Figure 18, world meat production has risen faster than production of staple crops, especially during the last 20 years.

## 4.2 Supply-side factors affecting food prices

### 4.2.1 Trends in agricultural productivity

When people abandon agriculture and move from rural areas into urban areas, larger farming units become possible in rural areas. Larger farms can use machinery more efficiently; they usually also have better access to credit, so that they can more easily afford capital equipment, as well as greater quantities of the inputs needed at the beginning of the planting season. If there are such economies of scale involved in agriculture, larger farming units should lead to efficiency gains that should translate into increased production. Thus, we would expect rural-urban migration to lead to increased productivity in agriculture, at least if the migration is sufficiently large to lead to reduced rural populations. Looking at actual agricultural productivity trends, and comparing these to urbanization (Figure 19), we can see that there is certainly no indication that higher urbanization rates have been linked to reduced agricultural productivity on any continent.

**Figure 19: Trends in agricultural productivity and urbanization for different continents, 1961–2005.**



Sources: UN Population Division (2008) and FAO online database.

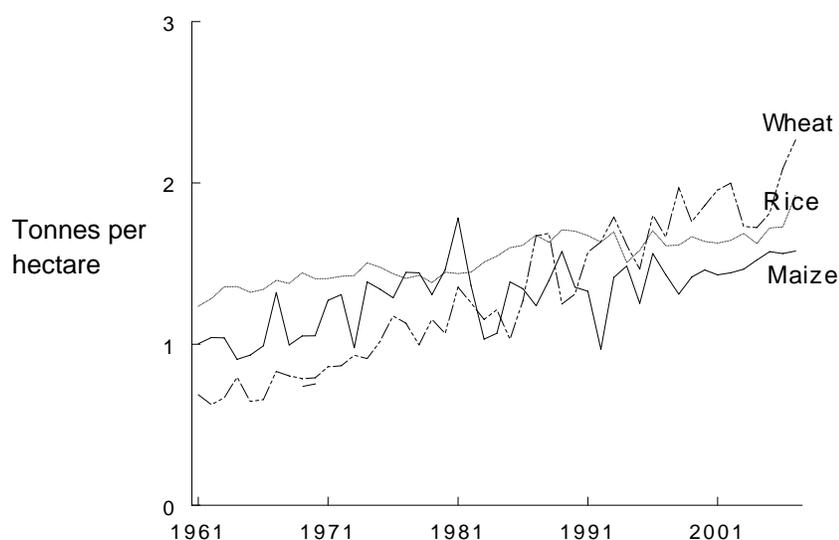
Productivity increases have been the lowest in Africa. Many African countries, where land ownership is not clearly defined, have insecure property rights. Among other things, this means that households moving into cities frequently cannot sell their land, and can only maintain claims to it by continuing to farm it on a part-time basis. This may create a situation where urbanization will lead to reduced food production, because households that have moved to urban areas will have less time available for farming activities. In addition to this, limited access to credit for investment and limited access to important inputs such as fertilizer (and, in some cases, limited access to output markets as well) mean that the economies of scale from larger farming units are not necessarily realized. In such cases, even if smaller plots are consolidated into larger units, productivity may not increase much. At worst, it may even decrease, because there is less labour available per hectare and because this labour cannot easily be replaced by other inputs.

#### **4.2.2 Trends in agricultural research funding**

Part of the increase in productivity has been caused by improved farming methods and by improved, higher-yielding varieties of crops. Agricultural research has played a major role in improving yields per hectare in Asia, America and Europe. But these higher-yielding crop varieties are frequently unsuitable for African agriculture, and although a fair amount of agricultural research has taken place for Africa as well, much of it has yet to translate into changed agricultural practices. To some extent, this is for the same reasons that economies of scale have not materialized; an African farmer who does not have access to credit or crop insurance, and who will starve if crops fail, will be reluctant to switch to new crop varieties where the average yield is higher but where the variability in yield is frequently also greater. Agricultural productivity has increased in Africa (Figure 20), but less than on other continents; average rice yields per hectare in sub-Saharan Africa are now approximately a third of what they are in the world as a whole; average wheat yields are about 80 per cent of what they are in the world as a whole; and average yields of maize are less than half of the world average. (There are a number of other staple crops that are grown in Africa but not on other continents, but productivity growth has been limited for these as well.) There is some sign that productivity

trends have been improving in recent years (Badiane, 2008), but productivity in most crops is still far below that of most other agricultural areas.

**Figure 20: Productivity for the three main staple crops in sub-Saharan Africa, 1961–2007.**



Source: FAO online database.

Moreover, even for those countries in the rest of the world where agricultural research has translated into increased productivity, much of this builds on research that took place decades ago. Funding for agricultural research has declined substantially in recent decades and this is now beginning to show. Agricultural productivity is no longer increasing at the pace that it did in the past. This is not directly due to urbanization, of course, but the shift of population from rural to urban areas may have led to a reduced interest in rural issues, to the extent that the productivity slowdown in agriculture translates into higher food prices in the cities. This reduced interest in agricultural productivity has been short-sighted.

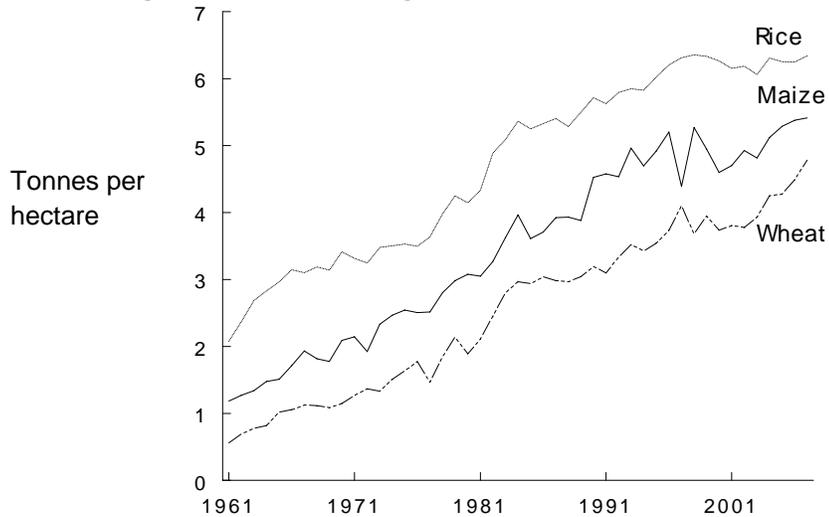
#### **4.2.3 Loss of agricultural land due to urban expansion**

Concern has been raised that urbanization may lead to displacement of agricultural production through the expansion of urban areas into agricultural land, so that less land is available for farming. Yet the area devoted to urban settlement is small compared to the land available for agriculture. In the Millennium Ecosystem Assessment (McGranahan et al., 2005), urban areas were estimated to cover about 7 per cent of the area within cultivated system boundaries. This figure exaggerates the cultivated land area lost to urban development, as a significant part of this urban area remains under cultivation; other studies (see, for example, Angel et al., 2005) have produced far smaller estimates of the land actually covered by urban settlements. However, even if the 7 per cent estimate is used, one should remember that the world's agricultural productivity per hectare has been increasing on average by, 2 per cent per year since 1960. Thus, a few years of normal productivity growth would be more than enough to replace all the cultivated land that has become urban in all of human history.

China has a stated policy of securing enough cultivated land to support its anticipated future population peak of 1.6 billion (expected in 2030), and has attempted to limit urban expansion onto arable land as part of this policy. Yet looking at Chinese agricultural productivity (see Figure 21), we may note that it has increased immensely in recent decades. Maize production

per hectare has risen by almost 100 per cent since the late 1970s; rice production per hectare has risen by 60 per cent; and wheat production per hectare has risen by more than 150 per cent. Urbanization is now increasing rapidly, but many small household farming plots remain and still have relatively low productivity (compared to other Chinese farms, at least – Chinese agriculture is already more productive per hectare than agriculture in many other countries). Further consolidation into larger farms should lead to further productivity increases. If productivity increases continue at their current pace, China will not even need all of its current cultivated land area to maintain its current per capita production levels through the population peak years and beyond.

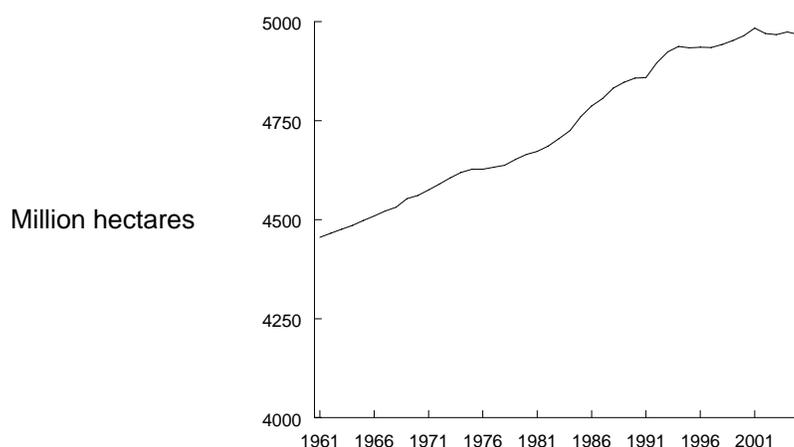
**Figure 21: Chinese agricultural production, 1961–2007.**



Source: FAO online database.

It is also questionable to what extent building over of arable land is caused by urbanization *per se*, rather than by population growth and/or income growth. If a government were to institute radical policies aimed at reducing urban populations and moving people into the countryside, and somehow succeeded in doing this without disrupting economic growth in the country, it is doubtful whether this would actually lead to more arable land becoming available. Rather, it seems likely that the new dwellings that would have to be built in rural areas would cover at least as much arable land as the abandoned urban areas, so that urbanization would actually increase the amount of arable land available by limiting the amount of land covered by housing. Figure 22 shows the global trend in agricultural area; despite the massive urbanization that has taken place since 1960, the total amount of land used for agriculture globally is actually estimated to be some 10 per cent higher.

**Figure 22: World agricultural land, 1961–2005.**



Source: FAO online database.

**Table 1: Estimates of average built-up area (in m<sup>2</sup>) per person for different regions, income groups and city size groups, 1990–2000.**

<b>Category</b>	<b>1990</b>	<b>2000</b>	<b>Annual change (%)</b>
Developing countries	105	125	1.7%
Industrialized countries	280	355	2.3%
<b>Region</b>			
East Asia & the Pacific	65	105	5.1%
Europe	190	230	1.9%
Latin America & the Caribbean	145	145	0.3%
Northern Africa	100	110	0.8%
Other developed countries	360	435	2.0%
South & Central Asia	55	75	2.7%
Southeast Asia	40	60	4.4%
Sub-Saharan Africa	105	150	3.6%
Western Asia	155	170	1.0%
<b>Income category</b>			
Low income	65	85	2.6%
Lower-middle income	80	115	3.3%
Upper-middle income	155	170	0.7%
High income	280	350	2.2%
<b>City population size</b>			
100,000– 528,000	170	210	2.2%
528,000–1,490,000	130	165	2.5%
1,490,000–4,180,000	145	165	1.3%
More than 4,180,000	170	185	0.8%
<b>Global average</b>	<b>155</b>	<b>185</b>	<b>1.7%</b>

Source: Angel et al., 2005.

Estimates of the distribution of built-over land in cities with populations over 100,000 are summarized in Table 1. We may note that although the average built-over area in urban regions is 185 m<sup>2</sup> per capita, this average figure hides huge disparities between different income categories and between different regions. For low-income groups in urban areas, the ones which low-income groups in rural areas should be compared to, the average built-over area per capita is only 85 m<sup>2</sup>. In some parts of the world, where land is scarce, the built-over land area per capita is even less. The built-over area per capita is considerably more difficult to estimate for rural areas, and to the authors' knowledge no such estimates have been made for the world as a whole. However, at least in richer countries the land per unit of new housing is often far higher in rural than in urban areas (see for example, Heimlich and Anderson, 2001, who study this issue for the United States). There is no evidence that, in general, the built-over area for groups at comparable income levels is substantially lower in rural areas than in urban areas. We may note that the built-over land area rises dramatically with increasing incomes; thus, it is likely that some of the building-over of land frequently associated with urbanization is largely linked to income growth rather than to the growth of urban populations.

#### **4.2.4 Environmental degradation**

As noted earlier, urbanization is often linked to economic growth, and economic growth is, in turn, often linked to increased environmental degradation. This means that increased urbanization will often take place at the same time as increased environmental degradation, so that the two will be correlated. Again, however, there is not necessarily a causal link. Some environmental degradation linked to water pollution and poor sewage treatment does tend to increase more or less as an effect of urbanization, because the increased concentration of people strains the natural environment's capacity to assimilate the human population's waste products. But experience has shown that such, largely localized, problems tend to be dealt with relatively quickly when incomes rise (see Shafik and Bandyopadhyay, 1992, for an example of the vast literature dealing with economic growth and environmental degradation; see McGranahan et al., 2005, or Marcotullio and McGranahan, 2007, for more recent examples).

Other environmental degradation such as increasing emissions of particulate matter, SO<sub>2</sub>, or CO<sub>2</sub>, can more appropriately be attributed to economic growth, or at least to the growth of specific economic activities, rather than to urbanization. Environmental problems linked to consumption, such as CO<sub>2</sub> emissions, tend to increase when average incomes increase, but this is caused by increased consumption rather than by increased urbanization. That the overall environmental problems are nonetheless usually worse in cities is partly because urban populations are more concentrated and partly because incomes are frequently higher. Similarly, just as the land use for housing tends to be higher per capita for rural dwellers than for urban dwellers at comparable levels of income, the overall environmental impacts also tend to be higher. This is especially so with higher-income households. Dwellings in rural areas, as opposed to suburban or centrally placed areas, demand more infrastructure per capita (Newburn and Berck, 2006; Berck and Newburn, 2007) and frequently have larger impacts per capita on the local ecosystems (Odell et al., 2003; Hansen et al., 2005).

Chen (2007) studies loss of arable land in China and, although this is not stated explicitly in the paper, the results indicate that loss of soil quality caused by environmental degradation is orders of magnitude more important than loss of arable land caused by urban expansion. In total, less than 2.8 million hectares of arable land have been converted to urban use in the last 20 years; this can be compared to the approximately 20 million hectares that are estimated to suffer from reduced productivity due to heavy metal contamination alone. Not surprisingly, many of these environmental problems are greatest close to the urban areas, where economic activity is greatest and where most of the manufacturing activities causing the pollution take place. As a

result, Chinese authorities have attempted to impose more stringent pollution regulations in recent years; the authorities clearly see the pollution itself as the problem to be addressed, rather than the cities from where the pollution is currently emitted. It may also be noted that one effect of these regulations has been to push some of the industries into rural areas where regulations are (as yet) more lax and where pollution problems are now growing faster than in most urban areas (Alford et al., 2002; Economy, 2007). The effects of pollution on soil quality are important for many other countries as well; however, if one is worried about the impacts of pollution on soil quality, it does seem more fruitful to address pollution directly rather than to reduce urbanization in the hope that this will indirectly lead to improved soil quality.

Loss of soil quality due to poor agricultural practices is another important form of environmental degradation that contributes directly to reduced food production. This is an issue of considerable importance, especially in sub-Saharan Africa. There are a number of reasons why loss of soil quality is a particularly important issue here. Annual crops tend to deplete the soil more than perennial crops. To a considerable extent this can be ameliorated, either by using inorganic fertilizer or by using less intensive organic farming practices; but smallholder farmers in sub-Saharan Africa very often either cannot afford inorganic fertilizer or do not have access to it, and often cannot apply less intensive organic farming methods than they do now because of land scarcity. In addition to this, lack of credit and lack of insurance make fertilizer even less attractive, because although it usually improves the average yield from the plot, it often increases the yield variability as well (Yesuf and Pender, 2005). Thus, farmers who are close to starvation-level yields under normal circumstances, and who cannot easily save surplus food from years with good harvests because of poor storage facilities, will often choose not to apply fertilizer even if they do have access to it because of the risk of starving if the crops fail.

Many longer-term investments that could help maintain soil quality, such as stone terracing or ditches, are not made either. One important reason is limited access to labour – farmers who wish to make these investments will either have to devote part of their own household's labour, reducing the quantity of labour available for farming, or hire labour, using up scarce funds. In many cases, farmers may well realize that such investments would be profitable in the slightly longer term. However, since they cannot easily borrow the necessary funds and cannot easily sacrifice the necessary resources out of their daily income, the investments will not be made. Poor tenure security is, of course, also an issue when farmers decide whether to make long-term investments. If farmers believe that the land is likely to be reallocated before all the benefits of the investments have been reaped, this will reduce the likelihood of their making them. The effect of this will be even stronger if the investments lead to higher profitability and this, in itself, increases the chance that the farms will be reallocated.

Thus, soil degradation and erosion are huge problems in many farming areas in sub-Saharan Africa, partly due to limited access to crop insurance and credit, partly due to tenure insecurity, and partly due to various other factors. But these are not caused by urbanization. In fact, the farmers who have the easiest access to additional funds for investments, and the easiest access to outside support if crops fail, are usually either those who have relatives who have moved into the cities, or people who themselves have moved into the cities but continue to farm as a part-time activity. To some degree, therefore, urbanization may actually reduce the problem of soil degradation.

#### **4.2.5 Biofuel production**

As we saw earlier, agricultural land in many parts of the world has been shifted from production of staple food crops to other types of food production, such as meat, where the number of calories provided for humans per hectare is substantially lower. Agricultural land has also been

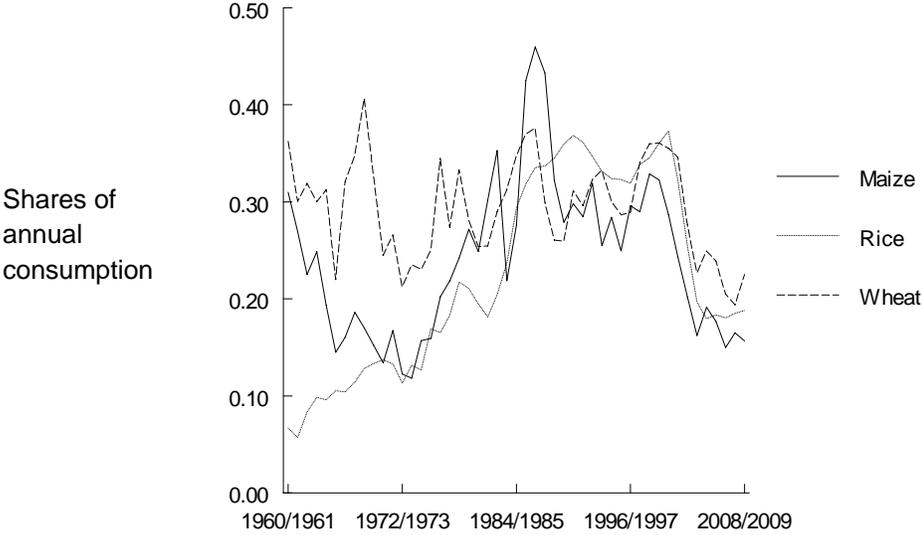
shifted from food production to other types of agriculture that does not contribute at all to the world's food supply. The most notable such shift is the move towards increased production of biofuels, especially various crops grown for ethanol. This is a relatively new development, largely taking place after 2000. Currently, almost a quarter of all maize production in the United States is used for ethanol production. This means that although productivity in maize farming has continued to increase after 2000, all new production has effectively been used for ethanol rather than for food. The European Union has seen a similar shift into growing of crops for ethanol production. Brazil produces ethanol from sugarcane, but this is largely on new land rather than on converted farmland; while the overall environmental impacts of these sugarcane plantations are still debated, this does mean that the land in question has not been shifted out of food production.

The development of biofuel production has also meant that agricultural markets and energy markets are now far more closely linked than they have been. This is a new phenomenon; it makes it difficult to analyse the long-term drivers of food prices statistically, as the underlying structure of the markets involved has changed completely. This new development also means that policies aimed at affecting one of these markets, e.g., agricultural policy, climate policy or transportation policy, will spill over into the other markets and affect consumption and production decisions there as well.

#### **4.3 Increased reliance on commercially traded food**

Historically, many countries have stored large quantities of food in government reserves. To some extent this has been an agricultural policy measure, intended to keep agricultural prices up by removing large quantities of food from the market. To some extent it has been a food security measure, intended to ensure a country's population has access to food. However, keeping large quantities in storage is costly. This is obvious when one knows that the food will be destroyed eventually, as was the case with much of that stored by the EU during the 1980s. Even when the food is stored with the intention of selling it later, funds are tied up in the meantime. Moreover, purchasing food for later resale is especially costly if the expectation is that prices will fall, so that the food will have to be sold at a lower price than that at which it was purchased. As we have seen, food prices have in fact been declining for decades, so many countries have lost large amounts of money on the food kept in storage.

**Figure 23: World stocks of maize, rice and wheat as shares of annual consumption, 1960-2008\*.**



\* Measured as stocks at the end of each year, divided by that year’s consumption of the crop.

Source: Foreign Agriculture Service, United States Department of Agriculture, online database.

With the increase in international food trade, the liberalization of agricultural policies in many developing countries, and the (albeit still limited) corresponding liberalization in many developed countries’ agricultural policies, reserves of food have been reduced considerably over the past ten years (see Figure 23). Ten or 20 years ago, many countries would have managed the effects of a poor harvest on domestic prices by selling food from national reserves; today, many countries are more reliant on meeting such shortfalls by purchasing food in world markets (Surowiecki, 2008). This means that, as long as there are no major supply disruptions in the global market, world markets for food function more efficiently than they did and governments save money from reduced stockpiling. Moreover, the greater reliance on world markets permits specialization in agricultural production and makes a shift in agricultural production toward more high-value crops possible in many areas.

But the world markets for the important food crops are all dominated by a few large exporting countries. Table 2 shows the situation for the July 2004–June 2005 period, shortly before food prices began to rise. For all three crops, the five largest exporters account for three-quarters of world trade or more; for maize, the three largest exporters account for almost 90 per cent of trade. This means that poor harvests in a few key exporting countries can be enough to substantially affect the world market price of a crop. A World Bank report warned several years ago that given the reduced stocks of rice, and the still relatively limited world trade in rice, ‘...the ability of stocks to buffer supply shocks has been markedly reduced. Global rice trade liberalization would make low-income, net-rice-importing countries more reliant on world rice trade, likely reducing political and food security’ (Wailes, 2005).

**Table 2: World trade in grains, July 2004–June 2005.**

	Maize		Rice		Wheat	
<b>Largest exporters</b>	USA	59.7%	Thailand	24.9%	USA	25.1%
<b>(share of world exports)</b>	Argentina	18.1%	Vietnam	17.7%	Australia	14.0%
	China	10.0%	India	16.1%	Canada	13.4%
			USA	13.2%	EU-27	1.0%
			Pakistan	10.4%	Argentina	11.9%
<b>Share of world exports:</b>						
<b>Three largest exporters</b>		87.8%		58.7%		52.5%
<b>Five largest exporters</b>				82.4%		77.4%
<b>World exports as share of world consumption</b>		11.0%		7.1%		18.7%

Source: United States Department of Agriculture, Foreign Agricultural Service, online data. (For maize, only the three largest exporters are displayed; no other exporters account for more than a few per cent of world trade.)

In parallel with this, domestic agricultural markets have been liberalized in many developing countries. Twenty years ago, most households in urban areas in developing countries purchased most of their food from stores that were supplied by government agencies, which in turn used large food reserves as buffers to meet unexpected fluctuations in supply (Surowiecki, 2008). Currently, most urban households purchase their food through commercial channels instead. As Table 2 also shows, world trade is still quite limited compared to world consumption; most food is still produced and consumed domestically. However, overall food reserves have dwindled, and most countries now rely on the world market to meet any shortfall in domestic supply.

As long as there are no sudden disruptions in supply, these liberalized agricultural markets are considerably more efficient than the government procurement agencies that came before them. But the current setup does mean that if several countries need to meet additional demand for food simultaneously by purchasing food on the world market, this can have a huge impact on world market prices because overall trade is so limited compared to overall consumption. The current setup also means that if this happens, and world market prices for food increase as a result, it will immediately translate into higher prices in the cities; there is no longer much scope for using stored food from reserves to buffer the price increase.

**Table 3: Average annual household consumption expenditure (in Eritrean Nakfa) in Eritrea's urban areas, 1996–1997.**

	All urban areas	Asmara	Other highland cities	Western lowland cities	Assab	Massawa
<b>Food</b>	4,494 (36%)	5,028 (32%)	3,619 (47%)	4,238 (52%)	3,712 (49%)	4,155 (47%)
<b>All other items</b>	7,933 (64%)	10,817 (68%)	4,139 (53%)	3,902 (48%)	3,924 (51%)	4,711 (53%)
<b>Total</b>	12,427	15,845	7,758	8,140	7,636	8,866

Source: Arneberg and Pedersen 2001.

The same types of household expenditure surveys referenced earlier can be used to analyse the importance of food expenditure in household budgets; for many poor urban households, food accounts for over half of the household budget, even with the food prices that prevailed in the 2000–2005 period. Table 3 shows consumption patterns in Eritrea’s urban areas; in some, the average household spends more than half its income on food, which of course means that the poorer households are likely to spend an even larger proportion of their income on food. Similarly, more detailed data from Namibia (Table 4) show that a quarter of urban households spend more than 40 per cent of their income on food. The proportion is even higher for rural households, but the crucial difference is that for them a large share of this ‘expenditure’ is consumption of own-produced food, rather than food purchased commercially at market prices. Tanzanian data (Table 5) show this difference between urban and rural dependence on commercial food sources in a glaring fashion: the average urban household spends about half of its income on food and acquires 90 per cent or more of it through commercial channels. The average rural household spends even more, almost two-thirds, of its income on food. However, almost half of this food is own production rather than commercially purchased.

**Table 4: Shares of household income (including value of own production) spent on food in Namibia, 2003–2004.**

	<b>80% or more</b>	<b>60–79%</b>	<b>40–59%</b>	<b>39% or less</b>
<b>National average</b>	3.9%	24.0%	27.3%	44.9%
<b>Urban</b>	0.6%	6.0%	18.3%	75.0%
<b>Rural</b>	6.1%	36.2%	33.4%	24.3%

Source: Central Bureau of Statistics 2006.

**Table 5: Expenditure per capita (including value of own production) on food in mainland Tanzania, 2000–01 and 2007. Nominal Tanzanian Shillings.**

	<b>2000/2001</b>			<b>2007</b>		
	<b>Dar es Salaam</b>	<b>Other urban</b>	<b>Rural</b>	<b>Dar es Salaam</b>	<b>Other urban</b>	<b>Rural</b>
<b>Food–purchased</b>	10,301	7,114	3,118	1,8731	12,650	5,944
<b>Food–not purchased</b>	368	876	2,375	418	1,717	4,612
<b>Total expenditure</b>	21,415	14,185	8,456	42,074	16,418	16,418

Source: National Bureau of Statistics 2008b.

Moreover, it is important to note that in many developing countries, food prices in rural areas are less sensitive to fluctuations in world market prices than the food prices in urban areas. A change in the world market price will translate into changed urban food prices almost instantaneously, because the urban areas rely on the world market for marginal food supplies. A changed world market price may, on the other hand, take months to translate into changed prices in rural areas. Thus, although rural food prices are often volatile for reasons linked to local conditions, they tend not to be very sensitive to world market fluctuations. Consumers in urban areas are highly sensitive to changes in world market prices; rural consumers considerably less so.

Let us consider what this means for the impact of changed world market prices on different types of households, and how this is likely to affect their behaviour. An increase in world market prices for food can be completely devastating for poor urban households in developing countries, and if they believe that prices may go up in future they have a strong incentive to insure themselves against this by purchasing extra quantities now and hoarding it for future use. Richer urban households are hurt less by higher prices because food expenditure is a less important part of their budget and hence they are less prone to undertaking speculative hoarding as a form of insurance – although if they are reasonably sure of higher prices, they will have better scope for hoarding than the poor.

Rural households will of course also be tempted to hoard food if they believe that prices may go up in future. However, the effects of world market price increases on these households are less disastrous than they are for the urban poor; most rural households grow at least some of their food themselves, and additional food purchases are mostly made in local markets that are often poorly linked (at least in the short term) to the world market.

Thus, the large increase in the number of urban poor, and the increase in the share of the world's poor living in urban areas, also increases the number and share of people who are sensitive to food price increases, and who may hoard food if they fear that prices will rise in the future. As we shall see in the next section, there is some indication that such hoarding, combined with the thin markets in several of the main food crops, may have played a role in the recent spike in food prices.

#### **4.4 Urbanization**

A number of factors linked to urbanization have probably contributed to keep food prices higher than they would otherwise have been. Ignoring any positive effects population growth has had on technological change, population growth has undoubtedly prevented food prices from falling as much as they might have in recent decades, and currently a large part of this increase in population is taking place in the world's cities. Economic growth has led to a shift in diets toward more meat consumption, which has reduced the number of calories produced per hectare; this economic growth has largely taken place in cities, and has encouraged further urbanization.

Measures that decrease population growth would probably contribute to lower food prices; however, if anything the consensus appears to be that increased urbanization leads to lower population growth. Measures to limit income growth would also contribute to lower food prices, but are not considered desirable by most of the world's governments or citizens. Measures to limit environmental degradation would perhaps contribute somewhat to lower food prices, but have no direct link to urbanization.

Urbanization has led to some building-over of agricultural land, and this land cannot easily be restored to agriculture. But the total agricultural production lost in this fashion corresponds to, at most, a few years' worth of normal productivity increases in agriculture. Moreover, since land prices are generally higher in urban areas, there is considerably more pressure for dense housing development in urban areas than in rural areas; similar amounts of land, and possibly even larger amounts, would probably have been lost if the people in question had chosen to live in rural areas instead.

Other than this, it is not clear to what extent one can meaningfully say that urbanization has caused higher food prices. If anything, urbanization has made more efficient agricultural production possible and has thus contributed to lower food prices in the longer term.

However, urbanization has meant that a larger number of people than ever before now live in urban areas, and depend on commercial purchases as their main source of food; and as we have seen, food reserves have been reduced substantially, so that increases in world market prices for food will immediately translate into higher food prices in urban areas. Urban households, especially the poorer ones, spend a large fraction of their income on food and are highly vulnerable to price increases. This can lead them to hoard food if they believe that prices will go up.

## 5 What were the causes of the 2007–2008 food price spike?

### Summary

- Analysts are still debating both the factors causing the food price spike, and the relative importance of these factors.
- Land was being shifted from food production into biofuel production.
- Incomes were rising, both in China and India (leading to increased demand for meat) and in sub-Saharan Africa (leading to increased demand for wheat, maize and rice); thus, demand for food was higher than ever.
- The economic boom led to higher oil prices, which in turn pushed up the prices of biofuels, natural gas and fertilizer, making food production less attractive.
- Dollar prices of food rose partly because of the decline in the dollar's value; this affected many developing countries with currencies pegged to it.
- Financial speculation may have contributed to the price spike.
- Hoarding by households, retailers and farmers may have contributed to the price spike, both in world markets and in domestic markets.
- Emergency measures by individual governments, aimed at keeping domestic prices down, contributed to the spike in world market prices.
- The price spike in 2007/08 was sufficiently short that farmers did not have time to respond by increasing production or by shifting land from other uses; however, production of food crops has increased during 2008.
- Urbanization may have played an indirect role. More poor households live in urban areas than ever before and are highly sensitive to price increases; this can make them more prone to start hoarding food if they fear higher prices, contributing to higher prices, and can also make governments more prone to attempt to keep domestic prices low through emergency measures that may contribute to higher prices elsewhere in the world.

Research is still ongoing on what precisely happened in world markets for food, and in domestic markets, during the 2007–2008 food price spike. Several researchers have specifically noted that the market structure in many food markets, and the changing linkages between food markets and other markets such as those for fuel, make it more difficult to examine the drivers of food prices statistically than it is to examine the drivers of prices in many other markets. Yet reports published so far (see Mitchell, 2008; OECD, 2008; Timmer, 2008) identify a number of key causes, and although urbanization *per se* has not been identified as one of them, we shall see that it probably played an indirect role in combination with other factors.

From the research discussion so far, it appears that some of the long-term factors discussed earlier contributed to the food price spike. The shift towards biofuel production was still ongoing during 2007; slower shifts to meat production were taking place; and increases in income, notably in China but also in other countries, were also occurring. In addition to this, a number of short-term events contributed to make things worse.

## **5.1 Shifts in agricultural production**

In principle, the higher food prices in the world market during 2006 should have encouraged farmers to switch to increased production of food and reduced production of cash crops and biofuel. In practice this did not happen to any great extent. In addition, policymakers in developed countries were slow to respond to the rising food prices during 2006; US subsidies to farmers for leaving farmland idle reached peak levels during 2007, with 8 per cent of cropland taken out of production during that year. Biofuel expansion was mandated by policies in the USA and the EU, and went on despite the increases in food prices; 23 per cent of the US maize crop in 2007 was used for ethanol production (up from 6 per cent in 2006). Thus, even though maize production in the world increased by more than 7 per cent during 2007, less maize was sold as food than in 2006. World meat production increased by 4 per cent, faster than production of any of the staple crops except maize, suggesting that farmers were still giving priority to increased production of feed for livestock.

Moreover, the rise in world market prices during 2006 was relatively limited and, in many countries, did not overly affect the farm-gate prices paid to producers; and the dramatic price increases during 2007 happened within the scope of one season and did not have time to affect farmers' behaviour until 2008. Although complete statistics for 2008 are not yet available, it is nonetheless clear that during this year production of food crops increased in many countries, contributing to the later decline in world market prices. Farm-gate prices rose in many countries (see, for example, Dawe, 2008), idle cropland was taken back into production in the USA and the EU, and production also increased in many developing countries.

## **5.2 Economic growth**

Although the financial crisis had begun in the United States by 2007, it had not yet spread much from the subprime market to the rest of the economy, and had not spread to other countries. Economic growth was still strong in many countries, including China, where average income grew by over 10 per cent during 2007. During 2005–2007, average income in China increased by a total of over 30 per cent.

The economic boom also contributed to high oil prices during 2005 and 2006, but still more in 2007. This served to increase demand for all available substitutes for oil, including natural gas and biofuels, pushing up prices for these substitutes as well. This, in turn, led to a further shift in agricultural production towards biofuels; some estimates indicate that 2007 is the one year during which maize-based ethanol produced in the USA would actually have been commercially viable even without supportive government policies. In addition to this, expensive oil and natural gas led to higher transportation costs and (more importantly) to higher prices of fertilizer. Thus, a typical farmer in a developing country confronted higher input costs but not much higher output prices for food crops, being further discouraged from traditional food crop production.

Economic growth during these years was also relatively high in much of sub-Saharan Africa. In many of the countries affected, this additional income translated into increased demand for maize and wheat, as many people in these countries still struggled to meet their daily nutritional needs. Thus, the demand for food crops was rising.

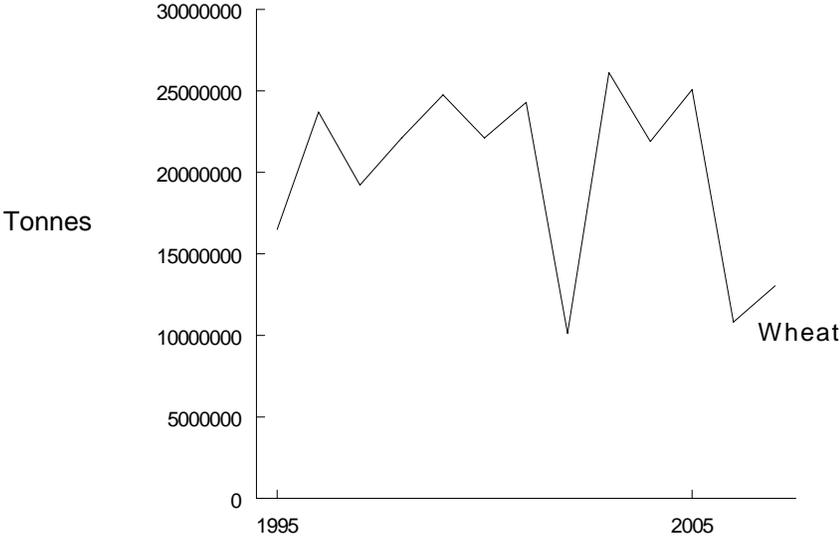
### 5.3 The fall in the dollar’s value

Another factor that contributed to the large nominal price increases seen during 2007 was that the US dollar fell in value, relative to the currencies of most other developed nations. Since world market prices are usually denoted in dollars, this in itself led to an increase in the dollar prices of many commodities, including food. This exaggerated the price increases, in the sense that countries not pegged to the dollar saw their currencies rise in value against it, and therefore experienced smaller price increases for food, measured in their own currencies. However, for the many developing countries pegged or semi-pegged to the dollar, the increase in dollar-denominated prices led to food price increases measured in their domestic currencies as well, and contributed to the overall price increases in these countries.

### 5.4 Failed harvests

As noted above, the world market of many foodstuffs is highly sensitive to weather conditions for a few major exporters like Australia, where in recent years the wheat crop has failed repeatedly (Figure 24), owing to poor climatic conditions. At the end of 2006, world stocks of wheat were at their lowest levels in decades; analysts predicted that one more failed crop in Australia would cause the world market price of wheat to rise sharply. When the Australian wheat crop did fail in early 2007, the dramatic increase was not totally unexpected.

**Figure 24: Australian wheat production, 1995– 2007.**



Source: FAO online database.

### 5.5 Financial speculation

Many people discussing the price boom in late 2007 blamed financial speculators such as hedge funds and pension funds; one financial analyst, in testimony to the US Senate, said ‘Are institutional investors contributing to energy and food price inflation?...my answer is an

unequivocal yes' (Masters, 2008), a sentiment echoed by many other analysts. OECD (2008) and OECD/FAO (2008) also suggest that financial speculation may have played an important role in the price boom. It is not obvious how this would have happened in practice, however. It is clear that there was a great deal of financial activity taking place in the markets for future agricultural commodity deliveries—hardly surprising as financial trading tends to focus on markets where there is large price volatility. But although this probably led to even greater price volatility than would otherwise have been seen, speculation in future prices can only have an indirect effect on the spot prices of food delivered more or less instantly.

Two important points deserve to be noted here. First, even if people believe that the price of a certain commodity will be different in the future from what it is at present, this will only affect the current price if it leads to changes in the levels of stocks held and/or changes in production. And even if people believe that food prices are going to rise in the future, the only way in which this can lead to higher current prices is through increased hoarding of food – and there is no evidence that financial speculators were doing this. Second, futures prices remained lower than spot prices, indicating that most of those speculating were in fact speculating that prices would eventually go down (as indeed they did) rather than up. If anything, financial speculators should thus have been reducing their stocks of food (if they had held any) rather than increasing them. It may have been the case that increased inventories of food held by financial speculators went undocumented, but it is unclear where they could have been storing the quantities of food that would have been necessary for the price behaviour that was observed. We may note that rice, the crop for which prices rose the most, was also the crop for which the financial derivatives trade was the smallest.

## **5.6 Hoarding and government interventions**

Hoarding by individual producers and consumers, and last-minute interventions by governments, probably played a larger role than speculation by financial companies. As we have seen, documented stocks of various foodstuffs have declined. However, smaller stocks of foodstuffs, such as those held by individual farmers, individual food retailers and individual households are poorly documented. If many farmers or retailers think that there is a chance that food prices will continue to go up, they may choose to hoard some of the food in their possession so that they can sell it later at the higher future prices. There is considerable evidence that this happened. at least for rice, the crop for which prices went up the most (Timmer, 2008).

Similarly, as noted in the previous section, if households fear that prices will continue to go up, they may choose to purchase extra quantities of food at the present high prices as a form of insurance against even higher future prices. Given the small quantities held in officially documented stocks, and given that cross-border trade in many foodstuffs is still relatively limited, changes in the behaviour of many small agents may be enough to have a relatively large impact on prices. A recent study from the Asian Development Bank (Timmer, 2008) estimates that if all households using rice as their staple food choose to increase their holdings from one week's supply to two, this extra demand would correspond to a quarter of the normal world trade in rice during an entire year; the study estimates that this could raise the price of rice by approximately 170 per cent. Perhaps needless to say, households increasing their holdings of rice from one week's supply to two would go completely undocumented in official statistics. However, it is well documented that rice reserves were subjected to 'runs' by retailers and households seeking to purchase rice while it was still available, suggesting that such hoarding behaviour was an important factor.

In addition to this, there was frantic stockpiling by governments in response to the increase in food prices. The government of the Philippines purchased large quantities of rice on the world market and the Indian government purchased large quantities of domestically produced rice that would have been exported under normal circumstances. Trade restrictions were introduced by governments in several food exporting countries, in order to limit the impact of the food price boom on domestic consumers; India followed up its government purchases of domestically produced rice with an outright export ban shortly afterwards; Thailand and Vietnam introduced export restrictions in rice; Indonesia (which is normally a large rice importer) introduced export constraints in order to ensure that domestically produced rice would not be exported; and Argentina introduced export taxes on food to encourage farmers to sell domestically instead. All these actions contributed to higher world market prices, especially for rice. It should be noted that prices continued to increase in many countries even after they had effectively sealed their borders to trade and should no longer have been affected by world market prices. This suggests that both producers and consumers expected prices to rise even further, and were stockpiling food against this eventuality.

The Japanese government announced in May 2008 that it would sell some of its stockpiles of rice to the Philippines; due to WTO agreements these stockpiles would eventually have been destroyed under normal circumstances, so this represented an addition to the overall supply on the market. This announcement led to an immediate fall in rice prices, even though the rice was not actually sold until several months later. Thus, when expectations of future prices changed, the current price fell even though the currently traded quantities had not changed. This is a clear indication that expectations of even higher future prices, and speculative behaviour based on these expectations did play a role in the food price crisis, at least for rice.

## **5.7 Urbanization**

Most of the factors currently cited by researchers attempting to explain the short-term price boom had nothing to do with urbanization. Again, however, urbanization has meant that a sizeable share of the population in all countries now depend on commercial trade as their main source of food. This is a relatively new phenomenon in many developing countries, many of which have not previously experienced a price boom in food under these circumstances. When the price boom of the early 1970s took place, less than a quarter of the populations of Africa and Asia lived in cities, and most of the urban populations were concentrated in relatively affluent countries on these continents. Currently, almost half of the populations of these continents live in cities, and the number of poor urban dwellers – who are extremely vulnerable to increases in food prices – has increased dramatically. This means that fears of higher food prices are more likely now than in the past to translate into massive hoarding by large numbers of poor urban households, and thus contribute to higher food prices because of increased short-term demand. It also means that although higher food prices have always been likely to lead to short-term measures by governments afraid of a political backlash among urban populations, urban populations are now sufficiently large in many countries that such short-term measures can themselves contribute to higher food prices elsewhere. Both these factors may have contributed to the 2007–2008 food price spike.

Thus, although urbanization has not contributed to reduced food production, it probably contributed indirectly to higher food prices during the 2007–2008 food price spike because the greater reliance on commercially supplied food led to greater price volatility. The reduced levels of stored food played an important role here as well; had there been greater food reserves at the beginning of the 2007 price increases, neither household hoarding nor government stopgap measures would have been important.

## 6 The way forward

### Summary

- Urbanization *per se* is not causing higher food prices.
- The perception that urbanization is causing higher food prices is largely due to the fact that urbanization is often conflated with factors, such as population growth and economic growth, which do cause higher food prices under certain conditions.
- Urbanization leads to a larger proportion of poor urban households, who are highly sensitive to price increases, to hoard food if they believe that prices will rise.
- This can contribute to price instability, but this can best be managed through increased reserves of food.
- Other than this, the main policy measures that can be taken to restore the long-term trend towards lower food prices are increased funding for agricultural research, and measures to improve productivity in African agriculture. Neither group of measures has any link to urbanization.

A number of links have been suggested through which urbanization might be contributing to higher food prices. Loss of farmland due to urban expansion is one such link; shifts in agricultural production towards more land-intensive food such as meat is a second link; loss of soil quality due to urban pollution is a third. We have seen that the first link is unlikely to be important (the land lost to urban expansion can be replaced by a few years' worth of normal productivity growth in agriculture, and in fact the land used for agriculture globally has not decreased in the past 50 years) and that the second and third links go from economic growth and growth-induced pollution to food prices rather than from urbanization *per se*.

But we have seen that one important effect of urbanization, which played no part in the food price spike of the early 1970s, is to vastly increase the number of people who are dependent on commercially supplied food and also to increase the number of people for whom expenditure on commercially supplied food takes up a large part of the overall household budget. This raises the risk of hoarding by households and retailers when prices are expected to rise, which itself can contribute to higher prices; it also turns food prices in urban areas into a major political issue in many countries, raising the risk of poorly considered short-run measures by governments that may contribute to higher food prices elsewhere. However, increased stockpiles of food (which are, in any case, an almost certain outcome of the 2007–2008 food price spike) would reduce both these risks substantially.

In this paper, we have examined other processes and factors driving food prices, in the short and long term, and we have seen that although several of these processes are often linked with urbanization, it is not meaningful to suggest that urbanization *per se* is the driving factor behind those other processes.

This means, in turn, that policies aimed specifically at reducing urbanization are unlikely to have much impact on food prices, except indirectly insofar as they affect those processes and factors that do have an impact. This means, in turn, that policymakers who are worried about food prices can probably do better by addressing those other processes and factors rather than urbanization.

Foremost among steps that could be taken is to increase spending on agricultural research. One of the clear long-term trends that we can identify is that spending on agricultural research – both public and private – has declined, and that this is an important explanation for the current slowdown in agricultural productivity growth. The International Food Policy Research Institute estimates that an extra 5 billion USD spent annually on agricultural research in developing countries could increase productivity growth by over 1 per cent per year (von Braun, 2008). Considering the funds spent on expensive stockpiling during the 2000–2008 price spike, and considering the damage caused by riots and political instability in many poor countries, 5 billion USD annually seems money well spent – both as insurance against the recurrence of such a price spike and to reduce rural poverty by improving agricultural yields.

Another important issue that needs to be addressed is the sluggish agricultural productivity growth in Africa. Since 1960, agricultural yields per hectare outside Africa have increased on average by over 2 per cent annually. In Africa, on the other hand, average agricultural yields per hectare have increased by less than 1 per cent. To a considerable extent we understand why this has happened. Poor tenure security, poor access to credit, poor access to crop insurance, poorly functioning input markets and poor infrastructure combine to create an environment where agricultural productivity does not increase. Sub-Saharan Africa is the only part of the world where food production could increase substantially, even without new agricultural research. However, if these production increases are to materialize, considerable investment in improved infrastructure is required. So are concerted policy efforts to make small-scale credit and insurance available to smallholder farmers and to reduce the problems in input and output markets so that farmers have better access to necessary inputs and can more easily choose who to sell their output to. It would also require more secure land tenure and better functioning land markets, so that farmers dare to make investments and so that farms can easily be sold to new owners if their current owners choose to move into the cities.

Limiting urbanization, on the other hand, is highly unlikely to lead to lower food prices. Unless policies to curb urbanization also lead to lower income growth (which would hardly be popular) the shifts in diet would continue regardless, and the increased pollution often linked to economic growth would simply be emitted in rural areas instead. On the other hand, the building-over of arable land would likely be even worse if people with rising incomes stayed in rural areas, and the productivity gains from consolidation of farms into larger units would be foregone. If anything, unless economic growth is reduced at the same time, it seems likely that reduced urbanization would actually lead to less agricultural production and higher food prices.

There are many things that we can do to restore the long-term trend towards lower food prices. It would be better to do those things than to try to limit urbanization, which at best would not have any effect on the problems currently causing higher prices and at worst might actually make them worse.

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