Urbanization and its impact on agriculture

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Abstract

The relationship between urbanization and agriculture is examined. With heavy migrations from rural to urban areas in the United States, there have been significant changes in land utilization. Land converted to urban uses is increasing, though it has little effect on total crop production. The technological transformation of agriculture has had much larger effects and has operated as a push-pull on the cityward movement of people as farm functions have moved to the city. Energy and chemical fertilizers now come from urban bases, with large numbers of urban people working for farmers. Yields per acre and per farm worker have risen sharply so that needs for agricultural products are fully met. Urbanization and rising buying power have moved Americans up the food chain. The demand for expensive animal products grows. These forces have resulted in a dramatic escalation of solid waste production in cities and on farms. Urbanization and transformed agriculture have exploded the organic matter cycle. The nitrogen thrown away in farm and urban organic wastes in the United States each year equals 137 percent of the nitrogen in all chemical fertilizers. In contrast, China keeps her organic matter cycle intact and feeds a population four times as large as ours on an equal cultivated area. Future planning must meet the challenge of wasteful land utilization, the overshift of population to cities, and the problems of restoring the organic matter cycle.

This paper discusses the influences on food and farming of an increasingly urbanized world and a declining ratio of food producers to food consumers. Urbanization has been underpinned by the rapid growth in the world economy and in the proportion of gross world product and of workers in industrial and service enterprises. Globally, agriculture has met the demands from this rapidly growing urban population, including food that is more energy-, land-, water- and greenhouse gas emission-intensive. But hundreds of millions of urban dwellers suffer under-nutrition. So the key issues with regard to agriculture and urbanization are whether the growing and changing demands for agricultural products from growing urban populations can be sustained while at the same time underpinning agricultural prosperity and reducing rural and urban poverty. To this are added the need to reduce greenhouse gas emissions and to build resilience in agriculture and urban development to climate change impacts. The paper gives particular attention to low- and middle-income nations since these have more than three-quarters of the world's urban population and most of its largest cities and these include nations where issues of food security are most pressing.

Keywords: urbanization; migration; food; farming; hunger

Introduction

Rural India is experiencing not only a decline in its rate of growth as well as share of population in the total, but also a decline in its contribution to national GDP. Figure 2 shows that the total contribution of agriculture sector to total GDP of India is declining significantly. For instance, in 1981 the contribution of agriculture to GDP was 36 % but it declined to 14 % in 2015. On the other hand, the limited urban GDP data currently available in the public domain shows that the share of urban sector's contribution to total GDP has increased significantly over time, i.e. from 38 % in 1970-71 to 52 % in 2004-05. Agriculture sector in India is majorly dependent on monsoon which is often unpredictable; therefore it is has been characterized by disguised and seasonal unemployment. The decline in employment opportunities in the agriculture and lower productivity level are the major reasons for the decline in the share of agriculture sector to total GDP. On the same logic, it could be construed that the increasing share of industry and service has also lead to the decline in the share of agriculture in GDP.

In 1900, worldwide, there were 6.7 rural dwellers to each urban dweller; now there is less than one and projections suggest close to three urban dwellers to two rural dwellers by 2025. This has been underpinned by the rapid growth in the world economy and in the proportion of gross world product and of the economically active population working in industry and services (since most industrial and service enterprises are in urban areas). Globally, agricultural production has managed to meet the demands from a rapid growth in the proportion of the workforce not producing food and rapid changes in food demands towards more energy- and greenhouse gas emissionintensive food. However, hundreds of millions of urban dwellers face under-nutrition today, although this is far more related to their lack of income than to a lack of capacity to produce food. There is a very large urban population worldwide with incomes so low that their health and nutritional status are at risk from any staple food price rise—as became evident with the rising hunger among urban populations after the food price rises in 2007 and the first half of 2008 (Cohen & Garrett 2009). Much is made of the fact that in 2008, the world's urban population exceeded its rural population for the first time.

Less attention has been given to two other transitions: around 1980, the economically active population employed in industry and services exceeded that employed in the primary sector (agriculture, forestry, mining and fishing); and around 1940, the economic value generated by industry and services exceeded that generated by the primary sector (Satterthwaite 2007). Today, agriculture provides the livelihoods for around one-third of the world's labour force and generates 2 –3% of global value added— although this is misleading in that a significant proportion of industry and services are related to the production, processing, distribution and sale of food, and other agricultural products. In addition, the figure might be higher if the value of food produced by rural and urban dwellers for their own consumption is taken into account. UN projections suggest that the world's urban population will grow by more than a billion people between 2010 and 2025, while the rural population will hardly grow at all (United Nations 2008). It is likely that the proportion of the global population not producing food will continue to grow, as will the number of middle and upper income consumers whose dietary choices are more energy- and greenhouse gas emission-intensive (and often more land-intensive) and where such changes in demand also bring major changes in agriculture and in the supply chain.

Two key demographic changes currently under way and likely to continue in the next few decades are the decline in population growth rates and the ageing of the population. An ageing population in wealthier nations may produce more people that want to and can live in 'rural' areas, but this is best understood not as deurbanization but as the urbanization of rural areas; most such people will also cluster around urban centres with advanced medical services and other services that they want and value.

Objective:

This paper aims to explore need for urbanization and impact on agricultural economy

Defining Urbanization:

The precise demographic definition of urbanization is the increasing share of a nation's population living in urban areas (and thus a declining share living in rural areas). Most urbanization is the result of net rural to urban migration. The level of urbanization is the share itself, and the rate of urbanization is the rate at which that share is changing. This definition makes the implications of urbanization distinct from those of urban population growth or those of the physical expansion of urban areas, both of which are often treated as synonymous with urbanization. A nation's urban population can grow from natural increase (births minus deaths), net rural to urban migration and reclassification (as what was previously a rural settlement becomes classified as urban or as an urban settlement's boundaries are expanded, bringing into its population people who were previously classified as rural). Nations with rapid economic growth and relatively low rates of natural increase such as China over the past few decades have most of their urban population growth from urbanization; nations with little or no economic growth and high rates of natural increase (including many sub-Saharan African nations during the 1990s) have most of their urban population growth from natural increase (see Potts 2009).

Differences in rural and urban rates of natural increase (influenced by differences in fertility and mortality rates) also influence urbanization, although generally these act to reduce urbanization. The term urbanization is also used for the expansion of urban land uses. The conventional definition for urbanization used in this paper entails a shift in settlement patterns from dispersed to more dense settlement. By way of contrast, much of the expansion of urban land use is the result of a shift from dense to more dispersed settlement. In effect, the term urbanization is being used to refer to two opposing spatial shifts in settlement patterns, likely to have opposing effects on, for example, the land available for agriculture.

Urbanization problem or panacea

Many development professionals see urbanization as a problem. Yet, no nation has prospered without urbanization and there is no prosperous nation that is not predominantly urban. Over the past 60 years, there is a strong association between economic growth and urbanization and most of the world's poorest nations remain among the least urbanized nations.

Urban areas provide many potential advantages for improving living conditions through the economies of scale and proximity they provide for most forms of infrastructure and services. This can be seen in the high life expectancies evident in the best governed European, Asian and North and South American cities. Urbanization over the past two centuries has also been associated with pro-poor social reforms in which collective organization by the urban poor has had important roles (Mitlin 2008). But there are still very serious development problems in many urban areas, including high levels of urban poverty and serious problems of food security and of high infant and child mortality. Many urban areas in sub-Saharan Africa also have very high prevalence rates for HIV/AIDs; where there are large urban populations unable to get required treatments and a lack of programmes to protect those most at risk, these increase urban mortality rates significantly (van Donk 2006). But it is not urbanization that is the cause of such problems but the inadequacies in the response by governments and international agencies. In most nations, the pace of economic and urban change has outstripped the pace of needed social and political reform, especially at local government level.

The consequences of this are evident in most cities in Asia and Africa and many in Latin America and the Caribbean—the high proportion of the population living in very poor and overcrowded conditions in informal settlements or tenements lacking adequate provision for water, sanitation, drainage, healthcare, schools and the rule of law. This is evident even in cities where there has been very rapid economic growth. The fact that half of Mumbai's or Nairobi's population live in 'slums and squatter settlements' is more

to do with political choices than a lack of resources. Little more than a century ago, most 'slums' in Europe and North America had living conditions, and infant and child mortality rates that were as bad as the worst-governed cities in low-income nations today. Here too there were problems of undernutrition, lack of education and serious problems with exploitation, as well as deeply entrenched discrimination against women in almost all aspects of life. It was social and political reforms that dramatically reduced these. And social and political reforms are addressing these in many middle-income nations today—as in Thailand, Brazil and Tunisia where housing and living conditions, basic service provision and nutritional standards have improved considerably for large sections of the low-income urban population.

Urbanizing and Agriculture

The world's urban population today is around 3.2 billion people1 —more than the world's total population in 1960. Many aspects of urban change in recent decades are unprecedented, including the world's level of urbanization and the size of its urban population, the number of countries becoming more urbanized and the size and number of very large cities. But these urban statistics tell us nothing about the large economic, social, political and demographic changes that underpinned them. These include the multiplication in the size of the world's economy, the shift in economic activities and employment structures from agriculture to industry and services (and within services to information production and exchange), and the virtual disappearance of colonial empires.

Aggregate urban statistics may suggest rapid urban change but many of the world's largest cities had more people moving out than in during their last inter-census period.2 The increasing number of 'mega cities' with 10 million or more inhabitants may seem to be a cause for concern but there are relatively few of them (17 by 2000), they concentrate less than 5 per cent of the world's population and most are in the world's largest economies. Although rapid urbanization is seen as a problem, generally, the more urbanized a nation, the higher the average life expectancy and the literacy rate and the stronger the democracy, especially at local level. Of course, beyond all these quantitative measures, cities are also centres of culture, of heritage, of social, cultural and political innovation. Some of world's fastest growing cities over the past 50 years also have among the best standards of living within their nation. It is also important not to overstate the speed of urban change. Rates of urbanization and of urban population growth slowed in most sub-regions of the world during the 1990s. Mexico City had 18 million people in 2000, not the 31 million predicted 25 years previously. Kolkata (formerly Calcutta), Sao Paulo, Rio de Janeiro, Seoul, Chennai (formerly Madras) and Cairo are among the many other large cities that, by 2000, had several million fewer inhabitants than had been predicted.

The need of Urbanization shrinking farm land

We need to understand what has underpinned urbanization in the past and how this is changing and might change in the future to be able to consider its implications for agriculture and food production. The history of urbanization and of the cities and towns it encompasses is a history of political strength and economic success. The spatial distribution of towns and cities is in effect the geography of the non-agricultural economy since it is where industrial and service enterprises have chosen to locate. It is also a map of where people working outside agriculture, forestry or fishing make a living. Changes in this spatial distribution reflect changes not only in the economy but also in how this is organized—for instance, how this is influenced by the growth of multinational corporations and how they are structured, by shifts in goods production to greater use of out-sourcing and by economic changes underpinned by advanced telecommunications including the Internet. The rural to urban migration flows that cause urbanization are mostly a response to these economic changes. Some migration flows might be considered exceptions—for instance, growth in places where retired people choose to live, or in tourist resorts; but this also reflects economic change because of the

growth in enterprises there to meet the demand for goods and services generated by the retired people and/or tourists. This close association between urbanization and political strength and economic success is not likely to change looking to the future, although the countries and regions that enjoy the greatest success will change. Economic success for most cities may depend more today on success in global markets than 50 years ago, although intense inter-city competition for markets beyond national boundaries has been an influence for most cities for many centuries (Bairoch 1988; Clark 2009). Urbanization has also been underpinned by the expansion of the state, although the scale of this depends on economic success. In addition, competent, accountable urban governments have considerable importance for economic success. Today, many of the world's largest cities are large not because they are political capitals but because of their economic success. How urbanization is understood has large implications for how its likely future influence on food and farming is perceived. If urbanization is regarded as a process taking place in almost all nations and as a driver of change, then it can be assumed that extrapolating past trends provides us with a likely picture of the world's future urban population. This is backed up by projections for all nations for their urban populations and their levels of urbanization up to 2025 and beyond (United Nations 2008). These suggest that almost all nations continue to urbanize except for those already classified as 100 per cent urban. Within this assumption of almost universal increases in urbanization, often there are references to urbanization being out of control because it seems to take place regardless of economic conditions. There is also uncertainty as to how to fit examples of de-urbanization into this broad picture of a world with almost all nations becoming increasingly urbanized. But if urbanization is understood as a process that is deeply influenced by the scale and nature of economic, social and political change (see for instance Hasan 2006), then projections up to 2025 and beyond become more uncertain. How does one predict the absolute and relative economic performance of each nation up to 2025? Within this understanding of urbanization, there is an interest in the links between urbanization and economic change (which prove to be robust and multi-faceted). Since the scale and nature of economic change varies so much between nations and within nations, there is an interest here in how differences in economic change are associated with (and often the main cause of) differences in the scale and nature of urban change (including urbanization). De-urbanization is more easily incorporated into this, as a spatial manifestation of economic decline or collapse. This paper suggests that there is a substantial but often overlooked evidence base for this second interpretation of urbanization—and that this also provides a more reliable basis for considering the current and future influence of urbanization on food and farming.

Urbanization and food and agriculture road ahead

Urbanization brings major changes in demand for agricultural products both from increases in urban populations and from changes in their diets and demands. This has brought and continues to bring major changes in how demands are met and in the farmers, companies, corporations, and local and national economies who benefit (and who lose out). It can also bring major challenges for urban and rural food security. But it is misleading to consider this in general terms for 'developing countries' as if current or likely future changes in (say) Argentina and Chile have anything in common with (say) Mauritania and Burkina Faso. To predict changes for each nation is difficult, in large part because of uncertainties as to how much and where urban populations will grow in the future. It is usually assumed that most 'developing nations' will continue urbanizing but many low-income nations currently lack any area of comparative advantage within the global economy and so also the basis for the prosperity needed to underpin urbanization (see Satterthwaite 2007; Potts 2009).

It is often assumed that there are particularly serious problems with serving growing numbers of 'megacities' (cities of over 10 million inhabitants) but as noted already, there are relatively few of them, and in many nations a more decentralized pattern of urban growth was evident in the last round of censuses taken in 2000; it will be interesting to see if this is a trend that has been sustained when data from the current round of censuses become available. It is worth considering likely changes at two different ends of the

spectrum in terms of nations' economic success. It would be expected that in nations with successful economies and rapid urbanization, there will be rising demands for meat, dairy products, vegetable oils and 'luxury' foods, and this implies more energy-intensive production and, for many nations, more imports (de Haen et al. 2003).

Conclusion

Urbanization is often considered as having negative impacts on agriculture—for instance, from the loss of agricultural land to urban expansion and an urban bias in public funding for infrastructure, services and subsidies. But the scale of urban poverty suggests little evidence of urban bias for much of the urban population—and clearly, urban demand for agricultural products has great importance for rural incomes. Agricultural producers and rural consumers also rely on urban-based enterprises for a wide range of goods and services—including access to markets. So the key issue is whether the growing and changing demands for food (and other agricultural products) that an increasingly urbanized population and economy brings can help underpin agricultural and rural prosperity and sustainability within a global decline in agricultural land area per person and water constraints.

To this is now added the need to adapt to the impacts of climate change that have the potential to disrupt agriculture and urban demand, and the urban enterprises that provide producer and consumer services to rural populations. The world's level of urbanization is likely to continue increasing, as long as the long-term trend in most low- and middle-income nations is for economic growth. Among these nations, those with the most economic success will generally urbanize most. Higher income nations may no longer urbanize, but this is largely the result of non-agricultural workers being able to live in rural areas or industrial and service enterprises located in rural areas. Low- and middle-income nations with no economic success will have little urbanization. In extreme crisis, they may de-urbanize through an increase in the proportion of the population working in agriculture, forestry and fishing. But this is only likely in nations where parts of the urban poor still have the links in rural areas that allow their reincorporation into rural livelihoods. With regard to climate change, it is difficult to predict likely impacts because these depend so much on whether global agreements rapidly reduce the drivers of greenhouse gas emissions. Climate change mitigation presents many challenges to agriculture to reduce greenhouse gas emissions and to better-off urban dwellers to shift to less carbon-intensive diets and lifestyles.

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