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Sylvia Szabo

Urbanisation and Inequalities in a Post-Malthusian Context

Challenges for
the Sustainable
Development Agenda



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Challenges for the Sustainable Development
Agenda

 Springer

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Preface

Urbanisation and inequalities have emerged as key contemporary challenges despite the fact that population growth is projected to stabilise and overall poverty levels have been declining. The present book analyses these issues through a dual lens: that of a traditional Malthusian framework and the global development agenda. While the book is concerned with the analysis of both urbanisation and inequalities, the speed of urban growth and its impacts on human development remain the primary focus of investigation.

The book is the result of a marriage of academic training, practitioner's perspective and philosophical reflection. The motivation for the subject developed gradually. First, it was prompted by the author's professional experience working in international development and direct exposure to the shaping of the sustainable development agenda. Global development politics and policies remain largely unknown outside of the specialist area, despite the fact that both often have a tangible effect on people's lives. Second, the inspiration for the book arose from the rich Malthusian scholarship, which remains most notorious for Malthus' claim that population growth would impact disastrously on food supplies, or resources more broadly. Combining these two aspects—the practical human development challenges and the need to revisit the traditional Malthusian framework—provided an opportunity for extended research, resulting in this book.

While the present volume has been written in an academic context and its content is evidence-based, it is the author's hope that the chapters of this book will appeal to different audiences, both in terms of professional interests and geographical location. Urbanisation is a key contemporary issue that crosses boundaries: the fast growth of Asian cities is occurring at the same time as urbanities are expanding in Africa and as Europe faces unprecedented challenges associated with living in urban areas. In addition, inequalities continue to rise despite positive aggregate trends in most human development indices.

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Chapter 1

Why This Book?

Abstract While the contributions of the Malthusian theory to the current debate on population and development are without precedent, they fail to account for the impact of contemporary socio-economic processes. Today, as was the case during the Malthusian era, urbanisation constitutes a key social phenomenon, yet both Malthus and his followers have continued to focus on the “population-food-environment trap” and to stress that the primary condition for responding to food demand lies in population control. This chapter highlights the need to reorient the original Malthusian framework, accounting for key contemporary challenges related to sustainable development. The main focus is on the role of contemporary urban growth including its direct and indirect human development impacts. The chapter develops the argument that in the current highly urbanised, innovative and interconnected world, the Malthusian theory should not be abandoned, but instead revised so as to reflect additional factors affecting resource availability and human livelihoods.

Keywords Malthusian theory • Malthusian theoretical framework • Urbanisation

1.1 Introduction

This book has been motivated by the traditional Malthusian debate on population growth and the availability of means of subsistence. The Malthusian debate has not only survived throughout time, but could be argued to have become even more relevant as the world’s population experiences unprecedented growth. With the total population exceeding seven billion, the potential Malthusian risks have never appeared more pertinent. At the same time, current human development discussions continue to focus on population growth as a key barrier to achieving a high level of human development and enhancing quality of life (Sachs 2002; Cleland and Sinding 2005; House of Commons 2007; Sachs 2009; Bongaarts and Sinding 2011; FAO 2013a). Population control programs are implemented around the world and

governments and UN agencies periodically announce new achievements in the area. Given rapid population growth and spread of hunger, a recent report by the Food and Agricultural Organisation of the United Nations (FAO) recommended that edible insects should be adapted more broadly as part of the human diet (FAO 2013a).

This book develops the argument that in an era of rapid urbanisation coupled with technological advancements resulting from the continuously increasing power of human capital, a population-centric approach is outdated. Thus, the primary tenet of this book is that in order to remain relevant, the Malthusian theoretical framework has to be reconceptualised, so as to serve as a useful tool in identifying and tackling the contemporary challenges related to securing people's livelihoods. In this book, it is argued that a traditional population-centric approach has at least two major pitfalls. First, it disregards other key factors, such as urbanisation, which have significant impact on food demand, agricultural supply and the availability of and access to quality food and safe drinking water. Second, by focusing on the issue of population growth, the neo-Malthusian logic neglects the need to redirect our attention from confounders to key outcome variables. Over centuries, the population has continued to grow, yet today's world benefits from the highest levels of quality of life witnessed in human history (Zlotnik 2011). On the other hand, numerous countries, such as Vietnam and Moldova, face development challenges, although their total fertility rates are below replacement level. At the same time, while poverty and inequalities continue to persist in different geographical settings, their nature has evolved. In many countries, including those in sub-Saharan Africa, positive checks acting at the mortality level are predominant in rural areas, where overall life expectancy is lower (Hanna and Hanna 2009). Although separate studies have addressed questions about the impact of urbanisation on the provision of food and water, limited research has been conducted in this area in the context of the Malthusian theory and subsequent post-Malthusian debate.

In 1798 Malthus made two central postulates, which along with other socio-demographic claims, became the tenets of his famous theory. These postulates read that (1) "the food is necessary to the existence of man", and (2) "the passion between the sexes is necessary, and will remain nearly in its present state" (Malthus 1798). While it is difficult to refute these assumptions, the aim of this book is to complement the Malthusian postulate with a set of supplementary propositions, taking into account the current global demographic and human development situation. Consequently, the research summarised in this book proposes and investigates the following additional postulates:

1. Urban factors, such as place of residence and urban growth rates, have a significant impact on vital resources, including food. The impact of urbanisation on the availability of food and access to food depends on country-specific human development context.
2. Human capital has a considerable mitigating effect on households' livelihood outcomes. Its impact on access to basic necessities, such as safe drinking water,

varies depending on the nature and scope of urbanisation and the initial human development level.

3. Poverty and inequality are not a direct consequence of population growth as they exist in different demographic and spatial contexts. Within-urban inequalities, which have arisen as a new developmental challenge, exacerbate traditional inequality causes (e.g. income) and differentials (e.g. rural-urban).

Each chapter of this book aims to investigate one of the above-mentioned postulates so as to enable the conceptualisation of a contemporary evidence-based post-Malthusian framework. In the 21st century, risks related to securing vital livelihood outcomes continue to exist and in many cases result in hunger and death. The word “vital”, from the Latin “vita”, is used to stress the focus on resources that are necessary to human life. The Malthusian arguments are strongly related to contemporary challenges, which result in misery, poverty and inequality. According to the “Millennium Development Goals Report” (United Nations 2011), on average the proportion of people who suffer from hunger has stagnated at 16 %. In terms of the number of people who have become victims of hunger, the figure increased from 818 million between 2000 and 2002 to 837 million between 2005 and 2007. Many countries, particularly those in sub-Saharan Africa, are finding it difficult to meet their goals of hunger reduction. At the same time, contemporary food-related challenges go beyond issues related to hunger and malnutrition; as such, a new approach is required. This book addresses the evolving reality not only by investigating the interlinkages between urbanisation and present-day food security, but also by reassessing the concept of food insecurity itself. In many countries currently facing food challenges, access to improved water sources remains a key developmental obstacle. Most countries are projected to exceed their targets relating to improved water access. However, between 1990 and 2008, the proportion of people with access to safe drinking water declined in 13 countries. Simultaneously, within-urban inequalities are on the rise.

There is no doubt that the origins of urbanisation are complex. While in parts of Asia, urbanisation is primarily thought of as a consequence of natural population increase (Dutt et al. 1994), in Europe and Africa the origins of urbanisation differ. In Europe for example, urbanisation is generally linked to industrialisation processes, while in Africa, colonial settlements are thought to have contributed to the increasing urbanisation of the continent. The geneses of urbanisation will be discussed in more detail in Chap. 2. It is, however, important to stress at the outset of this book that urbanisation should not be defined only in relation to population growth, whether through natural increase or migration, but ought to be treated as a separate phenomenon. Crucially, the nature and scope of urbanisation have important implications when it comes to populations’ concerns about ensuring human survival. Thus, despite the changing nature of the underlying associations, the Malthusian threats remain an important contemporary issue.

In light of the above, the purpose of this book is twofold. First, it provides an in-depth analysis of interlinkages between urbanisation and vital resources. Second,

it makes a conceptual contribution by reorienting the traditional Malthusian debate towards a focus on global urbanisation processes.

1.2 Structure of the Book

This book contains six chapters. Chapter 1 serves as an overall introduction and roadmap to the book. The aim of Chap. 2 is to provide a brief overview of historical and recent trends in urbanisation and discuss issues related to the geneses and definitions of urbanisation. Chapter 3 offers novel approaches to the analysis of the relationship between urbanisation and food security at both macro and micro level, with a focus on differentials in human development. Chapter 4 emphasises another key area of post-Malthusian research, human capital. The chapter delivers a household-level analysis of the underlying associations between urbanisation and households' access to safe drinking water, as well as the presupposed mitigating effect of households' human capital. As highlighted previously, the last empirical chapter, Chap. 5, investigates the extent of intra-urban inequalities in children's nutritional outcomes in the least developed countries, which have experienced a different pace of urbanisation. Finally, Chap. 6 provides the overall conclusions of the entire study, including a revised post-Malthusian framework, a discussion of inter-linkages between historical and contemporary urbanisation and a discussion of policy challenges in the context of the new Sustainable Development Goals (SDG) agenda.

1.3 The Original Malthusian Framework

The overarching research questions in this book have been motivated by the arguments in the *Essay on the Principle of Population* by Thomas R. Malthus and the related work conducted by his contemporaries, in particular William Godwin and the Marquis de Condorcet. While both these thinkers advocated progression towards an idealistic society, Malthus claimed that the outlook for the future of the world's population was bleak. A very simplistic yet key assumption of the Malthusian theoretical framework (MTF) is the hypothesis that population grows at a geometrical ratio, while resources increase arithmetically. It is therefore inevitable that at a certain stage, people will outgrow their means of subsistence. Providing the example of the United Kingdom ("The Island"), Malthus argued that a hundred years later (1898), the population of the country would have reached 112 million. Following this logic, we could have expected the UK's population to be almost 1.8 billion in 1998 and to exceed 2.5 billion in 2023. Malthus recognised, however, that population does not grow at an equal pace in all countries. He acknowledged that there are certain countries where population is stationary and even retrograde.

In general, however, it was assumed that population growth was regulated by two means, preventive checks and positive checks. In England, for example, the

operation of preventive checks hampered to a large extent the natural propensity of the population to grow. Frightened by potential expenses that a husband would have to endure, as well as the need to give up “the fancied pleasures”, many young men renounced marriage. Malthus claimed that “[t]he labourer who earns eighteen pence a day, and lives with some degree of comfort as a single man, will hesitate a little before he divided that pittance among four or five” (Malthus 1798, p. 91). These 18th century preventive checks, relating to Adam Smith’s economic theory of rational choice, have never been more relevant than today. The importance of maintaining a certain standard of living and economic wellbeing, individualism and reluctance to accept responsibilities are currently amongst the main factors in the decline of fertility rates worldwide. Today, fertility decline and global fertility convergence constitute areas of demographic research and are a focus of policy planning (Wilson 2011). Although often forgotten, the Malthusian contribution to the demographic transition theory constitutes one of the greatest and longest-lasting achievements of the Malthusian Theoretical Framework.

Related to the idea of preventive checks is the Malthusian assumption of constant passion between the sexes, which is one of the key tenets of his theory. Malthus disagreed with Godwin, who claimed that in a perfect society, passion between the sexes would extinguish (Sandmo 2010). Both thinkers understood the danger of the utopian equal society advocated by Godwin as being propitious to population growth. However, Godwin argued that the solution to potential population growth in an equal society lay in the assumption that passion between the sexes would cease. A strong proponent of the power of knowledge, Godwin believed in “the eclipsing of the desire for sex by the development of intellectual pleasures” (Medema and Samuels 2003). One might argue that there is a certain degree of plausibility in terms of the potential weakening of passion between the sexes. This is however likely not due to the “development of intellectual pleasures”, but rather to the stress and lack of spare time associated with working patterns in many contemporary societies. According to a survey conducted by the Ministry of Health, Labour and Welfare and the Japan Family Planning Association, around 35 % of all married couples in Japan are “sexless” (Kawakami 2007). This is mainly explained by long working hours that cause tiredness, postpartum abstinence and the perception of sex as “too troublesome” (Moriki 2012).

Malthusian positive checks, on the other hand, are those that affect death rates, and as such are mainly attributable to the lowest classes in society. These include famine, wars and natural disasters, as well as the consequences of being exposed to hard labour and difficult living conditions. In China, although early marriage was popular, famine and the custom of abandoning one’s children, or “exposing children” (Malthus 1826), kept the population in check. One could argue that positive checks are equally relevant today. In contemporary Chinese society, population control has taken the form of the one child policy, which has triggered sex-selective abortion and male preference. Overall, populations without access to health services and nutrition are at much higher risk of disease and death. Across the globe, military conflicts and war generally occur in poor countries. For example, war-torn

Afghanistan and the Democratic Republic of the Congo experience a crude death rate (CDR) of 19.22 and 16.79 respectively (UN 2013). On the other hand, research has shown that in conflict-ridden countries, fertility tends to pick up because of the so-called replacement effect. Evidence from Rwanda suggests that the genocide had a strong impact on fertility increase relating to the loss of children (Schindler and Brück 2011) (Fig. 1.1).

One of the key tenets of the Malthusian theory, often omitted in demographic literature, is Malthus’ stress on inequalities. Societal inequalities, in Malthus’ view, were a natural part of human organisation. Malthus compared the existence of inequalities to the distribution of different elements in objects of nature or naturally occurring phenomena. He argued that as a tree consists of roots and branches, so a society needs to be diversified (Malthus 1798). While Malthus acknowledged that ideally the largest possible part of a society should be comprised of a middle class, he warned that a tendency to move towards the middle of a distribution could only exist within limits. At the heart of Malthusian arguments against an egalitarian society, advocated by Condorcet and Godwin, lay Malthus’ claim that “misery and the fear of misery” were what was keeping the population in check. In the spirit of Hobbes’ views on human nature, Malthus (1826, p. 334) argued that in conditions of scarcity, “the spirit of benevolence, cherished and invigorated by plenty, is repressed by chilling breath of want”. Thus, he rejected the possibility of an egalitarian society based on the presumption that ultimately the need to satisfy the requirements for basic means of subsistence would overtake any intellectual or spiritual aims.

Another important aspect of the Malthusian outlook regarding inequalities was his claim that societal inequalities stimulate innovation. Because people aim to

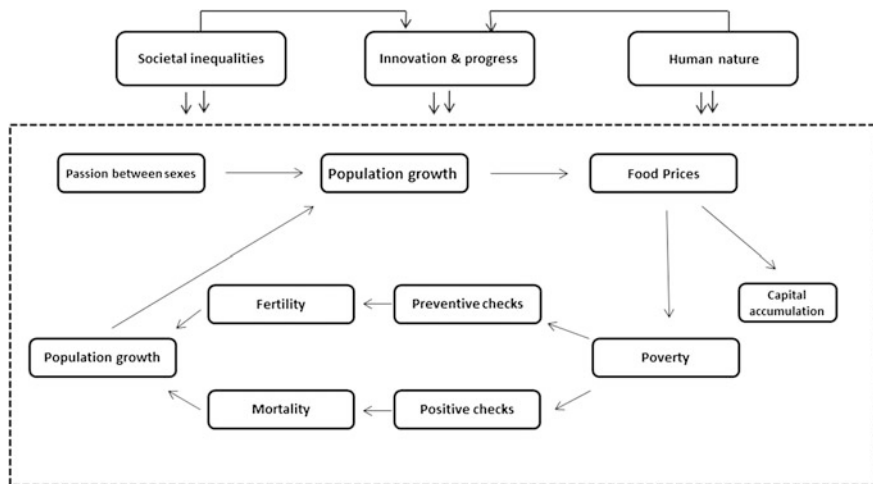


Fig. 1.1 Malthusian conceptual framework (adapted from Malthus 1798, 1826)

improve their conditions, they are thus compelled to “exertion and activity”, which stimulate new ideas and thus enable progress. This little known element of the Malthusian theory, which involves the power of human capital, should be taken into account when evaluating the Malthusian theoretical framework. According to Malthus, human progress was only possible through moral restraint (a preventive check), self-reliance and continuous advancement of one’s mind. These factors would enable societies to extend their “middle parts” and counterbalance the vices and weaknesses of human nature.

While the contributions of the Malthusian theory to the contemporary debate on population and development are without precedent, certain lacunae in the overall framework are worth pointing out. In addition to the previously highlighted issues, the omission of urbanisation from the overall theory stands out. It should be acknowledged that Malthus did mention “unwholesome cities” amongst the positive checks, as during his time, mortality rates in cities were particularly high. Difficult working conditions in a rapidly industrialising England provided new challenges to public health and safety. Yet, throughout Malthus’ *Essays on Population* the references to the impact of urbanisation on means of subsistence are scarce. This omission is even more surprising when one examines the historical literature analysing the urban history of England. 17th and 18th century England experienced an unprecedented urban growth, with new cities being formed and the proportion of urban population increasing over time. While in 1670, the urban proportion amounted to 13.5 % of the population, it had grown to 17 % by 1700 and 27.5 % by 1801 (Wrigley 1985). Initially, London held the majority of this urban population; however, this situation changed in the second half of the 18th century, when other cities, such as Bristol, York and Exeter, expanded rapidly. These urbanisation patterns had important consequences for agricultural demand and supply, but were largely excluded from the Malthusian analysis.

1.4 The Need for a New Framework

Today, we live in a different world. While population growth is likely to influence availability of and access to vital resources, there are also many examples that contradict this thesis. At the same time, securing vital livelihood outcomes in both developed and developing countries remains a fundamental requirement for increasing the overall quality of life. In a world where millions of people suffer from hunger and food-related diseases and many households do not have access to safe drinking water, the issue of survival remains a *sine qua non* condition for any further societal progress. Today, rapid urbanisation, coupled with advancements in human capital and fertility convergence, plays a key role in access to nutritious food and water. Unprecedented urban growth has had significant consequences for households’ livelihoods, both in developing and developed countries, albeit in different ways. A permanent expansion of human capital

resulting in more complex technological applications, together with globalisation processes, affects the production and distribution of food. At the same time, recent fertility trends have shown unparalleled decline in both developing and developed countries. A number of nations, such as Poland and Germany, are even experiencing negative population growth and face long-term changes in the composition of their populations.

The main tenet of this book is that urbanisation, which influences changes in human settlements, has a major contemporary impact on challenges relating to access to vital resources. Developing countries across the globe, including “emerging economies”, experience high urbanisation and industrialisation rates. By mid-2009 the number of people living in urban areas exceeded those living in rural regions, and this trend is projected to continue. Feeding cities has become a key challenge for the 21st century. Another challenge lies in ensuring a reduction in inequalities: not only those pertaining to urban-rural differentials, but also growing intra-urban inequalities.

In the 20th century, the urbanisation process accelerated rapidly and emerged as a major phenomenon with a significant impact on food security. However, the followers of Malthus have continued to formulate arguments in terms of “population-food-environment trap” and stress that the primary condition for responding to food demand lies in population control (Meadows et al. 2005; Sachs 2008, 2009). In the 20th century, all regions, regardless of their level of development or geographical location, experienced a change in the distribution of their populations marked by an increase in the proportion of urban dwellers (Fig. 1.2). While globally the current urban percentage of the population is reported to be about 53 %, it is projected to increase to 67.2 by 2050 (UN 2012). The number of megacities, with populations of at least 10 million, is growing rapidly. Whereas in 1970 the world counted only two megacities, Tokyo and New York, today there are 28 megacities globally. The number of megacities is projected to reach 41 by 2025. Urban growth is faster in developing regions, and new megacities will be mainly in Asia, where already more than half of all current megacities are located. This rapidly progressing urbanisation presents particular challenges to developing countries, which will have to continue to adapt their food production systems in order to respond to the consequences of urbanisation. In addition to evolving patterns in human settlements, a related issue is advancements in human capital and globalisation, including drastic changes in communication systems. Today, with fast-growing internet penetration rates, the aggregate number of internet users has exceeded 2 billion. This means that currently almost one in three persons is using the internet. The network perspective argues that individuals’ agency is influenced by their interactions with others—the networks. The literature in this area is now in its nascent stage and it is only recently that researchers have started to investigate the impact of the internet and online social networks on union formation and fertility patterns. It has, however, been acknowledged that social networks and interactions have a significant impact on fertility and couples’ decisions regarding future family size (Keim et al. 2009). Emerging research on the role of social media in

disseminating contraceptive knowledge in Taiwan (Cheng 2011) showed that an association exists between the two phenomena. It has been further proven that contraceptive knowledge gained through social and mass media has translated into reduced fertility.

In addition to the wide use of the internet, movement of people, represented by migration, and movement of goods, reflected by international trade, are key aspects of globalisation. The volume of international trade, including e-trade, is growing rapidly. The level of migration of both skilled professionals and labourers is high in all world regions. In the EU and Switzerland, since restrictive labour laws were abolished, eligible emigrants and expatriates from across Europe have benefited from the free movement of labour and services policy. International companies continue to compete for global talent across national borders. The impact of globalisation on access to food will be discussed in more detail in Chap. 3, in the context of the debate on the urbanisation-food security nexus. It is, however, important to stress that in this highly interconnected world, a new demographic pattern is emerging. As projected by the United Nations (2011), the discrepancy amongst TFRs on different continents is expected to further decrease. Based on the UN Population Division’s statistics, 19 countries now experience between -0.5 and

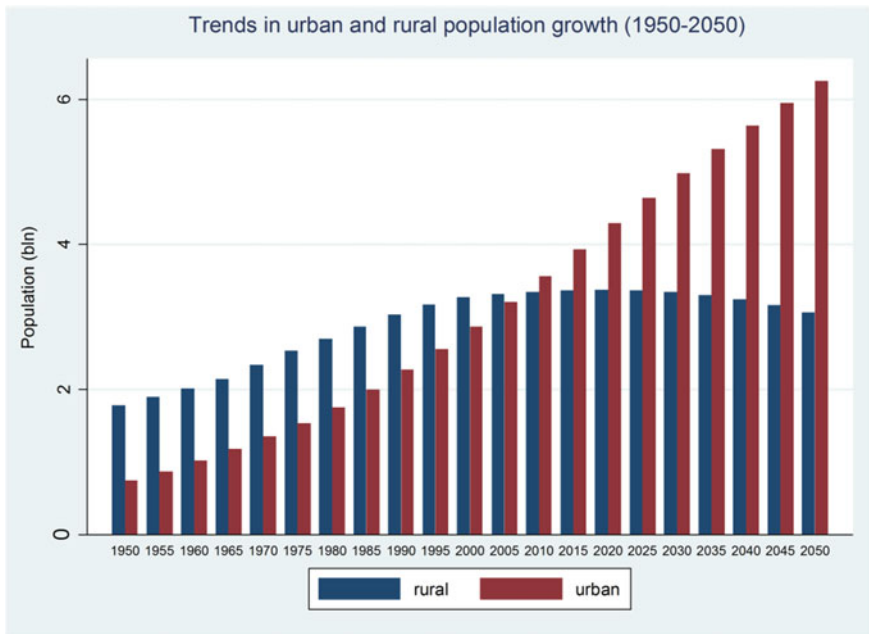


Fig. 1.2 Trends in urban and rural population growth (1950–2050). *Notes* Data beyond 2010 are projected. *Data source* UN World Urbanisation prospects 2011

0 % rates of population growth. These countries include Japan, as well as countries in Eastern and Western Europe. Many more states across the globe have Total Fertility Rates (TFR) below the replacement level.

Despite this shift in reproductive patterns resulting from Malthusian positive checks,¹ a considerable number of countries suffer from serious resource depletion and contamination of natural habitat. For example, in Moldova, a thorough analysis of environmental issues has revealed that the country faces problems such as soil degradation and water pollution from agrochemicals, as well as the eutrophication of local water reservoirs (Sutton et al. 2007). In addition, droughts occurring every several years, in particular in Southern Moldova, cause significant losses to the country's agriculture. Ukraine, although traditionally known for its large agricultural sector, fertile soils and vast forests, has also been suffering from resource depletion. As in the case of Moldova, this is mostly caused by poor management and lack of adequate policies. For instance, it has been reported that one-quarter of all agricultural lands is contaminated by pesticides.

At the same time, whilst the passion between the sexes is unlikely to diminish, it is reasonable to assume that globally the operation of contemporary *preventive checks* will continue to grow, thus bringing fertility down. Similarly, the management of natural resources, technical cooperation, information exchange and migration is influencing peoples' behaviours, technological advances and policy design. As this book was being written, new cooperation agreements were being signed. For example, Japan and Qatar have recently agreed to strengthen their bilateral cooperation, including water and wastewater management, desalination and irrigation technologies for agriculture. Similarly, as citizens of developing countries continue to be increasingly engaged as members of the global community, at least partially due to migration and social media, it is highly probable that natural resource management in these nations will improve.

In this new highly urbanised, innovative and interconnected world, the Malthusian theory should not be abandoned, but revised so as to reflect additional factors affecting resource availability and resulting livelihood outcomes. While the primary focus of this book is on urbanisation, it is acknowledged that factors other than those listed (e.g. changing nature of inequalities) have an important role in the overall framework. These factors will be included in the initial post-Malthusian framework suggested in Chap. 3, as well as in the final framework proposed in the concluding chapter. Before proceeding with empirical examples, the next sections offer background on key issues pertaining to urbanisation, i.e. historical context, geneses of urbanisation, conceptual foundations and measurement challenges.

¹While the positive checks operate at the fertility level, it should be stressed that from the Malthusian perspective contemporary contraception would likely be classified as vice.

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Chapter 2

The Urban Context

Abstract Urbanisation is not a new phenomenon, although its impacts have recently been paid increased attention. During Malthus' times, England witnessed significant growth in industry, which cumulated in what was to become the industrial revolution. The development of industry triggered a need for cheap labour and hence resulted in huge migration flows into the cities. In the 20th century, the urbanisation process accelerated rapidly and emerged as a major phenomenon with a significant impact on food and water security. Similarly to the historical context, the geneses of more recent urbanisation are not uniform and differ depending on regional and country-specific circumstances. This chapter analyses the trends and dynamics of urban growth during the Malthusian era and the origins of urbanisation using selected country examples. Finally, the chapter proposes a novel definition and typology of urbanisation, and discusses the differences in the national classification of urban areas.

Keywords Urban growth • Urbanisation • Historical urbanisation • Urban areas • Typologies of urbanisation

2.1 Urbanisation in the Age of Malthus

In order to understand both the background behind the Malthusian theory as well as the motivation for this book, it is important to provide the relevant historical perspective. The historical context of interest refers in particular to demographic and urban developments occurring in the Malthusian era. During Malthus' lifetime, overall population in England and Wales grew considerably: from around 6.5 million in 1760 to almost 14 million in 1830, according to the records from the 1831 census. At the same time, poverty dominated the lower strata of society and the increase in food prices made it difficult for the poor to afford food. Growing towns had become home for many new residents, including those with little income, and

thus swarmed with homeless families, the sick and individuals with disabilities. During this time, other countries across the globe witnessed hunger and famines. India suffered from the Bengal famine (1770), Chalisa famine (1783–84) and Doji bara famine (1789–92), and China followed with famines in 1810 and 1811. Throughout Europe, countries such as Germany, Sweden, Iceland and the Czech Republic all witnessed famines in the 18th century. Tunisia and Egypt both suffered from widespread famines towards the end of the 18th century. This situation provided Malthus with excellent arguments to support his claim in the repeatedly revised editions of the *Essay on the Principle of Population*. In his analysis of the potential impact of population growth on means of subsistence, Malthus so fiercely defended his argument about the causal effect of human fertility on food that he neglected to analyse the power of industrialisation and urbanisation on the availability of and access to natural resources.

Although historians dispute the exact dates of the industrial revolution, it is broadly agreed that it involved a process of economic change from agriculture to manufacture, which took place between 1760 and 1840. The data regarding the occupational structure of the population during this time period provide further insights. While in 1759, 24.6 % of families in England and Wales worked in agriculture, by 1801–3 the proportion of families employed in agriculture had dropped to 14.6 (Mitchell 1988). These numbers exclude labourers, whose proportion increased throughout the late 18th century and amounted to 6.3 % in 1759 and 15.5 % in 1801/03 (Mitchell 1988). When analysed jointly, the proportion of people working on land remained at similar levels. However, the changing trends in terms of agricultural workers versus labourers were likely a result of evolving property rights and land enclosures. In the 19th century, the proportion of families working in agriculture decreased considerably. Based on the census information, which distinguishes between three occupational categories (agriculture; trade, commerce and handicraft; others) the decline in agricultural employment in Great Britain dropped from 35 to 28 % between 1811 and 1831 (Mitchell 1988). Alongside the increasing process of industrialisation and urbanisation of the country during the same period, this decline continued throughout the 19th century. Similar trends can be observed when looking at the composition of National Accounts in the 19th century (Fig. 2.1). While the factor cost from agriculture remained at comparable levels throughout the century, the income from trade and transport, as well as mining, manufacturing and building, continued to grow. These evolving trends in occupational patterns and income distribution accompanied an increasingly important urbanisation process.

Although the phenomenon of rapid urbanisation is not new, the terminology(ies) describing the process became popular only in the 20th century. When screening through historical statistics, the word “industrial” appears frequently, whereas it is impossible to find any mention of “urban”, let alone “urbanisation” (Mitchell and Deane 1962; Mitchell et al. 1971; Mitchell 1988). Mitchell quotes the Shorter Oxford English Dictionary, which states that “urbanise was first used in 1884 [well after the death of Malthus] in the sense of ‘to make of an urban character; to convert into city’” (Mitchell 1969). However, it remains a historical fact that during

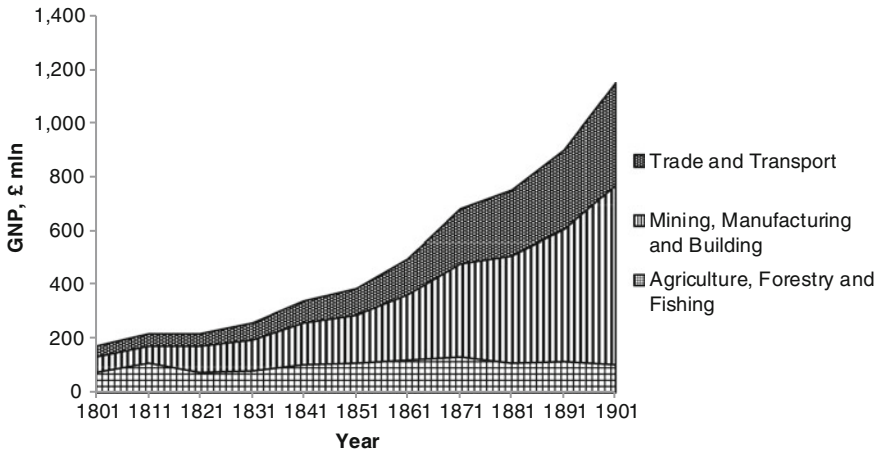


Fig. 2.1 GNP at factor cost—Great Britain 1801–1901 (in £ million). *Data source* Mitchell 1988

Malthus’ times England, and in fact Europe, witnessed significant growth in industry, which cumulated in what was to become the industrial revolution. The development of industry triggered a need for cheap labour and hence produced huge migration flows into the cities. Immigration into cities was the primary cause of urban growth in England in the late 18th century (Williamson 1988). When compared with other European countries, there is evidence that the British population was much more mobile. This may be partly explained by the fact that the benefits received under the Poor Laws could be claimed in places other than one’s native area (Wrigley 2004). It is therefore surprising that, in the context of his theory on population growth and food, Malthus made limited references to urbanisation and population distribution. It was during the Malthusian era that in England the urban share of the population increased tremendously: from 25.9 % in 1776 to 65.2 % in 1871 (Williamson 1988).

In addition, regional data from South England confirm shifting patterns in the occupational structure of the population, which was one of the characteristics of increasing urbanisation in 19th century England. Figure 2.2 shows data points for the four geographical areas with which Malthus was particularly familiar—Surrey, Cambridgeshire, London and Herefordshire. As can be observed from the chart, in 1831, the percentages of families working in trade, handicraft and manufactures were above 25 % for all four regions. London, not surprisingly, accounted for 54 % of such families, followed by Surrey with 35 %. The growing demand for food, resulting from rapid urbanisation accompanied by poor harvests and war with France, led to price hikes in food products, which in turn resulted in greater poverty (Turner 1986). At the same time, the rich landed classes were able to make a profit and, through capital spending, contribute to the country’s agricultural and industrial production (Cannadine 1986). This multifaceted reality provided Malthus with

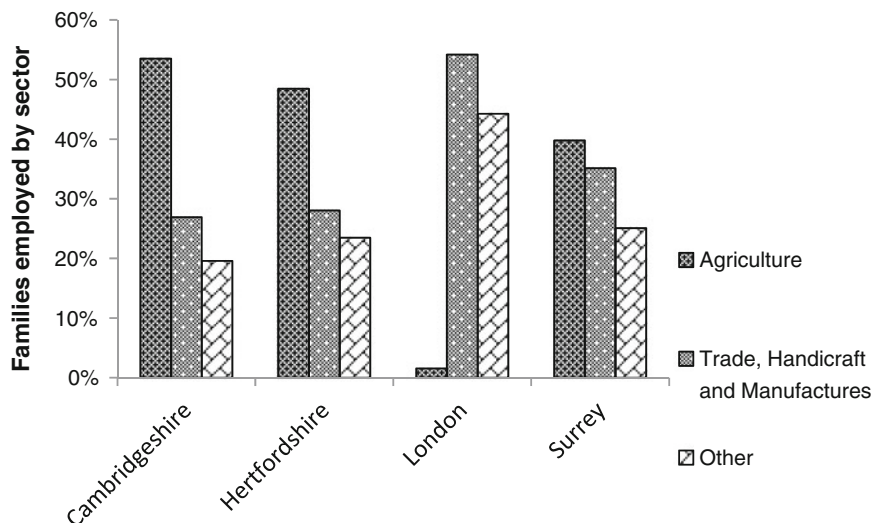


Fig. 2.2 Percentage of families working in agriculture, trade, handicraft and manufactures and other occupations in four English regions (1831 census). *Data source* Population census 1831

inspiration for establishing his theoretical foundations. The Malthusian theory will be discussed in greater detail later in the chapter, but first we turn to other key issues pertaining to urbanisation: its geneses, definitional challenges and current trends.

2.2 Geneses of Urbanisation

The geneses of urbanisation are not uniform; they differ depending on regional or country-specific circumstances. Urban origins are also closely linked to other historical factors, such as geographical environment, trade and colonial expansion. While cities existed in the pre-industrial era, it was only in the 20th century that urbanisation became a globally widespread phenomenon. In Europe, the fastest urbanisation occurred in the second half of the 19th century and beginning of the 20th century. In 1914, the developed world counted 281 cities of over 100,000 inhabitants; by 1980, this number had grown to 1,006 cities (Bairoch and Goertz 1986).

More specifically, when analysing the geneses of pre-industrial urbanisation in Europe, several factors need to be highlighted. One key factor was the role of commercial activities, which resulted in the transformation of landscape and centres of power. Not surprisingly, the countries that were most active in geographical exploration, such as the Netherlands, Portugal and Italy, developed trade links that prompted the growth and importance of cities in their settlement systems. At the same time other nations, particularly Russia and Scandinavian countries, remained relatively non-urbanised. This can be explained by the fact that the Neolithic

revolution in these countries occurred comparatively late. The Neolithic revolution not only changed the process of agricultural production but also contributed to establishing more sedentary societies. In addition, it is argued that some Northern countries experienced relatively late urbanisation because of the cold climate, which entailed a need for combustibles and lower agricultural production (Bairoch and Goertz 1986). The differences in the pace of urbanisation between early industrialised countries and late industrialised countries are illustrated in Fig. 2.3.

Another factor contributing to European urbanisation involved changing property rights related to land ownership. In England, the enclosure movement started in the 16th century (World Bank 2009) and gradually intensified. The enclosure process was dictated by the agricultural progress and the related profitability of the land. During this time, many peasants were dispossessed of their land and worked for feudal estates (Ciriacywantrup and Bishop 1975). This in turn caused peasant displacement, resulting in greater migration to cities. By 1800, England had achieved a level of urbanisation that was not attained by any other country until half a century later (Kingsley 1955). In England, and subsequently in other European countries, urban expansion progressed quickly following the process of industrialisation and the emergence of industrial capitalism. In this context, the interdependency theory allows geographers to argue that urbanisation can be explained as a spatial product of capitalism (Clark 1998). Industrialisation, which created the factory system of manufacturing, entailed unprecedented labour migration to the cities and contributed to further urban growth.

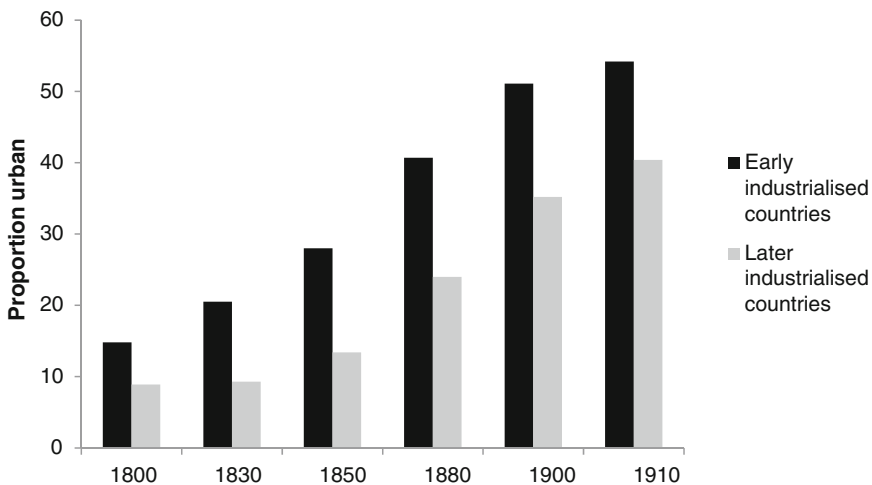


Fig. 2.3 Proportion of urban population in early industrialised and later industrialised European countries (1800–1910). *Notes* Early industrialised nations include Belgium, France, Switzerland and the United Kingdom, while later industrialised countries include Austria-Hungary, Germany and the Netherlands. *Data source* Bairoch and Goertz (1986)

When analysing societal and demographic changes in industrialising England, researchers have focused on explaining the causes of modern population growth. While McKeown's hypothesis states that the decrease in mortality in 19th century England should primarily be attributed to raising living standards, including nutrition (McKeown 1976; Colgrove 2002; Harris 2004), his critics highlight the importance and negative impact of urban processes on human survival during this period. Research has shown that during this time, urban dwellers suffered from lower life expectancy than their rural counterparts and that spatial inequalities existed in terms of access to food and health services (Szreter 1998; Szreter and Mooney 1998). In particular, studies investigating improvements in urban mortality have highlighted the role of sanitation and personal hygiene as key contributors to population growth (Szreter and Mooney 1998; Harris 2004). This discussion will be further referenced in Chap. 5, which focuses on contemporary intra-urban inequalities in developing countries.

The origins of urbanisation in North America have been attributed to large-scale migration from the European continent, as well as a propitious property rights system and rapidly developing transportation links. For example, Dutt et al. (1994, p. 383) stressed that in the 19th century, America acted as a "safety valve" for Europe, absorbing European surplus population as the colonies offered extra job opportunities. However, immigration alone cannot be considered the primary factor accounting for American urbanisation. More plausibly, the impact of technology—in particular transportation, but also industrial energy—became a crucial pillar that enabled greater trade and contributed to the establishment of cities. Borchert argued that these technological innovations, together with the resource base of the hinterland, constituted key elements enabling further economic growth and geographical diversification of the United States (Borchert 1967; Pacione 2009). Thus, despite the fact that there were no urban settlements in pre-Columbian America, urbanisation of the USA progressed rapidly in the 19th and early 20th centuries (Bairoch and Goertz 1986; Pacione 2009). While in 1800 the urban population had amounted to 5.3 %, by 1900 the number had reached 35.9 % (Bairoch and Goertz 1986).

Although today the countries in the Gulf region are classified as highly developed, their socio-economic development path has been distinct from that of the Western countries. As such, the urbanisation processes and trends in the Gulf region differed from those discussed above. This previously nomad region experienced very rapid urbanisation in the second half of the 20th century. The urbanisation process was triggered by an economic boom that followed the discovery of oil and gas and the creation of the petroleum industry in the region. This new sector created job opportunities and thus attracted foreign labour, resulting in urban population growth and increased consumption. While the urbanisation process in the Gulf has primarily been influenced by economic factors, hydraulic theory claims that because of water scarcity in the Middle East, cities were created to enable central management of precious water resources, which was key to agricultural production (Pacione 2009). Today, desalination, centralised management systems, highly developed infrastructure and concentrated settlements allow more efficient resource

distribution. In addition, human capital accumulation that occurred in the urban centres has further contributed to effective spatial planning in this region.

In most developing countries, the origins of urbanisation were still different (and not uniform throughout the group). Dissimilarities between developed and developing countries played out in terms of the overall social and economic environments in which urban processes accelerated. For example, the rates of natural increase have been much higher in the rapidly urbanising developing world. In addition, “natural endowments” and “higher absolute levels of development” were greater in Europe and North America at the times of their urbanisation (Kasarda and Crenshaw 1991). Dutt et al. (1994) offer a comparative analysis of the origins of urban growth in the West and in Asia. While in Western societies, urbanisation was primarily triggered by rural-urban migration (a result of industrialisation and division of labour), in the 20th century, Asian cities had to absorb large surpluses of rural population through a “rural push” process. On the other hand, research suggests that the rapid urbanisation of South Asia was triggered by post-colonial industrialisation processes resulting in turn from increasing globalisation (Hackenberg 1980; McGee 2009). Following this logic, the rural-urban migration was a consequence of an increased demand for labour triggered by the global economy.

Finally, when considering the African experience, the literature suggests that the seeds of urbanisation were planted during the process of the expansion of coastal settlements and administrative centres that took place in the colonial period. In her study on urbanisation in Africa, Coquery-Vidrovitch (1991) claims that this approach does not reflect the reality. She points out that although in some cases new settlements were indeed created, most often existing towns or villages were used and adapted by the colonisers. As Coquery-Vidrovitch (1991, p. 36) explains, “The change was not so much an emergence of cities, but an alteration of the previous urban networks and hierarchies between small trading centres and new selected metropolises, most of them located along the coast, since colonisation aimed at generalizing an outward-oriented market economy”. Similarly, Tettey (2005) points out that both urban bias theory and modernisation theory fail to explain pre-colonial urbanisation in Africa. At the same time, however, it is hard to refute the arguments that colonisation did, at least to some extent, contribute to the increasing urbanisation of Africa, which progressed rapidly in the post-colonial era. In the latter period, migration from rural to urban areas caused by income disparities and natural increase were the primary reasons for rapid urbanisation. The phenomenon of internal migration was complemented by governmental policies, which favoured centralisation of investments and therefore attracted the workforce to the cities. As a result, over the last few decades, Africa has witnessed an unprecedented rate of urbanisation and city growth. A summary of urban origins is provided in Table 2.1. The next section offers a typology of contemporary urbanisation.

Table 2.1 Summary of global urban origins

Urban origins	
Indirect	Direct
<ul style="list-style-type: none"> • Industrialisation • Globalisation • Labour markets and labour demand • Expected labour demand • Colonialism • Overall population growth • Human capital and technological advancements 	<ul style="list-style-type: none"> • Rural-urban migration • Urban population growth (natural increase) • Reclassification of areas of residence

2.3 Definition and Typology of Urbanisation

Before undertaking analysis pertaining to urbanisation, it is important to define what “urbanisation” and “urban” mean as well as to acknowledge measurement challenges related to urbanisation. Both the concept of urbanisation and the division between urban and rural have often been subject to academic and policy debates. Half a century ago, Kingsley Davis provided a simple yet convincing definition of urbanisation as “the proportion of the total population concentrated in urban settlements, or else to a rise in this proportion” (Davis 1965, p. 41). Following the UN guidelines, the Organisation for Economic Cooperation and Development (OECD) defines urbanisation as “(1) increase in the proportion of a population living in urban areas; (2) process by which a large number of people becomes permanently concentrated in relatively small areas, forming cities” (OECD 2012a, b). While the first aspect of this definition implies that urbanisation is a direct result of demographic processes, the second part conceptualises urbanisation as a broader phenomenon. To complement the above definitions, another social (and aspatial) aspect of urbanisation should also be highlighted. Bhatta (2010), for example, referred to urbanisation as “a social process, which refers to the changes of behaviour and social relationships that occur in social dimensions as a result of people living in towns and cities”. This definition of urbanisation is particularly interesting to both sociologists and demographers, as it implies that people’s behaviour, norms, and family patterns change through the process of urbanisation.

This book proposes a revised definition of urbanisation as “a process of population concentration, which has important demographic, social and environmental ramifications”. By using this modified definition, the stress is placed on both the process and the impact of urbanisation. As highlighted in the previous section, urban origins may vary depending on regional and country-specific historical circumstances and contemporary dynamics (Davis 1955; Coquery-Vidrovitch 1991). These include direct demographic causes, such as rural-urban migration and natural increase in urban populations associated primarily with high fertility rates. This global urbanisation process has been accompanied by an increasing reduction in available land, including agricultural land. Importantly, urbanisation is closely

linked to demographic transition (Dyson 2011). Historically, it has been observed that the process of urbanisation continues until the percentage of urban population in the country is relatively high. On the other hand, once urban residence becomes predominant, as is the case in most European nations, de-urbanisation trends can follow.

Traditionally, cities have become the core of business and politics, and thus often represent the centre of power and distribution of state welfare when applicable. At the same time, it is important to highlight that urban spaces are far from homogeneous; they comprise large cities, including megacities, as well as a vast net of smaller towns and cities and their respective peripheries. In the absence of clear administrative divisions, it is hard to distinguish boundaries between urban and rural areas. Importantly, when the proportion of urban dwellers grows, so does the diversification of this group and inequalities of access to basic means of subsistence. Diversification of urban areas encompasses the size and density of urban centres as well as the social class and social capabilities of urban dwellers. In developed countries, urban groups tend to be more homogeneous, partly due to the governmental provision of social welfare; meanwhile, in developing countries, large rural-urban inequalities and increasing intra-urban inequalities persist. Spatial inequalities relating to the place of residence often exacerbate inequalities resulting from households' financial situations (income-based), size (demographic) or both. The discussion of inequalities will be the focus of Chap. 5, which will examine the case of rapidly urbanising LDCs.

Finally, it is crucial to highlight the difference between the impacts of urbanisation as an ongoing process and its effects once the process of rapid urban growth has ended. In this context, urban processes are most likely to have an impact in developing countries. Rapid urban growth, when uncontrolled, can result in large informal settlements (e.g. slums) that often lack access to basic amenities. In these circumstances, fundamental human rights, such as schooling for children or access to safe drinking water, are frequently compromised. In addition, due to challenges related to access to clean water and sanitation, slum dwellers tend to be at high risk of ill health. On the other hand, developing countries are more likely to be affected by direct and indirect outcomes of urbanisation rather than the consequences of urban growth. Obesity constitutes an excellent example. As an outcome of urbanisation, individuals invest less in physical activity, which, coupled with changing dietary patterns, can have dramatic effects on human health.

Table 2.2 provides a summary overview of the differentiated impact of urbanisation in the form of a typology. A distinction is made between two separate but complementary aspects of urbanisation. These include quality and quantity of urban process; quality can be evaluated based on the impact on households' livelihoods, while quantity is measured by traditional indicators of urbanisation such as proportion of urban population, urban growth rate and percentage of urban population in slums. Both aspects of urbanisation can translate into either a negative or a positive outcome. The outcomes encompass demographic, social and ecological phenomena, including the effect of urbanisation on fertility rates, population age

Table 2.2 Typology of urbanisation

Aspect of urbanisation	Assessment/measurement		Mitigating/confounding factors	Negative impact	Positive impact
Quality	Qualitative	Impact on households livelihoods	Macro human development context, including country's welfare policies	Environmental: ecological degradation	Environmental: infrastructure
			Micro socio-economic characteristics	Social: social ties, care support	Human capital (HC): potential for HC development
Quantity	Quantitative	Rate of urban growth and pace of urbanisation	Macro indicators of human development	Demographic: population structure, including aging	Demographic: fertility
				Rapid/unplanned urban growth	Slow-moderate
		Proportion urban	Micro socio-economic indicators	Can vary—limited relevance	Can vary—limited relevance
		Urban population in slums		Large proportion of urban population in slums	No slums

structure and social relationships. Environmental outcomes can be as varied as a potential reduction of fish stock caused by rapid urbanisation and improvements in infrastructure that facilitate the distribution of food and water.

The differentiated impact of urbanisation will be further discussed in Chap. 3 in the context of the analysis of interlinkages between urbanisation and food insecurity. The next section focuses on key definitional and measurement issues related to urbanisation.

2.4 National Classifications of Urban Areas

Finally, when it comes to national definitions of “urban”, the United Nations’ Department of Social and Economic Affairs (DESA) acknowledges that different countries have their own definitions of urban and rural areas. While supranational efforts exist to provide a certain degree of standardisation, with the best known examples probably being the EU and OECD, at the national level countries tend to have their own distinct classifications. Given that it is impossible to discuss each and every country in detail, this section provides several relevant examples. The purpose of this discussion is to acknowledge that international comparisons are not based on a uniform set of standards, but rather on best adapted practices often resulting from a variety of compromises. In order to ensure a broad geographical overview, this section first discusses selected highly urbanised European countries, then large emerging economies, and finally a number of African nations.

According to the Office of National Statistics (ONS), in England and Wales the definition of urban/rural is based on settlement approach, with settlements of 10,000 or more being classified as urban (Malik et al. 2013). Hectare grid squares are used as the minimum classification areas. These are then combined into larger geographical entities, including Output Areas (OA), Wards and Super Output Areas (SOA). Overall, at the smallest level of OA a settlement can be classified as (1) urban, (2) town and fringe, (3) village or (4) hamlet and dispersed. Within each category, further classification relates to the criterion of sparseness. Thus, a settlement can be sparse or less sparse depending on the number of households in the relevant hectare grid squares. The details of the method are spelled out in a joint report by the Countryside Agency, the Department for Environment, Food and Rural Affairs (DEFRA), the ONS and the Office of the Deputy Prime Minister (Webb and Rogers 2003).

In Norway, the country by which Malthus was particularly impressed (Malthus and James 2009; Drake 1966), urban settlements are defined as agglomerations of houses with more than 200 residents (OECD 2007). In addition to this condition, the distance between houses in urban settlements should not exceed 50 m. As a comparison, in other Nordic countries such as Denmark and Sweden, the cut-off distance is set to 200 m (OECD 2007). Based on these criteria, in 2011, Norway was almost 79 % urban compared to around 20 % in 1865 (OECD 2007; UN 2014).

The southeastern part of the country is the most urbanised, with Oslo being the only city exceeding 500,000 inhabitants.

In large economies, such as Brazil, Russia, India and China (BRICs), the urban-rural classifications are different again. In China, a country that experienced rapid urbanisation, urbanisation is usually defined “as the convergence process of population to urban areas” (Liu et al. 2003), which is measured by the ratio of urban population to total population of the country. Urban areas are officially designated by the government as well as at the provincial level. However, the criteria for designation of these areas are complex and have changed over time. In 1955, for instance, places “with seats of county level and above state government agencies or with a clustered population of 2000 of which 50 % or more are non-agricultural population” (Liu et al. 2003) could acquire the status of designated towns. The current system takes into account a number of factors, such as size of population including non-agricultural population, income and infrastructure of an area.

Chang and Brada (2006) reported that after 2000, migrants who had been urban residents for at least six months were also counted amongst urban population. In addition, at that time the density criterion for urban areas was specified at 1500 persons/km² (Chang and Brada 2006). Moreover, it has been observed that in practice two parallel systems of defining “urban” exist—one based on spatial distribution and another parallel system based on inhabitants’ personal registration (Hussain 2003). This latter system is known as 户口 or *hu kou*, using the pin ying transcript. Individuals with non-urban *hu kou* but residing in a city are not considered to be legitimate residents of that urban area and are therefore unlikely to be counted as part of urban population. In addition to introducing bias in the classification system, the *hu kou* issue creates far-reaching challenges, including underestimation of urban poverty. Finally, because of the dynamic nature of China’s urbanisation and the resulting changes in the classification of urban areas (Zhou et al. 2004), caution is needed when referring to urban and rural categories.

India, meanwhile, classifies an area as urban if it fulfils one of the following conditions: (1) a place that hosts a municipality town area committee, corporation or cantonment board, or (2) a place with a population of at least 5,000 inhabitants, a population density that amounts to at least 400 persons/km² or more, and at least 75 % of the area’s working male population employed in non-agricultural sectors (Government of India 2011). According to the Indian Government, settlements that fulfil the first condition are designated as Statutory Towns (ST), whereas places satisfying the three criteria under point 2 are classified as Census Towns (CT). In addition to these two categories, there exist urban agglomerations (UA) and out-growth areas (OG), which are settlements such as ports, railway colonies, campuses or any other areas with identifiable boundaries. According to the 2011 census, India counted 7,935 towns; this was an increase of 35 % from the previous census, conducted in 2001. Comparatively, in Brazil, defining urban areas lies in the competency of each municipality (IBGE 2011). Thus, at the national level, “urban” refers to any urban or sub-urban area as defined by respective municipal authorities (UN DESA 2012a, b). Similar to India and China, Brazil experienced a rapid urban

transition, with its urban proportion of the population increasing from 36 % in 1950 to 84 % in 2010 (UN 2014).

Finally, African countries, which are amongst the least urbanised nations globally, have been experiencing unprecedented urban growth with annual growth rates as high as 6 % for Burkina Faso and Uganda (2005–2010). On average, between 2005 and 2010, the least developed countries, most of which are located in sub-Saharan Africa, had an annual urban growth of 3.7 % compared to 2.6 % for other developing countries (UN 2014). While overall the African continent is dynamically urbanising, considerable differences exist in terms of both the rate of urban growth and definitions of urban areas. For instance, Ghana, since gaining independence in 1957, has seen improvements in its infrastructure and information networks accompanied by a high rate of urbanisation. Ghana defines urban settlements as those with at least 5000 inhabitants (Owusu 2005; Obeng-Odoom 2010). Although the urban proportion of the population continues to grow, the definition of urban areas has remained constant since Ghana's independence. The proportion of urban population in Ghana increased from 15 % in 1950 to 51 % in 2010 (UN 2014). Accra and Kumasi are the largest urban centres in Ghana, with 34 % of urban dwellers residing in these cities (Obeng-Odoom 2010).

In Ethiopia, a country with one of the lowest rates of urban population, cities are defined as settlements of more than 2000 (Schmidt and Kedir 2009). Similarly, Liberia defines its conditions for urban areas as localities exceeding 2000 inhabitants (UN DESA 2012a, b). With these definitional differences, establishing joint standards remains a challenge for international and regional agencies as well as cross-national survey organisations. In order to allow comparisons, the UN statistics are based on the national classifications. At the same time, the Demographic and Health Surveys (DHS) Program has been using its own classification of types of residence, which comprises the following four categories: capitals and large cities (with more than one million inhabitants), small cities (between 50,000 and one million inhabitants), towns (other urban areas) and countryside. Both UN and DHS classifications will be used throughout this book.

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Chapter 3

Urbanisation and Evolving Food Security Challenges

The quest for food security can be the common thread that links the different challenges we face and helps build a sustainable future (José Graziano da Silva, Director-General of the FAO 2012a, b).

Abstract Little attention has been paid to the impact of urbanisation on food insecurity in the context of Malthusian and post-Malthusian studies. In addition, there has been little investigation into the evolving nature of food insecurity and the way urbanisation affects food insecurity risks in different human development contexts. This chapter examines the above research problems by drawing evidence from post-Malthusian literature and policy-oriented research in the area of food security and sustainable development. While traditionally the debate has focused on undernutrition and hunger as the only outcomes of food insecurity, the chapter posits that obesity constitutes a major contemporary food insecurity threat. Drawing from Popkin's nutrition transition theory, the chapter discusses how obesity and evolving nutrition challenges are increasingly linked to the impacts of urbanisation, such as contemporary lifestyles in urban areas. The chapter provides a revised conceptual framework of food insecurity risks and a conceptual analysis of factors affecting global food insecurity.

Keywords Urbanisation · Urban growth · Food security · Food insecurity risks · Human development

3.1 Introduction

Food insecurity constitutes a major threat to contemporary societies and has both short- and long-term impact on human survival and wellbeing. The relationships between population and food are widely established and have been discussed on numerous occasions (Malthus 1798, 1826; McNicoll 1984; Pimentel et al. 1994, 1997; Sachs 2008, 2009; Bongaarts 2011). However, the field of population and development lacks a systematic analysis of how urbanisation affects contemporary

food insecurity risks and the way these potential risks are likely to be mitigated by different levels of human development. Yet urbanisation constitutes a major present-day phenomenon, with more than half of people already residing in urban areas. At the same time, too often the concepts of food security and insecurity are taken for granted as being measured by indicators of hunger. Frequently, the definition of food insecurity is omitted altogether, thus hampering the progress in adjusting to evolving global challenges (Alexandratos 2005, 2008; Cleland and Sinding 2005; Naylor and Falcon 2010; Malik et al. 2013). In this context, several fundamental questions arise: What is the nature of associations between urbanisation and food insecurity in contemporary societies? How does human development influence the relationship between urbanisation and food insecurity? In addition to examining these questions, the analysis in this chapter has two broad goals. First, it aims to develop a post-Malthusian analytical framework with a focus on the increasing role of urbanisation; second, it offers a modern framework of the food insecurity concept.

As discussed in more detail in Chap. 2, urbanisation is not entirely a new phenomenon. Historical data show evidence of a rapid increase in the urban population in England, from 25.9 % in 1776 to 65.2 % in 1871, which coincided with significant industrial growth across Europe (Williamson 1988). Occupational shifts from agricultural to manufacturing sectors can be confirmed by a comparison of the 1801 and 1831 population census data. The changes in occupational structure led to a gradual expansion of townships and small cities across England, enabling a flow of workers from rural to urban areas. Urban areas including new townships expanded gradually, facilitating a constant flow of people from rural areas who relied on agricultural activities. Although agricultural production and related income remained unchanged throughout the century, the income from trade and transport as well as mining, manufacturing and building continued to grow. Towns became home for many new residents in the 19th century, including those with little income; as a result, they swarmed with the homeless, the sick and individuals with disabilities. This was at a time when most parts of the world were severely affected by hunger and famines (Dando 2012). Malthus analysed these developments, which led to a set of propositions concerning the potential impact of population growth on food and agricultural production. However, by limiting the role of urbanisation to one amongst many positive checks, Malthus overlooked the power of urban growth and its impact on natural resources.

Today, when scholars refer to urbanisation as the “real population bomb” (Liotta and Miskel 2012; Buhaug and Urdal 2013) it is no longer possible to neglect the impact of urban growth on different dimensions of food security. The motivation for this research relates to a set of observations related to (1) the changes in population distribution driven by the pace and scale of urban population growth in the 20th century and (2) the evolving concept of food security in the contemporary world. Globally, the percentage of urban population, currently at 52.9 %, is projected to increase to 67.2 % by 2050 (UN 2014b). These trends are explained by the unprecedented levels of urbanisation in less developed countries, including the rise

of megacities in Asia. Urban processes present critical challenges to both developed and developing countries, albeit often in different ways. Developing countries often struggle to adapt their food production systems to meet the needs of people living in urban areas. Adverse climate conditions and natural disasters exacerbate the production and availability of food. Moreover, developing countries have also been severely affected by the surge in global food prices (Alexandratos 2008; FAO 2011). Meanwhile, in the urban areas of highly developed nations, the quality and safety of food poses risks to human health. These developmental differentials will be further investigated throughout the chapter.

Based on the definition proposed in Sect. 2.3, urbanisation is defined as “a process of population concentration, which has important demographic, social and environmental ramifications”. Regarding food security, this chapter develops the argument that the notion of food security requires conceptual and functional revision. Traditionally, food security has been defined as “a situation that exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life” (FAO 2003b; FAO et al. 2012). Conversely, food insecurity is thought to exist when people do not have physical, social or economic access to safe and healthy food. In the context of contemporary food consumption, food trade and evolving disease patterns (WHO 2011), it is timely to reexamine both the concept and the determinants of food insecurity. For the purpose of this research, levels of human development are determined based on the Human Development Index (HDI). The first two categories of the HDI (“very high development” and “high development”) are used to classify countries as developed. The remaining countries (with “medium development” and “low development”) are categorised as developing. The group of OECD countries is also referenced in order to supplement the discussion and analysis regarding trends in the highly developed nations. In addition, a United Nations list of the least developed countries (LDCs) is used (UNCTAD 2011).¹

This chapter unfolds in the following order: Sect. 3.2 starts the discussion with a reconceptualisation of the present-day notion of food security in different human development contexts, after which Sect. 3.3 highlights the global interlinkages between urbanisation and the four aspects of food security, taking into account countries’ levels of human development. Using the traditional Malthusian feedback loop, a new analytical framework is suggested, which focuses on the relationship between urbanisation and food security while incorporating key external factors influencing this relationship. Conclusions are drawn reflecting on the main findings, with the last section providing a summary of the results, implications for the post-Malthusian framework and policy recommendations.

¹Although the list of LDCs and the list of countries with low human development (as per the HDI ranking) are very similar, they are treated distinctly because they are based on a different set of criteria.

3.2 Conceptualising Contemporary Food Security

The first definition of food security was proposed in the wake of the economic recession in the mid-1970s, which was triggered by the oil crisis. After the Organisation of the Petroleum Exporting Countries (OPEC) embargo in 1973–74, oil prices quadrupled (Gately 1984). In the same vein, the prices of food and fertilisers increased, putting developing countries at risk of hindering their socio-economic progress (World Bank 2012a, b). It was in this context that the first definition of food security was established during the World Food Summit in 1974. At that time, it was decided that food security implied “availability at all times of adequate world food supplies of basic foodstuffs to sustain a steady expansion of food consumption and to offset fluctuations in production and prices” (FAO 2003b). The focus on food supplies was supplemented by a more balanced approach when, in 1983, the definition was expanded to include “ensuring that all people at all times have both physical and economic access to the basic food that they need” (FAO 2003b). Later in the 1980s, the concept was further redefined, primarily a result of influential work conducted by the World Bank. The World Bank paper “Poverty and Hunger: Issues and Options for Food Security Developing Countries” highlighted the key role of the income and purchasing power of households and nations in the fight against food insecurity (World Bank 1986a, b). It also distinguished between long-term and chronic food insecurity and temporary food insecurity. Chronic food insecurity was referred to as “a continuously inadequate diet caused by the inability to acquire food” (World Bank 1986b). At the same time, the study defined food security as “access by all people at all times to enough food for an active and healthy life” (World Bank 1986b).

In 1996, the World Food Summit adapted a revised definition, which is arguably the most commonly used definition of food security to date although it has since been updated. The most novel aspect of the revised concept was the inclusion in the definition of the quality of food as well as the issue of satisfying dietary needs and food preferences (FAO 1996). The definition stated that food security exists when “all people, at all times, have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life” (FAO 1996). The declaration from the 1996 World Food Summit highlighted the existing perception that poverty was the root cause of food insecurity and thus income generation was the main way of preventing it.

It was in the 1990s that the concept started to evolve, largely influenced by the writings of (Sen 1983b, 1989; FAO 2003b). In the context of the debate on food and hunger, Sen developed new concepts of entitlements and capacities (Sen 1981). He highlighted that “ownership of food is one of the most primitive property rights” (p. 434) and that each person was entitled to meet their food requirements. Despite its normative connotation, Sen’s entitlements did not imply that each individual had the right to food. Instead, entitlements should be interpreted as a person’s ability to convert their “endowments” (capital, resources or labour) into goods and services through “exchange entitlements mapping” (Sen 1981; Devereux 2001). On the

basis of their entitlements, people are able to gain “capabilities”, i.e. an ability to obtain goods or services. Sen argued that famines could take place in a context of general availability of food or even during a time when aggregate food output was on the rise. For instance, in 1974, during the famine in Bangladesh, people died from hunger even though per capita food availability was relatively high (Sen 1983a). Thus, in 2001, the FAO (2001) amended the definition of food security by including the social aspect of access to food. A recent report by the FAO reconfirmed the same definition (FAO et al. 2012). While this report officially introduced a number of new indicators measuring different aspects of food security, the overall discourse regarding the concept has not changed. Food insecurity has continued to be linked to poverty in developing countries. The most recent definitions of food security and insecurity are as follows:

Food security is “a situation that exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life.”

Food insecurity is “a situation that exists when people lack secure access to sufficient amounts of safe and nutritious food for normal growth and development and an active and healthy life. It may be caused by the unavailability of food, insufficient purchasing power, inappropriate distribution, or inadequate use of food at the household level. Food insecurity, poor conditions of health and sanitation, and inappropriate care and feeding practices are the major causes of poor nutritional status. Food insecurity may be chronic, seasonal or transitory” (FAO et al. 2012).

Before discussing key challenges relating to the current interpretation of the concept of food security, it is important to point out that the concept comprises four key elements. These are: food availability, food access, food utilisation and food stability (FAO 2009a). In many ways, food availability tends to be the most intuitive aspect of food security, as it relates directly to food production and food supply. Similarly, food stability does not pose conceptual challenges, as it is linked to the temporal characteristic of food security, with the assumption that a country is food-secure if healthy and nutritious food is available and accessible on a continuous basis. This leads us to the two more complex aspects of the concept of food security. The first one relates to access.

Access to food can be either physical or financial, and this is well captured in the recent list of the FAO’s indicators (FAO et al. 2012). In developing countries, infrastructure is often poor, which can in many cases prevent physical access to food. In addition, limited physical infrastructure is likely to prevent food traders from reaching customers and may cause farmers to abandon agricultural production and migrate to cities (Martin et al. 2002; Bah et al. 2003). Another aspect of access to food relates to purchasing power. The issue of households’ income as a means of buying safe and nutritious food is relevant in both the developed and developing world. While unstandardised monetary comparisons do not enable cross-country comparisons, country-level studies reveal important patterns.

In general, in developed countries, research focuses on deprived areas, which may experience inadequate food access. These are often referred to as food deserts and have been analysed in the context of urban poverty, primarily in the United

States and the United Kingdom (Cummins and Macintyre 2002; Wrigley 2002; Wrigley et al. 2003; Beaulac et al. 2009). A recent systematic review of literature investigating the issue of food deserts in ten countries published between 1966 and 2007 suggested that further research was required in this area (Beaulac et al. 2009). Importantly, while developing countries tend not to link food-related challenges to the concept of food security, the United States Department of Agriculture (USDA) reports data on food-insecure households. The 2011 report by the USDA highlighted that almost 15 % of households in the USA were food-insecure (Coleman-Jensen et al. 2011). The USDA followed the FAO's definition of food security, quoting food security as "access by all people at all times to enough food for an active, healthy life" (Coleman-Jensen et al. 2011).

While access to food is a key element of food security, the concept would not be complete if it did not comprise an element of food utilisation. This issue is crucial for both developing and developed countries, albeit in slightly different ways. In the developing world, food utilisation has two aspects. First, it is linked to the issue of food safety, which is in turn largely related to hygiene. For instance, street food in many developing nations, technically called the informal food sector (IFS), is a cause of serious health risks. Diseases triggered by consumption of unsafe food include hepatitis, typhoid, cholera and tuberculosis (FAO 2007a, b). In addition, street food is often characterised by a lower level of nutrients and disproportionate quantity of hydrogenated oils (FAO 2009b). Second, developing countries and regions suffer from a high prevalence of overweight and obesity, which often coincides with hunger and undernutrition. A study by Mendez et al. (2005) concluded that amongst females, overweight exceeded underweight in most developing countries. In the developed world, overweight and obesity are the primary food insecurity risk relating to food utilisation.

The issues pertaining to food utilisation can be analysed drawing from the nutritional transition theory. In the early 1990s, a flagship paper by Popkin (1993) on nutritional patterns and transitions highlighted the role of urbanisation as a contributor to degenerative diseases. Across the world, food utilisation resulting in food insecurity risks has become a considerable societal problem. Consumption patterns, not only in highly developed nations but also in developing countries, increasingly involve fast food, resulting in worryingly high obesity rates. The 2012 obesity update by the OECD reported that on average 17 % of the adult population in OECD countries were obese and over 21 % of children aged 5–17 were obese or overweight (OECD 2012a, b).

The simple conceptual framework of food security presented in Fig. 3.1 follows on from the above discussion. As highlighted in this section, specific food security components can carry different food insecurity risks, which are linked to the level of a country's development. Food availability, food access and food utilisation can be thought of as part of a food consumption cycle, or food feedback loop. Food stability complements the concept of food security by highlighting the issue of sustainability. Food insecurity risks are linked to malnutrition issues such as undernutrition and obesity, and in extreme cases might result in hunger. Malnutrition in turn can lead to severe diseases, or even death. Food security risks

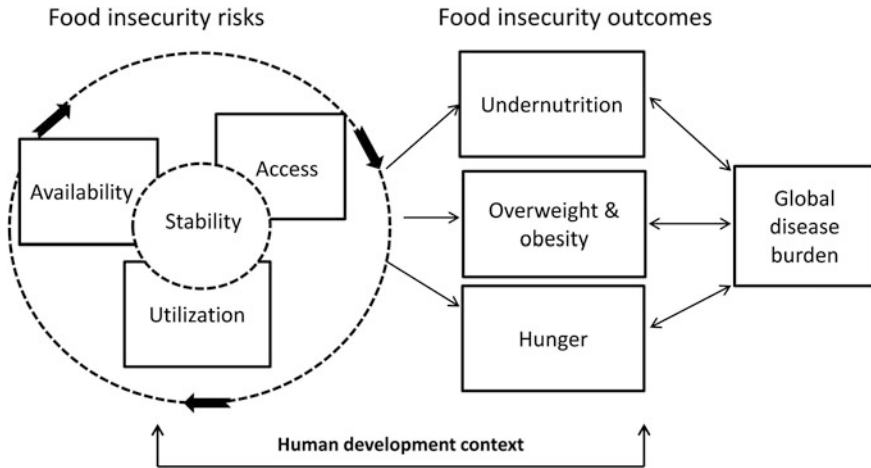


Fig. 3.1 Conceptual framework of food security. *Note* Food security components are based on the FAO's definition

can be understood as distinct factors contributing to the overall outcome of food insecurity. A failure to satisfy any of these elements (risks) results in the state of food insecurity (outcome). Food insecurity outcomes are a useful concept, because they allow a more straightforward measurement of both individual and macro-level food insecurity. We will return to the discussion on measurement under the relevant section. In order to gain a deeper insight into the overall concept of food insecurity in the context of rapid urbanisation, the next section provides a detailed discussion of the complex interlinkages between the two phenomena.

3.3 Urbanisation and the Four Aspects of Food Insecurity

In the 21st century world of exchange and consumption, starvation and hunger remain a major threat to human life and health. In the first decade of the century, 24,000 people died of starvation every day (Dando 2012). While lack of food results in hunger, lack of safe and nutritious food may cause foodborne diseases and general ill health. In the developed world, and increasingly also in developing countries, the dangers of malnutrition resulting from overweight and obesity have come to constitute an additional dimension in evolving food insecurity concerns. The goal of this section is to provide a discussion of the interrelationships between urbanisation and each aspect of food security: food availability, food access, food utilisation and food stability. Based on the food consumption loop presented as part of the conceptual framework in Sect. 3.2, the issues relating to availability of food

and food access will be discussed first, followed by food utilisation and the problem of sustainability. While the primary focus of the discussion will be at the country level, the same arguments are likely to apply to individual regions within countries with large populations, such as India, China or Brazil.

3.3.1 Food Availability

In terms of food availability, urbanisation constitutes a challenge, taking into account evolving consumption patterns as well as food production and food supply processes. Rapid urban growth and an increasing number of megacities mean that more food needs to be available to people who live in an environment that has traditionally been perceived as inadequate for agriculture. Almost all urban dwellers are net buyers of food, which is also, surprisingly, the case with small-scale farmers (FAO 2011). Rural-urban migration, which is a key driver of urbanisation (van Veenhuizen 2006), often results in changing lifestyles—including evolving nutritional habits—and food supply strategies. Continuing urban sprawl often makes it difficult to set clear boundaries between urban and rural areas. At the same time, land, even in urban peripheries and adjacent rural zones, is becoming more expensive, and farmers are often likely to sell land for profit, thus contributing to further urban expansion. As cities continue to grow, water—a key resource for agricultural production—is becoming scarcer and often wasted because of excessive domestic and industrial use.

As highlighted in Chap. 2, modernisation theory states that rural-urban migration and urban growth have a positive long-term impact on economic growth (Bradshaw 1987). This process is likely to operate smoothly in the long run; however, in the short to medium term, in many less developed countries, which suffer from weak food production systems, internal migration to urban areas often leads to reduced food production. At the same time, urban bias theory argues that due to the pressure exercised by urban-based groups, many states implement policies that benefit urban centres. This in turn creates disparities between cities and countryside (Lipton 1977). In the context of agricultural production, decision-making is likely to vary depending on the country's natural resources, level of development (including technological advancement) and trade opportunities.

Thus, in order to tackle challenges relating to food availability in the context of increasing urbanisation, three main solutions have been identified. These include increasing food production and agricultural yield through technological innovation and changing food habits, shifting food production to cities by means of urban agriculture and the global quest for new land. Each of these phenomena operates in different ways in highly developed and developing countries. Increasing food production through technology has traditionally been the most obvious way of ensuring that global food demand is met. Historically, until the green revolution, food production was mainly farm-based and reliant on local output (Gopalan 2001). In the post-Second World War era of golden capitalism, agriculture became

increasingly industrialised and based on science and technology. While this trend resulted in an overall greater food yield, it also led to new challenges. High-income and technologically advanced nations were able to produce large quantities of food and export it to developing countries. This in turn had a detrimental effect on local agriculture (Wilkinson and Scott 2012). Amongst the many social consequences of importing food, one can count increased rural-urban migration.

In order to gain a better understanding of human development differentials in the urbanisation-food availability nexus, a graphical illustration of the historical trends is presented in Fig. 3.2. As can be observed from the graph, in the last fifty years the proportion of the population living in urban areas in the least developed countries almost tripled. At the same time, the OECD member states, which were already highly urbanised by the 1960s, continued to experience urban expansion. Even though urban growth was faster in the LDCs, the increase in their agricultural yield amounted to only 72 %, while in the OECD group it exceeded 147 %. This is related to the previously discussed technological advances in highly developed countries. In developing countries, cereal intake² constitutes 56 % of total calories, which translates into 173 kg of cereal consumption per person per year (FAO 2003c). In developed countries, the proportion of cereals consumed is smaller. It should however be noted that households in developed nations eat cereals in an indirect way through consumption of livestock (Koochafkan et al. 2008).

In addition to technological advancements, the growing focus on edible insects as a source of nutritious food constitutes a new development that is likely to affect the availability of food. While in many developing countries insects have traditionally constituted a part of the regular diet, urbanisation poses challenges to larger-scale insect consumption in at least two ways. Firstly, urban dwellers are less willing to consume insects due to Westernisation of urban areas (FAO 2013a). Secondly, the process of urbanisation can result in decline or sometimes extinction of insect populations (Fattorini 2011), although some species have been able to adapt to urban habitat (McKinney 2006).

While more efficient farming techniques and overall industrialisation of agriculture have allowed greater agricultural productivity, another important phenomenon in the context of rapid urbanisation and food availability is the growing importance of urban agriculture, primarily in smaller cities and peri-urban areas. It is estimated that today around 15 % of food is grown in urban areas (USDA 2013), and the trend is on the rise. In general, in developing countries, urban agriculture is a means to decrease food insecurity, while in highly developed countries, its purpose is to provide leisure and recreation (Pearson et al. 2010). Thus, although the motivation for urban agriculture is different depending on the human development context, its overall impact on food insecurity cannot be neglected. Globally, urban agriculture contributes to greater food availability. In the developing world urban agriculture increases overall food access, while in highly developed nations its role

²Cereals were used to approximate food because cereals are the main components of human diet (in terms of kilocalories).

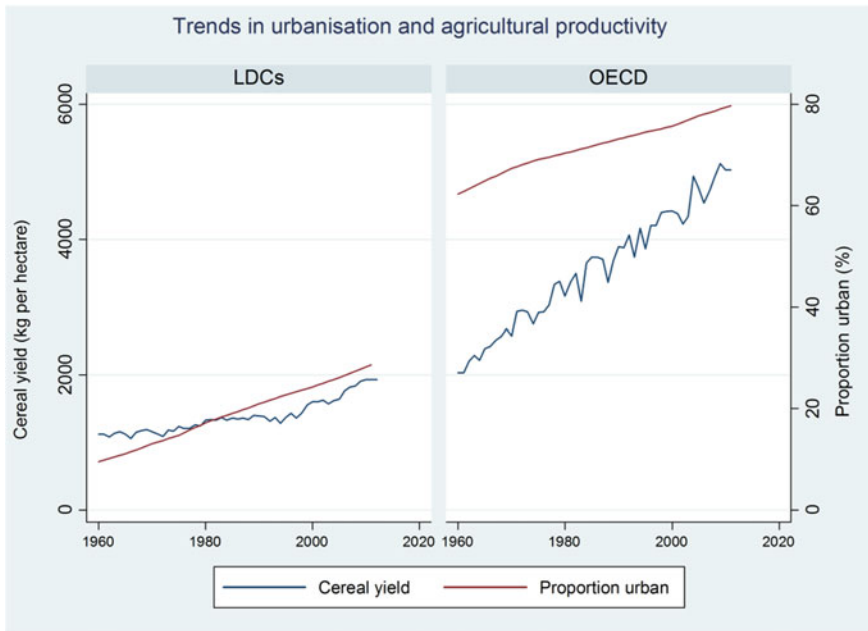


Fig. 3.2 Trends in urbanisation and agricultural productivity—OECD countries and LDCs (1960–2010). *Data source* World Development Indicators (WDI), The World Bank

is primarily linked to food utilisation. These distinct aspects of urban agriculture will be further highlighted in the relevant sections.

Thirdly, one of the most important issues relating to food availability in the context of rapid urbanisation is the amount of land available for agriculture. Logically, urban sprawl has a negative impact on agricultural land. As cities grow and real estate investments continue to acquire more land for commercial developments, farming land shrinks. For instance, an analysis of the city of Shijiazhuang in China (the capital of Hebei province) shows a major increase in urban land use at the expense of crop land (Xiao et al. 2006). Between 1934 and 2001, the city expanded from 6.3 to 165.5 km², an average rate of 2.4 km² per year, which triggered important changes in the management and use of land (Xiao et al. 2006). While the example of Shijiazhuang—as with Chinese cities in general—is likely to be an extreme case, it provides a useful illustration of the global decline in area harvested.

Figure 3.3 provides a graphical overview of the global trends in area harvested per capita. By definition, area harvested refers to “the area from which a crop is gathered” (FAO 2013b). The graph shows that as proportion of urban population has continued to increase, overall area harvested per capita has steadily declined. Globally, the area harvested per capita is now less than 50 % of its size in 1960. LDCs have observed a similar negative trend, and their current mean area harvested

per capita is only slightly larger than the global average. When considering regional differentials, it should be noted that all regions have experienced a per capita decline in area harvested, although at varying levels. In North America, for example, the area harvested per capita was almost 400 ha in 1964, and declined to 205 ha in 2010. In Asia, on the other hand, area harvested per capita was around 156 ha in 1960 and is now approximately 80 ha. Thus, while the trends are similar across different world regions, discrepancies exist in terms of the actual size of the area harvested and agricultural yield across geographical regions. Most developed countries, including those in North America and Europe, continue to benefit from highest cereal yield as well as highest area harvested per capita. It is safe to say that urbanisation processes in these countries have been accompanied by technological advances and structural changes, which have contributed to greater efficiency in agricultural production. As highlighted previously, urbanisation in developing countries is often accompanied by poor planning, which is likely to increase existing food insecurity risks in these nations.

The developed-developing differentials are apparent when it comes to land ownership and land use. In recent years, outsourcing food production through land lease has emerged as a phenomenon through which some countries and regions strive to protect themselves against food insecurity (Cotula et al. 2009). The recent global financial and food crises sparked controversies regarding land lease deals between land-scarce rich countries and land-abundant poor countries (Daniel 2011).

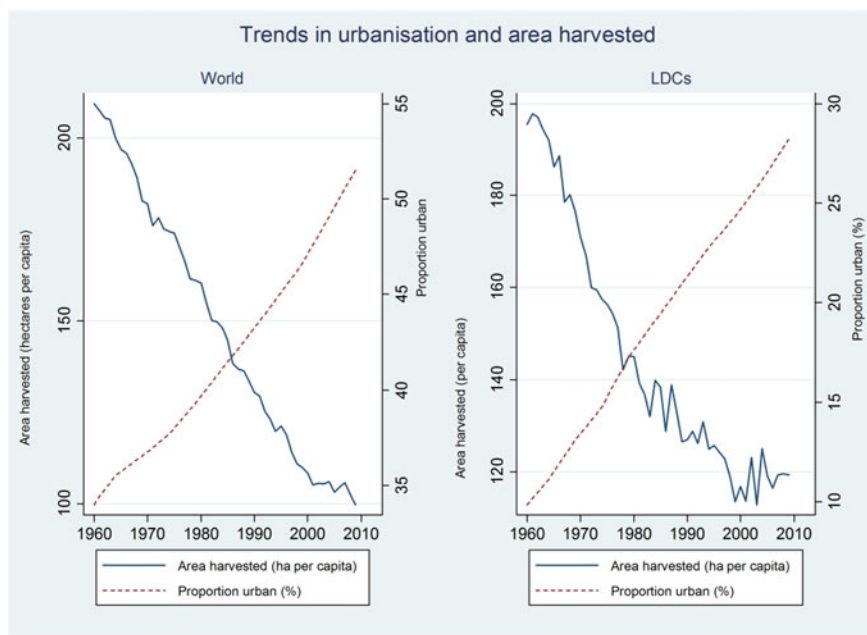


Fig. 3.3 Trends in urbanisation and area harvested—global and LDCs (1960–2010). *Data source* FAO and WDI. Area harvested refers to cereal crops only

It has been widely reported in the press that the Qatari Government leased 40,000 ha of land from Kenya to grow vegetables and fruit in exchange for constructing a port in the Kenyan island of Lamu (Cotula et al. 2009). In June 2008, the United Arab Emirates purchased 324,000 ha in Pakistan's regions of Sindh and Punjab (Daniel 2011). China and India are also reported to have leased land in Ethiopia. The 2009 collaborative report by the FAO, International Fund for Agricultural Development (IFAD) and International Institute for Environment and Development (IIED) highlighted that since 2004, almost 2.5 million hectares of over 1000 ha land allocations had been documented in five African countries: Mali, Madagascar, Ethiopia, Ghana and Sudan (Cotula et al. 2009). Many of the land-seeking countries are highly urbanised Gulf states. For example, in Qatar, the urbanisation rate exceeds 99 % while in Kuwait it amounts to 98 % (UN 2014b).

The land leasing trend might provide some immediate solutions to agriculturally disadvantaged nations, but it poses risks to developing countries. At the local level, land sale/lease in poor countries reduces the need for local workforce through improved agricultural production techniques. This triggers displacement of the agricultural work force and leads young people to urban areas in search of economic opportunities, thus contributing to further urbanisation. While international land deals spark lots of controversy, domestic land grab has had a long historical record. Domestic land grabbing can be motivated by a number of reasons ranging from real estate development to corporate investments and conflict situations. It is frequently aided by the lack of formal land tenure rights. Often, village chiefs cooperate with foreign investors in facilitating land deals. Regardless of the reasons behind land grabs, household-level consequences tend to be similar: land grabbing results in dispossession and displacements. This in turn contributes to decreasing food availability at the country level.

Before moving on to discuss the question of food access, one more issue deserves attention. Although the role of technology has been previously highlighted, it is worth stressing that technological impact goes beyond the mechanisation of agriculture. Technological advancements, which affect all areas of human life, have made an important contribution both to the demand and the supply side of the *population growth-food availability nexus*. On the (food) supply side, technology contributes to more efficient agricultural production and thus greater food yield. For example, in countries such as Spain and Israel, desalinated water has been successfully used in agriculture. As countries move along their developmental trajectories, technological advances have an increasingly large impact. When food is available, the next goal for countries and individual households is to ensure that quality food can be accessed by all and at any time.

3.3.2 Food Access

As previously stated, two key aspects of access to food include physical food access and financial food access. When it comes to physical access, urbanisation is likely

to have a positive impact on food security. In highly developed countries, in general, physical food access is not a concern. Individuals who are unable to access grocery shops often have the opportunity to buy food over the internet with a home delivery option. This facilitates food access for the sick and disabled. In developing countries, on the other hand, physical access is often a major problem. In many African countries, including Ghana, farming is predominantly subsistence-based (Sarpong 2006; FAO 2012a, b). This is due to the lack of tenure rights, lack of financial means needed for commercial agriculture and lack of adequate infrastructure. In this context, urbanisation is likely to be beneficial, if not driven by the narrow interests of urban elites.

In addition to physical food access, financial access plays an important role in ensuring food security. Research has shown that urban dwellers are likely to buy more than 90 % of their food (Ruel and Garrett 2003) and therefore food prices are a major determinant of whether food can be accessed. Residents of metropolitan areas such as Cairo, Lima and Maputo purchase between 92 and 98 % of their food (Ruel and Garrett 2003). Although urban agriculture can supplement the diet of urban residents, in many cases such options are not available to the poorest urban communities. Often the urban poor engage in informal exchange of services and commodities in return for food, which is likely to be of low quality. In the developed world, food prices can also be a cause for concern. As previously mentioned, the 2011 US Population Survey carried out by the US Census Bureau indicated that only 85 % of households in the United States were food-secure (Coleman-Jensen et al. 2011). The bulk of the households identified as food-insecure resided in the largest cities of each metropolitan area (Coleman-Jensen et al. 2011). In addition, the largest cities held a comparatively high rate of households with food-insecure children (12 %).

In many of the countries geographically located in the Caucuses or Central Asia, which are mostly categorised as medium developed, access to food is a societal problem. A 2006 World Bank report highlighted that poor populations in the Eastern Europe and Central Asia (EECA) region, in particular those residing in urban areas, had to adapt food reduction strategies in order to meet their minimum livelihood requirements (World Bank 2006). The situation of the urban poor has deteriorated further due to the economic crisis and the increasing price volatility of main food products (FAO 2010, 2011; Dando 2012). While in the long term, rising prices might present an opportunity in a sense that they could trigger increased investment in the agricultural sector (FAO 2011), such investments require capital and might not be feasible in the least developed countries. In addition, recent floods in South Asia, including in Thailand and Indonesia, have exacerbated these countries' vulnerability to food insecurity risks. Countries in Latin America, including Bolivia, Honduras, the Dominican Republic and Guatemala were hit by a surge in food prices triggering inflation in these nations above 5 % (Wroughton 2011).

The LABORSTA database by ILO is used to compare increase in food prices by countries' level of development (Fig. 3.4). Because LABORSTA does not provide country groupings, based on the HDI ranking, the ten most developed countries and

ten least developed countries are selected. The indices are then averaged in order to present the overall trends. For the least developed group (ten countries with lowest HDI), we provide an average trend as well as a mean trend, though Guinea is excluded. Guinea is treated as an outlier because during the last decade it experienced disproportional hikes in food prices with its food index rising from 114 in 2002 to 656 in 2010. It has been reported that the food uncertainties were amongst the causes of riots and political unrest in the country. However, even if Guinea is excluded from the data analysis, the overall trends confirm that price volatility constitutes a much greater challenge in the least developed countries.

3.3.3 Food Utilisation

Food utilisation is another integral aspect of food security because it pertains to food quality. The official FAO definition of food utilisation states that “utilisation is commonly understood as the way the body makes the most of various nutrients in the food” (FAO 2008). This definition highlights the importance of diversity of diet, food preparation and feeding practices (FAO 2008). By stressing the crucial role of nutritious and healthy food, food utilisation also encompasses such factors as safe water and sanitation.

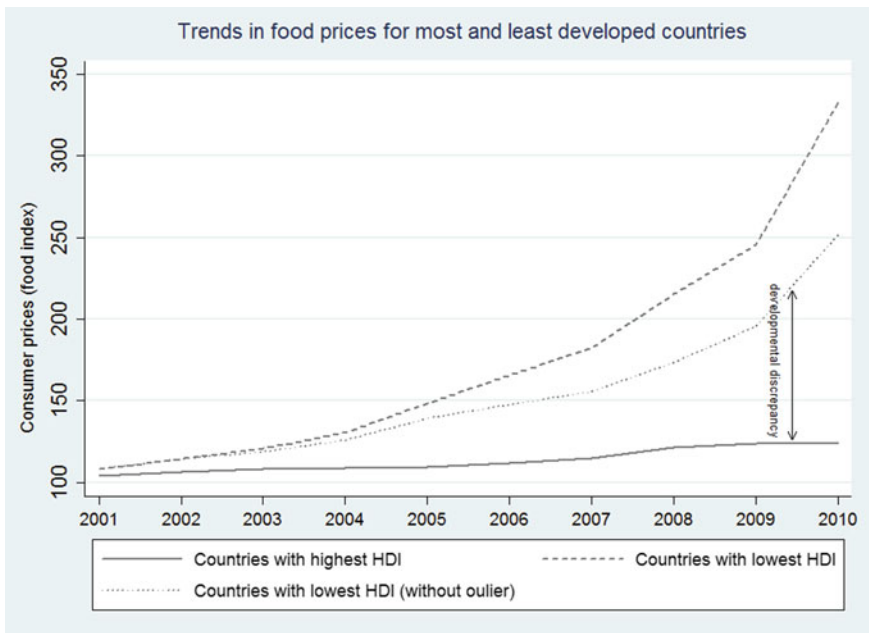


Fig. 3.4 Trends in food prices—most and least developed countries (2001–2010). *Data source* LABORSTA, ILO. Food indices include non-alcoholic beverages

As previously highlighted, because urban residents are particularly vulnerable to volatile food prices, they are often forced to reduce other expenditure in order to meet their basic food requirements. In the context of developing countries, poor urban dwellers are thus at risk of consuming low quality food, including unhygienic street food, and are therefore exposed to the danger of disease (Matuschke 2009). On the positive side, the informal food sector and street food can contribute to increasing food security by providing affordable food (FAO 2007a, b). However, this sector can also trigger food insecurity risks resulting from the low quality of the food consumed and lack of hygiene during food preparation, including the cleanliness of vending stands. Handling food with bare hands in places that lack immediate access to clean water may result in transmission of diarrhoeal pathogens (Mensah et al. 2002). Because the food serving stage is so critical, many urban poor incur food infections and are at risk of life-threatening diseases. In addition, because vending stands are often unprotected, insects including disease-bearing flies can contaminate food.

Another factor impacting food quality in rapidly urbanising developing countries is environmental contamination. Many countries, including Kenya, experience challenges due to high levels of lead in water and soil, which has a negative impact on food safety (Makokha et al. 2008). Chinese and Indian megacities and other urban areas suffer from high air and soil pollution, which affects the nutritional value of agriculture products. Globally, 16 out of the 20 most polluted rivers are located in China (McBeath and McBeath 2010). Water pollution caused by industrial and human waste as well as chemical pesticides leads to soil contamination (McBeath and McBeath 2010). In addition, wastewater-irrigated crops are likely to contain heavy metals and pesticide residues, which can have a dramatic impact on human health (Khan et al. 2008; Wang et al. 2013). Research conducted in the Jiangsu province in Eastern China found that heavy metal concentrations were also present in poultry and livestock (Cang et al. 2004). Furthermore, environmental pollution, which is likely to be higher in urban centres, is harmful when it comes to urban and peri-urban agriculture. This in turn affects the livelihood strategies and livelihood outcomes of many urban poor in the developing world.

A crucial aspect of food utilisation in both developing and developed countries pertains to quality of food, which is linked to the food supply system. Amongst the consequences of rapid urbanisation there has been a shift in the production patterns of food. These include the emergence of, and rapidly growing trends in, trade and consumption of processed food (Popkin and Nielsen 2003; Akram-Lodhi 2008). It has been proven that urbanisation correlates highly with access to processed food, which has higher sugar levels (Popkin and Nielsen 2003). In addition to sugar and artificial sweeteners, processed food tends to contain artificial colouring agents, hydrogenated fats, preservatives and chemical pesticides. In the contemporary world, processed food is often the most accessible type of food, both in terms of physical proximity as well as price. Employees and students in busy urban centres are thus highly likely to be at risk of consuming unhealthy products. The urban poor are also susceptible to choosing cheap processed food. A major concern that arises

when observing changes in consumption patterns linked to urbanisation is a shift towards high food energy (Kearney 2010).

The challenges relating to a greater consumption of processed food, coupled with sedentary lifestyles in cities, result in serious health risks. As highlighted previously, obesity and overweight have now become the cause of death for more than 2.8 million people every year. The WHO reported that in Europe, the Americas and the Eastern Mediterranean region,³ more than 50 % of women are overweight (WHO 2011). While the obesity epidemic has traditionally been considered to be more of a health concern in developed countries, today the overall burden of obesity and chronic diseases is greater in developing countries (Malik et al. 2013). In addition to the long-term risks resulting from food utilisation, populations in both developed and developing countries are likely to be affected by temporary food insecurity.

Box 3.1: Underweight, Overweight and Obesity Amongst Indian Females: the Impact of Place of Residence and Level of Human Development

With its rapid population growth, urbanisation and differentiated development, India can provide important insights into research on food security. Today, over 30 % of the Indian population reside in urban areas, which translates into 388 million urban dwellers. Indian urbanities are highly diverse, ranging from expensive residential areas and international urban centres to slums. At the same time, according to the official FAO food insecurity statistics (2010–12), 17.5 % of the Indian population are undernourished, and India's depth of food deficit (see notes below for definition) is estimated to be 125 kcal per capita per day. Previous studies have confirmed that in the Indian context, the relative risk of underweight is lower in urban areas, while the opposite is true for obesity and overweight. In addition, research has found that different socio-economic factors have a mitigating effect on these relationships (Griffiths and Bentley 2005; Subramanian et al. 2009; Kalra and Unnikrishnan 2012).

The results of regression analysis of the 2005–06 Indian DHS data (reported in Fig. 3.5) show that overall, in the most developed regions, the differences in relative risk ratios (RRR) are considerably smaller than in medium developed and least developed states. Specifically, in the highly developed regions, the relative risk of underweight is between 22 and 15 % lower in urban areas than in rural areas. When it comes to the relative risks of obesity, the greatest spatial inequalities can be observed in the least developed regions, where the relative risk of obesity in towns is more than 5.3 times higher than in the countryside.

³Regions defined by WHO.

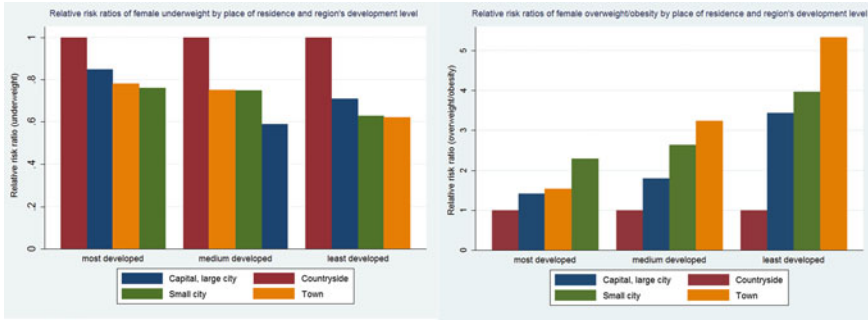


Fig. 3.5 Relative risk ratios of female underweight and overweight/obesity by place of residence and region’s human development level. *Notes* In the regression modelling, countryside has been set as a baseline category. All values are statistically significant ($p < 0.05$). *Data source* DHS 2005–06

According to the FAO, “The depth of the food deficit indicates how many calories would be needed to lift the undernourished from their status, everything else being constant. The average intensity of food deprivation of the undernourished, estimated as the difference between the average dietary energy requirement and the average dietary energy consumption of the undernourished population (food-deprived), is multiplied by the number of undernourished to provide an estimate of the total food deficit in the country, which is then normalized by the total population”.

3.3.4 Food Stability

Stability in food supplies and access to healthy food is the fourth aspect of food security. Food stability can be threatened by natural disasters, wars and conflicts as well as food dependency due to insufficient domestic production. At the household level, a lack of food stability can occur because of challenges relating to physical or economic access to food.

A recent report by the International Federation of Red Cross and Red Crescent Societies (IFRCRCS) discusses disaster risks in urban areas (IFRCRCS 2010). While in developed countries different aspects of life in cities are likely to be relatively well-planned, including increased disaster preparedness, in the developing world the urban poor are at risk of food insecurity caused by disasters and natural hazards. Sub-standard housing constructions, housing density and inadequate disaster preparedness in many developing countries contribute to greater human casualties. In this context, the risk of urban food insecurity increases. This

may be caused by disruptions in food production and food supply as well as food price hikes. In addition, as urban residents rely on paid employment to provision themselves with basic commodities, a disastrous event could entail job loss, consequently hampering households' access to food.

Temporary difficulties with access to food are not only the results of natural disasters or war, but can also be linked to other unforeseen circumstances. Unemployment or other sudden drops in income may result in difficulties with meeting basic livelihood needs. As per 2013 EUROSTAT data, throughout the whole of 2012, the EU27 suffered from an unemployment rate higher than 10 %. In some countries, such as Greece and Spain, the unemployment rate exceeded 25 % towards the end of 2012. Youth unemployment is reported to be even higher. A recent press release from the United States Senate's Budget Committee states that in the USA, one out of six Americans are on food stamps (United States Senate 2012). While in developed countries individuals and households often benefit from social safety nets, this is mostly not the case in developing nations. Although social and community networks tend to be stronger in the developing world, if the scale of financial loss is high, the consequences can be dramatic.

Finally, at the national level, food dependency can pose severe challenges. In the long term, importing food can be problematic because countries are reliant on good business relations with trading partners as well as efficient transport links. Highly urbanised nations with little arable land and/or adverse climate conditions are particularly prone to food dependency. This is the case with some of the countries and regions that rank highly in food imports, such as Hong Kong, Singapore, Qatar, the United Arab Emirates and Saudi Arabia. The Gulf region in particular has experienced a very rapid urbanisation following the discovery of oil and gas. The Gulf Cooperation Council (GCC) countries have undergone transformation from nomad and rural societies to highly urbanised societies (Costello 1977; Kapiszewski 2001). High urbanisation rates combined with rapid population growth and adverse geographical conditions put countries at risk of water shortage and food insecurity. Consequently, many food-dependent nations strive to secure land abroad in order to grow food for their domestic markets. Investigating the conceptual links between urbanisation and food insecurity is the theme of the next section. The focus of the discussion is reorienting the traditional Malthusian framework while concentrating on the key contemporary challenges affecting food security.

3.4 Other Key Factors Affecting Food Security

Following empirical evidence and taking into account theoretical considerations, we place the impact of urbanisation on food security as the central part of the revised analytical framework (Fig. 3.6). The urbanisation-food security association is moderated by the human development environment. This urbanisation-development-food security nexus is in turn influenced by a set of additional phenomena, which are

conceptualised and operationalised as exogenous factors. These include (1) population stock; (2) geographical habitat; (3) globalisation; and (4) disastrous events. It is acknowledged that separate associations may exist between each of these factors, which are considered to be outside the focus of this discussion.

Population stock is understood as overall number of people. The global population stock at any point of time is influenced by reproductive trends and patterns in mortality rates. Although migration influences country-level or community-level population size, it has little significance globally. Malthus argued that emigration could not be seen as a continuous solution to the inevitable laws of population, because any immediate vacuum caused by emigration would soon be filled (Malthus 1826; Ghosh 1963). More explicitly, the laws of population imply that such a vacuum could not last due to increasing numbers of births as well as immigration from other parts of the world. While today fertility rates are continuing to decline, increasing international mobility supports the Malthusian argument for the overall temporary impact of migration.

Population stock has a considerable impact on the association between urbanisation and food security. Rapidly growing overpopulated urban areas are generally more susceptible to food insecurity risks. The unique link between population size and urbanisation manifests through the process of rural-urban migration. In this context, the increasing proportion of urban residents, combined with a larger population size, triggers concerns about availability of and access to natural resources. In developing countries, in particular, urbanisation-population growth dynamics tend to put increased pressure on households' livelihoods. As previously discussed, poor urban dwellers are often at a disadvantage in terms of access to food, which can be exacerbated by large household size and a growing number of urban settlers. The potentially negative impact of a large population stock on food

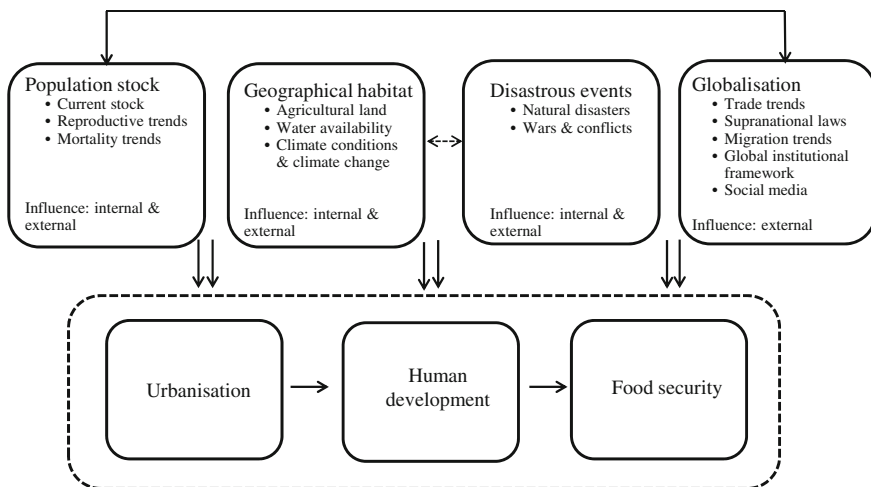


Fig. 3.6 Contemporary framework presenting associations affecting food security

insecurity risks can however be mitigated by the overall level of a country's human development and specific developmental drivers.

In the proposed framework, population stock plays both an internal and external role, while globalisation represents an external force. For the purpose of this research, globalisation is understood as “the process in which more and more people become connected in more different ways across large distances” (Lechner 2009, p. 15). Interpreted as such, globalisation encompasses not only economic expansion, trade and cross-country investments, but also international migration, social media, transportation links and the institutions representing global governance. These institutions can be either international (e.g. World Bank, IMF) or regional (e.g. European Union, ASEAN). In addition to multinational institutions, global governance incorporates multilateral and bilateral agreements and regulatory frameworks. Globalisation is not limited to international elites, but rather touches on every aspect of human livelihoods at both micro and macro levels. As such, globalisation influences the urbanisation-food security association in different ways. It has an impact on food availability, including food supply, because of trade and knowledge exchange between countries. From a political perspective, international trade has been referred to as a “vital component in the food security picture” (Lamy 2011). Logically, given a developed infrastructure, food can be made available on the market in response to demand for food produce. Lack of trade can bear severe consequences for food security; this could be recently observed through the example of plunging rice prices. The rice market has particularly suffered from the 2008 food crisis because of the fact that only a small percentage of rice was traded internationally, which further increased its price volatility (Lamy 2011). In addition, cross-national information exchange, including social media, can have a differential impact on both urban trends and food security. Access to the internet can empower people and facilitate decision-making, including with regards to their potential migration decisions and food choices.

As part of the globalisation process, international and regional governance can affect the urbanisation-food security nexus. Agriculture is increasingly perceived as a market-oriented economic sector, which has a number of implications (McMichael 2005). In this context, the global and regional agreements relating to food trade affect food security patterns in both importing and exporting countries. On the one hand, an institutionally imposed tariff system influences which food products are sold on which markets and at what price. This in turn has implications for local agriculture, which often fails to compete with foreign produce. On the other hand, the internationalised agricultural market can influence urbanisation trends. In developing countries, this is likely to take place through farmer displacements, leading in turn to greater urbanisation.

Geographical habitat, including climate change, constitutes another dimension in assessing the relationship between urbanisation and food security. Historically, urban settlements have been established in places with easy access to water. For instance, in ancient Mesopotamia, cities flourished on the shores of the Euphrates River. Countries such as Russia and Canada, which experience harsh weather conditions because of long winters and low temperatures, experience lower urban

growth rates, with Russia currently having a negative urban growth rate of -0.33 (UN 2012). In addition, there are many interlinkages between urbanisation, climate change and food security (Satterthwaite 2009). Because of the impacts of climate change, such as soil salinity (Szabo et al. 2015), farmers may be forced to migrate to urban areas, thus encouraging urban growth rates. On the other hand, climate change also makes urban areas likely to affect demand for agricultural produce (Satterthwaite 2009).

Disastrous events, such as floods, hurricanes and civil unrest, can potentially have an adverse impact on food security. Disastrous events are closely linked to countries' geographical conditions. The World Food Programme enumerates nature and war amongst the causes of global hunger. The FAO defines food emergency as a time when "a disaster-induced shortfall in its aggregate food supply relative to its consumption requirements in a given year cannot be fully covered by the country's own resources and, therefore, it needs external food assistance" (FAO 2003a, p. 39). In the last two decades, Liberia has suffered from two civil wars, which have highly contributed to the country's food insecurity. Almost 40 % of Liberia's children under the age of five suffer from stunting (Sutter and Cashin 2009). In Japan, the 2011 tsunami caused serious concerns about food security, not only because of its effect on agricultural land and forests, but also through danger of contamination due to nuclear risks at the Fukushima Daiichi Nuclear Plant (Johnson 2011). In addition, the production of Japan's main crop, rice, was heavily affected in tsunami-slugged areas.

All the elements discussed above constitute important factors influencing the urbanisation-food security nexus, albeit in different ways. Today, as the majority of the world's population live in towns and cities, it is timely to reflect on the nature of these new key relationships.

3.5 Future Outlook and Implications for Sustainable Development Agenda

This chapter had two primary aims. First, it was intended to analyse the impact of urbanisation on food insecurity risks in the context of countries' different developmental trajectories. The chapter was also aimed at reorienting the traditional Malthusian debate, turning its focus to urbanisation processes rather than simply population growth and revising the interpretation of contemporary food security.

Given the current stage of the nutrition transition, the interpretation and measurement of the food security definition require a novel approach. As such, a more comprehensive set of indicators should be developed, which would capture the evolving nature of food security and related challenges. In this context, three recent initiatives deserve credit. First, a recently published Sustainable Development Solutions Network (SDSN) report, which highlights the importance of re-quantifying hunger so as to include "child stunting, food insecurity and

malnutrition” (SDSN 2013, p. 28). Second, the 2013 Food Insecurity Report (FAO et al. 2013), which discusses the multiple dimensions of food insecurity and proposes new indicators such as percentage of children with anaemia. Third, and most importantly, the Sustainable Development Goals (SDGs), which integrate food security, nutrition and promoting sustainable agriculture into a single sustainable development goal (UN 2014a).

The future outlook in terms of associations between urbanisation and food security is mixed. On the positive side, both urban growth rates and fertility rates have been declining globally over the last few decades (Montgomery 2004; UN 2011, 2013a, b, 2014b; Wilson 2011), and these trends are projected to continue. These global convergence patterns in fertility and urbanisation, as well as in economic and human development, provide arguments for an optimistic outlook with regard to sustainable urban development and the fight against hunger and under-nutrition. Globalisation, increased exchange of information, stronger cooperation and sharing of knowledge are all likely to lead to more sustainable urban processes. On the negative side, however, the current trends in the global food industry, urban lifestyle and consumption patterns trigger concern. As we move forward, a strong shift is required in thinking about food insecurity risks. While the FAO definition constitutes a useful basis, we need to move towards a more integrated approach. The responses to food insecurity challenges should be conceptualised and implemented taking into account country-specific and region-specific urbanisation processes and human development context as well as the socio-economic characteristics of targeted populations.

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Chapter 4

Urbanisation, Human Capital and Safe Drinking Water

The ultimate resource is people—skilled, spirited, and hopeful people who will exert their wills and imaginations for their own benefit, and so, inevitably, for the benefit of us all (Simon 1981 p. 348).

Abstract This chapter builds on the arguments developed by Julian Simon and Esther Boserup, who claimed that population growth triggers innovation. Water stress is a major global challenge, discussed not only by world leaders and academics, but also consumers—often the urban poor, who struggle to gain daily access to this key resource. In this context, the research presented in this chapter investigates relationships between urbanisation and access to safe drinking water and examines how households’ human capital affects these associations. The descriptive analysis is carried out using household-level datasets from 19 Demographic and Health Surveys, supplemented by country-level statistics. The results of the analysis suggest that, regardless of the indicators of urbanisation used, human capital has a significant positive influence on the association between urbanisation and water access. The chapter provides specific examples of ways people innovate in order to secure access to safe drinking water and suggests that policymakers ought to prioritise not only greater investments in education but also the establishment of regulatory environments for innovation and knowledge exchange.

Keywords Urbanisation · Water scarcity · Safe drinking water · Human capital · Demographic and health surveys (DHS)

4.1 Introduction

Urbanisation was a key global phenomenon in the 20th century, and many developing countries, primarily in Asia and Africa, continue to experience rapid urban growth. At the same time, the process of urbanisation has had important consequences for the environment and subsequently human health. For example, a considerable proportion of the urban population in Bangladesh has become increasingly vulnerable, at least partly due to uncoordinated urbanisation, inadequate sewage systems and lack of effective waterways (Helal uz Zaman et al. 2010).

Lack of access to safe drinking water can lead to waterborne diseases, such as malaria or cholera (WHO 2012). In addition, it has been shown that cities that already have difficulties providing inhabitants with adequate water resources will inevitably struggle even more due to climate change (McDonald et al. 2011).

While empirically the impact of urbanisation on availability of and access to water resources can be observed in different geographical locations, there is limited analysis regarding the potential moderating impact of human capital on urbanisation and water access. This is despite the fact that previous literature has emphasised the strong positive impact of education on health outcomes. Throughout time, different health variables have been used to measure the causes of death and health threats, including risk of heart disease, risk of diabetes and possible anxiety or depression. For example, it has been shown that individuals with higher levels of education tend to follow more health-conscious behaviours (Leigh 1983; Ross and Wu 1995; Peters et al. 2010).

At the same time, access to safe drinking water constitutes a *sine qua non* condition for fruitful agriculture, safe nutrition and ultimately human health. Put simply, together with food, water is the most important livelihood outcome, as no life can exist without water. A number of highly developed rapidly urbanising countries, such as Saudi Arabia, the UAE and Qatar, have been able to increase their water supplies through innovative technologies leading to desalination. Similarly, Singapore, which experienced rapid urban growth, has developed an innovative system of water catchment and purification in order to make best use of its abundant rainfalls. At the micro level, a recent study from rural Ethiopia (Abebaw et al. 2010) has confirmed that a significant direct association exists between the educational level of the head of the household and access to improved water sources. While many positive examples can be observed, currently entire world regions suffer from limited access to drinking water. In Oceania, 44 % of people do not have access to potable water, while in sub-Saharan Africa, 37 % suffer from the same problem (UN 2013). Most of the least developed countries face additional challenges, such as lack of political stability and limited expenditure on education, which are likely to have both a direct and indirect effect on peoples' livelihoods.

In this chapter, water access is measured by well-established UN categories defining "improved" water sources, which include piped water into dwelling, piped water to yard/plot, public tap or standpipe, tubewell or borehole, protected dug well, protected spring and rainwater. For convenience, the terms "access to safe water", "water access" and "access to improved water sources" are used interchangeably. It is acknowledged that improved water sources are likely to overestimate the access to actual safe drinking water (Bain et al. 2012); nonetheless, the UN indicator provides a useful and widely used proxy for households' access to sources of safe drinking water (United Nations 2012; WHO 2012; Yang et al. 2013). Urbanisation is quantified based on indicators of place of residence, urban growth and the percentage of urban population living in slums. Human capital is measured as weighted mean years of schooling attained by household members of working age (18–65).

Related to the above, the motivation for this research has been threefold: first, the need to advance knowledge in the area of broadly understood human development

and factors contributing to the achievement of global sustainable development objectives; secondly, the need to highlight the issue of water access as a basic human right and investigate the extent to which this right is exercised; and thirdly, the aspiration to contribute to the traditional Malthusian and neo-Malthusian debate concerning the factors affecting access to key natural resources, such as food and water. In this regard, the proposed study addresses both pro-Malthusian and anti-Malthusian perspectives. This research may be thought of as being pro-Malthusian in the sense that it assumes that a growing population may constitute a challenge to countries' development. In addition, by selecting water as the response variable, the study's focus is on the basic necessities required for human survival. On the other hand, this research may be thought of as anti-Malthusian because it assumes a powerful role for both human capital and urban processes in terms of availability of and access to vital resources.

This chapter is structured as follows. First, a critical discussion of the association between urbanisation and water access is undertaken through references to relevant literature. Further background sections include an analysis of the concept of human capital and recent trends in human capital accumulation, with a particular focus on the least developed countries. Empirical examples are provided to further substantiate the discussion. The final section summarises the key points of the chapter and offers several policy recommendations.

4.2 Urbanisation and Water Challenges: Macro and Micro-level Interlinkages

While overall urban residents are at an advantage when it comes to access to safe drinking water, it is important to recognise that the impact of urbanisation is likely to vary given the diversity of urban areas and depending on the level of analysis. Although traditionally urbanisation has been associated with better standards of living, the picture is more complex when one considers both cross-country differentials and within-country inequalities. With a growing number of slums and urban poor, the distinction between urban and rural is becoming less obvious. Recently, the United Nations Department for Social and Economic Affairs (UN DESA) recognised that the traditional rural-urban division and the higher quality of life associated with urban areas have become blurred (UN DESA 2012). Today, within-country urban-rural differentials vary depending on the country-specific situation, including the level of development, and household-specific socio-economic factors.

This line of argument is supported by a methodology developed by the Centre for International Earth Science Information Network (CIESIN), which provides a comparison of rural poverty headcount and urban poverty headcount (CIESIN 2006). The indices demonstrate that the median for urban poverty is slightly higher than the median for rural poverty, and its spread is much larger. Large urban slums have now become a common feature of many cities, and pose additional threats to human health, especially for the vulnerable segments of populations such as the

elderly (Falkingham et al. 2011). Oxfam (2009) warned that Kenya is at risk of a new urban disaster and that rapid urbanisation of the country is changing the patterns of poverty in Kenya. This phenomenon has implications for households' livelihood outcomes, including access to safe drinking water.

More specifically, the interplay between urbanisation and water resources can be analysed from several angles. These include the macro-level dynamics relating to the speed of urban growth, as well as specific micro-level conditions pertaining to households' water access. When discussing the macro-level dynamics, it is important to highlight the differences in use of water by agriculture, industry and individual households. Naturally, the quality and quantity of water available for household use is affected by overall demand and water management, including wastewater treatment. Thus, any debate regarding the micro-level dynamics ought to consider contextual factors and the interlinkages between the two. Accounting for the above, the succeeding discussion will be concentrated around three main issues: (1) urban–rural differentials in water demand; (2) urbanisation and its impact on environmental degradation; and (3) health risks resulting from the negative effects of urbanisation on water availability and water quality. Although this chapter does not focus on the analysis of inequalities, when relevant, disadvantages relating to social segregation will also be highlighted.

Not without reason, urbanisation has traditionally been associated with greater consumption (Rees and Wackernagel 1996; Lin and Mele 2012). At the aggregate level, urban dwellers are likely to dispose of higher incomes and consequently spend more on goods and services. Cities as a whole can be seen as production-consumption machines where rational consumers function on the basis of trading their work for products and facilities. Traditionally, the main difference between patterns of water consumption in urban and rural areas has been related to agricultural production. Globally, agriculture accounts for around 70 % of all water withdrawals (UNESCO 2012), and this proportion can increase by up to 95 % in developing countries (FAO 2007). At the same time, because of high household dependency on agriculture as a basis for livelihood, conflicts and natural and industrial disasters can have dramatic consequences for households' chances of survival. In such circumstances, coping strategies involve migration to the cities, as was the case during the Sahel food crisis (FAO 2013).

While the countryside requires water for crop irrigation and domestic usage, in urban areas industry is also a considerable water consumer. This has important consequences because of the way in which used water is disposed. In the context of the least developed countries, wastewater treatment is often poor, leading not only to environmental pollution but also to increasing risk of diseases. In Dhaka, Bangladesh, for example, only 30 % of households are covered by sewage systems (ADB 2007). In addition, as few as 20 % of households benefit from the system of solid waste collection (ADB 2007). In such circumstances, diarrhoea and other waterborne diseases constitute an enduring threat, primarily for the poorest segments of society. For example, a study of water usage in the Brazilian slum Parque Universitario in Fortaleza found that around 30 % of samples from water stored in clay pots contained faecal material (Fong 2013). Similarly, following the outbreak

of typhoid in an urban slum in West Bengal, researchers established that *Salmonella typhi* bacteria was carried out through open sewage, which then contaminated sources of drinking water (Fong 2013).

At the macro level, highly urbanised and rapidly urbanising large countries such as the USA, India and China are amongst the leaders in terms of total water withdrawals (World Bank 2012) and overall water consumption (GWSP 2008). Also, according to the 2011 data from the US Energy Information Administration (EIA), the USA, Russia, China, India and Europe top the list of energy carbon dioxide emissions. Because of the association between urbanisation and consumption and the impact of urbanisation on climate change, there is a growing concern regarding future water supplies. McDonald et al. (2011) projected that in 2050, 993 million urban dwellers are likely to face perennial water shortage, while 3.1 billion urban residents could experience seasonal water shortage. It is anticipated that the greatest water scarcity will take place in Asia and Africa, in terms of both perennial and seasonal lack of water. At the same time, it has been recognised that amongst the negative consequences of excessive urban water withdrawals, there are important environmental threats posed to wetlands, including imperilled fish species (Smith and Darwall 2006; McDonald et al. 2011). Rapid urbanisation can disturb the hydrological cycle by affecting air circulation, impacting temperatures and frequency of precipitations (Zhou et al. 2004; Jones et al. 2008; O'Driscoll et al. 2010). In addition, urbanisation is likely to increase the level of environmental pollution, including water and soil pollution. In the context of the least developed countries, unsafe water sources, such as surface water and unprotected wells and springs, continue to be widely used. It is through educated choices and the impact of human capital that the negative consequences of urbanisation can be mitigated and the positive ones strengthened, as will be discussed later in this chapter. Prior to that, a short discussion regarding the concept of human capital in the context of post-Malthusian literature imposes itself.

4.3 Human Capital in the Context of the Traditional Post-Malthusian Debate

The debate regarding the pressure of rapidly growing populations on scarce natural resources was originated by Thomas R. Malthus; his arguments were presented in six editions of the *Essay on the Principle of Population* (Malthus 1798, 1826). Malthus claimed that passion between the sexes, which he assumed to remain constant, results in population growth, which in turn puts strain on natural resources and leads to poverty. Post-Malthusian researchers criticised this logic as over-simplistic. Scholarly analysis and empirical evidence have shown that it is possible for societies experiencing rapid population growth to enjoy unchanged, or even greater, access to natural resources. Simon (1981) credited human imagination for being a key factor in enabling such achievements. Ester Boserup argued that population growth provides incentive for greater investments in agriculture, including investments in labour. In

her revolutionary book *Conditions of Agricultural Growth*, Boserup (1993) claimed that population growth should be considered an independent variable explaining increased food output, rather than the opposite.

Through examples of the island of Java and Japan, she illustrated how these rapidly growing populations contributed to higher agricultural productivity and intense land use in both places, ensuring greater availability of vital resources. With a total population of 135 million, Indonesian Java is today the most populous island in the world, while the main island of Japan, Honshu, is the second most populous island. It comes as no surprise that Japan benefits from a high stock of human capital, with different educational indicators placing Japan as one of the top countries in terms of access to education. Japan scores 16th in terms of mean years of schooling and is in the top quartile for expected years of schooling (UNDP 2011). It has an educational system where 12 years of schooling are compulsory and net enrolment ratio for secondary education is over 98 % (OECD 2010), compared to an average of 81.5 % for OECD countries. These achievements result from the commitment of the country to education, a firm belief in education as an investment and an efficient education management system (OECD 2010).

While Indonesia, an emerging economy classified today as a country with medium human development by UNDP's HDI, does not benefit from high rankings in terms of formal education, peasant innovation was at the core of transforming fallow land into highly productive agricultural plots (Boserup 1993). Since 1992, agricultural productivity has slowed down to an annual one per cent growth rate (Bond et al. 2007). Evidence suggests that one of the causes of this slowdown was a decline in spending on research and development (Bond et al. 2007). At the same time, different cooperation agreements were put in place, notably through Indonesia's membership of the Association of Southeast Asian Nations (ASEAN).

Many more examples could be discussed that demonstrate the impact of human capital on improving vital livelihood outcomes. These examples provide evidence that the Malthusian "want of food" does not act as a trigger for positive or negative checks, but rather prompts innovation and thus increases productivity. Scholars who have claimed that new technologies create more problems that they solve (Diamond 2005) have been contradicted by arguments that wealth and human capital can continuously improve existing technologies (Goklany 2007). Goklany provides the example of HIV/AIDS, which was once an immediate death sentence for those who became infected; today, thanks to adequate therapies, many people suffering from HIV/AIDS survive. Similar arguments can be applied to the impact of human capital on availability of and access to basic necessities, such as food and water.

It is safe to assume that the future outlook in terms of the stock of human capital and its impact on agricultural productivity is positive (Dyson 1996). Human capital is projected to grow in all world regions. By 2030, China is projected to have the largest number of educated people (Goujon and Lutz 2004). In sub-Saharan Africa, the percentage of the population between 20 and 65 years old with secondary or tertiary education is projected to increase from 19 to 35 % under one of the three scenarios presented by Goujon and Lutz (2004).

Research has shown that in many developing societies which lack formal welfare systems, diversity and adaptability are at the core of survival. In such circumstances, larger families (and the resulting greater stock of human capital) are treated not as a burden but as an investment. Parents mitigate their future financial risks by having more children and hence potentially larger future social networks. For example, the Mende community in Sierra Leone places fertility and childbearing at the centre of the adult struggle for power and wellbeing (Bledsoe 1995). Urbanisation has created both opportunities and challenges for those who seek to maximise their livelihood outcomes. While many rapidly urbanised countries and communities manage to find innovative solutions in order to increase their water access, other countries and regions suffer from lack of drinking water access, food insecurity and sanitation problems. The examination of the impact of human capital on the association between urbanisation and access to safe drinking water is the subject of the next two sections.

Box 4.1: Trends in Human Capital Accounting for Countries' Level of Development

In the last 30 years there has clearly been an increase in access to formal education (Fig. 4.1). However, considerable differences exist between countries based on their level of human development. Countries with the lowest levels of human development have approximately one-third the average years of education of the highest developed countries. As of 2011, with a score of 12.6 years, Norway was the country where residents received the longest schooling, whereas Mozambique closed the list with a result of 1.2 years. Although the situation in Mozambique has improved from 0.7 years in 1980 to the current score of 1.2 years, poor education continues to be a developmental obstacle. Given the benefits of primary education, it has been widely recommended that at least five to six years of schooling should be attained (Bruns et al. 2003). Today, 60 countries report a score of less than six, and 45 countries have a score of five or less (UNDP 2011). When looking at the data for the expected years of schooling, the situation is similar. Australia, New Zealand, Ireland and Iceland have the highest score of 18 years, whereas Somalia has the lowest score of 2.4 years (UNDP 2011), which is 7.5 times less. 92 countries fall below the average result of 12.3 years.

Wide empirical evidence supports the hypothesis that, *ceteris paribus*, people in developing countries are more likely to encounter additional barriers when it comes to meeting their basic needs. Combined with low levels of human capital and rapid population growth, these countries are likely to experience unforeseen challenges in ensuring universal access to food and water. A question therefore remains: can urbanisation provide solutions to this fundamental need, or will it constitute an additional developmental obstacle? And secondly, will the positive trends in human capital continue and if so, will they be able to speed up the progress in access to safe drinking water for both urban and rural populations?

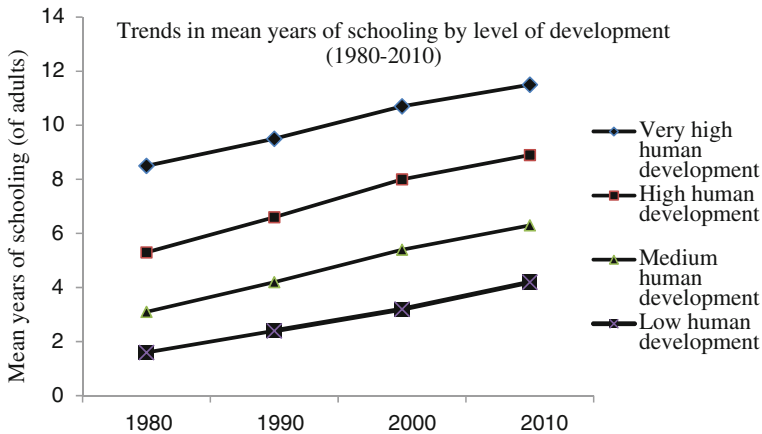


Fig. 4.1 Global trends in mean years of schooling by level of development (1980–2010). *Note* Author’s own analysis. Levels of development are defined based on HDI ranking. *Data source* UNDP

4.4 The Impact of Human Capital

Empirically, education and access to safe drinking water have been linked in a number of important ways. Different water and sanitation programmes have evidenced that children may be deprived of education because they need to fetch water. In addition, resource-constrained schools may lack access to safe drinking water. While these associations have been stressed frequently, little attention has been paid to the mitigating impact of human capital on the association between urbanisation and access to safe drinking water. Yet human capital is a key driver of innovation and broadly understood societal progress. The World Water Assessment Program (WWAP) recognised that with better education, people are not only able to expend knowledge on best water practices, but also to acquire new skills, which are likely to lead to finding alternative solutions (UNESCO 2006). For instance in Kenya, examples are known of innovative entrepreneurs who collect rainwater and store it in underground tanks. With greater knowledge and technology, water purification can be applied in a greater number of countries and regions and new water sources are likely to be generated in challenging urban settings.

Based on the discussion regarding the differentiated impact of urbanisation on access to safe drinking water (Sect. 4.2), and given the evidence of the positive influence of human capital, several propositions are outlined below. These propositions concern the presumed mitigating effect of human capital on the relationship between urbanisation and access to safe drinking water, and are as follows:

- **Proposition 1:** On average, human capital is higher in urban settings. This represents a double advantage for households seeking to meet their basic needs, such as access to safe drinking water.

- **Proposition 2:** Human capital enables educated choices and innovation, which impact on coping strategies amongst the urban poor, thus preventing capability deprivation.
- **Proposition 3:** At the macro level, human capital can constitute a buffer to the potentially hampering effects of rapid urban growth and increasing urban poverty.

Overall, the first proposition refers to the positive impact of urbanisation, while the second and third propositions presuppose the potentially negative effects of urbanisation. As far as the first proposition is concerned, it has been widely acknowledged that on average, urban residents tend to have better access to safe drinking water as well as education and healthcare (Cohen 2006; United Nations 2011; UNICEF 2012b). In general, cities provide better infrastructure and educational facilities, which in turn is likely to result in greater employment prospects. Schools, including universities, tend to be located in urban centres and students often change their place of residence to urban areas in order to follow educational opportunities. At the primary and secondary level, urban children are more likely not only to enrol in schools, but also to complete secondary education and better balance work–school demands (UNICEF 2012a, b, p. 14). This phenomenon has often been referred to as “urban advantage” (UNICEF 2012a, b, p. 6).

Secondly, the accumulation of human capital is likely to lead to knowledge generation, which can in turn result in a higher likelihood of accessing safe drinking water. UNHABITAT (2012, p. 101) recognised that human capital is key to fostering innovation and creating knowledge. Naturally, in cases where the proportion of urban dwellers reflects a higher number of slums, the added value of human capital can be challenged. Currently, with 62 % of urban residents living in slum areas, sub-Saharan Africa suffers from the highest slum prevalence, whereas in Asia average slum prevalence varies from 35 % in South Asia to 25 % in Western Asia (UNHABITAT 2012). While in certain cities, such as Havana, residents of sub-standard accommodations benefit from the same access to education as everyone else in the city, in most other cities, including Quito and Nairobi, access to education for children living in slums remains a challenge. Households suffering from one or more shelter deprivations¹ can be at a disadvantage when it comes to their capacity to access safe water. Yet, even though in slums human capital is often poorly developed, empirical evidence suggests that considerable improvements in water access have been taking place in deprived urban localities.

In this context, human capital can prevent capability deprivation (Sen 1999), while increasing the chances of functionings relating to and resulting from water access. Examples of the impact of human capital on poor urban settings include the use of sun-powered water ATMs in slums in India and *awami* (people’s) water

¹By definition, shelter deprivations include access to improved water sources. Here, when speaking about shelter deprivations, our focus is on household conditions, such as housing material and potential overcrowding.

tanks in peri-urban areas in Pakistan. India's innovative ITC-tracked water ATM system has been recognised for its pioneering contribution to the society, as well as through an award by the Tech Museum of Innovation. While initially the project targeted primarily rural areas, it has now expanded to urban locations, including Delhi slums, where marginalised communities are able to access drinking water in a convenient and inexpensive way. Similarly, community water tank developments in the Orangi township, near Karachi, provide evidence of the power of innovation and local engagement, and have resulted in considerable improvements in water access for the urban poor. The Orangi township in Pakistan has long been known for its informal settlements, the so-called *katchi abadi* (Ahmed and Sohail 2003), which, for a number of reasons,² have struggled with adequate water supply. However, by mobilising political and religious leaders, the residents of Orangi were able to build underground water tanks to store and distribute water (Ahmed and Sohail 2003; Satterthwaite 2003). While further instances of the positive impact of human capital and innovation in challenging urban settings could be provided, it is also important to highlight the cross-level interactions between urbanisation, water access and human capital.

At the macro level, human capital can play a role in preventing the potentially negative influence of rapid urbanisation taking place in developing countries. As highlighted in Sect. 4.2, uncontrolled urban growth can have a disruptive effect on the environment, including agriculture. In addition, rapid urbanisation can put strain on governments' capacities to plan for delivery of basic services. Research conducted by Chinese scholars (Chen and Yang 2010) showed that a rapid increase in the numbers of migrant children caused by growing rural to urban migration could leave children out of the formal schooling system. On the other hand, when urban growth is planned and managed by both central and local authorities, urbanisation is likely to benefit communities by providing them with greater access to educational and health facilities. In this respect, Cambodia's Phnom Pen constitutes a relevant example of good governance (Roberts and Kanaley 2006; Biswas and Tortajada 2010). As a city, Phnom Pen has experienced unusual urbanisation patterns resulting from the complex recent history of the country. After the seizing of power by Khmer Rouge and its ambition to create a classless society, which involved forced relocation of urban residents, the population of Phnom Pen saw a dramatic decrease (Biswas and Tortajada 2010; Brunn et al. 2012). After the fall of Khmer Rouge, the trend was reversed by the rapid growth of the city. While in 1993 the population of Phnom Pen was 700,000 inhabitants, it had reached over 1.3 million by 2008 (Biswas and Tortajada 2010). Although initially inefficient when dealing with the growing city's demand for water, the Phnom Pen Water Supply Authority (PPWSA) gained substantial autonomy and, through innovation and good governance practices, was able not only to increase the overall amount of water supplied,

²These reasons included rapid growth and poor rainfall (Ahmed and Sohail 2003).

Table 4.1 Correlation matrix of macro-level data

	Education	Urban growth	Water access
Education	1.00		
Urban growth	-0.52***	1.00	
Water access	0.71***	-0.40***	1.00

Notes Education is measured as mean years of schooling of adults above 25 (UNDP 2011), urban growth is measured by the rate of annual urban growth between 2005 and 2010 (UN), and water access pertains to the percentage of the population with access to improved water sources (World Bank 2012). ***indicates p -value of < 0.01

but also reduce the proportion of unaccounted-for water (UFW).³ It is not insensible to deduct, based on the above, that the right channelling of human capital supported by financial incentives can lead to powerful solutions, which can result in greater water availability and more just distribution of drinking water.

4.5 Quantifying Associations Between Urbanisation, Human Capital and Water Access

Disclaimer: The statistical analysis presented in this section is relatively easy to follow. For readers who dislike statistics, please feel free to skip this section.

For the purpose of the initial investigation, a dataset of 160 countries is used. It is analysed by means of correlation coefficients, scatter plots and unadjusted regression modelling. This provides us with a first insight into the relationships under investigation. At the macro level, the data for LDCs constitutes too small a sample size, in particular when accounting for missing values, therefore a global dataset is used. Observing correlation patterns between the main variables of interest yields first conclusions. While country-level education positively correlates to access to an improved water source ($r = 0.7$, $p < 0.01$), the remaining two relationships show opposite patterns. More specifically, urban growth negatively correlates to both education and access to improved water sources. While it is difficult to draw any conclusions regarding the impact of urban growth, or causality, it is interesting to observe the directions and strength of the underlying correlation coefficients (Table 4.1).

In order to gain a deeper understanding of the associations under investigation, Fig. 4.2 provides a graphical representation of the association between urban growth and access to safe drinking water by level of education in the country. While overall a negative pattern exists between urban growth and access to safe drinking water, when considering human capital stock in a country (measured by educational

³The World Bank defines UFW as “the difference between the quantity of water supplied to a city’s network and the metered quantity of water used by the customers. UFW has two components: (a) physical losses due to leakage from pipes, and (b) administrative losses due to illegal connections and under registration of water meters” (World Bank 2013).

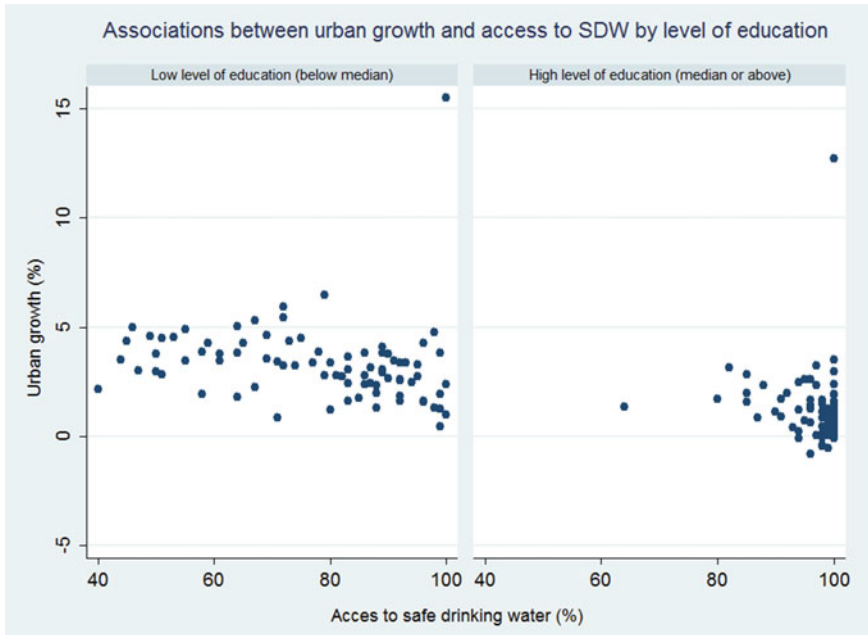


Fig. 4.2 Macro-level association between urban growth and access to safe drinking water accounting for education. *Notes* SDW stands for safe drinking water. *Data sources* as in Table 4.2

attainment), it is evident that countries with more educated populations benefit from proportionally higher access to water compared to countries with lower levels of education. Two potential explanations may elucidate this pattern. First, countries with higher educational levels tend to be more developed and as such do not suffer from a lack of basic necessities such as access to safe drinking water or food. Second, the rate of urban growth in these countries is also much slower. Finally, it should be noted that there are at least two outliers showing a disproportional rate of urban growth. These include Qatar and the United Arab Emirates, with rates of urban growth of 15 % and 13 % respectively (2005–2010). Interestingly, for Qatar, which is a highly developed country, the mean years of schooling of its adult population is below the mean and median values.

Before proceeding with the analysis of the household-level data, it is useful to inspect the results of an unadjusted macro-level regression and to examine the presumed effect of the interaction trend between urban growth and human capital. These results are reported in Tables 4.2 and 4.3. While a significant negative effect of urban growth can be observed in the unadjusted model ($\beta = -3.3$, $p < 0.01$), this impact is mitigated by countries' educational level. There is a significant interaction term between education and urban growth ($p < 0.1$), which also improves overall model fit (R^2 increases from 1.16 to 1.51). In order to facilitate the understanding of this interaction, predicted values are produced and plotted. These are shown in Fig. 4.3. For the purpose of interpreting the interaction effect, the value of the rate

Table 4.2 Regression results of unadjusted model testing the effects of macro-level urban growth

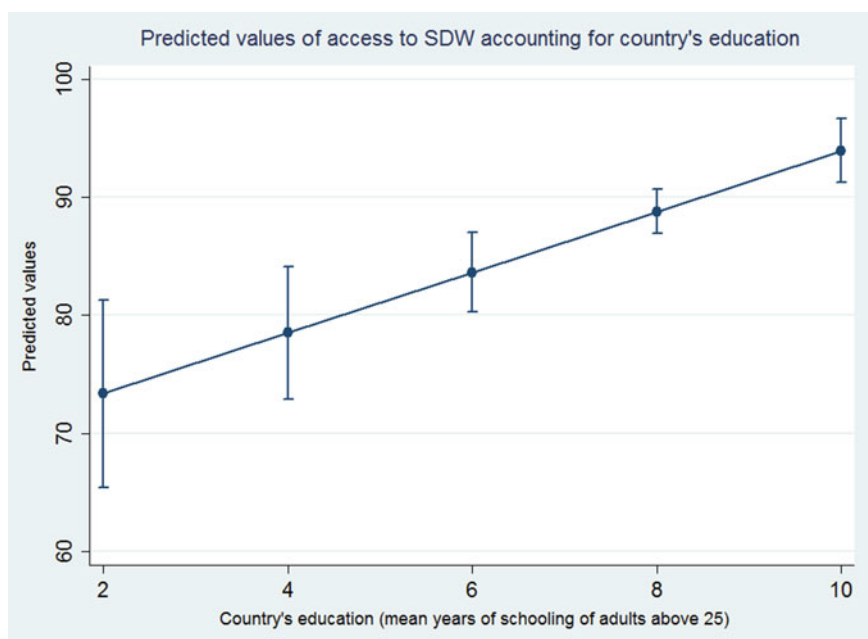
Access to SDW	β	Std. Err.	z	$P > z$	95 % Conf. interval	
Urban growth	-3.27	0.57	-5.74	0.00	-4.40	-2.15
Constant	94.48	1.72	55.04	0.00	91.09	97.87

n = 172

 $R^2 = 0.16$ **Table 4.3** Regression results testing macro-level interaction effects

Access to SDW	β	Std. Err.	z	$P > z$	95 % Conf. interval	
Urban growth	-3.16	1.70	-1.86	0.07	-6.51	0.19
Education	2.57	0.62	4.15	0.00	1.35	3.80
Urban growth * Education	0.39	0.21	1.89	0.06	-0.02	0.80
Constant	68.99	5.92	11.65	0.00	57.29	80.69

n = 160

 $R^2 = 0.51$ **Fig. 4.3** Predicted values of access to safe drinking water by country's education (% of population with access to SDW). *Note* The value of urban growth was set at 2 %

of urban growth was set at 2 per cent and the levels of countries' education were 2, 4, 6, 8 and 10 years of schooling. The results suggest a strong mitigating effect of human capital on the association between the rate of urban growth and access to safe drinking water. The next section focuses on disentangling the patterns in household-level data based on the Demographic and Health Surveys (DHS).

4.5.1 DHS Data

This section presents the results of descriptive statistics for household-level data. The underlying data patterns are investigated by means of bar graphs, box plots, cross-tabulations and statistical significance tests. Figure 4.4 displays the patterns of access to safe drinking water by households' place of residence and human capital. The results are categorised both by urban-rural differentials and by four types of residence based on the DHS classification. More specifically, the four types of residence are large cities (capital cities and cities with over 1 billion inhabitants), small cities (with a population over 50,000), towns (other urban areas) and countryside (rural areas). While overall 85 % of urban households benefit from water access, in rural areas this proportion drops to 63 %. However, when the households

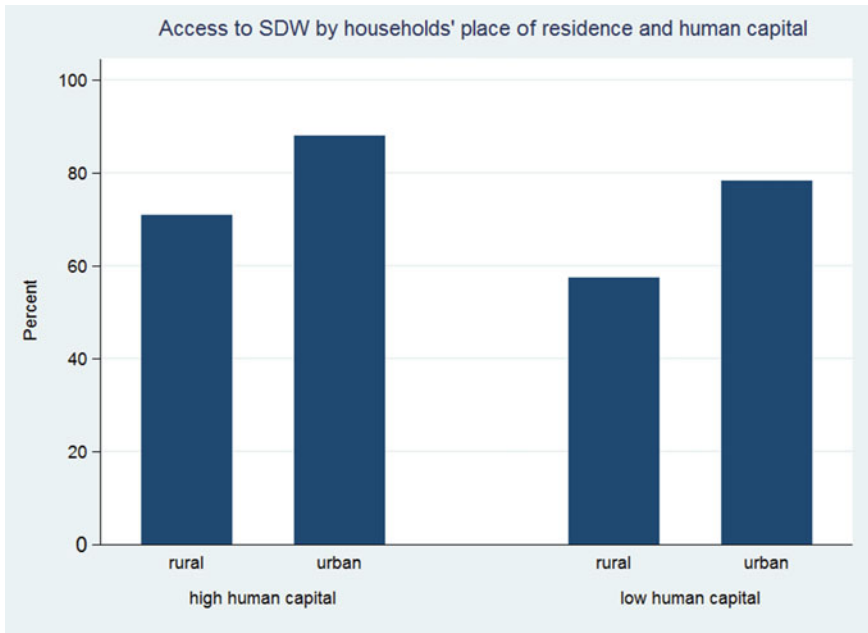


Fig. 4.4 Patterns in access to safe drinking water (SDW) by households' place of residence and level of human capital. *Note* Low human capital refers to values below median, while high human capital refers to values equal or above median

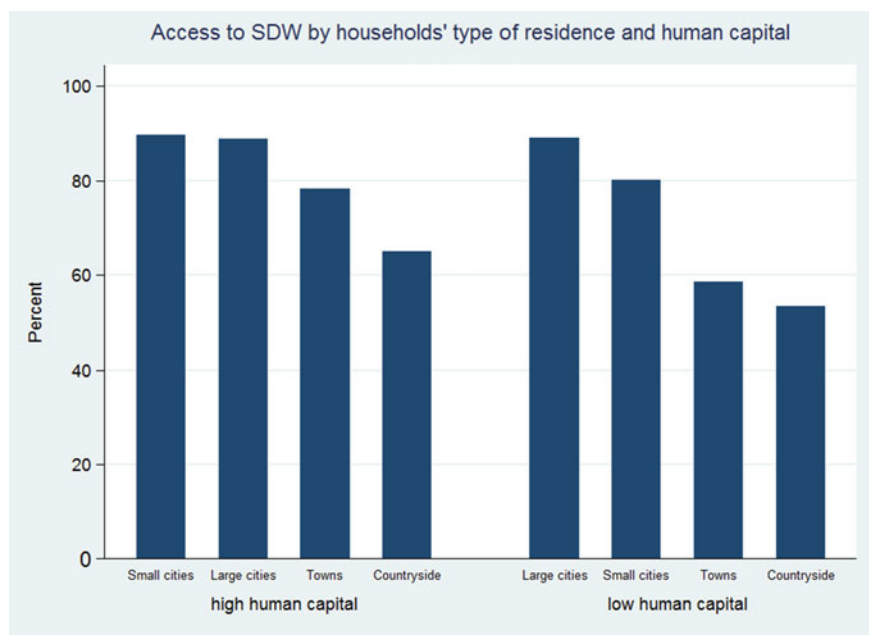


Fig. 4.5 Patterns in access to safe drinking water (SDW) by households' type of residence and level of human capital. *Note* Level of human capital defined as in Fig. 4.4

are divided by their level of human capital (based on the median distribution of the variable), these differences are further exacerbated. Thus, 88 % of urban households with higher levels of human capital have access to safe drinking water, compared to 78 % of urban households with lower human capital. Similarly, when considering rural households, only 57 % of households with a lower level of human capital benefit from access to safe drinking water, whereas this proportion increases to 72 % for households with higher human capital. When the data are further desegregated by type of residence, more nuanced patterns emerge.

The data by desegregated type of residence are only available for 9 countries.⁴ The total number of observations included in this analysis is 96,874 households. While in large cities there is almost no difference in terms of the potential impact of households' human capital, all other categories show considerable variations (Fig. 4.5). In particular, the potential mitigating effect of human capital appears to be most pronounced for households residing in towns and the countryside.

The second step of the analysis is to investigate the distribution in households' human capital by place and type of residence in the context of households' access to safe drinking water. For this purpose, two sets of box plots have been constructed,

⁴The 9 countries are Bangladesh, the Democratic Republic of the Congo, Liberia, Mali, Malawi, Sierra Leone, Tanzania, Uganda and Zambia.

Table 4.4 Cross-tabulation of household education by access to safe drinking water (SDW) and place of residence

Access to SDW		Household education			Kruskal-Wallis χ^2
		Mean	Median	St. deviation	
Able to access SDW	Rural	2.84	2.43	2.36	(13,618)***
	Urban	5.01	4.57	3.46	
Unable to access SDW	Rural	2.06	1.60	2.05	(1981)***
	Urban	3.73	3.11	3.26	

Note *** $p \leq 0.01$

accompanied by statistical tests of significance. Here, households' human capital is measured by the continuous variable of households' mean education (for household members of working age only). The statistical significance of between-group differences was first investigated by means of ANOVA tests (reported in Table 4.4). However, because Bartlett's statistics rejected ANOVA's assumption of equal variances across groups, an alternative non-parametric test was eventually applied. As highlighted by Ware et al. (2013), the F-statistic requires normality assumption. An additional inspection of the sample data confirmed that the distribution of the variable measuring households' human capital is positively skewed. In such instances, McDonald et al. (2011) suggested applying an alternative non-parametric test—the Kruskal-Wallis test. According to the Kruskal-Wallis test, a very small p -value indicates that the between-group difference is statistically significant, which was the case in this analysis.

As can be deduced from the graphs below (Figs. 4.6 and 4.7), educational attainment of all households varies greatly depending on their place of residence. As expected, the traditional urban bias persists. In urban areas the mean household education varies between 3.7 years of schooling (for households that lack access to safe drinking water) and 5 years (for households that benefit from water access). These results can be compared to a range of 2.1–2.8 years for households living in rural areas. When urban-rural differentials are further desegregated into large cities, small cities, towns and countryside, it can be observed that there is a significant variation between different types of urban settlements. Thus, educational attainment is highest in large cities and small cities (with respective means of over 5 and over 4 years of education); however, it is considerably lower amongst households that lack access to safe drinking water (Table 4.5). In addition, the greatest discrepancy in human capital can be noted for households residing in towns, suggesting that special attention should be paid to that category, as well as peri-urban areas. For all spatial groups, the graphical results show a large number of outliers, indicating that some households manage to obtain a high educational level regardless of their place of residence.

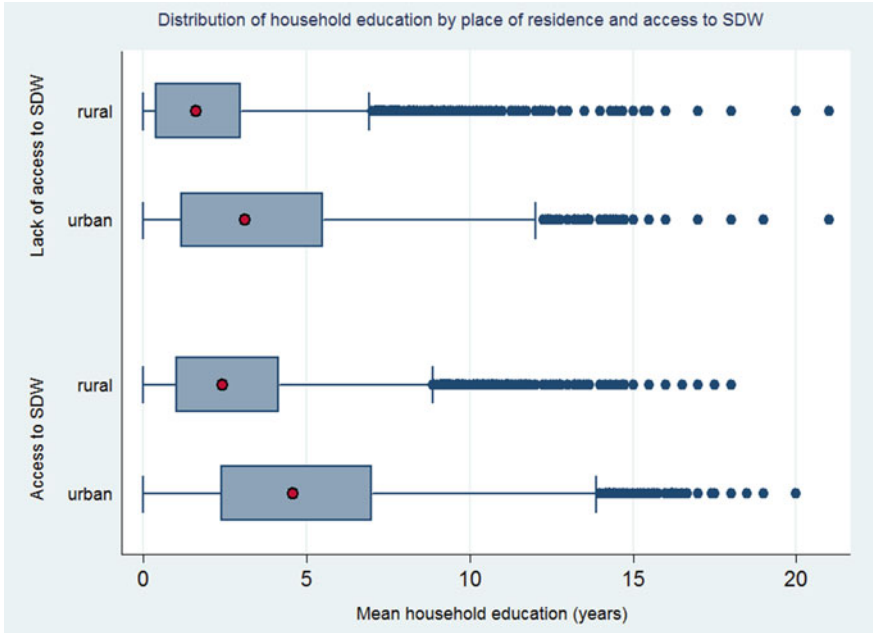


Fig. 4.6 Household access to safe drinking water (SDW) by human capital and place of residence

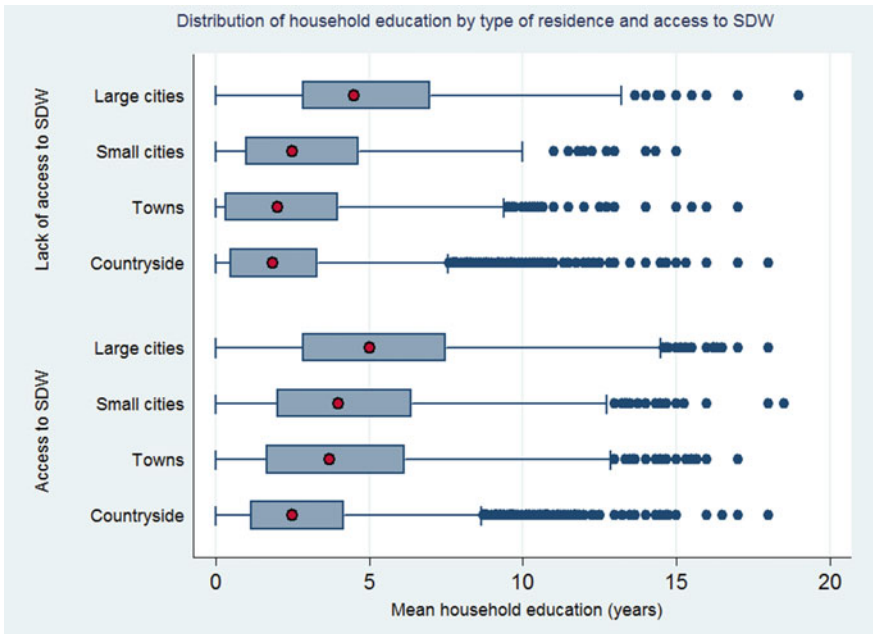


Fig. 4.7 Household access to safe drinking water (SDW) by human capital and type of residence

Table 4.5 Cross-tabulation of household education by access to improved water source and type of residence

Access to SDW	Type of residence	Household education			Kruskal-Wallis χ^2
		Mean	Median	St. deviation	
Able to access SDW	Large city	5.38	5.00	3.48	(5049)***
	Small city	4.45	4.00	3.23	
	Town	4.22	3.71	3.25	
	Countryside	2.91	2.50	2.35	
Unable to access SDW	Large city	5.21	4.50	3.50	(995)***
	Small city	3.06	2.50	2.70	
	Town	2.57	2.00	2.66	
	Countryside	2.23	1.86	2.09	

Note *** $p \leq 0.01$

4.6 Conclusions

Motivated by the Malthusian theory and post-Malthusian debate about the availability of and access to natural resources, this chapter had two main objectives. These were (1) to assess the impact of urbanisation on access to safe drinking water in the least developed countries, and (2) to investigate the presupposed mitigating effect of human capital on the association between urbanisation and water access. This chapter adapted the Simonian line of argument relating to the power of human capital as the *ultimate resource* (Simon 1981). Empirical examples cited in the chapter, along with quantitative analysis, confirmed these assumptions.

It was explained in Chap. 2 that while Malthus acknowledged the role of “wholesome cities” as a positive check, he failed to fully incorporate the impact of urbanisation on households’ basic livelihood outcomes, such as food and water. In this context, the contribution of this chapter to the Malthusian framework has been twofold. First, it has revealed that while (positive) urban bias persists, in the least developed countries contemporary urbanisation can act as a Malthusian check. Second, the study showed that the strength of this check can be attenuated by households’ human capital.

As a final word, a number of general reflections should be conveyed. It was mentioned earlier in this chapter that access to safe drinking water has been recognised as a basic human right (UNESCO 2006). However, as with other human rights, the question remains how to ensure that this right is being respected. In the context of rapid urbanisation, it is crucial that infrastructure and basic services are designed in a way that takes into account the needs of the country as a whole, including investments in rural areas. Cohen (1995, 1996) argued that the issue of the Earth’s carrying capacity is dependent on both natural conditions and human choices. This entails both individual and household-level choices as well as favourable contextual dynamics, often defined by government policies. Therefore,

hotspots of deprivation in terms of provision of education ought to be identified and access to universal schooling guaranteed by law. In parallel, an enabling regulatory environment should be created in order to facilitate research and development in the private sector. As the research presented in this chapter has confirmed, both urban-rural and intra-urban inequalities exist and, with continuing rapid urbanisation in the LDCs, the latter are likely to grow. The topic of intra-urban inequalities in the context of urban growth is the subject of the next chapter.

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Chapter 5

Urbanisation and Intra-urban Inequalities in Nutritional Outcomes

It has appeared, that from the inevitable laws of nature some human beings must suffer from want. These are the unhappy persons who, in the great lottery of life, have drawn a blank (Malthus 1798, p. 74).

We have a collective responsibility to uphold the principles of human dignity, equality and equity at the global level. As leaders we have a duty therefore to all the world's people, especially the most vulnerable and, in particular, the children of the world, to whom the future belongs (United Nations Millennium Declaration 2000).

Abstract The questions in this study have been motivated by both the Malthusian approach to poverty and inequalities and the contemporary human development debate. Malthus argued that inequality should be viewed as the natural societal order and that it existed because of “passion between the sexes” and the limited capacity of the planet to produce food. Today, the proposed Sustainable Development agenda recognises the crucial role of reducing inequalities in order to ensure progress towards inclusive socio-economic development. Within the broader context of current debates around inequalities, this chapter examines the magnitude of wealth-based intra-urban inequalities in child health in the least developed countries (LDCs), with a focus on undernutrition. The extent of these inequalities is investigated by classifying countries according to their pace of urbanisation, using five most rapidly urbanising LDCs and five less rapidly urbanising LDCs. The results of the analysis confirm significant inequalities in children’s nutritional outcomes, and establish that these inequalities are greater in the most rapidly urbanising LDCs. The wealth effects in these countries are strong, suggesting that children born in economically disadvantaged households are significantly more likely to be undernourished. The chapter highlights the importance of quantifying, monitoring and addressing intra-urban inequalities for sustainable human development.

Keywords Intra-urban inequalities · Wealth inequalities · Urban growth · Undernutrition · Child health

5.1 Introduction

Today, the majority of the population reside in urban areas and urban sprawl is projected to continue. The least developed countries are experiencing rapid demographic and urban growth. As these countries often lack basic means of subsistence, infrastructure and access to education, increasing urban inequalities pose additional societal challenges. It has been estimated that children and youth (0–19 years old) born in urban locations account for 60 % of overall urban growth (UNICEF 2012b). Instead of benefiting from the demographic dividend, the LDCs struggle with a growing number of children affected by urban poverty and poor health status. The human rights of children, including the basic right to survival, as enshrined in the 1989 Convention on the Rights of the Child (UN 1989), are often violated. This is due to the fact that many children in the LDCs lack access to the most basic necessities, such as safe water and nutritious food, which results in disconcerting rates of child mortality. While residing in urban areas has traditionally been associated with an improvement in households' livelihood outcomes, the over-rapid pace of urbanisation has contributed to greater urban poverty and presumably exacerbated intra-urban inequalities. In this context, this chapter aims to investigate the following primary research question:

1. Are intra-urban inequalities in nutritional outcomes amongst children more severe in least developed countries that have experienced the greatest pace of urbanisation?

The chapter also aims to examine the following additional questions:

2. How do the mother's social-educational characteristics and the child's birth weight contribute to a child's nutritional status?
3. Does controlling for these factors attenuate the impact of households' wealth?
4. Do the strength and direction of the estimated associations differ between most rapidly urbanising and less rapidly urbanising LDCs?

The questions in this study have been motivated by both the Malthusian approach to poverty and inequalities (Malthus 1798, 1826) and the contemporary human development debate (UNECE et al. 2012; UNICEF 2012b; Mitlin and Satterthwaite 2013). Researching inequalities is not a new phenomenon. In the 18th century, Malthus argued that inequality should be viewed as the natural societal order. Inequalities exist because of passion between the sexes and the limited capacity of the planet to produce food (in other words, "the laws of nature" or "carrying capacity") (Elwell 2001). In addition, inequalities can be perceived as having a positive impact on society and individuals because they stimulate innovation and thus societal progress. In an ideal situation, Malthus claimed, inequalities would be minimal; however, no society can exist with only a middle class. While Malthusian arguments are certainly appealing, Malthus and his successors working in the area of population and development failed to recognise the multi-faceted nature of inequalities, which goes beyond the labour supply-demand

relationship. In addition, while today traditional urban-rural and income-based differentials continue to exist and constitute an important global challenge, the contribution of structural factors such as the rapid pace of urbanisation has seldom been investigated.

With a growing number of urban poor, the UN (2012) recognised that urban areas can no longer be uniformly associated with opportunities and prosperity. Furthermore, social scholarship has confirmed the existence of large intra-urban inequalities in human wellbeing. In the 1970s, a flagship paper by Basta (1977) found that intra-urban differentials in health and nutritional status exceeded those between urban and rural areas. The detrimental impact of living in slums on households' health conditions has been confirmed by recent research (Ompad et al. 2007; Martinez et al. 2008). Geographers have argued that globally there exists "spatial segregation", which is linked to place of residence (Skop 2006). Crucially, as discussed in Chap. 4, macro-level processes of rapid unmanaged urban growth can lead to environmental degradation and lack of adequate housing. Those living in densely populated, poorly planned urban areas are increasingly at risk of ill health, including waterborne diseases and respiratory conditions. As intra-urban inequalities are on the rise, in many urban settings the availability of and access to nutritious food remains a challenge.

Overall, in the LDCs, infants and children are particularly threatened by undernutrition (Semba and Bloem 2008). A recent report by UNICEF (2013) highlighted that globally, one in four children under five is stunted. In some LDCs, including Timor-Leste, Burundi, Niger and Madagascar, the prevalence of stunting amongst children amounts to 50 % or more (UNICEF 2013). In addition, children are disproportionately affected by deaths resulting from environmental factors, including water and sanitation, infrastructure and air quality. While globally 24 % of the disease burden is estimated to be a consequence of environmental problems, amongst children (0–14) the equivalent fraction amounts to 36 % (Prüss-Üstün et al. 2006). In this context, over-rapid urban growth can be considered a key contributor to environmental degradation. Contaminated environment has a negative impact on children's nutrition, which consequently affects their overall health and educational outcomes.

Given the increasing variability in urban areas and the detrimental effect of environmental factors linked to rapid urbanisation, this chapter has two inter-related objectives. First, it aims to assess the scale of intra-urban inequalities in nutritional outcomes amongst children in the LDCs. Its second goal is to examine whether countries experiencing the most rapid pace of urbanisation suffer from greater intra-urban inequalities. The key assumption of this chapter is that over-rapid urbanisation is likely to (negatively) affect the extent of intra-urban inequalities in the countries under consideration.

As highlighted previously, this study adopts both a macro-level and micro-level perspective. By using individual-level data, this research aims to identify associations between children. Furthermore, through the analysis of aggregated datasets, the study examines these associations in both most rapidly and less rapidly urbanising LDCs. Most rapidly urbanising countries include Burkina Faso, Burundi, Mozambique, Nepal and Rwanda, while less rapidly urbanising countries

are Congo (DRC), Niger, Senegal, Sierra Leone and Zambia. The selection criteria were based on the pace of urbanisation over the last 30 years (1980–2010). The outcome of applying this benchmark was compared against results using other criteria (e.g. cumulative urban growth). While Chap. 3 focused on the concept of food insecurity, this chapter is concerned with analysing the inequalities and determinants of undernutrition. It is acknowledged that overweight and obesity constitute a growing health challenge, including in sub-Saharan Africa. At the same time, however, globally one-third of deaths of under-fives are linked to undernutrition (UNICEF 2012a).

This chapter is organised as follows. The next section offers a brief discussion of the understanding and interpretation of inequalities in historical literature, including the Malthusian arguments. Section 5.3 focuses on describing and discussing contemporary inequality trends in the context of rapid urbanisation. A discussion of the nature of inequalities is also included. Further sections describe the data used and report the results of quantitative analysis. The final part of this chapter highlights the key findings and offers policy recommendations.

5.2 Historical Inequalities in Access to Food

Inequalities are as old as the world itself. In hunter-gatherer societies, settlements were created based on the availability of food that allowed survival. People were constantly forced to move in search of their means of subsistence, which prevented any sedentary form of life. The survival of nomadic groups was conditioned on the physical strength of the group members as well as the natural environment. Eventually, human innovation and technological advancements led to the evolution of hunter-gatherer societies and a subsequent shift towards agriculture. For example, Boserup (1987) argued that in pre-industrial Europe, population pressure triggered important changes in food supply techniques, including the use of forest land and natural pastures for crop production and fallow land for feeding domestic animals. Urbanisation was made possible by an increase in population density and a surplus of agricultural produce. At the same time, ancient urban communities experienced high inequalities in terms of their living standards, including access to food (Boserup 1981).

As highlighted in the previous section, Malthus considered inequalities to be an indispensable element of societal construction. Following the functionalist-utilitarian line of argument, Malthus claimed that society had to be stratified because the eradication of property rights would ultimately lead to an uncontrolled population explosion. While Godwin's solution to societal progress lay in improvement of institutions, Malthus claimed that institutional reforms had their limitations. This was again due to the intrinsic cause of inequalities, which lay in the discrepancy between available food and the number of people to be nourished. In this context, inequalities existed because rational self-interested elites took advantage of their privileged situation in society by avoiding positive checks (Elwell 2001).

In his writings on political economy, Malthus outlined his argument from an economical perspective. He claimed that a larger class of wealthy individuals would create a greater demand for goods, and as such would be more beneficial to the economy as a whole. This statement was part of a broader reasoning that in order for a country to progress in its economic development, production and distribution were key and should be managed in adequate proportions. Malthus postulated that “production and distribution are the two grand elements of wealth, which, combined in their due proportions, are capable of carrying the riches and population of the earth ... to the utmost limits of its possible resources” (Malthus 1836, p. 370). In order to assist the poor, and also to help ensure balance between consumption and production, Malthus was a proponent of maintaining a class of “unproductive consumers” through employment in public works (Malthus 1836; Pancoast 1943).

In addition to the management of demand-supply dynamics, Malthus believed that narrowing the inequality gap could be best achieved by large-scale education of the poor. In that sense, he supported Smith’s idea to expand the system of parochial schools, but argued that teachings should also include the principle of population and self-determination of human destiny (Malthus 1826, p. 352). Malthus further stressed that teaching the principles of political economy to the lowest classes would bring invaluable benefits to the society as a whole. Education offered to the poorest people would allow them to acquire the habits of the middle classes and thus, by increasing their prudence and delaying marriage, contribute to poverty elevation. Importantly, Malthus postulated that it was the duty of the government to install a comprehensive educational system. Finally, Malthus was critical of financial aid to the poor, including the “Poor Laws”, because he believed that it further aggravated their condition by providing incentives for reproduction. The limitation of the Malthusian line of thinking, as this book argues, lies in his underestimation of the crucial role of historical urbanisation, both in terms of changing the labour market and contributing to the health outcomes of urban residents. Studies in historical demography have shown that life expectancy was much lower in the cities than in the countryside, and that there existed considerable within-urban differentials (Szreter and Mooney 1998; Harris 2004). In addition, during Malthusian times, large inequalities existed in the distribution of food as well as in the quality and quantity of food consumed by the different strata of society (Harris 2004). These inequalities were, at least partially, a result of rapid urbanisation.

Despite its shortcomings, Malthusian theory has made a unique contribution to broadly understood population studies. Often without explicit acknowledgment, scholarly analysis of the origins of famines points out that unequal distribution of resources rather than crop failure are the root causes of hunger and starvation. This unequal distribution can operate at different levels of analysis i.e. region, district, less often household. The causes of unequal distribution entail economic and political factors. Thus, Sen (1983a, b) argued that famines are strongly linked to the modes of production and class structure within a society. In an interview with Barsamian (2001), he recalled that during the Bengal famine, the poorest proportion of the society died, while the remaining 90–95 % of the population were unaffected. Sen (1983) also pointed out that in many cases, food exports continued from

countries that suffered from famines. Examples include Ireland, which exported food to England during the Great Potato Famine, despite the starvation of its own labouring class. It has been estimated that by 1851 Ireland had lost one-fifth of its population either to death or mass emigration (Kearney 2010).

Furthermore, the contemporary discourse of African famines portrays famine as the result of wars, natural disasters and corruption. Yet the relationship between natural disasters and famines is not necessarily unidirectional. Influential research on African famines conducted by Lofchie (1975) showed that droughts and famines are two distinct phenomena and that the causes of African famines entail deep social, political and economic conditions rather than natural disasters. This situation is aggravated by the agrarian paradox, where African agriculture fails to ensure adequate food production for local markets, while crops for exports are on the rise. In this context, internal urban-rural dynamics and the increasing urbanisation of African countries play an important role in access to food. Although cities generate a large demand for agricultural produce, the prices offered to cultivators are often so low that farmers are de facto encouraged to migrate to urban centres (Lofchie 1975). The complex nature of inequalities will be further discussed in the next section.

5.3 The Nature of Inequalities

Inequalities are multifaceted and incorporate different aspects of human life. A large body of evidence has documented considerable household-level inequalities, which vary across countries (Menon et al. 2000; Wagstaff 2002; Garcia 2012; UNICEF 2012a). These inequalities can be either exacerbated or attenuated by parents' education, behavioural factors and spatial aspects such as household location. A conceptual framework developed by Wagstaff (2002) summarises the proximate determinants of health inequalities, accounting for different levels of analysis. An increased risk of a negative outcome (or odds of success that such an event occurs) is a derivative of household assets, including durable goods, income and human assets, as well as contextual factors. Finally, gender-related inequalities can include the mother's socio-economic background as well as the child's gender.

The extent of inequalities can be mitigated by effective government policies and transnational policies and laws such as international trade agreements. While in the least developed countries, institutional welfare is limited or non-existent, many examples document successful pro-poor strategies. These include governmental collaboration with local and international NGOs in order to scale up the provision of essential health services in Cambodia and upgrading essential obstetric care in Bangladesh with a goal of making it universally accessible (Gwatkin et al. 2005; Peters et al. 2008). Other examples include providing targeted health interventions to vulnerable and marginalised groups in the context of HIV/AIDS prevention and treatment (WHO 2009; GFATM 2011). With regards to improving nutritional outcomes, successful initiatives aim to provide of micro-nutrients to the poor.

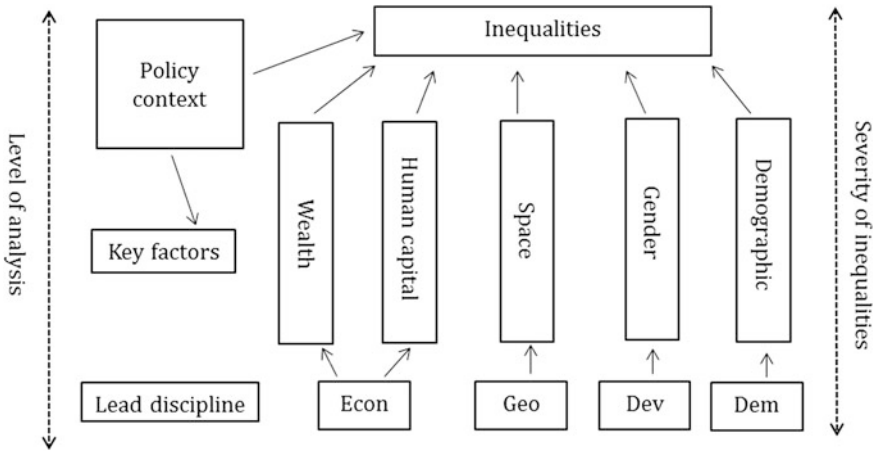


Fig. 5.1 The nature of inequalities—an interdisciplinary framework

Drawing from the existing literature, and as illustrated by the discussion above, Fig. 5.1 summarises the key aspects of inequalities. By incorporating different academic disciplines, it highlights the interdisciplinary nature of societal inequalities. While the framework was developed in the context of child undernutrition, it can be thought of as representing a universal nature of contemporary inequalities. In addition to focusing on contributing factors and levels of analysis, the framework integrates the issue of the extent or severity of inequalities, which can be either horizontal (cross-sectional) or vertical (time-related).

It follows from the above that inequalities are not constant and their severity can change over space and time. Historically, countries have managed to implement successful policies and minimise the extent of inequalities in their respective societies. There is vast evidence that historical European elites had wide access to food resources, unthreatened during the times of crises or famines (Livi Bacci 1990). In some *milieux*, including the court of King Erik in Sweden, daily diets exceeded 6,000 calories per day (Neveux 1973; Livi Bacci 1990). At the same time the masses of (urban) poor were condemned to starvation, as documented in the history of famines from different continents (Livi Bacci 1990; Dando 2012). Regardless of the association between nutrition and child mortality, which is largely disputed by historical demographers, today it is recognised that the leading causes of child mortality, such as diarrhoea, pneumonia and malaria, are related to undernutrition (UNICEF 2012a). As such, studying inequalities in nutritional outcomes is key not only to improving the health and wellbeing of populations but also to increasing life expectancy. While in more developed countries, the welfare state and technological advancements have contributed to the narrowing of inequality gaps, the LDCs continue to experience large societal inequalities, which are exacerbated by over-rapid urbanisation.

In addition to country-level changes regarding inequalities in access to food and nutritional outcomes, individual health status often evolves throughout one's life course. It has been proven, for example, that children suffering from undernutrition are more prone to becoming obese in later life (Popkin et al. 1996; Sichieri et al. 2000; Sawaya et al. 2004). Also, because malnutrition is associated with a higher risk of infection, an individual undernourished in their childhood can contribute to greater prevalence of infectious diseases in a particular country or community. On the other hand, the socio-economic status of individuals can change, as can their place of residence. This, in turn, is likely to have implications for people's current health outcomes, as well as those of future generations. While it is important to highlight the different aspects of inequalities, the present study concerns itself with one assumed contributor to growing intra-urban inequalities: rapid urban growth. In this context, the next section provides a brief overview of contemporary intra-urban inequalities in child nutritional outcomes accounting for the pace of urbanisation.

5.4 Contemporary Urbanisation and Intra-Urban Inequalities

5.4.1 *Urbanisation and Child Undernutrition in the Least Developed Countries*

As mentioned previously, the group of least developed countries was identified by the UN's General Assembly in 1971 in order to pay greater attention to the needs of the poorest nations (UNCTAD 2011, 2012). While research has proven that in general there is a positive association between urbanisation and income, the cases of many African countries illustrate that rapid urbanisation can occur without economic growth (Clarke Annez and Buckley 2009). On the one hand, in line with traditional urban bias theory, the World Bank has argued that urbanisation benefits urban elites, while rural dwellers have been excluded from social protection and received low compensation for agricultural produce (World Bank 2000; Clarke Annez and Buckley 2009). On the other hand, however, an increasing body of research has documented child undernutrition in the context of urban poverty and proven that intra-urban inequalities can be greater than those occurring in rural areas (Menon et al. 2000; Fotso 2006; Van de Poel et al. 2007).

Weak economic systems, structural challenges and the inability of governments to provide growing urban populations with basic services are frequently mentioned as being amongst the key causes of a growing social stratification (Fotso 2006). Additionally, it has been suggested that in Africa (where the majority of the LDCs are located), environmental factors are amongst the drivers of urbanisation, constituting push rather than pull factors behind rapid urban growth. A paper by Barrios et al. (2006) found that in sub-Saharan Africa, shortage of rainfall was positively associated with rural to urban migration and that this relationship was stronger in the post-colonial period. Irrespective of the causes of continuous urban

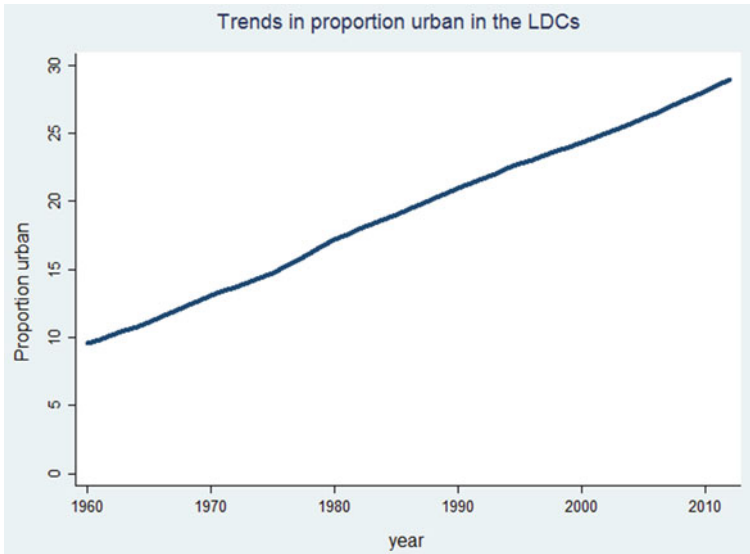


Fig. 5.2 Urbanisation trends in the LDCs (1960–2010)

growth (Fig. 5.2), the consequences of rising inequalities amongst urban populations deserve attention.

An “over-rapid” pace of urbanisation can pose challenges to children’s nutrition in terms of both greater overall poverty and barriers in access to food, and increasing social stratification. As discussed in Chaps. 3 and 4, unmanaged urban sprawl often results in large populations being forced to live in crowded, disease-prone settings, often illegal or semi-legal. Children are particularly vulnerable to the threats caused by poor urban environments. A recent report by UNICEF (2012b) highlighted that in 2010, 8 billion children under five died due to diseases such as diarrhoea and pneumonia and birth complications. Although no desegregation of these data was reported that would enable urban-rural comparison; it has been widely acknowledged that poor urban children are particularly at risk. In the context of least developed countries, this urban risk is exacerbated by overall structural problems, including weak health systems. The trends in child undernutrition in the context of rapid urbanisation can be best analysed when considering relevant time series Fig. 5.3.

The World Bank’s Development Indicators contain temporal data on child stunting from 1960 onwards. While for the early 1980s the data for LDCs are unavailable, from 1985 the relevant statistics became more frequently reported. This allowed the plotting of under-five stunting data accounting for countries’ pace of urbanisation. While in both groups of the LDCs (most rapidly urbanising and less rapidly urbanising), the trends in stunting were similar, the countries that have experienced the most rapid pace of urbanisation suffer from a higher prevalence of child undernutrition. The mechanisms through which rapid urbanisation can have negative impacts on child undernutrition are discussed in the next section.

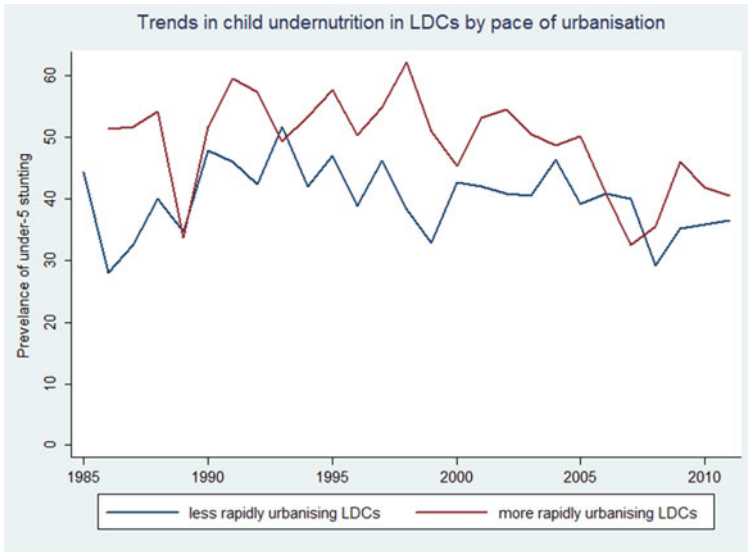


Fig. 5.3 Trends in child undernutrition (stunting) in LDCs by pace of urbanisation (more rapid vs. less rapid)

5.4.2 *Prepositions Regarding Urbanisation and Nutritional Inequalities*

More specifically, the negative impacts of the rapid pace of urbanisation on the intensity of intra-urban inequalities in nutritional outcomes can operate in a number of ways, including the following:

1. In the least developed contexts, rapid urban growth is likely to put pressure on already weak institutions, thus creating further barriers to access to support services for the poor.

Urbanisation without development is now a widely discussed phenomenon. Fotso (2006) pointed out that between 1980 and 2000, the urban population of sub-Saharan Africa grew by around 4.7 %, whereas the per capita GDP saw a yearly decline of almost 0.8 %. In a situation where support systems are limited, the additional demand for educational and health services generated by rapid urbanisation can exacerbate existing nutritional risks. At the same time, it has been proven that maternal health including mental health, as well as the educational background of the mother, is strongly associated with the nutritional outcomes of under-fives (Rahman et al. 2004; Subramanian et al. 2009; Arokiasamy et al. 2012). For example, in Mozambique, which is one of the most rapidly urbanising countries, one-third of the population live in urban areas, with the majority residing in slums. A recent report on the urban sector in Mozambique (UNHABITAT 2008)

highlighted that while the investments in poverty reduction have generally been successful, they have been compromised to a large extent by increasing urban poverty. Between 1997 and 2003, the national poverty rate declined from 70 to 54 %; however, at the same time, an increasing proportion of Maputo's population fell into poverty (UNHABITAT 2008). These macro-level dynamics contribute to individual livelihood outcomes, which often translate into greater inequalities.

2. Rapid urban growth triggers greater social stratification because of the dependence of the urban populations on the labour market and due to price fluctuations.

Rapid pace of urbanisation can lead to social stratification, which is likely to involve greater inequalities in access to quality nutrition. A While more detailed data desegregation will be provided in the *Results* section, it is important to highlight the key mechanisms through which urban stratification may occur. Here, the issue of access to food is key. As discussed at length in Chap. 3 in the context of food insecurity, access to food can be both physical and financial. Although urban populations often benefit from greater infrastructure, the urban poor are likely to encounter financial barriers in access to nutrition. In cities such as Maputo, Lima or Katmandu, households purchase more than 90 % of their food (Ruel et al. 2010). When opportunities for income generation are scarce, increases in prices of food can have a dramatic effect.

The Sahel food crisis, as discussed in Box 5.1, has had an exacerbating impact on the already dramatic prevalence of child undernutrition in the region. This societal stratification, resulting from dependency on income, has been further aggravated by spatial segregation. While urban-rural differentials are often cited with regards to poor rural infrastructure, many African cities lack basic coverage in electricity and water supply. The reliance of urban dwellers on external sources of food, combined with poor facilities, is likely to constitute the main source of increasing intra-urban inequalities in children's nutritional outcomes. Finally, the existing stratification can be further influenced by growing environmental degradation and climate change.

3. Rapid pace of urbanisation involves environmental degradation and is a proven influencing factor with regards to climate change. As such, urbanisation indirectly augments the threat of child undernutrition, especially amongst the poorest poor.

Rapid urbanisation increases the risk of environmental push factors and thus contributes to greater migration flows (Myers and Kent 1995; Myers 2002). Myers and Kent (1995) identified a number of key factors influencing environmental exodus, including deforestation, water shortage, agricultural stress, soil erosion and landlessness. It would be difficult to counter the fact that these challenges are at least partially caused by rapid urbanisation, in particular in the context of least developed countries.

Because urbanisation can have negative impacts on natural habitat, indirectly uncoordinated urban growth is likely to have an adverse effect on child nutrition. A recent report by IFPRI (2009) provided a number of useful scenarios for the

impact of climate change on agriculture, using the indicators of per capita calorie availability as well as child undernourishment. The report noted that accounting for climate change, by 2050, the per capita calorie availability in developing countries is likely to decline by 10 %. This trend is expected to be worse in sub-Saharan Africa, where the fall may exceed 20 %. At the same time, the number of undernourished children in sub-Saharan Africa is projected to increase from the expected 42 million to 52 million as a result of climate change (Nelson and IFPRI 2009). While climate change is a macro-level phenomenon, the poorest populations are particularly at risk, which can lead to further social stratification. The next section provides a quantitative analysis of intra-urban inequalities in children's nutritional outcomes.

Box 5.1: Rapid Urbanisation, Famine and Intra-urban Inequalities in Burkina Faso

Burkina Faso is one of the poorest countries in the world. According to the 2012 HDI ranking, it is the fifth poorest nation globally, followed only by Chad, Mozambique, the DRC and Niger (Malik 2013). While the results of the 2009/10 household survey showed that since 2003 the incidence of poverty had decreased by 2.5 %, the recent (2009/2010) poverty rate remains worryingly high at 44 % (IMF 2012). Importantly, while rural poverty dominates, analysis of time series reveal that urban poverty is on the rise. Between 1994 and 2009, Burkina Faso's rural poverty rates saw little fluctuation and remained at around 51–52 %, while the incidence of urban poverty experienced a twofold increase, reaching 20 % in 2009 (IMF 2012).

The increase in urban poverty is linked to the rapid and largely unplanned urban growth. Since the mid-20th century, the proportion of the urban population has continued to increase and is projected to exceed 50 % by 2045. At the same time, the population of Ouagadougou, the capital city, grew from 33,000 in 1950 to over two million in 2011. Today, more than 12 % of Burkina Faso's population reside in Ouagadougou (UN 2014a, b, c). While today the rural-urban gap persists (Fofack 2002; IMF 2012), there has been a significant increase in the number of urban poor. The factors behind urban poverty in Burkina Faso are diverse and include such phenomena as climatic conditions, limited purchasing power, age dependency, family size and governance issues (Ministry of Economy and Development 2004).

In the last decade, Burkina Faso has suffered from three food crises, two in 2005 and one in 2012. Most recently, in 2012, the Sahel food and nutrition crisis in West Africa, including in Burkina Faso, has further contributed to aggravating the food insecurity situation in the country. The FAO has estimated that 1.4 million children in the Sahel region are at risk of severe acute malnutrition (FAO 2013a, b, c). The crisis triggered large population movements. Rural populations that were unable to produce sufficient agricultural yield migrated to cities in search of alternative income. However, high food prices and lack of income generation opportunities often hindered access to nutritious food in the cities.

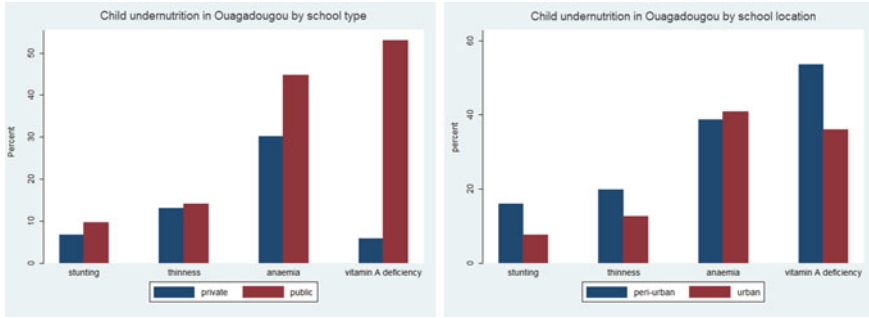


Fig. 5.4 Child undernutrition in Ouagadougou by school type and school location. *Note* Data adapted from Dabone et al. (2011)

A recent study of child undernutrition in school children (7–14) in urban and peri-urban Ouagadougou showed that as children get older, nutritional deficiencies persist. It has been found that 57 % of children in Ouagadougou showed more than one sign of malnutrition and that the majority of children who suffered from micronutrient deficiencies attended public schools (Dabone et al. 2011) (Fig. 5.4).

5.5 Intra-Urban Inequalities in Most Rapidly and Less Rapidly Urbanising LDCs

Tables 5.1, 5.2 and 5.3 summarise the results of the descriptive analysis as well as selected inequality measures. Based on the results reported in Table 5.1, it can be deduced that, overall, most rapidly urbanising countries experience greater intra-urban inequalities than less rapidly urbanising nations. Thus, for example, when considering child underweight, it can be noted that in the group of most rapidly urbanising countries, amongst the poorest households, 21.7 % children are underweight. While this is comparable to the equivalent proportion in the less rapidly urbanising countries, the percentages of underweight children amongst the richest households differ, thus revealing more severe inequalities in most rapidly urbanised countries. More specifically, around 6.4 % children from the richest households are underweight in the most rapidly urbanising LDCs compared to 9.1 % in less rapidly urbanising LDCs. When considering child stunting, the patterns are similar. In the most rapidly urbanising nations, amongst the children in the poorest households, almost 44 % of all children are stunted, while this number declines to 15 % for children in the richest households. On the other hand, in the less rapidly urbanised nations, 41 % of children from poorest households are stunted, compared to 20 % of those living in the richest households.

Table 5.1 Descriptive statistics

	Most rapidly urbanising LDCs					Less rapidly urbanising LDCs						
	Household's wealth					Household's wealth						
	Poorest	Poorer	Middle	Richer	Richest	Total	Poorest	Poorer	Middle	Richer	Richest	Total
<i>Child underweight</i>												
Not underweight (frequency)	940	946	1055	1107	1037	5085	795	936	897	909	965	4502
Percentage	78.27	85.46	87.84	91.49	93.59	87.27	78.64	81.68	82.60	84.79	90.87	83.73
Underweight (frequency)	261	161	146	103	71	742	216	210	189	163	97	875
Percentage	21.73	14.54	12.16	8.51	6.41	12.73	21.36	18.32	17.40	15.21	9.13	16.27
Total	1201	1107	1201	1210	1108	5827	1011	1146	1086	1072	1062	5377
Percentage	100	100	100	100	100	100	100	100	100	100	100	100
Pearson χ^2	$\chi^2 = 151, p < 0.00$											
<i>Child stunting</i>												
Not stunted (frequency)	672	694	850	948	944	4108	592	701	719	808	853	3673
Percentage	56.05	62.69	70.83	78.54	85.2	70.57	58.61	61.22	66.27	75.51	80.40	68.39
Stunted (frequency)	527	413	350	259	164	1713	418	444	366	262	208	1698
Percentage	43.95	37.31	29.17	21.46	14.8	29.43	41.39	38.78	33.73	24.49	19.60	31.61
Total	1199	1107	1200	1207	1108	5821	1010	1145	1085	1070	1061	5371
Percentage	100	100	100	100	100	100	100	100	100	100	100	100
Pearson χ^2	$\chi^2 = 306, p < 0.00$											
$\chi^2 = 170, p < 0.00$												

Table 5.2 Summary of selected inequality measures (most rapidly urbanising countries)

Indicator of undernutrition	Selected inequality measures	Study countries and aggregate dataset									
		Burkina Faso	Burundi	Mozambique	Nepal	Rwanda	5 LDCs	5 LDCs ²			
Stunting	Quintile ratio (poorest to richest)	1.68	4.15	3.24	3.74	3.76	2.97	3.42			
	Concentration index	-0.13	-0.27	-0.20	-0.21	-0.26	-0.20	-0.22			
	Logistic regression OR (richest compared to poorest)	0.51 (10)***	0.12 (0.04)***	0.19 (0.03)***	0.16 (0.06)***	0.17 (0.07)***	0.22 (0.02)***	0.19 (0.02)***			
Underweight	Quintile ratio (poorest to richest)	2.22	6.49	6.84	3.33	1.92	3.39	3.76			
	Concentration index	-0.15	-0.36	-0.30	-0.24	-0.17	-0.23	-0.24			
	Logistic regression OR (richest compared to poorest)	0.38 (0.09)***	0.11 (0.05)***	0.12 (0.04)***	0.21 (0.08)***	0.49 (0.28)	0.25 (0.03)***	0.22 (0.03)***			

Notes: The results in the last column (5 LDCs²) have been computed based on the modified assets index, which also included parents' intellectual characteristics. *** denotes highly significant ($p < 0.01$)

Table 5.3 Summary of selected inequality measures (less rapidly urbanising countries)

Indicator of undernutrition	Selected inequality measures	Study countries and aggregate dataset						
		Congo (DRC)	Niger	Senegal	Sierra Leone	Zambia	5 LDCs	5 LDCs ²
Stunting	Quintile ratio (poorest to richest)	2.50	2.49	2.44	1.61	1.92	2.11	2.49
	Concentration index	-0.17	-0.17	-0.15	-0.09	-0.12	-0.15	-0.16
	Logistic regression β (richest compared to poorest)	0.26 (0.06)***	0.29 (0.07)***	0.33 (0.09)***	0.51 (0.15)**	0.36 (0.06)***	0.35 (0.03)***	0.27 (0.03)***
Underweight	Quintile ratio (poorest to richest)	2.18	2.64	1.69	3.14	2.58	2.34	2.71
	Concentration index	-0.12	-0.17	-0.08	-0.13	-0.16	-0.13	-0.16
	Logistic regression β (richest compared to poorest)	0.40 (0.11)***	0.29 (0.07)***	0.55 (0.18)*	0.27 (0.12)***	0.35 (0.09)***	0.37 (0.05)***	0.31 (0.04)***

Notes: The results in the last column (**5 LDCs²**) have been computed based on the modified assets index, which also included parents' intellectual characteristics. *** denotes highly significant ($p < 0.01$)

Further conclusions can be drawn when analysing selected inequality measures (Tables 5.2 and 5.3). Quintile proportion ratios confirm existing wealth-based inequalities. While overall most rapidly urbanising countries show greater intra-urban inequalities, discrepancies between individual countries exist. Thus, at the pooled data level, the child undernutrition ratio of poorest to richest households is almost 3 for stunting, and approximately 3.4 for underweight. At the individual country level, the equivalent ratios for stunting vary, with the largest inequalities observed in Burundi, Nepal and Rwanda. Importantly, when the assets index is constructed including parents' education, the inequalities are wider. For the pooled data, in the most rapidly urbanising countries, the ratios increase from 3.0 to 3.4 for child stunting and from 3.4 to 3.8 for child underweight.

Concentration curves and concentration indices confirm the previous observations and allow more nuanced conclusions. In a perfectly equal society, the concentration curve would be a 45-degree line. The greater the distance between the 45-degree "equality line" and the concentration curve, the larger the health inequalities. The values of the concentration index fall between -1 and 1 , with 0 indicating perfect equality. When health variables measure ill health, a negative sign of a concentration index indicates a greater concentration of the outcome amongst disadvantaged groups (Wagstaff 2000; O'Donnell et al. 2008). Put simply, in this analysis, the lower the value of concentration indices, the higher the existing inequalities.

The results presented in Tables 5.2 and 5.3 show that overall, most rapidly urbanising countries experience greater intra-urban inequalities. Based on the quintile distribution of undernutrition variables constructed using households' material assets only, at the aggregate level, the concentration indices for most rapidly urbanising countries are -0.20 for child stunting and -0.23 for child underweight. For all countries but Rwanda, inequalities are greater for child underweight than for child stunting. In particular, Burundi and Mozambique experience very severe intra-urban disparities in child underweight with concentration indices exceeding -0.3 . Comparatively, in the less rapidly urbanising countries, the intensity of inequalities is less severe. At the pooled data level, the values of all concentration indices fall between -0.13 and -0.16 . As with the group of most rapidly urbanising countries, inequalities are slightly greater when accounting for parents' education. Figures 5.5, 5.6, 5.7 and 5.8 provide a graphical illustration of the above-discussed inequality patterns.

Finally, logistic regression analysis was conducted in order to examine the extent of inequalities between the top and bottom quintiles of wealth distribution. When the most rapidly urbanising LDCs are considered, the odds ratios (for the pooled data) vary from 0.19 to 0.25 and are all statistically significant. When parents' education is included in the households' assets index, as previously, the severity of inequalities

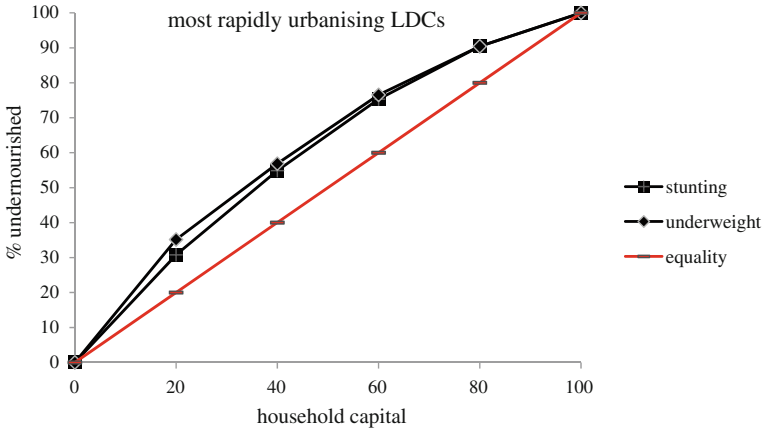


Fig. 5.5 Intra-urban inequalities in child nutritional outcomes in the most rapidly urbanising LDCs

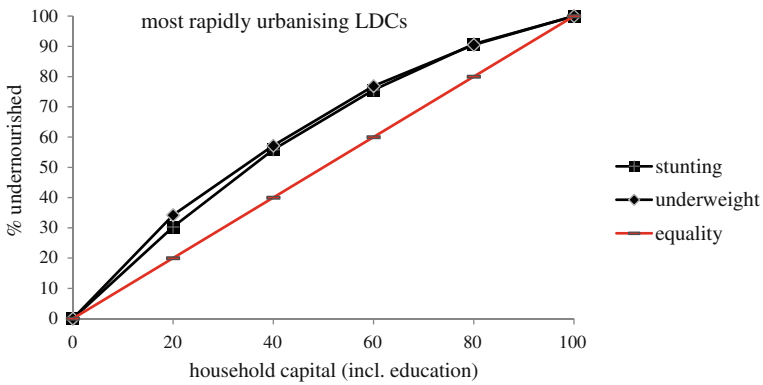


Fig. 5.6 Intra-urban inequalities in child nutritional outcomes in the most rapidly urbanising LDCs (accounting for parents' education)

intensifies. On the other hand, in the less rapidly urbanising LDCs, the equivalent odds ratios fall in the range of 0.27–0.37, and follow the previous patterns, where parents' education exacerbates intra-urban inequalities. The largest inequalities in child stunting can be observed in Burundi and Nepal, while the greatest inequalities in child underweight are reported for Burundi and Mozambique.

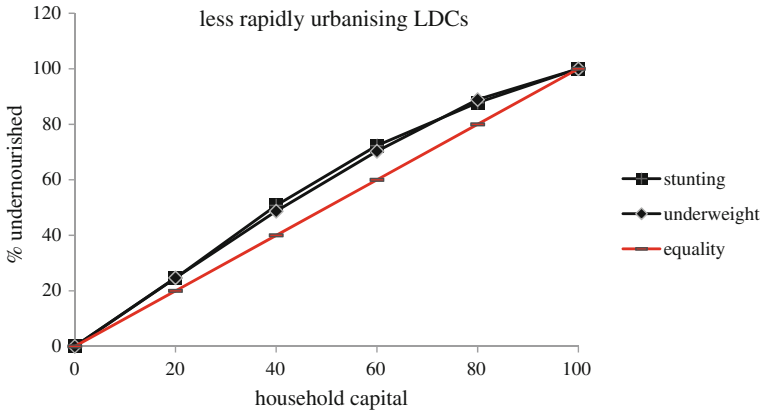


Fig. 5.7 Intra-urban inequalities in child nutritional outcomes in less rapidly urbanising LDCs

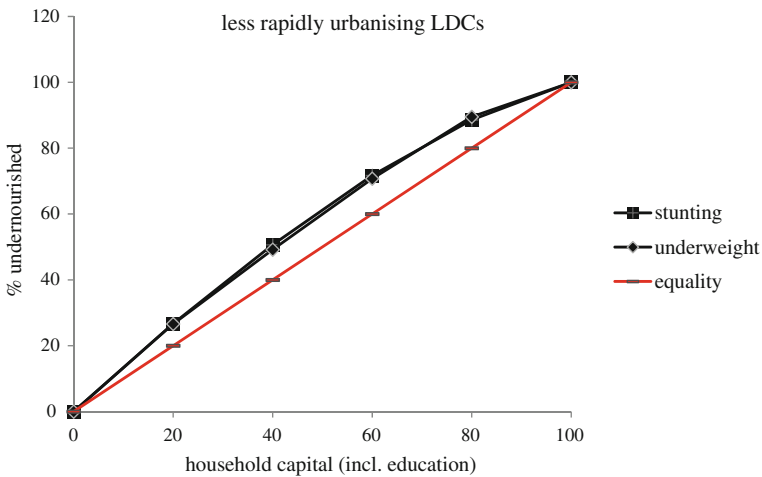


Fig. 5.8 Intra-urban inequalities in child nutritional outcomes in less rapidly urbanising LDCs (accounting for parents' education)

5.6 Conclusions

Drawing from the post-Malthusian literature and development studies, this research has aimed to estimate the extent of intra-urban inequalities in child undernutrition in the context of rapid urbanisation. More specifically, the first objective of this chapter was to investigate whether these inequalities are greater in the group of LDCs that have experienced the most rapid pace of urbanisation. Descriptive statistics, inequality measures and the results of logistic regression have shown that the extent of intra-urban inequalities in child undernutrition is greater in most

rapidly urbanising LDCs. Moreover, these inequalities are exacerbated by parents' education.

The research in this chapter has several important policy implications, which should be considered within the broader sustainable development agenda. The recently endorsed SDGs focus on outcome indicators, such as improvement of living conditions of slum dwellers, but ignore the macro-level processes that influence these outcomes. These macro-level phenomena, such as over-rapid urban growth, have far-reaching consequences in terms of individuals' livelihood strategies and their vulnerabilities to poverty and ill health. As shown in this study, uncoordinated urbanisation not only leads to greater spatial differentials, but also exacerbates existing inequalities in children's nutritional status. In this context, eliminating intra-urban inequalities in child undernutrition requires a committed policy agenda focusing on pro-poor initiatives. Such an agenda should incorporate factors relating to macro-level urban planning, rural development and investing in spatial connectivity. Importantly, because child undernutrition is part of the food insecurity challenge, agricultural policies, water management and public health promotion should constitute key factors of an integrated policy agenda.

As highlighted by previous research (McGuire and Popkin 1990; Summers 1994; Cartwright et al. 2003; Buvinić 2008), investments in women's education and maternal health constitute a prerequisite for progress in human development. Continuous scaling up of investments in these areas should lead to project-based interventions being embedded in national plans for health systems, educational systems and policies promoting technology and innovation. Finally, eradicating the underlying challenges pertaining to human survival, such as universal access to food and water, is a prerequisite for other sustainable development initiatives. While child survival is embedded in the UN Convention on the Rights of the Child (1989), formal M&E and legal mechanisms are required in order to ensure that this right is respected. Because of the importance of the practical implications of the rapid pace of urbanisation on children's health outcomes, it is crucial to invest both time and funding into a comprehensive research strategy in this area of study.

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Chapter 6

Linking Theory and Practice

The wealth and power of nations are, after all, only desirable as they contribute to happiness (Malthus 1826, p. 391).

Abstract This chapter summarises the key findings and arguments of the book and offers a revised post-Malthusian theoretical framework with a focus on urbanisation. The chapter further discusses the contribution of the book to the literature on urban theories and the linkages between historical urban challenges and contemporary risks caused by continuing urban sprawl. The findings in this book support some of the concerns raised by Lipton's critics. In particular, the results of the analyses showed that macro-level urban processes measured by the rate of urban growth and pace of urbanisation can have important negative effects on human development. Despite lessons from the past, rapid urban growth continues to be a threat to the environment and human health. Finally, this chapter provides a discussion of the key obstacles to the sustainable development agenda, with a special focus on five policy areas: population size and growth, urbanisation, food security risks, human capital and inequalities.

Keywords Malthusian theory · Post-Malthusian theoretical framework · Sustainable development · Sustainable development goals (SDGs) · Post-MDG agenda

6.1 Introduction

This book has been motivated by (1) the traditional Malthusian theory and post-Malthusian debate concerning population growth and availability of resources; and (2) contemporary sustainable development debate pertaining to population dynamics, urbanisation and environment. The Malthusian theory has provided inspiration for a vast body of research beyond demographic studies. Yet at the same time it failed to incorporate a number of key phenomena, such as urbanisation, which affect the availability of and access to vital resources. Given the speed and

extent of contemporary urbanisation and the effect that urban growth can have on households' livelihood outcomes, this book is intended to contribute not only to academic debate on the subject but also to the ongoing policy agenda. Today, despite the progress made in the fight against hunger, 66 million primary school children in developing countries attend school hungry (WFP 2013). The most recent FAO report stated that one in eight people suffer from chronic hunger (FAO et al. 2013), while WHO (2013b) highlighted that as of 2008, 35 % of the adult (20+) population are overweight. In many countries, access to safe drinking water, despite being a human right, is not guaranteed.

The issues analysed in this book encompassed three primary research areas, as defined by specific research questions outlined in each empirical chapter (Chaps. 3–5). The discussion in each chapter was related to a distinct research problem identified in the Malthusian literature and post-Malthusian studies. The primary motivation for Chap. 3 was the continuing debate about the potential impact of population growth on food supplies now that the population exceeds 7 billion. The chapter argued that the population growth-food supply debate is simplistic for two main reasons. First, it ignores the important role of urbanisation in terms of distribution of and access to food, as well as its indirect impacts through individual capabilities and endowments. Second, such an approach neglects the evolving nature of contemporary food insecurity challenges.

Box 6.1: Summary of Key Concepts Applied in the Book

Contemporary preventive and positive checks

Following on from the Malthusian definition, contemporary “preventive checks” act at the fertility level. They encompass the impact of the positive aspects of urbanisation, referred to as “urban advantage”. On the other hand, “positive checks” operate at the mortality level and include detrimental effects of urbanisation, such as lower life expectancy caused by deaths attributed to pollution and other urban hazards.

Food security and food insecurity

Based on the FAO's definition, food security is defined as “a situation that exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life” (FAO et al. 2013, p. 50). Conversely, food insecurity is defined as a “situation that exists when people lack secure access to sufficient amounts of safe and nutritious food for normal growth and development and an active and healthy life” (FAO et al. 2013, p. 50). The four aspects of food security are: availability, access (physical and financial), utilisation and stability. While the present study conforms to the above definitions, it postulates that a novel approach is required regarding the interpretation and measurement of both concepts.

Human capital

Individual human capital is defined as one's capacity to innovate or generate new ideas, and translate these new ideas into practice. This definition assumes that the process of innovation is stimulated by acquisition of knowledge through the process of education. At the macro level, accumulation of human capital enables countries' technological advancement and facilitates overall developmental progress. The definition assumes that human capital is a potential key factor in closing the ingenuity gap (Homer-Dixon 1995).

Inequalities

Drawing on the WHO (2013a) definition of health inequalities, inequalities are defined as differences in health, economic and educational outcomes as well as in the distribution of key determinants affecting these outcomes. The nature of inequalities can incorporate socio-economic, spatial and demographic factors and can operate at different levels of analysis. As such, investigating inequalities requires a comprehensive multidisciplinary approach.

Urbanisation

Drawing on the definitions developed by Davis (1955) and international agencies (OECD 2012; UN 2014b), urbanisation is defined as a process of population concentration that has important demographic, social and environmental ramifications. By including the impact of urbanisation in its definition, this concept highlights the multifaceted and multidisciplinary nature of urbanisation.

The arguments in Chap. 4 were primarily motivated by the work of Simon (1977, 1981), Boserup (1976, 1981, 1987, 1993) and Homer-Dixon (1995). The chapter developed an argument that in the era of rapid urbanisation and increasing urban poverty, human capital can act as an attenuating factor in the association between urban growth and households' livelihoods. Using safe drinking water as a case study, research found that while urban residence continues to be positively associated with access to safe drinking water, macro-level urban growth and proportion of urban population in slums have a significant negative impact on households' water access. Regardless of the indicators used to measure urbanisation, households' human capital was found to have a significant mitigating effect on the relationship between urbanisation and access to safe drinking water.

Finally, the aim of Chap. 5 was to complement the study by investigating the extent of intra-urban inequalities in child undernutrition in rapidly urbanising least developed countries. The main hypothesis was that countries undergoing the most rapid pace of urbanisation are prone to experiencing greater intra-urban inequalities than countries that have been urbanising at a less rapid pace. Research findings

confirmed this hypothesis and additionally found that human capital, measured by parents' educational attainment, can further exacerbate the extent of existing inequalities. These results not only complement the existing research on the topic, but yield important policy implications, as will be discussed later in this chapter.

6.2 Revised Post-Malthusian Framework in the Context of Global Urbanisation

One of the main goals of this book was to propose a revised post-Malthusian framework that could be applied to contemporary development studies. The revised framework presented in this section is based on three foundations. First, the initial Malthusian theory, as presented in Sect. 1.3. Second, the the concepts and definitions applied throughout this book. Third, the the empirical findings of Chaps. 3–5.

Based on these foundations, the framework presented in Fig. 6.1 encompasses several levels of thought process and analysis. For a thorough understanding, the framework should be read from left to right as well as top to bottom. Thus, the top level comprises structural elements, which draw from the original Malthusian framework. These include societal inequalities, innovation and progress and human nature. All these components are closely linked to each other and have an impact on confounding factors as well as the revised feedback loop. Given the human body's requirements for food, elites continue a perpetual struggle to sustain the status quo, where they are able to benefit from their privileged access to key resources. In the context of scarcity, as Malthus claimed, “the hateful passions...reappear” and “the temptations to evil are too strong for human nature to resist” (Malthus 1826, p. 334). However, the state of societal inequalities has, to a certain degree, some advantages. It triggers competition, which in turn brings about innovation and generation of human capital. This reasoning can be effectively applied to contemporary knowledge-based economies. Following Malthus, it should nonetheless be noted that large inequalities are detrimental to societal progress because they reduce the consumer base and can lead to economic stagnation. Moreover, given the progress achieved in human development over the last two centuries, it ought to be recognised that while inequalities can have a positive impact on countries' wealth, universal access to key necessities should be guaranteed by law. This aspect of the Malthusian framework will be further referenced in the *Policy implications* section.

The second level of the Malthusian framework encompasses the key contemporary factors that affect availability of and access to vital resources, such as food and water. This part of the framework has been largely motivated by the research conducted in Chap. 3. Based on previous literature as well as the results of the analysis in Chap. 3, the main contemporary factors affecting food security include population stock, geographical habitat, natural disasters, conflicts and globalisation. Population size can be seen as the most obvious factor because of its direct link to urban growth, but also because larger populations require greater supplies of food,

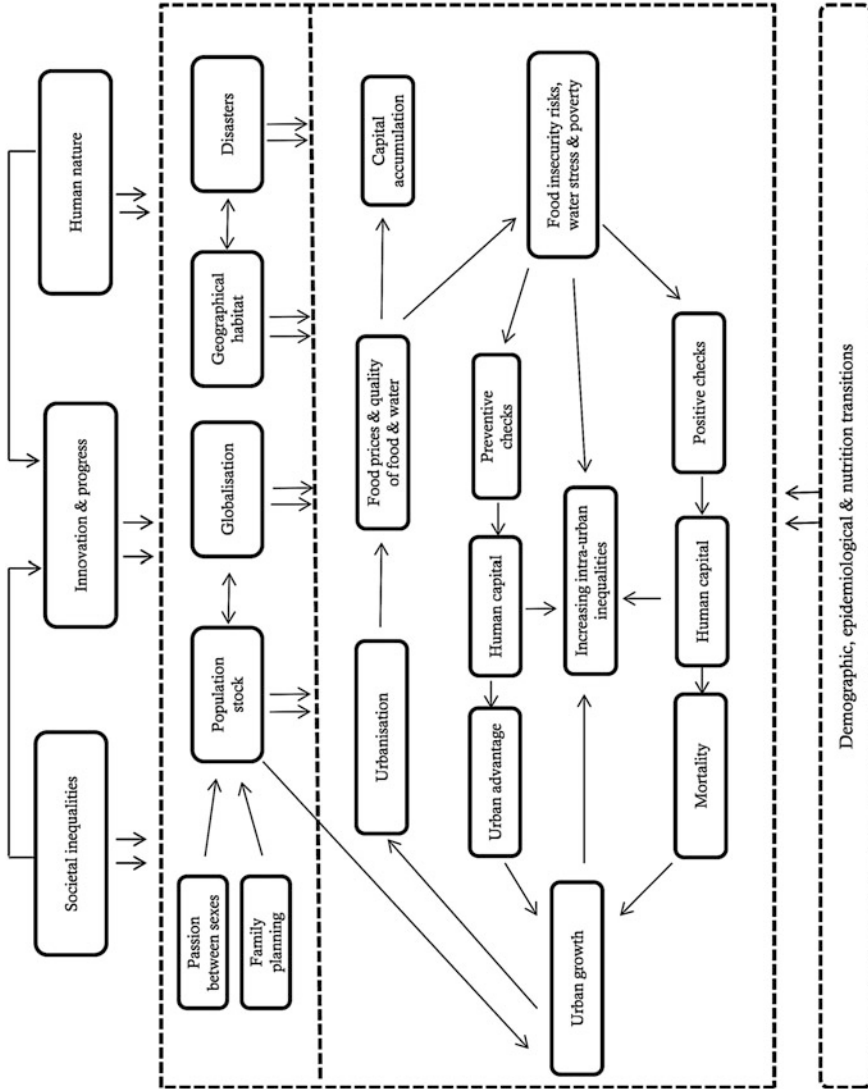


Fig. 6.1 Post-Malthusian theoretical framework

water and other resources. Today, population size is affected by two countering forces. The first element is the traditional Malthusian passion between the sexes, which acts as a primary trigger for population growth. The second aspect is modern family planning. Despite the likelihood that it would have been classified by Malthus as a vice, today family planning constitutes a key balancing force in the population size equation, at least partially due to such initiatives as the Family Planning 2020 (FP2020), which facilitated the access to sexual and reproductive rights in high fertility countries.

As discussed at length in Chap. 3, geographical habitat influences the way in which populations are distributed and can either support or hinder people's survival. Because of the surrounding natural habitat, individuals might be forced to migrate to cities, thus contributing to urbanisation. On the other hand, communities that live in prosperous natural habitats are likely to be less affected by poverty and famines. Likewise, individuals and communities affected by wars and conflicts can suffer from disease and hunger. In addition, disasters can contribute to greater population displacements, including flight to cities. Finally, as debated in Chap. 3, globalisation has a differentiated effect on food security and can influence urban trends through exchange of goods, services and information. These four sets of factors are all influenced by the traditional Malthusian elements incorporated in the top layer of the framework.

The bottom level of the framework comprises a revised post-Malthusian feedback loop. While the focus of the traditional feedback loop was on population dynamics and preventive and positive checks operating on fertility and mortality, the emphasis of the feedback loop proposed here is on the role of urbanisation in access to and availability of vital resources. To the furthest extent possible, the suggested feedback loop follows the original Malthusian logic, while accounting for new elements. More specifically, urban growth, which constitutes the starting point, results in countries' urbanisation as defined throughout this book. The process of urbanisation and urbanisation outcomes (ramifications) can have an important impact on prices and quality of food and other key resources. This is likely to contribute to increasing urban poverty while at the same time allow the privileged classes to gain greater profit (capital accumulation). Two sets of "urban checks" can then operate. The first set, which is the equivalent of the Malthusian preventive checks, acts through deterrence and is related to "urban advantage". This effect is further strengthened by the mitigating impact of human capital, both at the country and household level. Meanwhile, the second set works through increased urban risk relating to mortality rates. Pollution, disease and the consequences of disasters have been proven to have a strong negative effect on health outcomes in densely populated urbanities. In addition, the urban lifestyle is sometimes associated with a higher risk of obesity and chronic diseases. Eventually, the resulting level of urbanisation is linked to urban growth anew, thus resuming the cycle.

Finally, it should be stressed that while originally conceived as a macro-level framework, all elements of the suggested framework and associated relationships can be interpreted at different levels of analysis. From the process point of view, the phenomena that form this feedback loop have been developing concurrently with

the demographic, epidemiological and nutritional transitions to which they are closely linked. Meeting the need for food and water is conceptualised as the key requirement for human survival. As such, meeting this need constitutes the basis for any further developmental progress.

6.3 Rethinking the IPAT Equation

The traditional IPAT equation was first developed by Ehrlich and Holdren (1971, 1972) in the context of intense population–environment debate. As mentioned previously, Paul Ehrlich was amongst the most influential advocates of the detrimental impact of population growth. His views continued to stir fervent debate between the proponents of the catastrophic effect of continuing population increase and those, like Simon, who believed that population growth stimulates human capital generation and thus contributes to countries’ economic and human development.

More specifically, the idea of a simple equation quantifying the relationships between environmental impact and its key determinants arose in the early 1970s, when Ehrlich and Holdren (1971) proposed five “theorems” relating to population size, population growth, population density, environment and theoretical versus practical solutions. In their view, reducing population growth was a *sine qua non* condition to easing the pressure on natural resources and physical environment. More specifically in terms of the IPAT equation, “I” stands for environmental impact, “P”—population, “A”—affluence and “T”—technology. While population growth and affluence can negatively affect environmental change, technology was primarily considered a positive factor. For “P”, the population factor involved both overall population size and individual impact, primarily attributed to consumption. Going beyond the traditional Malthusian arguments, Ehrlich and Holdren (1971, p. 1212) postulated that “each human individual has a negative impact on his environment”.

Contrarily to the IPAT logics advocated by Ehrlich and Holdren, Coale (1970) argued that economic factors, including consumption, were primarily to be blamed for increasing environmental degradation. In this context, he pointed out that some affluent urban populations, such as that of Australia, suffered from severe air and water pollution despite their relatively small population size. On the other hand, Commoner (1972) argued against the presupposed positive impact of technological advancements on environmental impact. In his influential work “The Closing Circle”, he blamed new technologies for the increasing environmental stress. In response to the IPAT equation, he proposed the following revised formula:

$$I = \text{Population} * \frac{\text{Economic good}}{\text{Population}} * \frac{\text{Pollutant}}{\text{Economic good}}$$

where both economic good and population cancel out and hence environmental impact is primarily a function of pollutant (Chertow 2001).

Following the IPAT's logics, the negative effect of high population growth and its potential impact on environment would chiefly be attributable to developing countries (Gilbert 2005). Developing countries' population constitutes around 80 % of the overall population size and population growth is occurring primarily in Africa and Asia. At the same time, while consumption is higher in developed regions, rapid economic growth, especially in parts of Asia and Latin America, suggests that the affluence part of the equation is also likely to shift towards developing countries. This would imply that overall, the environmental impact of the planet is likely to be a function of (PAT) dynamics in the developing world.

In the context of the present study and the empirical findings of Chap. 3–5, a revised "IPAT" equation imposes itself. In contrast to the previous suggestions, this equation is motivated by the traditional Malthusian concern, i.e. the availability of vital resources, such as food and water, rather than overall environmental change. Contrary to the Malthusian claim of the risks posed by population growth, the equation suggested here reorients the attention to urban processes and their implications for individuals' access to basic necessities (UR). More specifically, the equation reads as follows:

$$IM = UR * HC * IN$$

As in the original formula, IM stands for impact and encompasses not only environmental impact but also access to vital resources, and overall human wellbeing; HC indicates human capital (at both the macro and micro level); and IN stands for wealth-based and spatial inequalities.

6.4 Contribution to the Critique of Traditional Urban Theories

As mentioned previously, this book has drawn from traditional urban theories, in particular urban bias theory. As a reminder, urban bias theory argues that because of the powerful interests and coalitions of urban elites, urban centres benefit from privileged levels of investment and development, thus leaving the countryside behind and exacerbating urban-rural disparities (Lipton 1977, 1984; Bradshaw 1987; Pugh 1996; Bezemer and Headey 2008; Jones and Corbridge 2010). On the other hand, critics of urban bias theory have highlighted that the reasoning proposed by Lipton was too simplistic, that he failed to account for increasing urban poverty and that no attempt has been made to consider existing political and class structures within developing nations (Griffin 1977; Corbridge 1982; Jones and Corbridge 2010).

The findings in this book support some of the concerns raised by Lipton's critics. In particular, the results of the analyses showed that macro-level urban processes measured by the rate of urban growth and pace of urbanisation have significant

negative effects. As pointed out before, one of the key counter arguments against the UBT is that it does not account for considerable urban poverty. Yet according to a recent report by UNHABITAT (2012), more than 60 % of people living in African towns and cities are slum dwellers, while in South Asia around 35 % of the urban population live in slums. A study by Ravallion et al. (2007, p. 693) found that “the poor are urbanizing faster than the population as a whole, reflecting a lower-than-average pace of urban poverty reduction”.

The findings in the empirical chapters of this book showed that rapid urban growth has a negative impact on countries’ risk of food insecurity and households’ access to safe drinking water. As such, the process of rapid urbanisation influences poverty levels, in particular in the most vulnerable nations with low resilience. It is useful to interpret these findings in conjunction with previous arguments stressing the weaknesses of the UBT relating to the neglect of class structure and power dynamics that transcend spatial boundaries (Jones and Corbridge 2010). Moreover, as highlighted in Chap. 3, new nutritional and health threats attributed to urbanisation yield additional arguments contradicting the UBT. Evidence has shown that urbanisation is positively associated with greater risk of obesity (Malik et al. 2013), which in turn can lead to diabetes and other non-communicable diseases. Given this accumulation of contemporary health challenges in cities and other urban areas, as well as increasing intra-urban inequalities, the UBT is likely to be of limited relevance in explaining contemporary social phenomena and the associations between them.

6.5 Linking Historical Urbanisation with Contemporary Urban Challenges

This book contributes new ideas pertaining to the linkages between historical urban challenges and contemporary risks caused by continuing urban sprawl. As highlighted in Chap. 2, 18th and 19th century England experienced rapid industrialisation and urbanisation, which resulted in shifting occupational patterns and higher mortality rates in cities. Despite a number of different mortality estimates, existing studies agree that historical urban mortality rates were higher than those in the countryside (Szreter and Mooney 1998; Woods 2003; Harris 2004). At the same time, research conducted by Szreter (1997) and Szreter and Mooney (1998) found that the trends between urbanisation, economic growth and life expectancy have not been linear. In contrast to Woods, the authors found that English urban life expectancy dropped during the 1820s and 1830s before picking up again in the late 1830s. In addition, in the second and third quarters of the 19th century, mean urban life expectancy declined despite rising incomes attributed to industrialisation.

McKeown established that the mortality transition which occurred in the 19th century was due to improvements in diet and nutritional status (Colgrove 2002). On the other hand, however, while overall an increase in the consumption of calories and protein per capita could be observed, 1863 data show that the quality of the diet

of urban labourers was far behind that of agricultural workers (Clark et al. 1995). Clark et al. (1995, p. 226) suggested that urbanisation potentially had “deleterious effects” on health outcomes. This provides an interesting linkage between historical literature and the current empirical research in the area of nutrition. While a vast body of research emphasises parallel trajectories between European urbanisation and the present urban growth in Asia and Africa, limited attention has thus far been paid to the influence of urbanisation on wider food insecurity trends. This book has highlighted the continuity of a harmful effect of macro-level urban growth on food insecurity risks.

Importantly, despite the traditional focus on urban-rural differentials, historical research has stressed the existence of intra-urban inequalities pertaining to health outcomes. For instance, in the previously referenced study by Szreter and Mooney (1998), the authors found large disparities in life expectancy between the residents of cities (measured by the city’s administrative boundaries) and those of larger urban areas (cities with their suburbs). The average life expectancy of core city dwellers was considerably higher than the mean life expectancy of those residing in extended urbanities, a trend that is in line with findings by Woods (2000). These historical patterns are broadly similar to the results in Chap. 3, which showed that regardless of the level of development, residents of large cities are at a higher risk of overweight/obesity than those living in small cities and peri-urban areas (towns).

As discussed earlier in this book, chronic hunger can be measured either by anthropometric indicators pertaining to weight and height or by indicators based on inadequate calorie intake. While historical statistics pertaining to individual undernourishment status are limited, Floud et al. (1990) provided a pertinent analysis of height differentials in historical England. Based on military recruitment data for males born in 1815, the authors estimated that rural Englishmen were shorter than their counterparts living in urban areas, except for individuals from London. These marked rural-urban as well as intra-urban discrepancies have been evolving over time; however, the main patterns appear to be similar. As research in this book has shown, in urban areas residents of towns (which approximate peri-urban spaces) are more likely to be underweight than those living in cities. In addition, sharp wealth-based inequalities continue to persist despite global achievements in advancing living standards.

Finally, the role of water and sanitation have arguably been amongst the core factors contributing to the decline in mortality rates, as highlighted by historical research (Szreter 1997; Harris 2004; Szreter 2004) and contemporary studies (Günther and Fink 2011; Cheng et al. 2012). Szreter (1997, p. 707) argued that “the scale and dispersed nature of demand for clean water created by rapid urbanisation are so great that the investment costs involved are beyond the financial logic of any commercial operation”. Similarly, in an influential book, “Sick cities”, Gordon (1963) highlighted the harmful effect of urbanisation on water pollution and spread of disease in the USA in the mid-1900s. This book has confirmed the negative effects of macro-level urban growth and incidence of slums on households’ water access. Despite lessons from the past, contemporary urban growth continues to pose similar challenges to the environment and human health.

6.6 Challenges for the Sustainable Development Agenda

The findings in this book yield policy implications for future sustainable development agenda. The policy areas, to which the suggested recommendations apply, include the following: (1) population size and population growth, (2) urbanisation, (3) food security, (4) human capital and (5) inequalities.

6.6.1 *Population Size and Population Growth*

This study has been motivated by the traditional Malthusian debate concerning population growth and availability of natural resources. Around the time of the UN Population and Development Conference (ICPD), which took place in 1994 in Cairo, there was an important shift in terms of policy priorities in international development. The focus on family planning and reduction of pressure on the planet's resources was largely replaced by attention to reproductive and sexual rights in the context of a broader human rights framework. At the same time, scholars such as Cleland (1996) argued against this perceived neglect of threats resulting from population growth, including the pressure on natural environment and health. Today, in the context of the post-MDG agenda, the neo-Malthusian *rhétorique* is regaining ground. Thus, as mentioned in Chap. 2, a recent report by SDSN (2013) highlights that future sustainable development is only possible within planetary boundaries. The stress on effective management of natural resources, including marine resources, is maintained in the new SDG agenda (UN 2014a). At the same time, concerns are arising around the issue of low fertility and the need to bridge the gap between actual fertility rates and desired family size in low-fertility countries (Matthews et al. 2013).

Given this increasingly complex reality, the policy implications of this research should account for both the existing evidence of the impact of population size on the environment and the changing demographic trends. As discussed in Chap. 3, at the macro level, high fertility rates can have a negative impact on food security. Also, large households can be disadvantaged in terms of probability of child undernutrition. On the other hand, smaller households are less likely to have access to safe drinking water, which can be attributed to the more efficient coping strategies of larger households and availability of “manpower” that can directly influence the need and ability to collect drinking water.

In this context, two policy recommendations can be made. First, there is a need to account for the divergent goals of different interest groups and varying perceptions of ideal family size within and across countries. Second, it is crucial to ensure that measures pertaining to family planning are designed based on existing human rights frameworks. Regarding the first point, in addition to accounting for the continuously debated macro-level impact of rapid population growth, policy initiatives should recognise that large families are often perceived as a benefit rather

than a strain. As an illustration, the desired family size in sub-Saharan Africa remains relatively high, often exceeding four children per woman (World Bank 2012a, b). This tension between a desire for relatively large families in some countries and regions and pro-family planning activists is likely to lead to challenges in designing effective policy initiatives.

In this context, the key question is whether complete global fertility convergence is really possible and, if not, what policy options should be made available. The priorities of low-fertility countries, including in Europe and East Asia, include creating pro-family policies that encourage couples to meet their desired family size. At the same time, this desired family size varies considerably from that in Africa or the Middle East, a result of cultural and religious pre-conditions. If these trends remain constant, governments may need to resort to unprecedented collaboration in migration management so as to meet the needs of their respective populations, which could result in additional policy deadlocks.

Finally, a human rights-based approach is key. Without going into detailed discussion regarding reproductive and sexual health, it should be acknowledged that any debate pertaining to population size and population growth should adapt a human rights perspective. The human rights of individuals should include meeting their desired family size even if this implies different rates of growth across national populations.

6.6.2 *Urbanisation*

The findings of this book also have policy implications as far as urban processes and outcomes are concerned. The three key areas are the following: (1) anticipating, monitoring and managing the rate of urban growth; (2) rural development and investments in peri-urban areas; and (3) investments in sustainable development of cities. With regard to the first point, both Chaps. 3 and 4 argued that the rate of urban growth is negatively associated with vital resources, including food security and access to safe drinking water. In addition, the results in Chap. 5 showed that a rapid pace of urbanisation can exacerbate the extent of intra-urban inequalities in the least developed countries. In this context, an effective system of planning, including tight collaboration between local authorities, is crucial. Such a system should encompass data sharing as well as exchange of information on manpower needs, business environment, housing opportunities and infrastructure. This information should be disseminated to households residing in rural and peri-urban areas so as to reduce the gap between the expected benefits of migration and the real costs incurred by migrants. Moreover, given the impact of rapid urbanisation on the natural environment (which can translate into food insecurity and water stress), environmental conservation agencies should establish close cooperation with population monitoring services. It is important that legal measures aimed at protecting the environment be implemented in anticipation of urban sprawl so as to prevent degradation of clean water and fertile farmland. In this context, the SDG

targets to reduce the environmental impacts of cities; supporting links between urban, peri-urban and rural areas would be a welcome addition (UN 2014a).

Secondly, there is a need to scale up investments in both rural and peri-urban areas. Although traditionally the focus has been on urban-rural divide, increasingly there has been recognition of intra-urban differentials. At the same time, while recent policy proposals (SDSN 2013) stress the importance of rural development, peri-urban areas are often neglected. Yet, as highlighted in previous chapters, evidence suggests that residents of smaller urbanities are often at a disadvantage when it comes to the risk of undernutrition or access to safe drinking water. In this context, investments should concentrate not only on modernisation of agriculture and improved food-processing technologies but also diversification of income-generating business projects. Initiatives aiming to create renewable energy sources provide a good example of such projects. For instance, the Commercialising Renewable Energy in India (CREI) scheme, initiated in Andhra Pradesh, provides opportunities for local entrepreneurs to identify sources of funding and build the capacity required for business development in this relatively new sector (UN DESA 2007). Importantly, micro-finance projects should contribute to an increasing convergence in the standard of living between cities, peri-urban areas and rural zones through enhanced cooperation between different localities.

Thirdly, large cities constitute a continuing challenge because of the negative impacts that they often have on natural environment. It is also in large cities where the biggest slums develop and where urban poverty and environmental degradation can have a potentially disastrous effect. While it has been universally recognised that cities constitute important trade and industry hubs and as such can drive economic development and innovation, living in cities can have non-negligible health effects. In the context of this research, two key issues should be highlighted: policy implications relating to the growing number of urban poor and/or slum dwellers in large cities, and policy ramifications linked to the health risks associated with city residence. Undeniably, growing urban poverty is inherently related to the overall lack of living wage job opportunities as well as the structural heterogeneity of cities. Thus, any effective policy should concentrate on intra-city collaboration, which would encompass such issues as spatial planning, migration management and inequality reduction initiatives. As highlighted by Montgomery and Ezah (2005), heterogeneous neighbourhoods could be beneficial for health interventions and could motivate a greater number of volunteers for community-based activities. This, in turn, could create greater social cohesion and potentially reduce inequalities. In addition, as previously pointed out, slum upgrading programmes combined with scaling up macro-finance initiatives are likely to yield positive results (Satterthwaite 2003, pp. 213–214).

Furthermore, as reported in Chap. 3, living in large cities can have a detrimental effect on food security and health outcomes. It is safe to assume that households in peri-urban areas are more likely to have access to food, both through their linkages to rural areas and by means of urban agriculture, than those in cities. Importantly, the quality of food in large urban centres combined with an overall low level of

physical activity can lead to overweight or obesity, which in turn generates the risk of diabetes and cardiovascular diseases. These risks exist in both developing and developed countries. In this context, policy initiatives should include large-scale public health programmes targeted at selected segments of the population. The issues pertaining to food security will be the subject of the next section.

6.6.3 Food Security

While the previous section touched upon the issue of food security in the context of policy recommendations related to urbanisation, this section focuses solely on policy questions pertaining to food insecurity risks, based chiefly on the findings of Chap. 3. As postulated in this book, as well as elsewhere (Szabo 2013), given the multidimensional nature of the food security concept, the interpretation of the concept should be reassessed. Policy measures should aim to anticipate the known food insecurity risks and thus prevent food insecurity outcomes (i.e. death, hunger and obesity/overweight). Accounting for the aforementioned considerations, concrete policy measures fall under three categories: first, reorienting the concept of food insecurity; second, investing and planning in the area of hunger-averting actions; and third, preventing and reducing the global burden of obesity at global and national levels.

With regard to the first implication, as already highlighted in Chap. 3, the interpretation and measurement of the food insecurity definition developed by the FAO (2012, 2013a, b, c) should be used as a basis for considering both food security risks and outcomes. A clear distinction should be made between input and output indicators and the latter need to encompass comprehensive categories of nutritional status. Outcome indicators of poor diet should be included in the list of official food security indicators. In this respect, the SDG agenda constitutes a move in the right direction. In particular, the inclusion of an integrated goal for food security, sustainable agriculture and improved nutrition is a welcome development (UN 2014a). Target 2.2 under this goal, with its aim to end all forms of malnutrition by 2030, as well as target 12.3 regarding the reduction of food waste, are important additions in this post-MDG agenda (UN 2014a). Importantly, this wider food security agenda will require an increased level of collaboration and efficient monitoring and accountability frameworks.

As far as hunger prevention is concerned, policy initiatives should target the most vulnerable groups. In this respect, food availability should involve investing in adequate food storage, agricultural trade agreements and food distribution channels. These recommendations have been stressed by previous research (Lofchie 1975; Sen 1983; de Waal 2009). At the same time, as highlighted previously, the current political, institutional and economic systems are likely to hinder an equitable distribution of resources. Similarly, within countries, stark inequalities exist. As shown in Chap. 4, in the least developed countries, access to safe drinking water is worst in rural areas followed by towns. In addition, poor households with low levels of

education are particularly disadvantaged and should therefore be targeted as priority groups.

Finally, overweight and obesity have become major contemporary public health problems. In order to efficiently tackle these challenges, governments should implement strict policy measures aimed at promoting healthy nutrition and banning sales of harmful food. With regard to the first point, public health campaigns should focus on raising awareness of the consequences of fast food consumption. Popular science programmes and short multimedia spots should focus on conveying key messages by showing the chemical composition of food products and the impact that these substances can have on human health. Key challenges, in this respect, include not only individual behaviour and consumption preferences but also price regulations. Through price regulations, healthy food options need to be more accessible. It is therefore important to include in the SDG indicator framework a specific indicator related to food prices, possibly under target 2c (UN 2014a). In the context of increased globalisation and interdependency between countries, food quality standards should be subject to strict international agreements. Ideally, healthy food promotion policies should be linked to tariff regimes, with food products high in nutritional contents benefiting from lower tariffs.

6.6.4 Human Capital

One of the key findings of this research has been that human capital is critical in terms of directly affecting households' welfare and survival as well as attenuating the impacts of urbanisation on households' livelihoods. This has several important implications, which can be categorised under two broader policy initiatives. First, targeted investments in education are needed, including curriculum strengthening. Second, a focus on research and development should be the basis for innovation and economic growth.

With regard to the first point, as highlighted in Chap. 4 and in line with the current sustainable development debate, access to universal education is a *sine qua non* condition for maximising one's chances of a better standard of living. Education influences behavioural change and is often a key factor behind individual choices. Therefore, educational policies should focus not only on primary schools, which are emphasised through the MDGs (UN 2013), but also targeted training, provision of practical skills and professional qualifications. Therefore, the inclusion of promoting lifelong training opportunities in the SDG agenda (UN 2014a) is the right approach in terms of investment in human capital. Additionally, curricula should be adapted in such a way so as to respond to the specific human development needs of a country as well as future employment opportunities. Thus, for example, in countries with high undernourishment rates amongst poor children, practical courses about nutrition aimed at children, youth and a range of social actors should be provided, together with promotion of income-generating opportunities. Post-secondary education should focus on responding to the economic

needs of the country, which in turn is likely to generate incentives for young people to benefit from working opportunities in their homelands and thus prevent “brain drain”. This is particularly important in a context where, due to urbanisation, a continuously growing proportion of people rely on paid employment to meet their most basic needs.

Secondly, collaboration between the private sector, academia and regulatory bodies is crucial. This is due to the increasing importance of research and development (R&D), which allows innovation and technological advancement to be brought about. Commitment to R&D involves not only financial investments but also an adequate regulatory framework. In the case of agriculture this should involve laws and guidelines related to property rights, environmental safety and health protection. Pardey et al. (2006) highlighted that the trend in developed countries for private companies to invest in biotechnological research is likely to follow in less developed nations, although it might require greater public involvement and significant resources. In this context, the focus on regulatory frameworks, albeit potentially challenging in practice, is key to ensuring technological progress.

6.6.5 Inequalities

Finally, despite progress in the reduction of traditional poverty indicators, widening of inequality gaps constitutes an increasingly salient challenge. In this book, six different aspects of inequality have been described. These are spatial, economic (income or asset-based), demographic, gender, educational and sociological inequalities. As highlighted previously when discussing the nature of inequalities (Sect. 5.3), inequalities can exist at the micro, meso and macro levels. From the public policy perspective, a key question that arises is what measures can effectively tackle the rising inequalities between the best off and the most disadvantaged.

Based on the empirical evidence provided in this book, the following broad policy initiatives are suggested: first, developing a holistic approach accounting for different aspects of inequalities; second, designing policy measures targeting the marginalised groups identified through evidence-based research; third, recognising that equality of opportunities requires large-scale investments in infrastructure; and fourth, mobilising local, national and global communities to action, including through volunteer and paid programmes. With regard to the first point, specific examples of potential policy interventions include prioritising access to safe drinking water amongst the most deprived households living in rural and peri-urban areas. Similarly, in the case of child undernutrition, the poorest urban households should be targeted. Indirect interventions include investments in education, especially amongst the urban poor, as well as overall poverty elevation measures. The priority groups are likely to change when considering different health outcomes and overall human development level. Thus, for example, when dealing with the

challenges linked to obesity, large cities and peri-urban areas should be prioritised through targeted public health interventions.

Second, while overall trends show that wealthier, more educated, smaller urban households are better off, caution is required when designing policy measures aimed at bridging inequality gaps. While both rural and urban poor appear to be the obvious target groups, evidence suggests that other categories can be more affected by adverse outcomes. Third, inequalities are linked to poor infrastructure and broader environmental factors. Both macro and micro-level infrastructure, such as distance to a source of safe drinking water or a country's road system, can have a significant effect on households' water access. Similarly, structural differences, such as pace of urbanisation, can exacerbate existing inequalities. This suggests that equitable development of the country's and neighbourhood's infrastructure is crucial to reducing the degree of inequalities. In this context, inclusion of a specific development goal for infrastructure is an important addition to the post-MDG agenda. The indicators under this goal should relate not only to physical infrastructure, but also ITC and energy, as suggested by the UN Statistical Commission (UNSC 2015).

Finally, community mobilisation should be prioritised as a key aspect of inequality reduction agendas. Such engagement could contribute to decreasing different facets of inequalities. As highlighted previously, inequalities in human capital can have a particularly detrimental effect given the strong direct association with and indirect impact of human capital on access to basic necessities, such as food and water. In addition, accounting for the fact that poor education can translate into technological illiteracy, investments in education should be a key aspect of cross-sectoral strategies aimed at bridging the gaps between the most advantaged and the most disadvantaged. Community mobilisation programmes could help recruit and coordinate volunteers to train the most vulnerable groups in practical daily life skills, such as water purification, as well as assist in longer-term capacity development. At the same time, with regard to reducing demographic inequalities linked to household size, targeted programmes should concentrate on reducing the gaps between desired and actual family size. In developing countries, this can be achieved not only through family-planning programmes, but also through policies aimed to eliminate child marriage and thus lower adolescent fertility rates.

As with other thematic areas, policies aimed at inequality reduction require complex solutions and are likely to encounter a number of practical challenges, which may hinder the intended results.

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