



**Resource-Efficient Land Use –
Towards A Global Sustainable Land
Use Standard**
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Urban-Rural Linkages and Global Sustainable Land Use

GLOBALANDS Issue Paper

prepared by

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Executive Summary

Currently, more than half of the world's population is living in cities, which has implications for land use and land use changes, use of natural resources, and the absorption of rural labor in cities. Economic development and respective resource use as well as livelihoods bind cities and rural areas together.

Rural population is increasingly adopting urban behavior, or becoming socially urbanized. A growing **inter-dependency** of rural and urban dwellers on resources they offer to each other makes **rural-urban linkages** the more important for global land use and respective governance approaches.

As rural-urban linkages increase and intensify, global land use faces changes and new opportunities in cities and the rural hinterlands.

With increasing international and even global trade, traditional flows of (primary) goods - food, textiles and timber - from rural production areas to adjacent urban processing and consumption centers shift towards a spatial decoupling.

Modern information and communication technologies and the digital revolution foster decentralization and delocalization so that dependencies of rural areas on urban centers as administrative, commercial and cultural hubs become less relevant, which also supports the spatial decoupling.

GLOBALANDS identified **urbanization** trends as key drivers for future land use – both directly in terms of buildings and infrastructure footprints, and indirectly through the demand for agricultural and forest land to provide for sustenance, energy, and materials. Urbanization will be the defining trend over the next decades, especially in Asia and sub-Saharan Africa, where the bulk of extreme poverty is concentrated. Between 2010 and 2050, the urban population share will grow to 2/3 of the world's population.

Urbanization dynamics, urban population growth and rural population change, respectively, **differ** between urban-rural settings: there are regions with growing cities including their peri-urban and rural area, and growing cities surrounded by rural decline, and vice versa, i.e. urban decline plus rural growth, and urban plus rural decline.

Rural areas still account for almost half the world's population, but after 2020, it is expected that rural population begins to decline, especially in China and India.

Migration and related remittance are key elements of urban-rural linkages which affect land use both within cities, and the rural areas.

Rural out-migration implies urban population increase, diet transitions, and land use changes such as conversion of formerly cultivated land, forests, and wetlands.

Urbanization and migration indeed offer options to improve both urban and rural livelihoods, if managed well.

Urban and rural land use policies and respective planning have to become integrative and to improve in methods to not only address land tenure, but also ecosystem services.

The functional **and** spatial decoupling of cities and their “hinterlands” needs to be considered as a challenge for governance to which – so far – no convincing approach can be identified on the UN level, although the problem has been taken up by UN-HABITAT.

This problem requires a **global** approach, though, as local and regional governance is not able to deal with international competition, and the increasing translocal nature of urban-rural links. In response, a new “**Global System of Cities and Rural Regions**” may be required.

How to further conceptualize, discuss and implement such an approach in an inclusive way should be seen as a key issue for future research on urban-rural linkages with regard to global sustainable land use.

In parallel, the dynamics of the **peri-urban** need to be reflected. At this interface between the urban and the rural, a more integrated approach for planning and policy development is required to address sustainability challenges. The **integrated landscape approach** could transcend not only spatial scales but also separated knowledge realm, especially those of ecological and sociological views.

The recently formed **Global Landscapes Forum** could be a platform to further this, and earlier work in the EU regarding urban and rural development could contribute a wealth of experience. Further exchanges with the US and especially Africa and Asia should be considered. The upcoming UN HABITAT III conference could be an excellent opportunity to share these first thoughts.

Many rural areas reacted to globalization with innovative approaches such as the **New Rural Economy** and **territorial cooperation**. Fundamentally different from globalized, often vertically integrated competing businesses, these approaches follow the logic of “network” and collaborative economics to transcend rural disadvantages of remoteness through horizontal – often virtual - business linkages, and valuing elements of social (trust, cooperation etc.) and environmental capital.

Such strategies could well fit into the integrated landscape approach suggested before, and should be seen as another key issue needing further attention.

Table of Contents

Executive Summary	i
List of Figures	v
Acronyms	vii
Acknowledgement	x
1 Introduction	1
2 Background: Characteristics and Trends in Urban and Rural Areas.....	3
2.1 Definitions.....	3
2.2 A Brief Historical Review of Urbanization	6
2.3 Urban Settlements	8
2.3.1 <i>Cities</i>	10
2.3.2 <i>Shrinking Cities</i>	14
2.3.3 <i>Slums and informal Settlements</i>	16
2.4 Rural Areas	16
2.5 Peri-Urban – the Bridging New Space	19
3 Urban-Rural Flows and Interactions	20
3.1 Urban-Rural Linkages	20
3.2 Flows of People – Demographic Linkages	22
3.2.1 <i>Migration</i>	22
3.2.2 <i>Flow of Money</i>	26
3.2.3 <i>Loss of Knowledge</i>	29
3.2.4 <i>Commuting</i>	29
3.2.5 <i>Demographic Change and Employment</i>	30

3.3	Flows of Goods and (Public) Services	32
3.3.1	<i>Agriculture and Food</i>	33
3.3.2	<i>Building Materials</i>	34
3.3.3	<i>Energy</i>	34
3.3.4	<i>(Public) Services</i>	35
3.3.5	<i>Infrastructure and Transport</i>	36
3.4	Ecosystem Services and Land	37
3.5	Summary of Key Urban-Rural Interlinkages	39
3.5.1	<i>Rural Transformation and Migration</i>	39
3.5.2	<i>The Dualism of Urban-Rural Decoupling and Peri-Urban Integration</i>	39
3.5.3	<i>Consumption and Production Patterns: New Regionalism versus Globalized Markets</i>	40
3.5.4	<i>ICT and Mobility: A Game Changer?</i>	40
4	Conclusions and Perspectives	41
4.1	Urbanization and Migration: Appreciating the Unavoidable? ..	41
4.2	Urban-Rural Decoupling as a Governance Challenge.....	42
4.3	Transcending Fragmentation through Integrated Landscape Approaches?	43
4.4	Urban-Rural Co-Evolution: Re-Inventing Sustainable Flows	44
	References	45

List of Figures

Figure 1	Main Flows between Urban and Rural Areas	4
Figure 2	Urban and Rural Population as Proportion of Total Population, 1950–2050 .	8
Figure 3	Average Annual Rates Urban and Rural Population Growth, 1990-2014	9
Figure 4	Global Distribution of Cities by Size.....	10
Figure 5	Percentage of Urbanization and Location of Urban Agglomerations	11
Figure 6	Correlation between Urbanization Rate and Per-Capita GDP.....	12
Figure 7	Historic and Future Urban Expansion into Biodiversity Hotspots	12
Figure 8	Relative Increase in Urban Population and Urban Land Cover 2000-2030 ...	13
Figure 9	Shrinking Cities around the World.....	14
Figure 10	Infrastructure-related Problems for Shrinking Cities	15
Figure 11	Estimated Urban Slum, Urban and Rural Population	16
Figure 12	Population Change 2005-2010 in Cities and Rural Areas of World Regions .	17
Figure 13	Population Growth in Rural Regions and Proximity 2000-2008.....	19
Figure 14	The Rural-Urban Continuum.....	21
Figure 15	Remittance and Resource Flows to Developing Countries 1990-2017	26
Figure 16	Share of Population Working in Agriculture in Africa.....	31
Figure 17	Dynamics of Urban-Rural Flows under Globalization.....	32
Figure 18	Conceptual Scheme of a Global System of Cities and Rural Regions Cooperating for Sustainable Resources Management	42

List of Tables

Table 1	Indicative Examples of Definitions of Rural and Urban	6
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List of Boxes

Box 1	What is “urban”?	4
Box 2	“Development”	7
Box 3	Rural USA	18
Box 4	The Pioneering Work of Johann Heinrich von Thünen.....	20
Box 5	Key Issues for Urban-Rural Linkages.....	21
Box 6	Migration: A Global Phenomenon	23
Box 7	Rural-out Migration affecting Land Use in China	24
Box 8	“Amenity Migration”: A Special Case	25
Box 9	Employment in Agriculture – Africa and China	30

Acronyms

ABS	Australian Bureau of Statistics
BBSR	German Federal Institute for Building, City and Land Research (Bundesinstitut für Bau-, Stadt- und Raumforschung)
BMBF	German Federal Ministry for Education and Research (Bundesministerium für Bildung und Forschung)
BMEL	German Federal Ministry for Food and Agriculture (Bundesministerium für Ernährung und Landwirtschaft)
BMUB	German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (Bundesministerium für Umwelt, Naturschutz, Bau und Reaktorsicherheit)
BMZ	German Federal Ministry for Economic Development and Cooperation (Bundesministerium für wirtschaftliche Entwicklung und Zusammenarbeit)
CBD	United Nations Convention on Biological Diversity
CFS	United Nations Committee on World Food Security
CIFOR	Center for International Forestry Research
EC	European Commission
EEA	European Environment Agency
EU	European Union
FAO	Food and Agriculture Organization of the United Nations
GDP	Gross domestic product
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit GmbH
GLF	Global Landscapes Forum
ICT	Information and communication technologies
IDDRI	Institut du Développement Durable et des Relations Internationales
IEA	International Energy Agency
IFAD	International Fund for Agricultural Development
IFPRI	International Food Policy Research Institute
IIED	International Institute for Environment and Development
IINAS	International Institute for Sustainability Analysis and Strategy
ILA	integrated landscape approach
IMF	International Monetary Fund
IMO	International Migration Organization
IPCC	Intergovernmental Panel on Climate Change

IRENA	International Renewable Energy Agency
JRC	Joint Research Centre of the European Commission
LPFN	Landscapes for People, Food and Nature Initiative
MEA	Millennium Ecosystem Assessment
NEF	New Economics Foundation
OECD	Organisation for Economic Development and Cooperation
PBL	Netherlands Environmental Assessment Agency
SDG	Sustainable Development Goals
SDSN	Sustainable Development Solutions Network
UBA	German Federal Environment Agency (Umweltbundesamt)
UN	United Nations
UNCCD	United Nations Convention to Combat Desertification
UN-CHS	United Nations Centre for Human Settlements
UNCTAD	United Nations Conference on Trade and Development
UN-DESA	United Nations Department of Economic and Social Affairs
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UN ESC	United Nations Economic and Social Council
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNFCCC	United Nations Framework Convention on Climate Change
UNFPA	United Nations Population Fund
UN-HABITAT	United Nations Human Settlements Programme
UN-HLP	United Nations Secretary-General's High-level Panel on Global Sustainability
UNIDO	United Nations Industrial Development Organization
UN-OWG	United Nations Open Working Group
UN-TST	United Nations Technical Support Team
UNW-DPAC	United Nation Water Decade Programme on Advocacy and Communication
USCA	United States Census Bureau
USDA	United States Department of Agriculture
WB	World Bank
WEF	World Economic Forum
WHO	World Health Organization

WWF

World-Wide Fund for Nature

ZALF

Leibniz-Zentrum für Agrarlandschaftsforschung

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1 Introduction

Currently, more than half of the world's population is living in cities¹, which has implications for land use and land use changes, use of natural resources, and the absorption of rural labor in cities. Economic development and respective resource use as well as livelihoods bind cities and rural areas together (Steinberg 2014).

The significant urban expansion into peri-urban and rural areas, in some developing countries rapidly in an unplanned and uncoordinated manner, is one facet of the growing inter-connection between rural and urban areas. Moreover, the rural population is increasingly adopting urban behavior, or becoming socially urbanized. The process of rural urbanization is taking effect because of increasing information flow from the urban to the rural areas through media, social relations and other communication (Rodriguez 2014).

A growing inter-dependency of rural and urban dwellers on resources they offer to each other makes rural-urban linkages the more important for global land use and respective governance approaches².

The GLOBALANDS research project³ identified urbanization trends as key drivers for future land use – both directly in terms of buildings and infrastructure footprints, and indirectly through the demand for agricultural and forest land to provide for sustenance, and structural materials (Fritsche, Eppler 2013).

As rural-urban linkages increase and intensify, global land use faces changes and new opportunities in cities and the rural hinterlands.

This Issue Paper addresses two key – and closely related – phenomena:

- The changing relation of larger cities to their “hinterland” (peri-urban and rural areas adjacent to cities), especially the **decoupling** of the formerly close spatial relation while there is a need to **integrate policies** across landscapes
- The more and more **globalized value chains** of key products (e.g. food, textiles) and services (e.g. administration, tourism) while there is a trend for **regionalized** products.

The separation of urban and rural in science is still present, but their interlinkages and the respective dynamics must be acknowledged when considering “sustainable cities” (BMBF 2015a+b).

¹ See Section 2 for more details, and references.

² For an analysis of “International Governance screening of global urban policies and their impacts on sustainable land use”, see separate GLOBALANDS Issue Paper (Wunder, Wolff 2015).

³ see www.globalands.org

The linkages between urban and rural areas are historic (see Section 2.2), but subject to **change** further:

With increasing international and even global trade, the traditional flows of (primary) goods - especially food, textiles and timber - from rural production areas to adjacent urban processing and consumption centers more and more shift towards a spatial decoupling.

On the other hand, modern information and communication technologies (ICT) and the “digital revolution” foster decentralization and “delocalization” so that dependencies of rural areas on urban centers as administrative, commercial and cultural “hubs” become less relevant, which also supports the spatial decoupling.

Hence, most cities are part of a world urban system, an interdependent web of urban places bound together by uneven flows and relations of goods, people, capital, ideas, and power. All these cross-border processes have made it much harder to classify companies, or even products (Allen 2009).

Key Questions of this Paper

This Issue Paper addresses the following questions:

- What are the main characteristics in urban and rural settings? (*Section 2*)
- What are the implications of changing urban-rural linkages (i.e. **interactions**) for global land use, and for livelihoods of people in urban and rural settlements from an integrative point of view? (*Section 3*)
- What implications can be drawn from this for **opportunities** towards global sustainable land use, and which key issues should be considered in further research? (*Section 4*)

It should be noted that this Issues Paper is meant to answer these questions based on an extensive, cross-disciplinary review of relevant literature, but not through own new research.

The findings presented here should be seen as preliminary hypotheses requiring further work, and substantiation.

2 Background: Characteristics and Trends in Urban and Rural Areas

This Section provides the background information for understanding the urban-rural settings and characteristics. First, several urban and rural definitions are considered, which are crucial to examining and understanding urban-rural linkages. Next, a brief historical review of urbanization is given, followed by a short overview on the different conditions and dynamics of urban, peri-urban and rural areas⁴.

2.1 Definitions

The “*divide between urban and rural is artificial and counter-productive*” (FAO 2011) as drivers for land use change act beyond boundaries of spatial categories (Zscheischler et al. 2012).

An alternative and more integrative approach to space is the concept of urban-rural linkages. Rural-urban interactions can be defined as

“linkages across space (such as flows of people, goods, money, information and wastes) and linkages between sectors (for example, between agriculture and services and manufacturing). In broad terms, they also include 'rural' activities taking place in urban centers (such as urban agriculture) and activities often classified as 'urban' (such as manufacturing and services) taking place in rural settlements” (IIED 2012a).

This paper focuses on the spatial flows, as sectoral aspects are mainly economic concepts which do not provide insight into land use related issues.

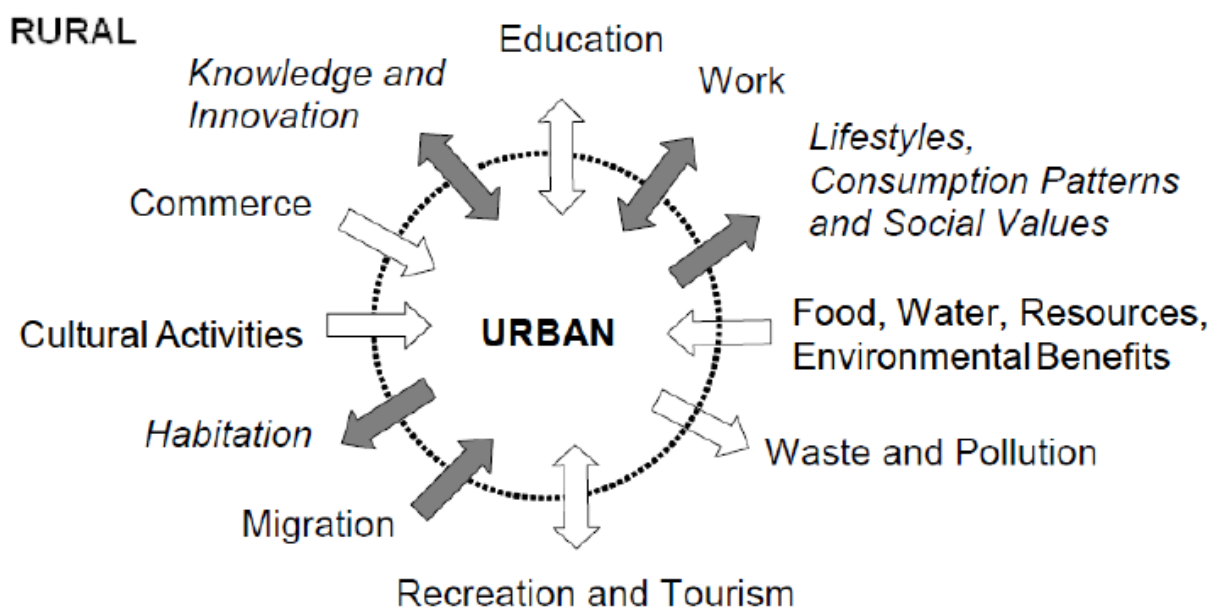
Yet, the paper addresses material flows (e.g. food/feed, building materials, energy, water) as key elements of spatial flows (see Sections 3.2 and 3.3).

Urban and rural areas are interdependent through economic, political, social and physical connections issues such as employment, education, housing, transport, tourism and resource use.

Figure 1 illustrated some of the main flows of people and materials between urban and rural areas. The reciprocal flows are the dark grey arrows.

⁴ For detailed information, see UN-DESA (2014a).

Figure 1 Main Flows between Urban and Rural Areas



Source based on Preston (1975), Stead (2002), adapted by Repp et al. (2012)

Urban and rural areas are variously defined according to criteria such as population density and size, employment density, agricultural employment, administrative functions, educational facilities, and infrastructure such as street lighting (McGranahan, Satterthwaite 2014). Population size and density are among the most frequently used criteria.

Repp et al. (2012) provides a comprehensive overview on diverse attempts to define 'urban' and 'rural' and their linkages resulting in the description of the urban-rural as a continuum preferable to a single definition.

Box 1 What is "urban"?

"Urban" is defined in many different ways and there is no international consensus on how to determine the boundaries of urban areas or identify when a settlement is 'urban', as the diversity of national urban definition shows (UN-DESA 2014a; McGranahan, Satterthwaite 2014). The lower population limit for cities ranges from 200 to 50,000 inhabitants (OECD 2015).

Mexico's definition of "urban" includes the indigenous town San Pablo Huitzo (population 5,500). In Equatorial Guinea, an urban center is any locality with 300 dwellings or more or with 1,500 inhabitants or more.

In India, an urban location is defined as (a) all statutory places with a municipality, corporation, cantonment board or notified town area committee; (b) a place satisfying the following three criteria simultaneously i) minimum population of 5,000; ii) at least 75 % of male working population engaged in non-agricultural pursuits; iii) population density of at least 400 km² (UN-DESA 2011).

Some countries, e.g. the USA, have several official definitions of "urban" (Berdegú 2014).

The **peri-urban interface** is where urban and rural activities meet. Peri-urban areas are a mosaic of agricultural and urban ecosystems, affected by material and energy flows demanded by urban and rural areas. They are socially and economically heterogeneous and subject to rapid change. Small farmers, informal settlers, industrial entrepreneurs and urban middle class commuters may all coexist in the same territory but with different and often competing interests, practices and perceptions. Few institutions can address both urban and rural activities. Local government agencies have either an urban or a rural focus. Few metropolitan governments include rural jurisdictions (Allen, Dávila 2002).

Peri-urban areas can be seen as not just a fringe in-between city and countryside, rather it is a new kind of multi-functional landscape, which is marked by the emergence of urban activities in rural areas, like hobby farms and second homes (Kjell 2014). The fact that the residents can be considered urbanized even if they do not live in a strictly urban spatial type, because of their lifestyles and social focus on the urban, for example, underlines the distinctiveness of the zone.

Peri-urbanization can be defined as

“a process in which rural areas located on the outskirts of established cities become more urban in character, in physical, economic, and social terms, often in piecemeal fashion” (Webster 2002).

Rural areas include diverse patterns of settlement, infrastructure, and livelihoods, and relate in complex ways with urban areas (Dasgupta 2014). There is a lack of clear definition of what constitutes rural areas, and existing definitions are determined on definitions of the urban.

In fact, all human settlements exist along a continuum from “rural” to “urban” and in between, with remote settlements to large villages, small towns, and small urban centers. Across the world, the importance of peri-urban areas and new forms of rural-urban interactions are increasing. There is limited evidence on that in literature, but as Dasgupta (2014) formulates it: a “high agreement”.

Ultimately, *“in developing countries as well as industrialized countries, the rural is defined as the inverse or the residual of the urban”* (Lerner, Eakin 2010).

The OECD definition of rural is based on the assessment that rural regions have low population densities (and an ageing population) **and** are located in a region that does not contain a major urban center (missing markets and services). This combination has an impact on economic activity, as enterprise dynamism and job creation, on the accessibility and quality of educational and other public service resources, on the quality and density of infrastructure, and thereby individual well-being (Garcilazo 2013; OECD 2006).

A diversity of classifications exists worldwide, as Table 1 shows exemplary.

Table 1 *Indicative Examples of Definitions of Rural and Urban in Selected Countries*

Country	Term	Definition
Australia (ABS 2013)	Rural area	Includes small towns with a population of 200–999
	Other urban area	Population of 1000–99,999
	Major urban area	Population of more than 100,000
India (GoI 2012)	Urban area	Population of 5000 or more; or where at least 75% of the male working population is non-agricultural; or having a density of population of at least 400 people km ² . It is implied that all non-urban areas are rural.
Jamaica (SIJ (2012)	Urban area	Population of more than 2000 people; and provision of a certain set of amenities and facilities that are deemed to indicate “modern living”. It is implied that all non-urban areas are rural.
USA (USCB 2015)	Rural area	“Rural” encompasses all population, housing and territory not included within an urban area with fewer than 2500 residents; with population densities as high as 386 cap/km ²
	Urban area	Urbanized Areas of 50,000 or more people Urban Clusters of at least 2,500 and less than 50,000 people
Germany (BBSR 2012)	Rural counties (low population density)	Counties with population share in towns and cities with minimum 50% but a population density under 150 cap/km ² and counties with population share in towns and cities under 50% and a population density without cities of more than 100 cap/km ² .
	Rural county (densification trend)	Counties with population share in towns and cities under 50% and population density (without towns and cities) under 100 cap/km ² .
	Urban county	Counties with population share in towns and cities with minimum 50% and a population density of minimum 150 cap/km ²
	Major City	Cities with minimum 100000 inhabitants

Source: Dasgupta (2014) and own contributions

2.2 A Brief Historical Review of Urbanization

The first wave of urbanization got underway in the 18th century with industrialization (emergence of manufacturing) creating an unprecedented demand for labor in specific locations, together with strong increases in agricultural productivity and advances in sanitation (OECD 2015).

In the 19th century, cities grew further as rail transport and steamships made it possible to transport resources from ever-larger distances, and in the early 20th century, new construction methods increased economically feasible heights of commercial buildings by a factor of more than ten and the rise of the automobile made suburban living possible. During the same period, the nature of cities

started to change in many industrialized countries, as they went from being centers of industrial activity to service hubs (OECD 2015).

From the second half of the 20th century onwards, the **second wave** of urbanization spread from industrialized⁵ to developing countries⁶ driven by industrialization, agricultural mechanization, and environmental change, but above all by population growth (EEA 2015; OECD 2015).

Since then, urbanization proceeds even faster and in much larger numbers. It took more than a century for most industrialized countries from the time urbanization started to increase markedly until they reached 50%. Today's developing countries often reach that threshold in less than half the time (OECD 2015). Between 1750 and 1950 the urban population increased by roughly 400 million (Parmar 2013). Current projections are the likely increase of urban population by approximately 8 billion between 1950 and 2100, mainly in developing countries and emerging economies (OECD 2015).

In addition and increasingly important, urbanization levels and economic growth rates particularly in Africa and parts of South Asia are less closely related than they were for industrialized countries. While development does not occur without urbanization, urbanization does not necessarily imply country development (Henderson 2000; OECD 2015).

Box 2

“Development”

The term “development” is typically used with regard to **economic** development, i.e. GDP growth and increases in monetary income and consumption of goods and services offered on markets. There is no UN definition of what “developed” or “developing” countries are, but the World Bank structures countries in four groups, according to their per-capita GDP, and then aggregates the “low-income” and “middle-income” into “developing” countries⁷.

This traditional economic perspective ignores that “development” as an increase in GDP is a one-dimensional metric which needs at least complementing by other indicators such as the Human Development Index (HDI) which considers healthy lifetime, education and standard of living⁸. Furthermore, societal development (UN-SG 2014) and “planetary boundaries” (Steffen et al. 2015; WBGU 2014) should be considered, as discussed in recent work on “beyond GDP” metrics (e.g. Enquete 2013; Martens, Obenland 2015; IIDRI 2014; NEF 2009-2012; WEF 2011).

⁵ The industrialized world is comprehensively urban: 90 percent of the population of Japan live in cities. In Australia and New Zealand, 88 percent of the population is urban; in Canada and the United States the figure is 80 percent; and in Europe, 73 percent. The population growth rate in these regions is rather stable, i.e., slow or declining, and their cities continue to grow at a relatively slow rate (UN-DESA 2014a).

⁶ Latin America and the Caribbean are already highly urbanized, with 79 % of the population in the cities, while Africa (38 %) and Asia (45 %) increasingly urbanizing, although most of the population remains rural (UN-DESA 2014a).

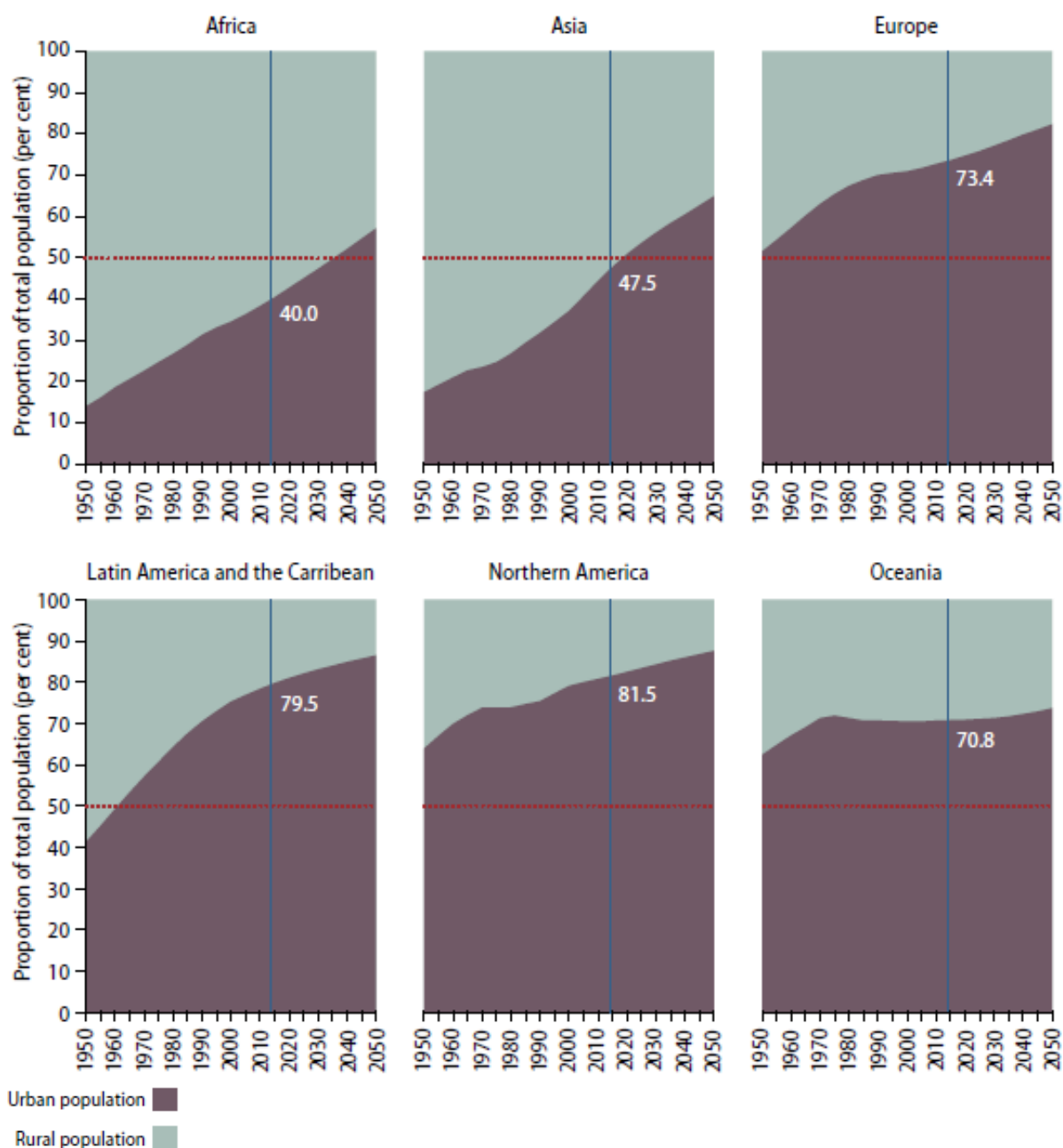
⁷ <http://data.worldbank.org/about/country-and-lending-groups>

⁸ <http://hdr.undp.org/en/content/human-development-index-hdi>

2.3 Urban Settlements

In 2014, fifty-four percent of the world's population was urban (UN-DESA 2014a). Urbanization will be the defining trend over the next several decades, especially in Asia and sub-Saharan Africa, where the bulk of extreme poverty is concentrated (UN-SDSN 2013). By 2030, there will be over one billion more urbanites. Between 2010 and 2050, the urban population share will grow to 2/3 of the world's population, with different shares in major world regions, as shown in Figure 2.

Figure 2 *Urban and Rural Population as Proportion of Total Population, 1950–2050*



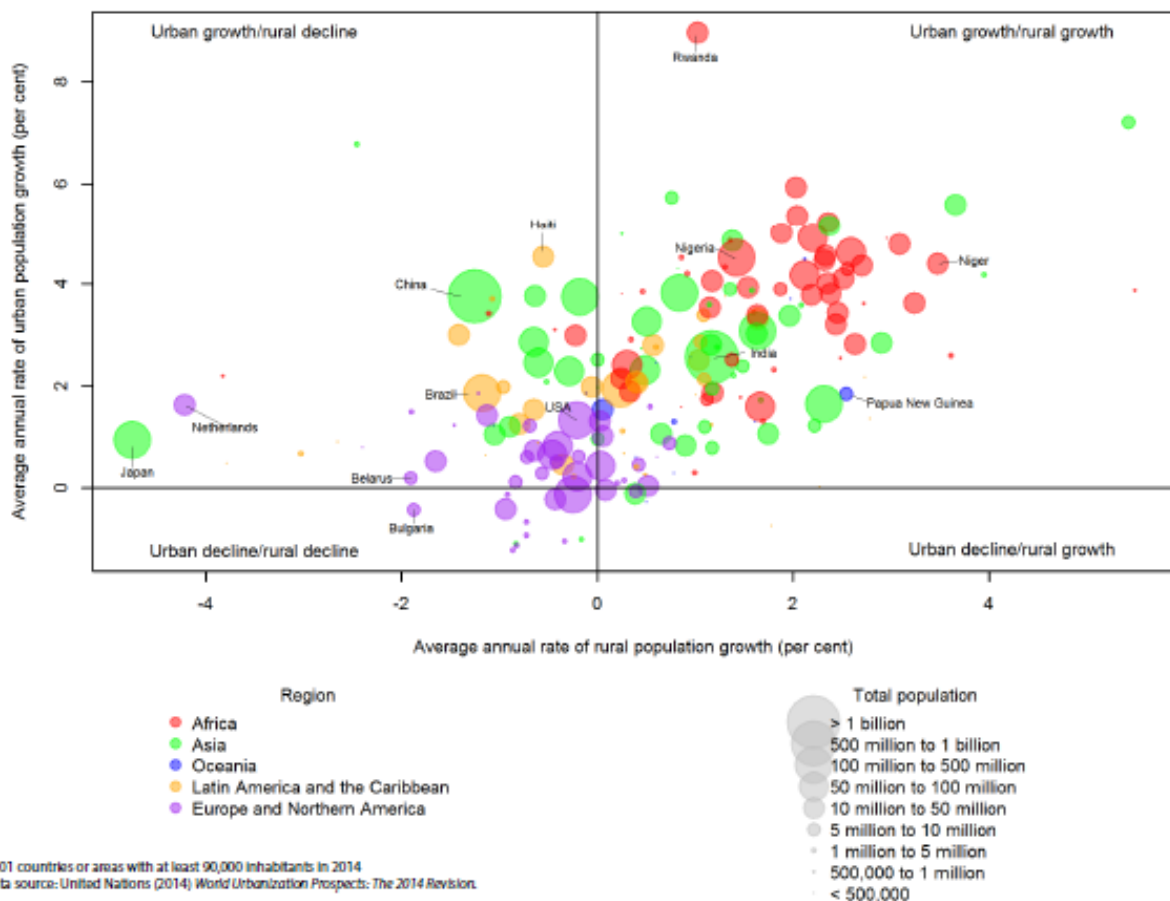
Source: UN-DESA (2014a)

In **industrialized** countries, urban population growth will be rather stagnant (0.67 % per year), which still represents about six million more every year, whereas the urban population in the developing world will grow at an average of 1.2 million people **per week** (UN-HABITAT 2013b).

However, contrary to common perception, migration from rural to urban areas is no longer the dominant determinant of urban population growth in **developing** countries: Today, natural increase (high birth rate) accounts for some 60 % of that growth, and the transformation of rural settlements into urban places, a process known as ‘reclassification’, accounts for another 20 % (UN-HABITAT 2013b).

Urbanization dynamics, urban population growth and rural population change⁹, respectively, **differ between urban-rural settings**: there are regions with growing cities including their peri-urban and rural area, and growing cities surrounded by rural decline, and vice versa, i.e. urban decline plus rural growth, and urban plus rural decline (UN-DESA 2014b). This is illustrated in Figure 3.

Figure 3 Average Annual Rates Urban and Rural Population Growth, 1990-2014



Source: UN-DESA (2014b)

⁹ Between 1990 and 2014, 36 % of countries faced a decline in rural dwellers, while 61 % experienced rural populations growth (UN-DESA 2014b).

2.3.1 Cities

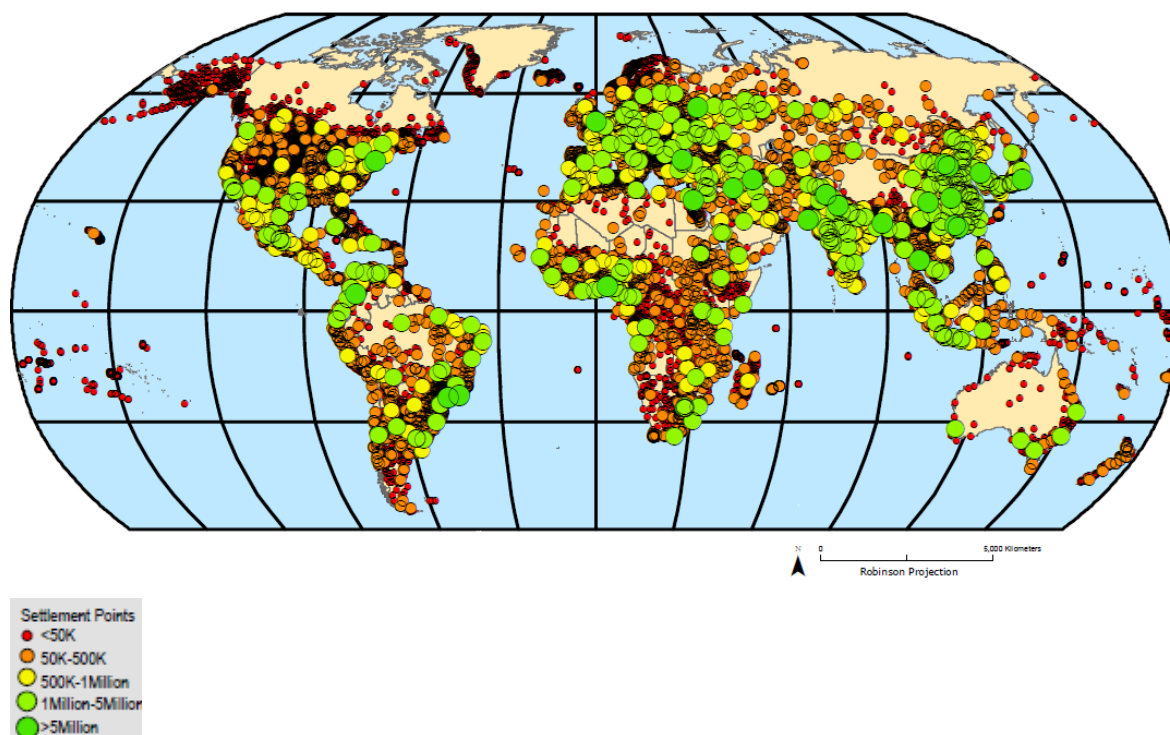
Cities and towns currently occupy only 1–3 % of the global land¹⁰, but exert a dominant influence on regional and global ecosystems (EEA 2015). Directly and indirectly, cities consume 78% of the world’s energy and produce 60% of all greenhouse gas emissions (UN-HABITAT 2014b).

At the same time, cities, and in particular the urban poor in the developing world, are most vulnerable to e.g., droughts, floods and storms (Broekhuis et al. 2004), and urban land expansion is growing faster in low elevation coastal zones than in other areas so that risks to climate change impacts increase for millions of new urbanites (Fragkias et al. 2013). Recent spatially explicit modelling found that

“...without factoring in the potential impacts from climate change, the extent of urban areas exposed to flood and drought hazards will increase, respectively, 2.7 and almost 2 times by 2030. Globally, urban land exposed to both floods and droughts is expected to increase over 250%” (Güneralp, Liu 2015).

In 2014 there were 28 Megacities, with more than 10 million inhabitants, most of which were located in the Global South, while by 2030, there could be 41 Megacities globally (UN-DESA 2014a). The current distribution of cities with regard to their population size is shown in Figure 4.

Figure 4 Global Distribution of Cities by Size

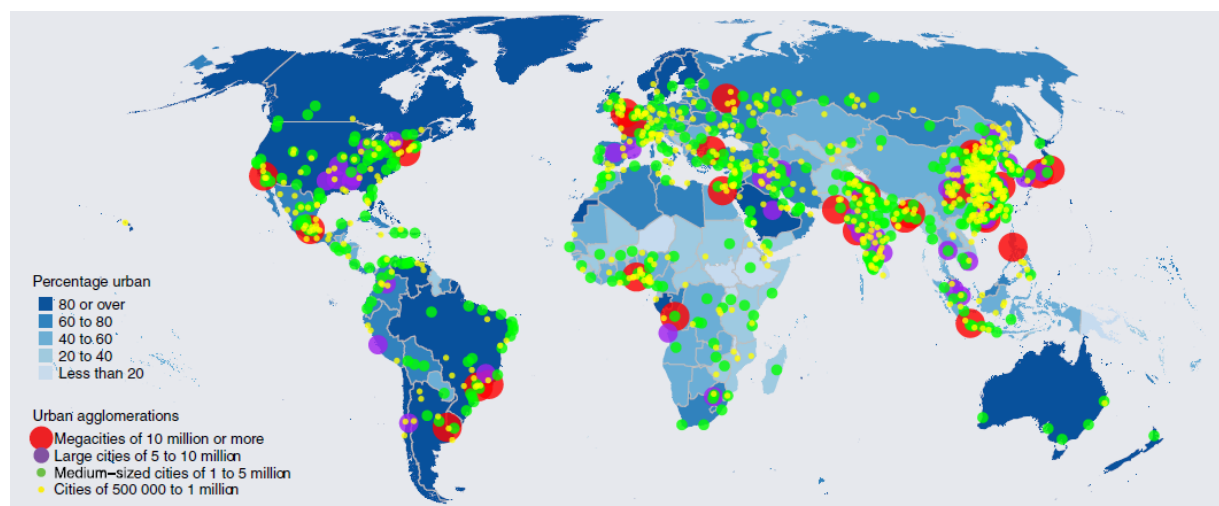


Source: <http://sedac.ciesin.columbia.edu/downloads/maps/grump-v1/grump-v1-settlement-points/globalpoints.pdf>

¹⁰ By 2050, cities will cover 4–5 %, an increase from 250 to 420 million ha (HBS, IASS 2015).

Very large cities are predominantly located in South-East Asia. With regard to land use, not only the city size but the urbanized area is of interest. The current major urbanized areas are found in Europe, the US, and South-East Asia, including Japan¹¹. The urbanization share of countries in combination with the location of Megacities is shown in Figure 5.

Figure 5 Percentage of Urbanization and Location of Urban Agglomerations with at least 500,000 Inhabitants



Source: UN-DESA (2014a)

Today, people live in cities because there are better opportunities for employment, housing, education, and health care, and cities are major centers of culture, innovation, and economic activity (Angel et al. 2011).

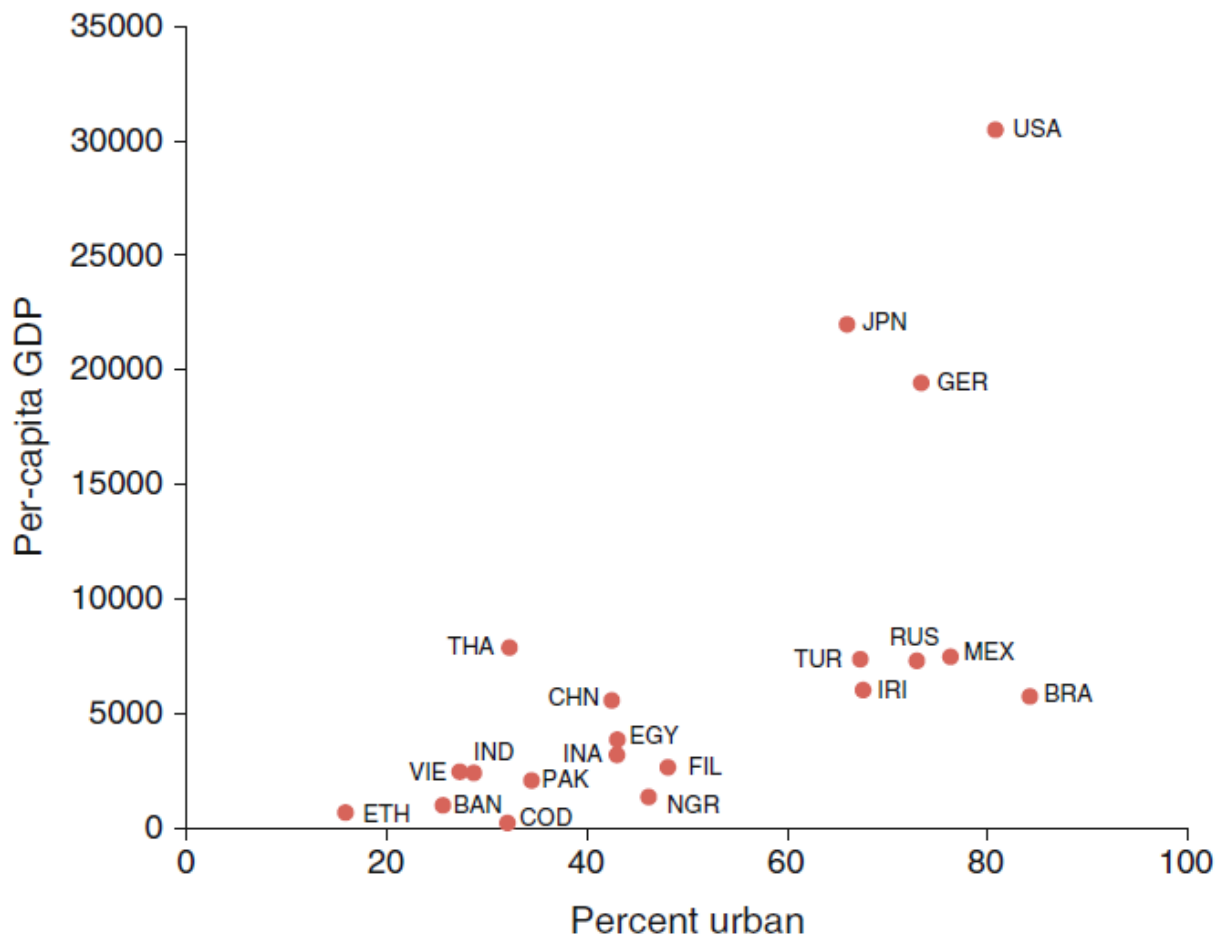
Cities have become the engine of the global economy, generating between 80% and 95% of the global GDP (Cadena et al. 2011; Seto et al. 2011). There is a clear link between high urbanization rates and per-capita GDP, as depicted in Figure 6.

The rapid growth of urban agglomerations has intensified the demand and competition for food, land and water, along with needs for infrastructure, housing and jobs, often at high environmental and social costs (Parés-Ramos et al. 2013).

Future urbanization, especially in Megacities, may have severe impacts on global biodiversity hotspots, as indicated in Figure 7.

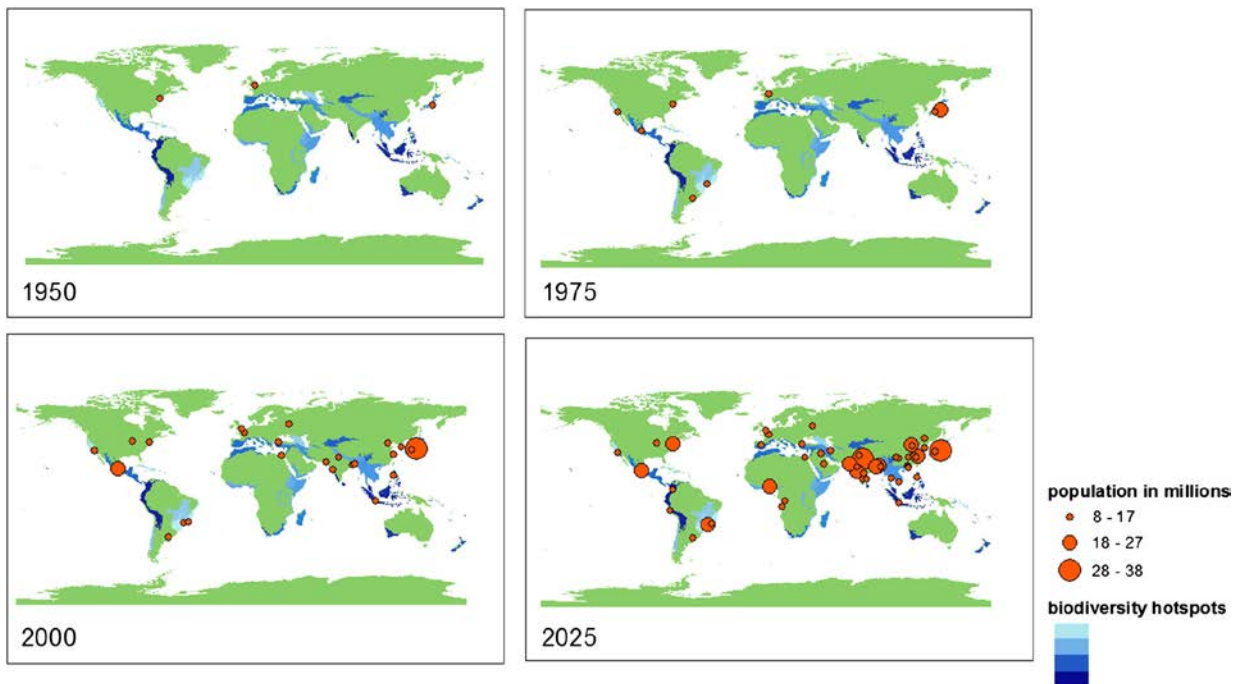
¹¹ See for details the publically available maps at <http://sedac.ciesin.columbia.edu/downloads/maps/grump-v1/grump-v1-urban-extents/globalexents.pdf>

Figure 6 Correlation between Urbanization Rate and Per-Capita GDP



Source: McDonald, Marcotullio, Güneralp (2013); data for 2005, GDP in 1990 \$ (purchasing-power)

Figure 7 Historic and Future Urban Expansion into Biodiversity Hotspots



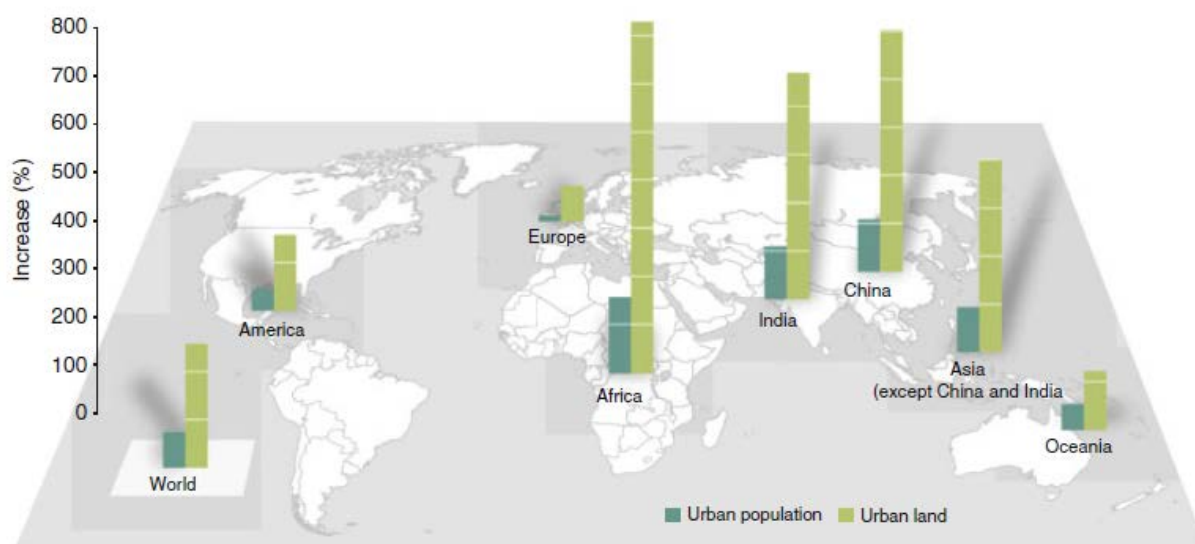
Source: Schewenius, McPhearson, Elmqvist (2014); biodiversity hotspots shown with higher (dark blue) and lower (light blue) levels of biodiversity

Small- and medium-sized cities have been engines of urbanization, and although the population of megacities is projected to double by 2025, the largest number of urbanites will live in cities with less than 500,000 people (McGranahan, Satterthwaite 2014) ¹².

In the next 30 years, the doubling of urban population in developing countries is likely to **triple** the extent of built-up areas (Piorr et al. 2011). This relative spatial inefficiency is linked to the fact that most future urbanization is likely to be informal settlements and slums which have a comparatively low density.

The following figure shows the results of spatially disaggregated projections for urban land cover and urban population growth.

Figure 8 *Relative Increase in Urban Population and Urban Land Cover from 2000-2030*



Source: Fragkias et al. (2013)

Up to 2030, the percent increase in global urban land cover is expected to be over 200 % (compared to 2000), while global urban population growth will be about 70 % within the same timeframe.

The most relevant dynamics is expected for Africa where urban land cover is projected to increase by 700 %, while the African urban population will increase by 160 % in the same period (Fragkias et al. 2013).

In industrialized countries, population increase, combined with a demand for more single-person houses, may result in urban sprawl and competition for urban “green” land (EEA 2015).

¹² Today, 12% of the world urban population lives in megacities while about half live in these smaller cities (UN-DESA 2014a)

2.3.2 Shrinking Cities

Although the dominant global urbanization trend is growth, some regions are experiencing significant urban population declines. Urban shrinkage is not a new phenomenon, and most cities undergo cycles of growth and decline (Seto et al. 2014). In the past, localities have always experienced population losses, for a multitude of reasons¹³.

The multi-causality of urban shrinkage is clearly reflected in an OECD definition:

“A ‘shrinking city’ can be defined as an urban area – a city, part of a city, an entire metropolitan area or a town – that has experienced population loss, economic downturn, employment decline and social problems¹⁴ as symptoms of a structural crisis.” (OECD 2012)

The diverse causes for shrinkage in the world are e.g. economic transformation, shifts in urban structure, and ageing of society (Oswalt, Rienits 2006). Most shrinking cities in the last 50 years have been in Western industrialized countries, especially USA, UK, Germany and Italy and since 1990 in Eastern industrialized countries such as Russia and the Ukraine. South Africa, Asia and Japan are facing this problem as well, though, as shown in Figure 9.

Figure 9 Shrinking Cities around the World



Source: Haase (2013), based on data from Oswalt, Rienits (2006)

¹³ For instance the American settlements that attracted a lot of gold diggers in the Gold Rush of the nineteenth century – they are abandoned now as “ghost towns” (Haase et al. 2012).

¹⁴ Houses are difficult to sell, schools need to close, services become too expensive to maintain (Haase et al. 2012)

Economic “progress” (see *Box 2*) and population growth are closely linked. Due to globalization, trade liberalization and economic rise of low-labor cost countries, the traditionally strong manufacturing sector in Europe struggles, and also in the USA, many rural areas are on the decline.

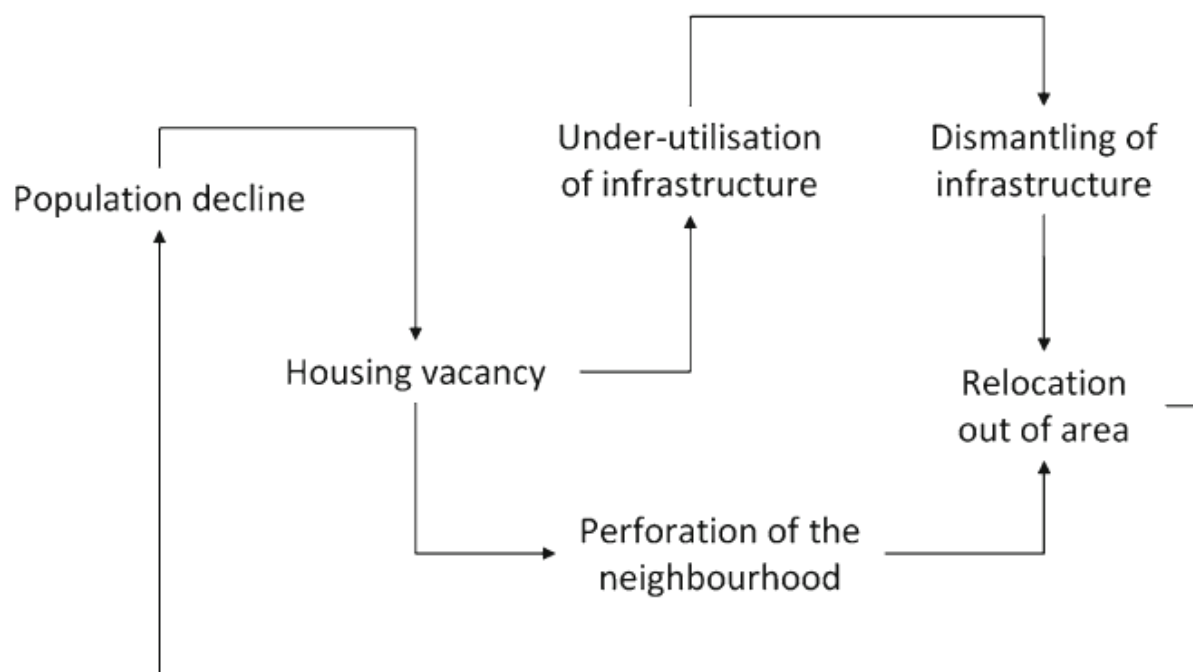
This gradual de-industrialization is an on-going transformation process, involving job losses and social deprivation. The lack of economic opportunities has led to migration, mainly of young people, a so-called “brain drain” (see Section 3.2.3).

The growth of metropolitan areas such as Greater London deprives the rest of the country of investment and talents that go to “places to be” (Haase et al. 2012).

In both growing and shrinking cities, the number of households increases due to demographic change towards 1- and 2-person households so that in shrinking cities, coupled with rising per capita housing space, might lead to more land use, and new requirements for transport infrastructure (Haase 2013).

Furthermore, the process of shrinkage leads to a decrease in density and to underuse of urban land (housing stock, infrastructure and services)¹⁵, and is subject to a positive feedback loop, as indicated in Figure 10.

Figure 10 Infrastructure-related Problems for Shrinking Cities



Source: Haase (2013)

¹⁵ This underuse creates also opportunities for more sustainable land use, especially by increasing urban biodiversity (see Haase 2013).

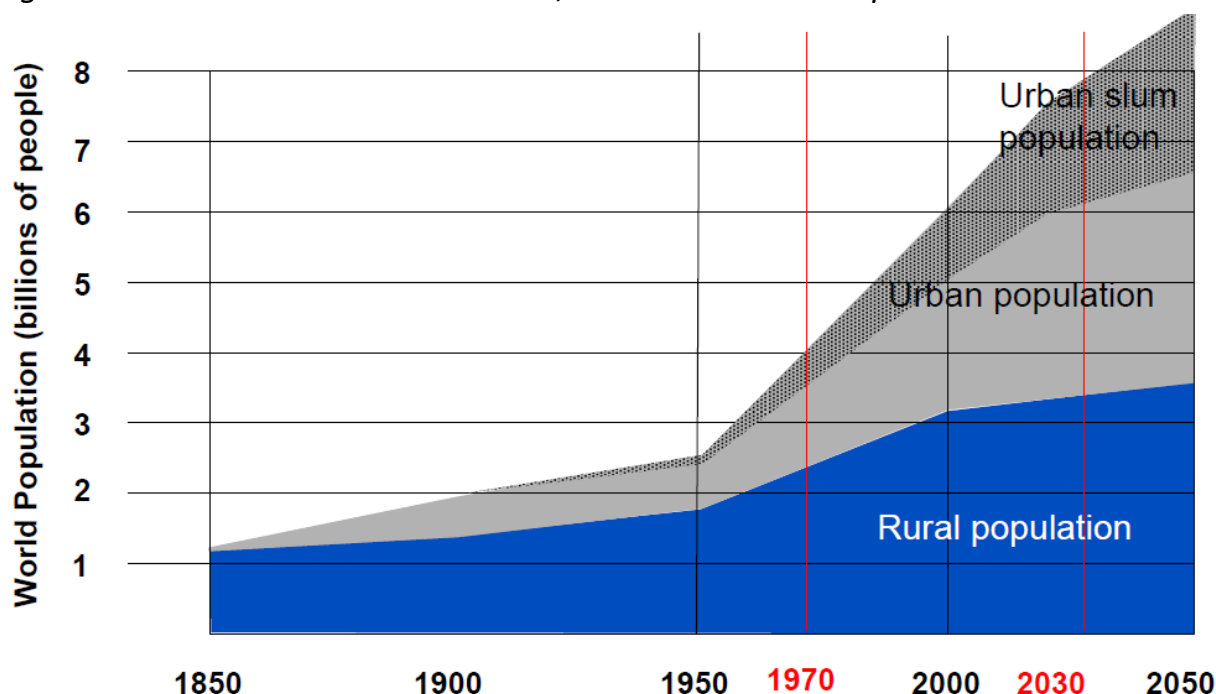
It must also be noted that **rural shrinkage** is also an important issue. In many EU countries, population decline occurs in the countryside rather than in cities¹⁶.

2.3.3 Slums and informal Settlements

Instead of being the locus of opportunity and prosperity, cities all-too-often have become places of deprivation, inequality and exclusion. In too many parts of the developing world, unequal access to opportunities and resources has pushed vast numbers of people into *favelas*, *bidonvilles*, *katchi abadis* or *campamentos*, as slums are known (UN-HABITAT 2013b).

UN-HABITAT (2013b) estimated the number of people living in the slums in developing countries as 863 million, or about 1/3 of their urban population¹⁷. This number is likely to increase, as Figure 11 indicates.

Figure 11 Estimated Urban Slum, Urban and Rural Population



Source: Sietchiping et al. (2015)

2.4 Rural Areas

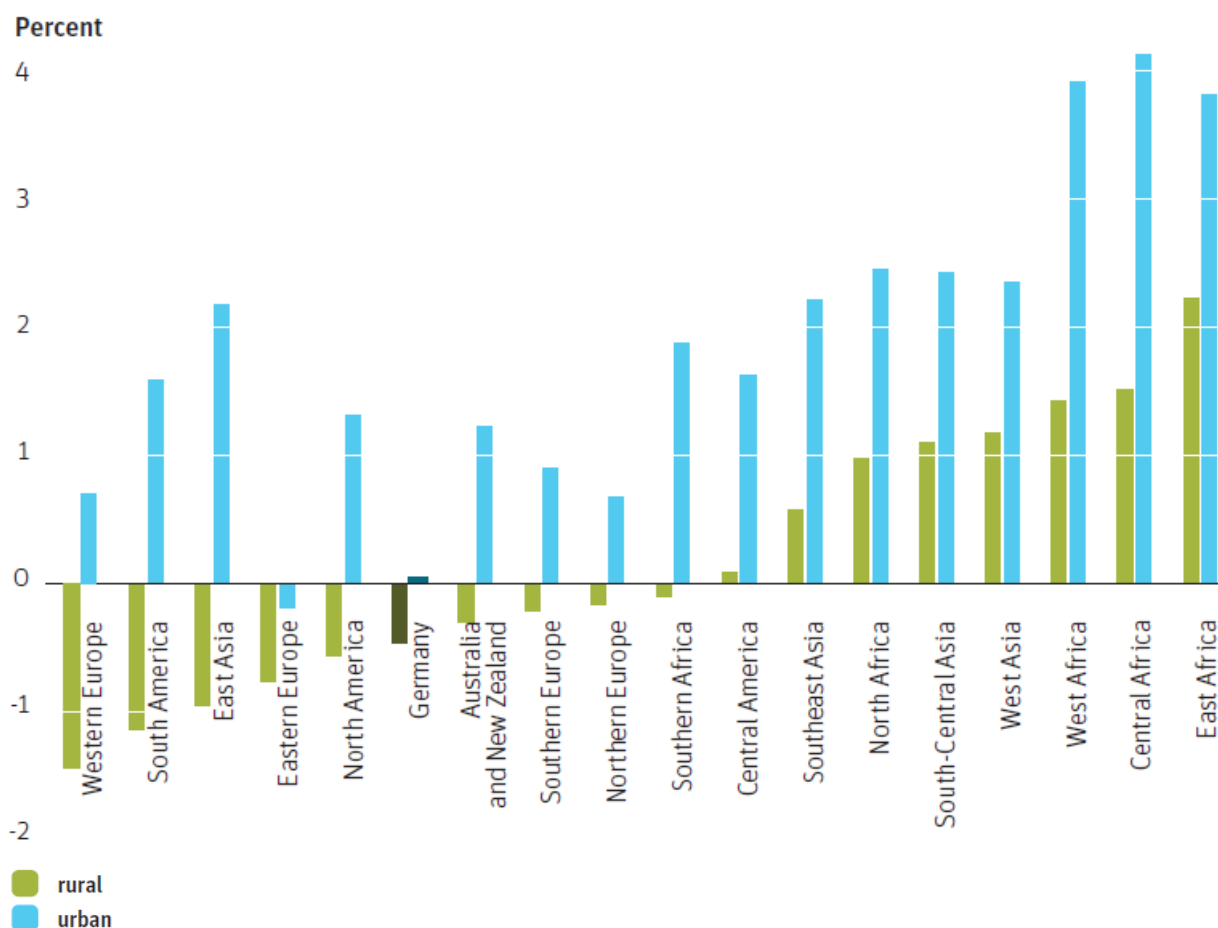
Rural areas still account for almost half the world's population, but after 2020, it is expected that rural population begins to decline, especially in China and India (UN-DESA 2014a). With few exceptions, population growth in cities is higher than

¹⁶ In France, Italy and Spain, many rural villages no longer have a shop, pub or post office, but derelict buildings (Haase et al. 2012). The "rural decline" also happens in parts of Germany (Kuhn, Klingholz 2013; Slupina, Sütterlin, Klingholz 2015).

¹⁷ In Africa, over half of the urban population (62%) lives in slums, in Asia, 30%. In Latin America and the Caribbean, a region where slum upgrading and housing strategies have historically contributed to provide housing solutions to its citizens, still the problem prevails with a 24% rate of urban slum-dwellers (UN-HABITAT 2014).

in rural areas, and - most notably in Europe and East Asia – some rural populations begin to shrink (Figure 12).

Figure 12 Annual Percentage of Population Change between 2005 and 2010 in the Cities and Rural Areas of World Regions



Source: UN-DESA (2012)

Nonetheless, three quarters of the poor and hungry people in the world live in the rural areas of developing countries (IFAD 2015) and most of them depend on small-scale food-crop agriculture, fishery, pastoral husbandry, wage labor on plantations and ranches, or ancillary activities linked to rural townships.

However, increasingly smaller parcels of land, low agricultural productivity, volatile weather conditions and soil erosion compel many rural families to seek additional sources of income even in rural regions (UNIDO 2013).

Many young people migrate to urban centers, thus contributing to the growth of urban slums (WB 2015).

In difference to developing countries, agriculture in OECD countries is no longer the backbone of rural economies¹⁸. This has caused by increased agricultural

¹⁸ Currently, less than 10% of the rural workforce is employed in agriculture (OECD 2006).

productivity, changed supply chain for commodity production, which includes relatively few farm producers and concentration of feed and food processing in large operations in few rural places. Many rural regions indeed depend on non-agricultural activities such as extractive, manufacturing activities and tourism (Garcilazo 2013; OECD 2006).

While urbanization is a dominant trend, the “rural” is transformed in a

“process of comprehensive societal change whereby rural societies diversify their economies and reduce their reliance on agriculture; become dependent on distant places to trade and to acquire goods, services, and ideas; move from dispersed villages to towns and small and medium cities; and become culturally more similar to large urban agglomerations” (Berdegué 2013).

Box 3

Rural USA

A century ago, rural America was the center of American life. It was home to most of the population and most rural residents were involved in producing food and fiber for the nation. The rural economy has changed, shifting from a dependence on farming, forestry, and mining to a diversity of economic activity. Rural regions of the country survive economically on one or more of three basic assets:

- (1) natural amenities for tourism, second homes, and retirement;
- (2) low-cost, good quality labor and land for manufacturing, but also services such as prisons and extended care health facilities; and
- (3) natural resources for farming, forestry, and mining.

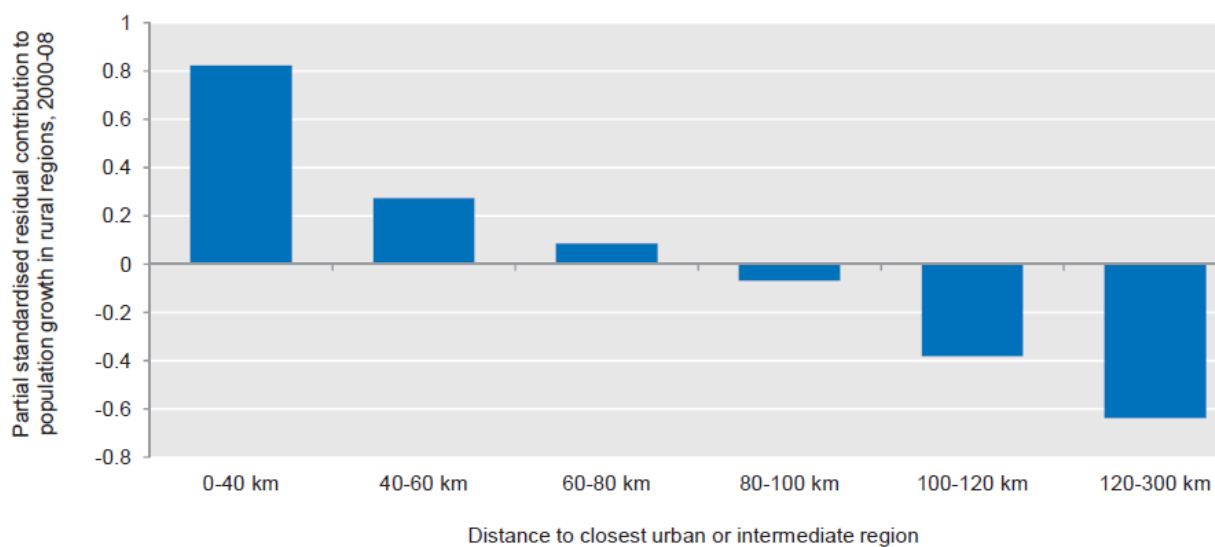
Most rural jobs are not directly related to these assets, but instead are in consumer services — retail trade, education, health, and other consumer services primarily for local residents. Yet, consumer services cannot thrive without agriculture, recreation, manufacturing, and/or other activities such as commuting that bring money into the community.

Source: USDA (2003)

In OECD countries, about 77% of the rural population live in rural regions close to cities, only the remaining 23% is located in remote rural regions (Garcilazo 2013).

OECD countries also show a correlation between rural population growth and distance to the nearest urban or intermediate region (Figure 13).

Figure 13 *Population Growth in Rural Regions and Proximity to Urban or Intermediate Regions, 2000-2008*



Source: Veneri, Ruiz (2013)

2.5 Peri-Urban – the Bridging New Space

The processes of industrialization, globalization and urbanization have caused exhaustive changes in land use and in linkages between urban and rural areas (Section 2.2). Divisions of labor, increasing mobility and migration as well as changing social preferences modified the flows of goods, people, and resources. In consequence, the dichotomy between rural and urban is blurring, creating the “peri-urban” as a new spatial type, with its own range of specific characteristics, problems and opportunities (Zscheischler et al. 2012; Piorr et al. 2011).

In older industrial countries, the peri-urban is a zone of social and economic change and spatial restructuring, while in emerging economies and most developing countries, it is a zone of chaotic urbanization (Nilsson 2013)¹⁹. Suburbanization and urban sprawl are driven by real estate markets, housing policies, new economic regimes, and preferences for “green family living” in close proximity to urban amenities.

Peri-urban areas are characterized by changing economic and employment structures from agriculture to manufacturing and services, rapid population growth and migration, and rising land values (Woltjer 2014). Thus, peri-urban areas increasingly lose their (former) “rural role” in supporting cities with food, energy, water, building materials and ecosystem services (UN ESC 2013).

There is a lack of land regulation and weak planning over peri-urban areas (UN-HABITAT 2010).

¹⁹ It should be noted that many slums are located in peri-urban areas, which has been recognized as a key challenge, but also reveals informal “adaptation” practices (Thorn, Thornton, Helfgott 2015).

3 Urban-Rural Flows and Interactions

3.1 Urban-Rural Linkages

Urban and rural developments affect each other, either positively or negatively. Economic and social progress in urban areas can have positive and negative impacts on rural jobs, markets, livelihoods, the climate and the natural environment in rural areas etc. - and vice versa (Wehrmann 2014).

Box 4 The Pioneering Work of Johann Heinrich von Thünen

In 1826, von Thünen was one of the first to develop economic rural-urban linkage concepts²⁰. He analyzed the spatial allocation of economic activity by using a model of agricultural land use, showing that land use is a function of transport costs to markets and the farmer's land rent (Nellinger 2011). Concentric rings of agricultural activity around a central city, with dairy and intensive farming closest to the city, followed by timber and firewood in the second circle, grain production in the third, and finally, ranching and livestock activities in the fourth circle, were used to describe his model (Ehrich, Berkenhagen, Ebeling 2008).

In von Thünen's model, the spatial allocation of economic activities was determined by the urban demand and a distance factor. However, his model did not allow for roads or railways that make it easier to transport goods over long distances, nor include diverse consumer preferences (Akkoyunlu 2013). Therefore, the models' applicability to real settings is limited (IFPRI 2007).

The view of urban and rural as separate and conflicting spaces began to change in the late 1990s towards place-based approaches²¹ and rural-urban linkages (Douglass 1998; Tacoli 2006; van Leeuwen, Nijkamp 2006). The linkages are created by interactions, including **sectoral** flows of commodities from rural producers to urban and regional, national and international markets, and vice versa (Figure 14).

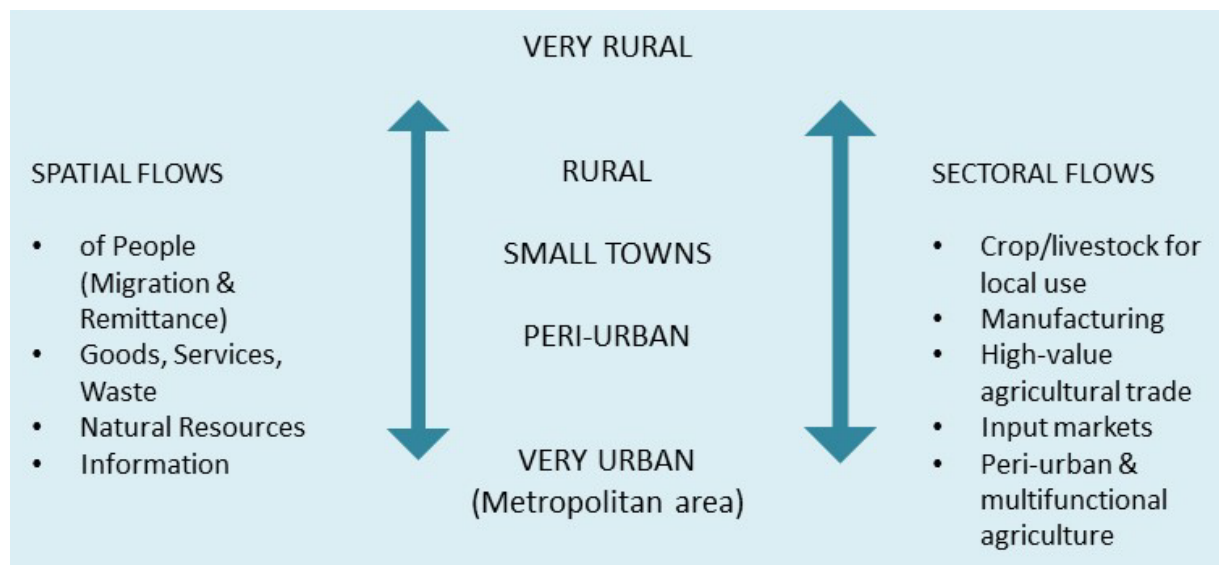
Spatial flows represent **people** moving between rural and urban settlements, either commuting on a regular basis, for occasional visits to urban-based services and administrative centers, or migrating temporarily or permanently. **Financial** flows include, primarily, remittances from migrants to relatives and communities in sending areas, and transfers such as pensions to migrants returning to their rural homes, and also investments and credit from urban-based institutions.

Moreover, flows of manufactured and imported **goods** and **services** from urban centers to rural settlements and the exchange of **environmental resources** and services and the flow of **pollution and waste** relate cities to their rural hinterland.

²⁰ For access to transcripts of von Thünen's original work see <http://thuener.de/index.php?id=166>

²¹ See e.g. Schejtman, Berdegúe (2004); Barca (2009); Orszag et al. (2009+2010); McCann, Rodríguez-Pose (2011).

Figure 14 The Rural-Urban Continuum



Source: von Braun (2007)

Additional flows of **information** between rural and urban areas include information on markets - from price fluctuations to consumer preferences - and information on employment opportunities for potential migrants (Tacoli 2003).

Box 5 Key Issues for Urban-Rural Linkages

- Diversification of rural economies and of rural household livelihood strategies (Carney 2002).
- Urbanization and agricultural transformation of developing countries (WB 2007)
- Growing importance of secondary cities (UN-Habitat 2012) and their growth and distributional effects (Ferré et al. 2012; Christiaensen, Todo 2014).
- The growing integration of the different forms of contemporary agriculture with manufactures and/or services, and value chains strongly influenced if not dominated by intermediate and downstream actors that had an urban location (Reardon, Timmer 2014).
- Improved connectivity of rural areas, both physical (roads) and by ICT (Andersen, Shimokawa 2006)
- Greater importance of subnational governments (provincial, local) with adoption of decentralization policies by many developing countries (Arzaghi, Henderson 2005; Canziani, Schejtman 2013), and the democratic agenda (de Souza Briggs 2008).

Source: own compilation based on Berdegú (2014)

Given the interlinkages, urban and rural cannot be seen as a dichotomy - there is a continuum with a gradient from “deep” rural areas to provincial regions that combine rural and urban characteristics, to peri-urban areas next to medium and large cities, and very urban - metropolitan - areas (Schejtman, Berdegú 2004).

Moreover, all of these places are interlinked in systems that combine functions and hierarchies (Canziani, Schejtman 2013; Roberts, Hohman 2014).

Yet it is important to distinguish two different types of rural-urban linkages.

The **de-localized** type is created by flows between a city and **many** rural areas throughout a country or even the world e.g.:

“Mobile phones manufactured in the city of Shenzhen, China (...) will be shipped and used to facilitate trade and social relations in hundreds or thousands of villages in Africa and Asia. The food consumed in Lagos or in Abuja (...), or the immigrants flowing into them, come from all over Nigeria, the region and the world, and not just from the proximate rural areas” (Berdegué et al. 2014).

Further examples for this linkage type are rural recreation and tourism by urban people which are not restricted to the immediate vicinity of the home city (and vice versa), planting trees for carbon capture not directly linked to emissions from neighboring urban areas, and rural renewable energy which is distributed via national grids to many – and not only urban – consumers (Copus 2012).

This illustrates that in a globalized world, linkages of urban areas to **specific** rural areas are less and less likely. Instead of contiguous “hinterlands” they may connect to “generic” rural and urban areas, which are not necessarily adjacent to each other (Berdegué et al. 2014).

The other linkage type is **localized**: there are still **direct** relations of cities to their neighboring hinterland, e.g., water flows: many cities have formal or informal agreements with peri-urban or rural districts to manage water, including basins and watersheds. Another example is Community Supported Agriculture (CSA) which directly links urban consumers with producers in contiguous rural areas (Fritsche, Laaks and Eppler 2015).

All linkages are described in the following sub-sections.

3.2 Flows of People – Demographic Linkages

Population increase and decline have large impacts on land use. Migration is the most important demographic factor causing rapid land-use changes, and interacts with government policies, changes in consumption patterns, economic integration, and globalization (Lambin, Geist 2007).

3.2.1 Migration

Migration²² plays an important role in shaping rural-urban linkages and economic development in both home and destination regions, and in both rural and urban areas (Berdegué et al. 2014). In 2013, there were 232 million international migrants globally of which nearly 59% lived in developed regions, while developing regions hosted 41% (UN-DESA 2013e).

²² Migration is not a new phenomenon – it has existed throughout history in practically all parts of the world (GIZ 2015).

Box 6 Migration: A Global Phenomenon

The International Organization for Migration (IOM) distinguishes between internal²³ and international migration and it defines them as follows:

Internal migration consists of “a movement of people from one area of a country to another for the purpose or with the effect of establishing a new residence. This migration might be temporary or permanent. Internal migrants move but remain within their country of origin (e.g. urban-rural migration)” (IOM 2004).

Internal migration includes temporary, permanent and semi-permanent migration, with regard to both relocations of entire households and multi-locational households, but excludes commuting.

Multi-locational households are families consciously live in two locations, which are sometimes far away from each other. However, often situated in both in rural and in urban areas, maintaining sustained physical connections between places of origin and destination, and for which migration of one or more members, often seasonal, is part of a livelihood strategy to diversify income sources (WB 2007; Keshri, Bhagat 2013).

Although multi-locational households do not necessarily have a higher income at their disposal than those based in a single location, they do spread risks better (Dick, Reuschke 2012).

Migration is determined by push and pull factors. Push factors include droughts, land scarcity, missing land tenure rights, low wages or absence of employment, and armed conflicts in out-migration areas, while pull factors include better job and income opportunities, and lower social risks in destination areas.

Migration from rural to urban regions affects land use through a decrease in rural labor and consumption, but often creates an inflow of remittances which again can change rural land use (Lambin, Meyfroidt 2011).

Migration can occur in different directions²⁴, but rural-to-urban is dominating²⁵.

Rural out-migration is an important driver of local land use change (Lambin, Meyfroidt 2011; Seto et al. 2012). However, migration has long been considered a consequence of demography and was neglected in land use and food (in)security research (Teller, Hailemariam 2011).

The following Box 7 illustrates the link between rural-out migration and land use for the example of China.

²³ Internal migration far exceeds international migration in terms of numbers - there are four internal migrants for each international migrant according to some estimates (UN-DESA 2009).

²⁴ In India, the predominant net migration flows are rural-rural (Chandrasekhar, Sharma 2014), whereas in other Asian and especially in West and Southern Africa countries even migration from urban to rural areas is found. For Ghana, see Songsore (2000) and Potts (1995), for West Africa in general Beauchemin, Bocquier (2004) and Beauchemin (2011), focusing on Burkina Faso and Cote D'Ivoire. For Eastern and Southern Africa, see Potts (1995 + 1997).

²⁵ The 2013 World Population Policies report states that “among 185 countries with available data in 2013, 80 per cent of governments had policies to lower rural to urban migration, an increase from 38 per cent in 1996” (UN-DESA 2013a).

Box 7 Rural-out Migration affecting Land Use in China

Migration has a great impact on national economic development, rural transformation and land use transition. It has transformed China from an agricultural based society to an urban and industrial society. Extensive rural out-migration²⁶ in China started in 1978. According to official statistics, the number of rural–urban migrants was 2 million in 1983, and by 2010 had reached 253 million. The rural population decreased from 841 million to 657 million between 1990 and 2011, while the urban population increased from 302 million to 691 million. The urbanization rate changed from 17.9% in 1978 to 51.3% in 2011.

China faces a number of challenges in urban and rural development, as rural–urban migrants not only contribute a lot to urban development, but also cause great transformation of rural areas. Thus, even if rural population faces a decline rural settlement area is increasing at the expense of high-quality cultivated land.

Further, the abandonment of houses and property in inner settlement and the expansion of new settlement areas on the outskirts of the old settlement created many hollowed villages. Correspondingly agricultural land use is modified.

An increasing urban population and corresponding increased food consumption requires more production of vegetables, which leads to rapid expansion of plastic greenhouses and in general a more intensified agriculture. Shows the interaction between rural out-migration and land use transition exemplary for China.

Source: own compilation based on Chen et al. (2013)

Migration reinforce reciprocal links between rural and urban households and creates challenges: In agriculture-dominated regions where a significant workforce portion is absent, the local economy may become highly **dependent on remittances**, raising concerns for its sustainability in the longer-term (Cotula 2004). Vice versa, urban migrant households are reliant on food provision from rural relatives²⁷ (UN-HABITAT 2008). Further, in urban and peri-urban areas, substantial remittance inflows and lack of effective local planning may lead to unregulated **urban expansion** into previously agricultural lands without adequate service provision (Cotula 2004).

Migration may also increase **inequality**, as households receiving remittances are able to buy land and other key resources, set up new businesses and improve their children's education (Cotula 2004).

²⁶ The rural out-migration is usually a sequence: first, the head of the family or a young, educated family member moves to a city to find an off-farm job, followed by other family adults members, and finally the entire family moves out.

²⁷ A study in Windhoek, Namibia, revealed that, over a one-year period, two-thirds of all households surveyed in the city regularly received food from rural areas, mainly from relatives. The most vulnerable and marginal households in urban areas were typically those with weaker or no links to their relatives in rural areas (UN-HABITAT 2008).

International types of migration significantly change the demographic and social conditions in places of origin as well as destinations. Within Europe²⁸, labor migration from Central and Eastern European countries is significantly changing established socio-spatial relations in Northern, Southern and Western Europe.

The results of depopulation include a marginalized and impoverished elders suffering social and economic isolation in more remote rural areas as well as large-scale land abandonment, in part due to lower levels of land management, resulting in natural reforestation of former cultural landscapes (Bell 2009; Bell et al. 2009+2010).

The age and gender of who moves and who stays can have a significant impact on source areas in terms of labor availability, remittances, household organization and agricultural production systems. In some cases, decision-making power over management of natural resources is invested with actual migrants and not with those who 'stay behind'. This can limit the impact of policy and project interventions (Tacoli 2004).

Box 8 *“Amenity Migration”: A Special Case*

Amenity migration and second-home ownership strengthen urban-rural linkages as they may have the potential to influence regional infrastructure and services (Huning 2012).

The concept of amenity migration was developed during the 1990s, meaning that *“migrants move for reasons of lifestyle rather than job, choosing places with natural amenities, climate, authentic rural culture, recreation and affordable housing”* (Borsdorf 2009).

In many cases, amenity migration does not appear to be a one-way process, but rather is linked to a broad variety of highly mobile lifestyles of households well equipped with financial and social resources (McIntyre 2009). New information and communication technologies (ICT) as well as extended transportation networks allow households to locate their home(s) not only in accordance with job locations, but also with personal ties or natural amenities (OECD 2001; Dubois-Taine 2004; O’Reilly 2003).

In Europe, shrinking small villages in rural areas are facing ageing population and significant out-migration for some time and became at least partly abandoned (e.g. in Portugal, Spain). Today, many of these areas are characterized by a high number of seasonally used or vacant houses and by secondary residences.

The high number of secondary residences has been interpreted as a stabilizing factor for villages, which more and more focus on exploiting their cultural and natural resources aiming to create growth and employment in agriculture and forestry, sectors that may in return contribute to the preservation of the regional heritage (Huning 2012).

²⁸ In Romania, for example, many villages are nowadays inhabited only by the old and young, while middle-aged groups fit for employment travel to countries such as France, Italy or Germany for work. The money transfers and remittances from these migrants are important sources of income for those left behind.

3.2.2 Flow of Money

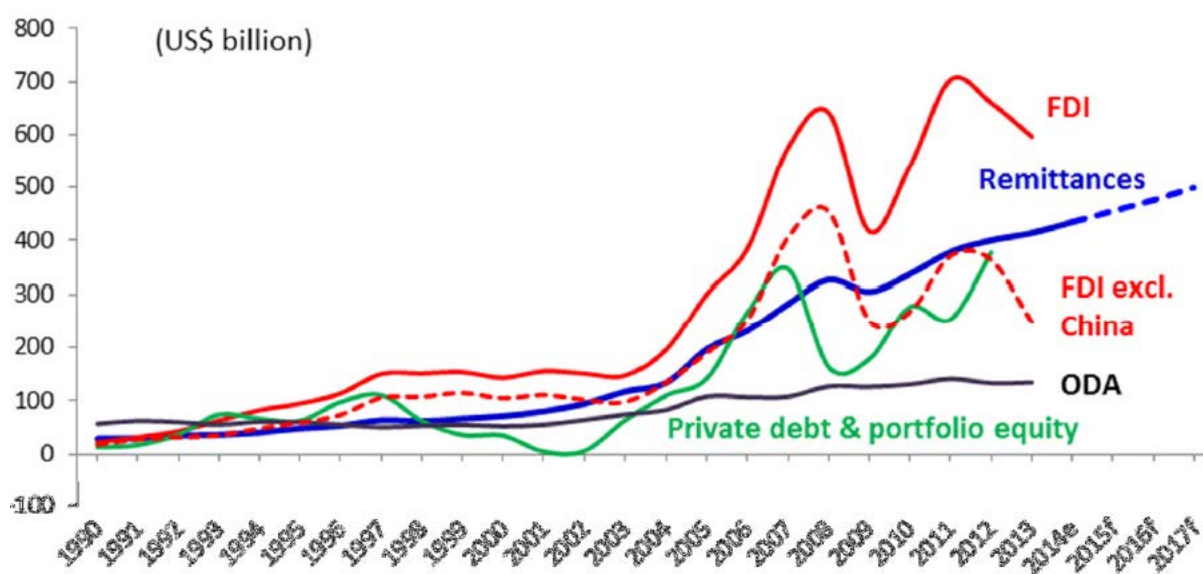
The flow of people in all its forms relate to another urban-rural link: the flow of money in form of remittance²⁹.

Officially, recorded remittance flows to developing countries are projected to reach US\$435 billion in 2014, 5 % higher than the year before (WB 2014). Most global remittances go from North to South (at least 43%), although there are significant flows between countries of the South and between countries of the North (IOM 2013).

Remittances remain an especially important and stable source of private inflows to developing countries, as they bring in large amounts of foreign currency that help sustain the balance of payments.

In 2013, remittances were significantly higher than foreign direct investment to developing countries (excluding China) and were three times larger than official development assistance (see Figure 15). Moreover, remittances from migrant relatives, either internal or international, are often a main component of rural households' incomes (Cotula 2004)³⁰ and have proved important for reducing rural poverty in many places (Deshingkar 2006).

Figure 15 Remittance and other Resource Flows to Developing Countries 1990-2017



Source: WB (2014)

²⁹ Remittances represent household income from foreign economies arising mainly from the temporary or permanent movement of people to those economies (IMF 2013).

³⁰ Unlike aid, remittances flow directly to individual households and unlike loans, they incur no debt. Besides contributing to household livelihoods, remittances can foster longer-term development through investment in education, land and small businesses. In some places, migrants' associations channel part of the remittance inflows into community development projects, such as schools, health centers and wells (Cotula 2004).

The sending and receiving areas of rural-urban and international migration remain connected through remittances, with specific characteristics varying considerably across regions. The potential remittance-driven impact on land use change is significant, while remittance-driven consumption may be similar in scale but more diffuse in its environmental impacts (WB 2011b).

Impact on Land Use

An example of land use change that may be induced by remittance-supported land purchases is the transition from agricultural to residential use. Evidence from West Africa shows that in peri-urban areas, particularly along paved roads, agricultural lands are being converted to residential plots, land prices are soaring and buildings are mushrooming very rapidly without adequate service provision. While many different factors are causing these changes, because of their greater-than-average purchasing power migrants are often among the main initiators of building projects (Cotula 2004).

Nevertheless, remittances and alternative income from non-farm activities have a major role in financing innovation³¹ and intensification of the farm sector (Tiffen 2003; Hoang et al. 2005+2008).

Remittance, on the one hand, may facilitate the reconversion of family members at home to the rural nonfarm economy³², thus decreasing pressure on land.

An increase in wealth of rural households is generally associated with a decreased engagement in agriculture and **diversification** toward rural nonfarm activities (Barrett et al 2001).

On the other hand, remittances can favor investments in mechanization and agricultural **intensification**. Migrants, to some extent, buy directly land, to establish a safety net or to maintain ties, in their country of origin (Zoomers 2010).

In summary, outmigration affects how land use decisions are made and may give rise to “*remittance landscapes*”³³ (Lambin, Meyfroidt 2011).

For instance, people having migrated abroad from southern Morocco invest more in land in their place of origin and have more formal property rights than households living in the area (de Haas 2006).

³¹ The age and gender of people migrating or staying can have a significant impact on source areas in terms of labor availability, remittances, household organization and agricultural production systems. In some cases, decision-making power over the management of natural resources is invested with the actual migrants and not with those who ‘stay behind’. This can limit the impact of policy and project interventions (IOM 2005).

³² In Vietnamese coastal communities, remittances were invested primarily in education, thereby increasing access to nonfarm income, but also in consumption, livestock, and agricultural diversification (Adger et al. 2002).

³³ In El Salvador, forest recovery was correlated with remittances sent from abroad by family members; households with remittances cleared less forests (Hecht, Saatchi 2007).

Remittance were as well used to recruit hired labor to cultivate the fields. For instance, in Southern Morocco, de Haas (2003) found that the incidence of fallow land was highest among non-migrant households, and that migrants usually entrusted land cultivation to other household members (women in particular), to sharecroppers or to hired laborers. This improved wage levels and sharecropping conditions³⁴ (Cotula 2004).

Finally, migrations interact with other factors associated with globalization that trigger a structural transformation of rural areas through land privatization, credit access, NGOs promoting social or environmental agendas, encroachment of large-holders or infrastructure projects (e.g., dams, mines, parks) on communal land, social mobility and expanded social networks, and the growth of urban aspirations. These trends result in a diversification of land use, with new crop varieties, home gardens, niche market production, or ecotourism, and the growth of off-farm activities (Lambin, Meyfroidt 2011).

Consumption Patterns

Scientists evaluated the influence of migrant's consumption patterns and how these affect both urban markets and land use in rural areas: For example, the growth of slum settlements has driven the demand for cheap timber.

To meet these new preferences, rural smallholder farmers in Peruvian Amazonia, as elsewhere, have responded to the growing demand for timber and other forest-based products in regional cities by shifting their emphasis from commercially oriented crop production to a combination of smaller scale subsistence agriculture and management of forest products, especially of fast-growing timbers.

The sale of fallow timbers can be very profitable and is therefore becoming the main source of income for smallholders affected by low prices for traditional agricultural crops. However, timber is not the only commodity affected.

Farmers settling in cities also bring their own culinary preferences. In some regions of the Amazon, this comes in the form of an appetite for Açaí, a palm fruit often used in desserts. The renewed hunger for the tree-based fruit has led to afforestation in certain areas – contrary to much of the rest of the Amazon basin. (Padoch et al. 2008).

In summary, migration and related remittance are key elements of urban-rural linkages which affect land use both within cities, and the rural areas.

³⁴ Whereas traditionally sharecroppers used to retain 1/5 of the yield, at the time of the study, they retained on average 41 percent of the harvest (Cotula 2004).

3.2.3 Loss of Knowledge

As people leave particularly rural areas and their families to go to cities their behavior becomes more urbanized contributing in a loss of traditional knowledge or long used practices, either for medical care or land use practices or even food production and processing/preserving. This can be observed in developing countries, but to some extent as well in industrialized countries.

Skilled migration is a major trend among current migration patterns, driven by the development of knowledge economies and the emergence of a global labor market for skilled professionals. It is also a source of concern for many less developed countries, which fear the negative consequences of the loss of skilled nationals in terms of economic and human development (UNESCO 2015).

Levitt (1998+2011) coined the term “social remittances” to describe that migrants also send back new ideas, attitudes and behaviors. Such flows can influence substantially on development in origin communities (UN-DESA 2013). When skilled migration estimates are adjusted for such return migrants, the net brain drain can be sharply reduced (UN-DESA 2005)³⁵. The brain gain effect has contributed to improved household and local incomes (Hoang et al. 2013).

Besides their direct support, migrants can also help their relatives by sharing information (Le et al. 2011). After health care, the most common subjects of migrants’ communication with relatives at home were trading and production, followed by other socio-cultural issues and education (Hoang et al. 2013).

3.2.4 Commuting

With urbanization and changing employment patterns, commuting between rural settlements and urban centers becomes increasingly important (IIED 2012a). About 32 million people, accounting for 4.3% of India’s rural population, live in households where one or more worker commutes from rural to urban areas (Denis, Zérah 2014). In addition, 15.4 million individuals - accounting for 5.5% of India’s urban population - live in a household where at least one member commutes from urban to rural area for work, indicating the extent of the peri-urban environment (Berdegué et al. 2014)³⁶.

However, commuting requires road and public transport, which can increase fragmentation, CO₂ emissions and soil sealing, and further urban sprawl.

³⁵ Since the late 1990s, an additional element of brain gain has been recognized: in the current era of globalization, global links may be more important than the human capital “stock” in a particular country. A professional may contribute more value to the source country by residing overseas than by returning permanently (UN-DESA 2005)

³⁶ Recent research for India analyzed factors affecting the decision of workers to daily commute across rural and urban areas, and found that this may have a dampening effect for urbanization, especially in the peri-urban neighborhoods close to larger cities (Sharma, Chandrasekhar 2014).

3.2.5 Demographic Change and Employment

Demographic change is often mentioned as one main driver for land use change. Since the 1970s, experts of spatial planning discuss consequences of demographic change, as it is one of the key challenges for urban and rural development.

The issues, which need to be faced within the urban-rural linkage, are on one hand that the number of young people in rural areas of many developing countries is falling. The exodus of rural youth means fewer small-scale farmers, today and tomorrow. Many are unemployed or work informally — often in unpaid, low-skilled, insecure and sometimes hazardous jobs (IIED 2012b).

On the other hand, also the ageing population in many industrialized countries is prone to “return to the cities”, seeking better medical coverage and cultural amenities together with better transport services.

These dynamics increase the urbanization trends and imply even more problems in rural areas where costs to maintain critical infrastructure and public services will rise due to declining population. Yet, there are also opportunities in new models, as research e.g. in Germany shows (Kuhn, Klingholz 2013; Slupina, Sütterlin, Klingholz 2015).

A further urban-rural link is employment, especially in the agricultural sector of developing countries where a rising number of rural youth turns their back on small-scale agriculture. Limited access to markets, land, finance and infrastructure and lack of employment, coupled with rapid growth and urban opportunities increasingly make cities the obvious choice for a better life.

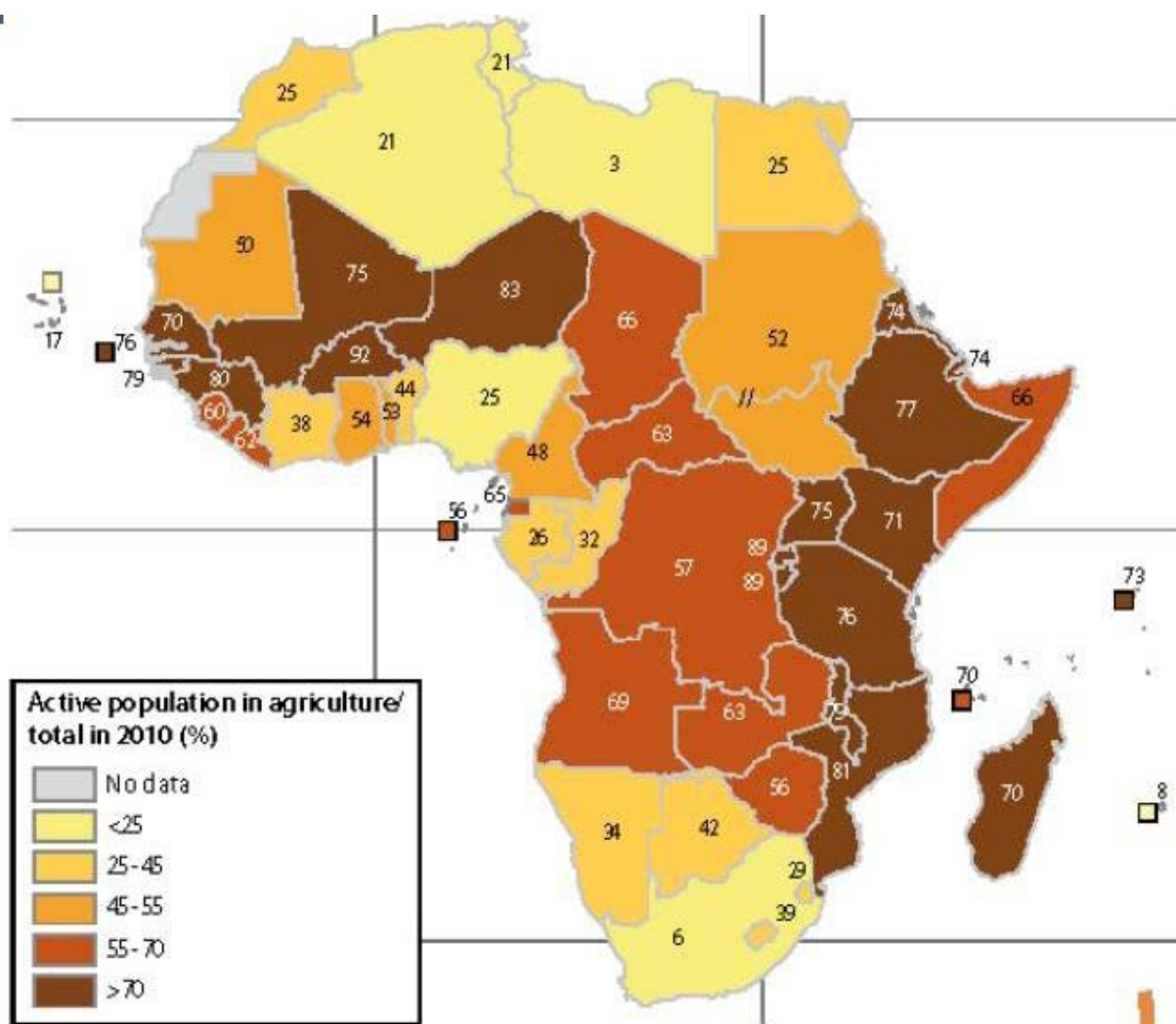
In addition, widespread access to information, changing financial expectations and a view of farming as “un-modern” associated with hard physical work, low returns and low social status also have a profound impact on employment patterns (Bezu, Holden 2014; Proctor, Lucchesi 2012; Tacoli 2004). However, small-scale farming is critical to future food security (IAASTD 2009).

Box 9 Employment in Agriculture – Africa and China

As agriculture is a dominant source of employment and income especially in many African countries (see Figure 16) where land productivity is rather low, investing in this sector is deemed a key strategy to stabilize livelihoods for the rural young (Douillet, Estrades, Dorin 2014).

In China most rural inhabitants born in the 1970s and 1980s perform off-farm work. Of the total migrants in 2010, nearly 45% are born after 1980s (Chen et al. 2013). The young and educated rural residents like to move to cities because of the cultural and economic attraction; once they move out, they become reluctant to return. In 2010, 40% of Chinese farmers were older than 50; it is estimated that the percentage will increase to 50% by 2016 (Chen et al. 2013). As laborers on farmland age over the next twenty years, the Chinese countryside will face the question of who will cultivate the farmland.

Figure 16 Share of Population Working in Agriculture in Africa

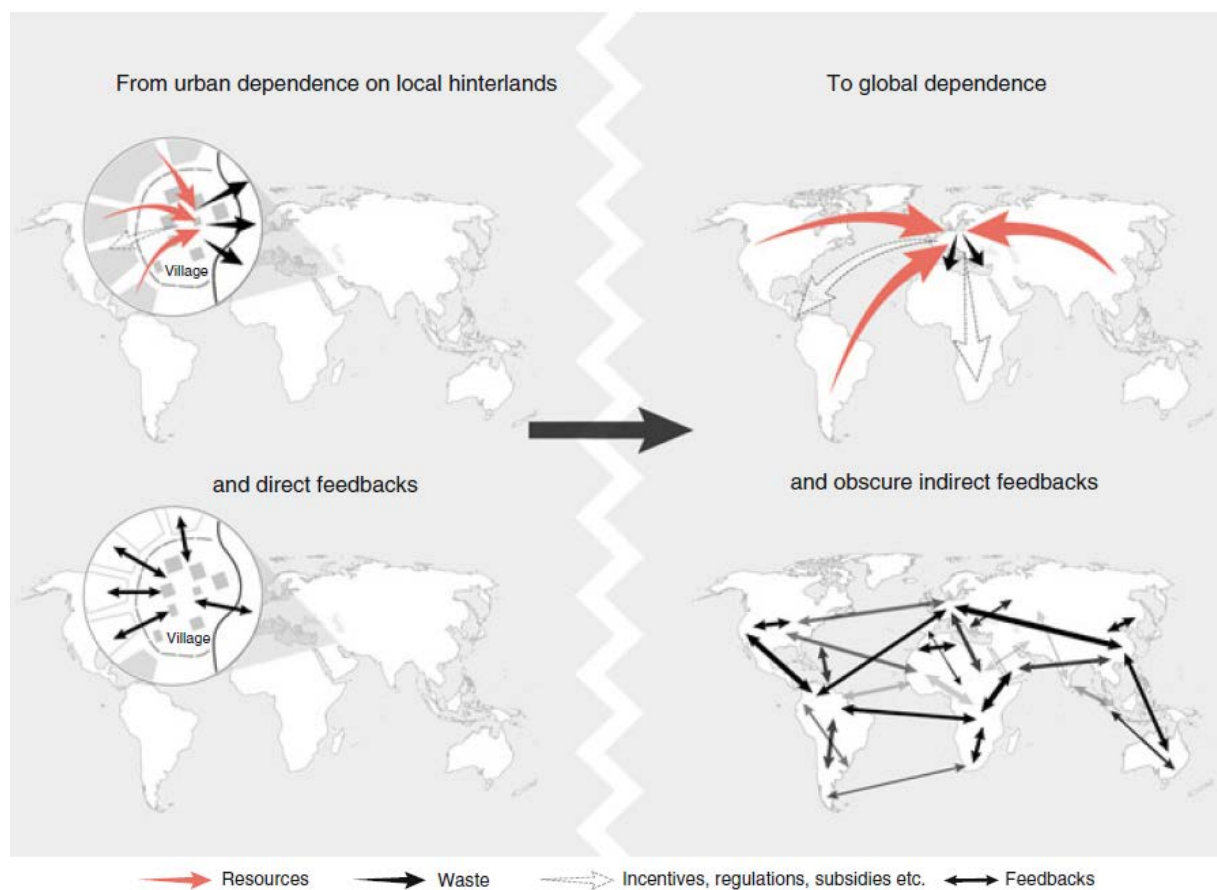


Source: Douillet, Estrades, Dorin (2014) based on FAOSTAT data

3.3 Flows of Goods and (Public) Services

The goods produced and consumed in cities and rural areas nowadays are “embedded” in globalized supply chains (Hubacek et al. 2014;) which are a result of market liberalization and increased trade flows (Haas et al. 2015; Schaffartzik et al. 2014). Urban areas draw resources from – more and more distant – regions, as Figure 17 indicates.

Figure 17 Dynamics of Urban-Rural Flows under Globalization



Source: Elmqvist et al. (2013)

With regard to **land** as a resource, global impacts are well researched (e.g. Fritsche, Eppler 2013; Haberl 2014; Lambin, Meyfroidt 2011), but the relation to urban and rural “drivers” are under examination, as various models give quite different results (Schaffartzik et al. 2015).

Meyfroidt et al. (2013), Weinzettel et al. (2013) and Yu, Feng, Hubacek (2013) established quantitative relations between locally consumed products and their global land impacts, showing that the major share of the “land footprint” occur **outside** of consuming regions and countries³⁷.

³⁷ An interesting exemplary analysis for the city of Beer-Sheva in Israel showed that for food, materials and water consumption, electricity use and transportation, 94% of the city’s footprint comes from the “global hinterland” and only 6% from the domestic hinterland (Zeev, Meidad, Avinoam 2014).

While it is still true that rural resource industries (pre-eminently agriculture) interact with urban markets, these are no longer necessarily adjacent (Copus 2012). This “telecoupling” (Bruckner et al. 2015) or “teleconnecting” (Yu, Feng, Hubacek 2013) implies that rural regions became the “global countryside” (Woods, 2007; Spiegel 2014), with implications for governance (Sections 4.2 and 4.3).

As a reaction to these tendencies (Swyngedouw 2004), attempts to retain more value added in local (rural) economies through shorter supply chains, re-localisation initiatives, and regional cooperation (Courtney et al. 2010; Marsden 2009) are an opportunity to consider (Section 4.4).

3.3.1 Agriculture and Food

The urbanization and globalization trends described in Section 2 pose challenges for small-scale agricultural and for both rural and urban food systems (FAO 2011). The current logic of industrialized agriculture and food processing implies to cultivate standardized agricultural commodities in large systems with high input intensity, transport over large distances, and to process in centralized plants in parallel to increasingly diversified consumer demands in terms of product quantity, quality and food safety standards³⁸.

The urban-rural relations in that regard are that agriculture takes place not only in rural areas but – again - within cities³⁹.

The involvement of e.g. supermarkets in the food supply chain tends to result in bypassing local markets. Farmers, mainly in industrialized countries commonly buy inputs from national suppliers, there is no longer any necessity for the involvement of retailers or wholesalers in their local market town. Modern logistics systems operate via a small number of regional hubs. Suppliers and business customers are connected through “translocal” business networks (Hedberg, Carmo 2011; Dubois et al. 2011), which can be seen as opportunities especially for rural areas (see Section 4.4).

With the ongoing industrialization of the global food system, land in rural areas in developing countries which was traditionally subject to growing subsistence crops is increasingly turned into commercial agricultural land for cash crops. This can have severe implications for local livelihoods, and hunger so that food security is taken up as Sustainable Development Goal 2 (UN-OWG 2014). On the other hand, demand for “regional” food grows, especially in cities (Section 4.4).

³⁸ It is beyond this paper to adequately describe the challenges of industrialized agriculture – the focus is on the urban-rural linkages. For a more detailed discussion of agricultural and food issues see e.g., EvB, FUE (2014).

³⁹ See Fritsche, Laaks, Eppler, (2015) for a more detailed discussion of urban food systems.

3.3.2 Building Materials

Cities are densely populated, and the respective housing requires significant material resources per hectare. In former times, most building materials (clay, stones, straw, wood) came from adjacent rural areas which pre-processed local resources⁴⁰.

With the rise of modern high-rise urban buildings using far more concrete, glass and metals, these linkages became weaker: glass and metals nowadays come from large industrial plants and are traded along international value chains, and even bricks, tiles and wood are globally traded commodities.

Similarly, materials for infrastructure such as bitumen-based road paving, metal and plastic underground pipelines and cables, tram rails and buildings for transport services are subject to international tendering with respective sourcing from non-neighboring areas.

The only exceptions from this trend are sand and gravel which, due to low economic value per ton, are still sourced from regional suppliers.

In principal, these trends have a net positive impact on global land use⁴¹, as mining of raw materials (e.g. ores for metals) from areas with high ore concentration, and centralized processing require less land than small-scale and less efficient systems.

From a **sustainable** land use point of view, though, the **quality** of the land use for resource extraction and processing needs to be considered as well, i.e. issues of biodiversity, reclamation, soil contamination, and tenure of land as well as employment, labor conditions and income distribution.

In that regard, sourcing of e.g. renewable materials such as wood from local wastes and regional forests, bio-based products from small-scale “biorefineries”, and “urban mining” for secondary building materials can have positive sustainability impacts and should be considered more.

3.3.3 Energy

A driving force in the urban-rural context is energy: electricity, heating and fuels are key commodities for both cities and rural areas in terms of household services, transport, commercial and agricultural as well as industrial activities. Moreover, energy prices significantly determine land use patterns (Steinbuks, Hertel 2013).

⁴⁰ In developing countries, this is still true for many smaller-scale villages in rural areas. Their expansion can cause land-use changes due to unsustainable timber harvesting, as examples in Namibia and Angola indicate (Röder et al. 2015).

⁴¹ Note that resource extraction represents only a very small share of global land use (Lutzenberger et al. 2014), although the environmental and social impacts can be quite significant (Fritsche 2013).

While energy in industrialized countries is available to nearly all, 1.3 billion people lack access to modern forms of energy such as electricity, and 2.7 billion in developing countries rely on “traditional” uses of biomass, mainly for cooking (IEA 2015). While electricity can foster prosperity (e.g. lighting, ICT, cooling systems), modern cooking systems result in better health⁴².

Despite various international initiatives to improve access to clean energy such as the Sustainable Energy for All Initiative (UN GA 2011), the amount of people relying on traditional biomass will maintain high in the coming years, and is projected to increase globally due to rising charcoal demands⁴³.

Many of the obstacles to rural electrification arise from remoteness, low population density, and poverty. Yet nowadays, distributed renewable energy systems (e.g. photovoltaics) are reliable means for rural electrification, while economics hinder the traditional extension of electricity grids in rural areas (UNCTAD 2014)⁴⁴.

Due to subsidies and technological improvements over the last decades, renewable energies prosper in many urban and rural settings in industrialized countries, and become competitive in remote, sparsely inhabited rural areas in developing countries (IRENA 2015).

Rural areas in both developing and industrialized countries can provide resources for renewable energy, e.g. agricultural and forest biomass⁴⁵ which can be used in both urban and rural areas.

3.3.4 (Public) Services

Service provision is another dimension of urban-rural interactions. Most services originate in urban areas and are either delivered to rural dwellers, or made available in access points to which rural users must come, e.g. postal services,

⁴² Traditional biomass cooking systems are inefficient and pose health risks, causing more than 1.5 million of premature deaths per year (WHO 2006; IEA, UNDP, UNIDO 2010).

⁴³ Charcoal is often used in cities and as energy source for industries, especially in developing countries. Global charcoal production increased by 30 % over the last decade (Boucher et al. 2011). Most charcoal is produced in Africa, Asia and Latin America. Charcoal production may lead a significant impact on deforestation and forest degradation, as it is the case of Brazil (IINAS, CENBIO 2014), and Africa (Mohammed, Bashir, Mustafa 2015). On the other hand, woodfuel and charcoal contribute to rural and urban income (Schure, Levang, Wiersum 2014).

⁴⁴ Improved access to electricity could substantially increase the scope for rural **non-agricultural** business, and facilitate access to information and education. It also supports improved agricultural production by allowing services such as refrigeration of perishable produce (Kirubi et al. 2009).

⁴⁵ Biomass for bioenergy is extensively used in industrialized countries for heating, power generation and (to a smaller extent) as transport fuels, and its use is expected to increase to feed bioeconomy targets (Panoutsou et al. 2015). In addition to primary biomass from crops and forests, residues from industrial processes (i.e. food processing, furniture, pulp and paper) and organic household wastes can be used. Bioenergy demand in industrialized countries depends on policy support (in particular for co-firing), as well as competing fossil fuel prices, and cost of CO₂ certificates (IINAS, CENBIO 2014).

utility networks, education, healthcare, social services etc. (OECD 2013; Copus 2012). Other services such as water (see Section 3.4) often rely on rural sourcing. The necessity to increase efficiency and cut expenditures will lead to more centralized provision of services in urban centers, and reduction of public transport services in remote areas will diminish quality of life there. On the positive side, new technologies (especially ICT, see Section 3.5.4) have some potential to improve rural livelihoods.

Urban and rural areas within functional regions depend on one another for a wide set of other basic services, such as administration, culture, and education. Under increasing fiscal constraints, many such services have to be rationalized to achieve economies of scale so that more “burden sharing” between urban and rural areas is under discussion (OECD 2013).

3.3.5 Infrastructure and Transport

Physical facilities, such as transportation, power and communications, contribute to economic development, industrialization, trade and mobility of labor. Water supply, sanitation and sewerage, together with education and health facilities, have a direct impact on quality of life. All of these types of infrastructure connect people to people, goods to markets, workers to jobs, families to services, and rural to urban centers – a connectivity process that is essential to reduce poverty and increase general well-being (UN-HABITAT 2013b).

Infrastructure and transport are bridging the urban and the rural. Transport costs account for a significant proportion of total costs to link urban and rural areas. An improvement in rural road quantity (length or density) and quality increases the inter-linkages between urban and rural areas (von Braun 2007).

On the other side, as mobility levels increase many urban dwellers tend to lower density living, giving rise to urban sprawl where land is available and comparatively cheap.

One of the most discernible trends when observing the current dynamics of cities and urban regions is **urban sprawl**.

“Urban sprawl can be defined as the low-density expansion or ‘leapfrog development’ of large urban areas into the surrounding rural landscape” (Kjell et al. 2014).

Urban sprawl contributes to high numbers of cars, distances travelled, length of paved roads, fuel consumption, alteration of ecological structures and the conversion of rural land into urban uses (UN-HABITAT 2013b). Urban areas expand approximately two times faster than the population in e.g., the USA and China. Increasing economic welfare and living standards, together with smaller household sizes but increasing household numbers, are important drivers behind this development (Kjell 2014).

In addition to more space being taken up by low-density developments, transport systems also use substantial amounts of space for roads, railways, parks lots and other associated infrastructure. The loss of agricultural land and the changing local climate resulting from greater amounts of land being allocated to urban development (and motorized transport) mean that there may be increased fragmentation of natural habitats, reductions in biodiversity and impacts on local ecosystems as roads act as barriers (OECD 2002).

Nevertheless, in developing countries the indirect effects of improved infrastructure⁴⁶ for flows of goods, services, and information are important benefits beyond transport cost reductions (von Braun 2007; Escobal, Torero 2005).

3.4 Ecosystem Services and Land

Rural-urban linkages with respect to environmental flows concern ecosystem services such as food, land, recreation and water, of which rural areas are often major providers, and cities major consumers (OECD 2013). The conversion of agricultural and pasture land, forests or protected areas into construction land used for housing, industry, and logistics leads to a loss of such services, though (Wehrmann 2014). Furthermore, water infrastructures are key for adequate livelihoods in urban areas (McDonald et al. 2014), and urban-rural cooperation with regard to water resources is a relevant linkage, as there are yet significant inequalities (Bain et al. 2014).

Accessibility and tenure of land are key factors influencing urban-rural linkages. In rural areas, availability and suitability of land is a determinant factor for livelihoods. Its availability influences the push and pull factors of rural-urban or urban-rural migration (Sietchioing 2015).

Land conversion for urban construction or urban productive sectors often results in loss of livelihoods and employment, further driving rural migration, often adding to expanding slums. According to UN-HABITAT estimates, one decade ago 924 million people in urban areas did not have security of tenure. In 2014, this figure is expected to have grown significantly, given the high rate of urbanization in developing countries (UN-HABITAT 2014).

The sustainable developments of urban areas, along with their rural environs, require that competing demands for social, economic and environmental uses of land are dealt with in an integrated manner. The Voluntary Guidelines on the Responsible Governance of Tenure of Land, Fisheries and Forests in the Context of National Food Security (VGGT) are a key soft law instrument in the area of

⁴⁶ The lowest levels of infrastructure provision are in urban Africa: average water and sanitation coverage 89 and 69 %, respectively; electricity: 69 %; paved roads: 28 %; fixed telephone lines: 4 %; cellphones and Internet connectivity: 57 and 10 %, respectively (UN-HABITAT 2013b).

tenure (CFS 2012), and their implementation is a key issue also on the city and regional level, as well as in peri-urban areas (Wehrmann 2015).

3.5 Summary of Key Urban-Rural Interlinkages

As shown in Section 3, urban-rural linkages are - in the broad sense - flows of people, goods, services, money and environmental services between rural and urban locations which are (or can be) **spatially** decoupled.

The urban-rural interface is and will be a significant research field to implement sustainable land use management (Wehrmann 2015).

Before drawing conclusions (Section 4), the following briefly integrates the key urban-rural linkages with regard to global land use.

3.5.1 Rural Transformation and Migration

Rural out-migration is a key urban-rural linkage, implying urban population increase, diet transitions, and land use changes such as conversion of formerly cultivated land, forests, and wetlands.

To meet this challenge, both urban and rural land use policies and respective planning have to become integrative and improve in methods (see Section 4.3) to not only address land tenure but also ecosystem services.

3.5.2 The Dualism of Urban-Rural Decoupling and Peri-Urban Integration

As indicated previously, urbanization seems irreversible and so is the urbanization at the peri-urban interface. As rural hinterlands and urban areas are interwoven, the nature of linkages has changed (globalization, trade liberalization, ITC development) from a direct regional connection (flows of material, people...) towards more supraregional linkages between the two spheres. In parallel, however, the peri-urban interface develops towards more integration, as rural and urban systems become more closely linked at this “borderline”⁴⁷.

This dualism needs to be recognized and integrated in a cohesive way in policy development. For instance, Colombia has re-defined “rural” based on a spatial approach that recognizes the urban-rural interdependencies (DNP 2014). In suburban areas of Lima (Peru), much work has been done to define watershed areas and make these part of urban-regional planning, ensuring water and energy supply⁴⁸ (Steinberg et al. 2014).

At the peri-urban level there are opportunities to plan for landscape mosaic patterns that protect valuable ecosystems and biodiversity hotspots and preserve natural corridors to prevent flooding and landslides (GIZ, ICLEI 2014).

⁴⁷ It should be noted that this delineation is not “strict”, as the peri-urban space is a “fuzzy” concept, see Section 2.

⁴⁸ <http://www.mundotnc.org/donde-trabajamos/americas/peru/rimac-1.xml>

3.5.3 Consumption and Production Patterns: New Regionalism versus Globalized Markets

The globalization trend in many product value chains “decoupled” previously close urban-rural links, e.g., for food and materials (Steinberg 2014).). As urban and rural food systems are increasingly important to food security and urbanization increases, more localized food systems can **complement** the globalized ones (Fritsche, Laaks, Eppler 2015).

The development of resilient food systems through urban-rural integration could benefit both the agricultural sector and the urban population. In particular, the organization of farmers has the potential to overcome traditional constraints in accessing productive assets, finance, training and markets (IFAD 2015).

Also, the “bioeconomy” demands renewable raw materials mainly from rural areas, and renewable energy from biomass, geothermal, small-scale hydro and wind are decentral options to supply both rural areas, and cities.

Urban consumers become more interested in regional (food, furniture, textiles...) and - in parallel - to globally “fair traded” products. This demand allows rural producers to engage in this by becoming suppliers of respective goods. On the other hand, urban areas are more likely to support a “sharing economy” due to the higher density of demands.

Yet, these developments must be seen in the context of the ongoing process of increasing standardized mass-market products traded internationally, To what extent the new urban-rural relationships can become transformative is an open issue.

3.5.4 ICT and Mobility: A Game Changer?

Information and communication technologies (ICT) are new elements in the discussion about accessibility of rural areas (Copus 2012). Technology is increasingly reducing the human work force, and transforms nature, type and location of work (Chapman, Slaymaker 2002). At the same time, aging populations and shortages of highly skilled labor emerge. This will affect rural-urban linkages regarding the possibility to absorb rural labor in modern businesses, and the need to retrain or “up”skill the workforce (Steinberg 2014).

With the improving nature of transport and connectivity between rural and urban areas, and emerging ICT, certain industries and services do not require to be located in cities any more (Chen, Liu 2013). This may bring opportunities to rural areas:

“It is only the rise of the internet, as a key marketing mechanism for many of our case studies businesses, which has enabled these businesses to remain in remote County Clare” (Wilson, Whitehead 2012).

4 Conclusions and Perspectives

The urban-rural transformation is embedded within a wider process of structural change that involves not only whole countries but – due to globalization – all “teleconnected” spaces around the planet, as discussed in Section 4.3.

Rural areas face a decline in the **relative** weight of agriculture, a corresponding increase in (extractive) industry and services, migration to cities, and a transitory period of rapid demographic growth. However, this process transforms rather than destroys rural societies.

The megatrend of urbanization is taken up in the Sustainable Development Goal 11 which calls for “*inclusive, safe, resilient and sustainable human settlements and cities*” (UN-OWG 2014).

To achieve sustainable development regarding land use, recognition and understanding of the **continuum** of rural and urban development are essential. As equitable, sustainable and balanced development can only be attained if the challenges of cities and towns and rural areas is seen from a holistic perspective (Sietchiping et al. 2015).

This paper identified several linkages, which seem crucial to analyze further, and to consider in more detail in follow-up work, as the sustainability of future global land use will largely be determined by these issues.

4.1 Urbanization and Migration: Appreciating the Unavoidable?

From the earlier review of literature on urbanization and migration one can draw that both trends will shape the 21st century, and will affect and transform current urban and rural land use. Acknowledging this, UN HABITAT – in preparing for the 2016 HABITAT III conference – seems to focus on opportunities instead of “containment” (Wunder, Wolff 2015).

As briefly discussed in Sections 2.3 and 3.2.1, urbanization and migration indeed offer options to improve both urban and rural livelihoods, if managed well. Furthermore, case studies in Europe found that international migrants can make a significant contribution to rural regional development (DERREG 2011). Researchers in Sweden found:

“As population decline is a constant threat to many rural areas, international migration flows can contribute to their repopulation and to a dynamic and transnational countryside” (Hedberg, Haandrikman 2014).

There is similar evidence from the USA, where immigration used to be an urban issue, and immigration to rural areas consisted mostly of seasonal farm workers – but this has begun to change (Schaeffer, Loveridge, Weiler 2014).

4.2 Urban-Rural Decoupling as a Governance Challenge

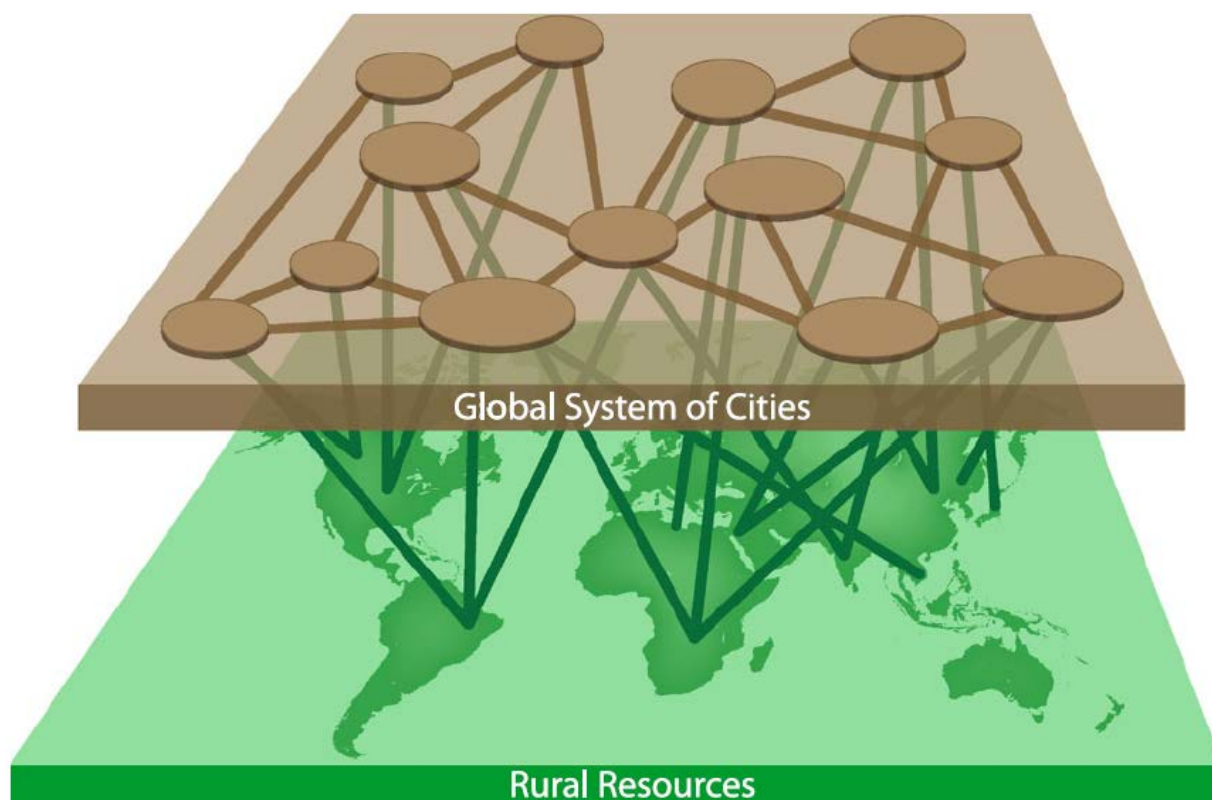
The functional **and** spatial decoupling of cities and their “hinterlands” needs to be considered as a challenge for governance to which – so far – no convincing approach can be identified on the UN level, although the problem has been taken up (Wunder, Wolff 2015).

From the literature one can conclude that this problem requires a global approach, though, as local and regional governance is not able to deal with international competition, and the increasing “translocal” nature of urban-rural links:

“Indeed, although urbanization has brought up the importance of the rural-urban linkages for regional development, the regional rural-urban linkages go beyond the national boundaries to global interactions that promote sustainable development. Thus, the existence of the rural-urban linkages can increase the level of economic growth and development, reduce poverty and improve livelihoods, but the scale, strength and sustainability of economic growth and development, poverty reduction and livelihood improvements depend on global interactions and international trade linkages” (Akkoyunlu 2013).

In a similar way, Seitzinger et al. (2012) have argued and proposed a new “Global System of Cities and Rural Regions”, as shown in Figure 18.

Figure 18 *Conceptual Scheme of a Global System of Cities and Rural Regions Cooperating for Sustainable Resources Management*



Source: Seitzinger et al. (2012)

The previously mentioned research on global material flows and respective land impacts also argues for a global approach to the problem:

*“(...) the spatial disconnect between production and consumption will continue to require the attention of policy makers and scientists alike. If a transition toward a more sustainable resource use is to be made, it must be made **globally**” (Schaffartzik et al. 2014, emphasize added).*

How to further conceptualize, discuss and implement such an approach in an inclusive way should be seen as a key issue for future research on urban-rural linkages with regard to global sustainable land use.

4.3 Transcending Fragmentation through Integrated Landscape Approaches?

In parallel to this, the dynamics of the **peri-urban** (Section 2.5) need to be reflected. At this interface between the urban and the rural, a more **integrated** approach for planning and policy development is required to address sustainability challenges.

From a broad literature base dealing with the concept of ecosystem services (Sayer J et al. 2013), “climate smart” agriculture (Minang et al. 2015) and low-carbon development strategies (e.g., Bell et al. 2014; Hooda 2014) converge on the so-called “**integrated landscape approach**” for which a variety of implementation experience⁴⁹ and views from developing countries (Cilliers et al. 2014; DeFries, Rosenzweig 2010) are already available.

With an integrated landscape approach, not only spatial scales would have to be transcended but also separated knowledge realm, especially those of ecological and sociological views (Pinto-Correia, Kristensen 2013). Yet, this is not without its own challenges with regard to co-operation and coordination between different horizontal governance schemes:

“Developing countries present distinct challenges in this regard, often with weak local governments and strong risks of clientelism and corruption. Here, collaborations between governments and international organisations are particularly crucial to structure and coordinate development approaches, build local capacities and monitor developments” (Rodríguez-Pose, Hardy 2015).

The recently formed Global Landscapes Forum could be a platform to further this (GLF 2014a+b), and earlier work in the EU regarding urban and rural development could contribute a wealth of experience. Further exchanges with the US and especially Africa and Asia should be considered. The upcoming UN HABITAT III conference could be an excellent opportunity to share these first thoughts.

⁴⁹ See e.g. Axelsson et al. (2011); Estrada-Carmona et al. (2014); Freeman, Duguma, Minang (2015); Kozar et al. (2014); Milder et al (2014); Nassauer (2012) ; Opdam et al. (2015); PBL (2015).

4.4 Urban-Rural Co-Evolution: Re-Inventing Sustainable Flows

Changing consumption and production patterns, driven in part by ICT and globalized markets, may further decouple rural from urban areas, and may well help to “stabilize” rural decline by offering new economic opportunities (Akkoyunlu 2013; UNCTAD 2014).

Yet, the positive “trickle-down” effect of liberalized global markets to rural areas must be seen in balance with the competitive challenges of larger-scale suppliers and the consumer trend for “cheap” products which caused economic depression in many rural areas, followed by loss of employment, and respective tax bases.

As a reaction to this, various innovative approaches were tried in e.g. Australia, Canada and the US under the heading “New Rural Economy” (Argent, Measham 2014), and in the EU under “territorial cooperation” (Courtney et al. 2010).

Fundamentally different from globalized, often vertically integrated competing businesses, these approaches follow the logic of “network economics” (Copus et al. 2011) which aims to transcend rural disadvantages of remoteness by decoupling physical space through horizontal – often virtual - business linkages (Woods 2007), and valuing elements of social (trust, cooperation etc.) and environmental capital (Woods et al. 2011).

A key element for success of these approaches is “branding”, a concept which originated from competing cities (Rehan 2014; Sevin 2014), but was translated into the rural realm to valorize rural uniqueness as a marketing device (Pike 2011)⁵⁰. Branding builds on the increasing urban consumer’s interest in more regionalized value-chains, especially for regional and local food, and on ecosystem services with regard to recreational opportunities (e.g. new “biking” tourism). For rural areas to develop beyond agriculture, it is important to

“...develop capacities and a business environment suitable for productive non-agricultural enterprise. Depending on the location of the rural area, these can be designed with agricultural processing in mind, or, if sufficiently proximate to urban settlements, with an emphasis on new opportunities in expanding markets. The reviewed research certainly suggests that agricultural and non-agricultural development go hand in hand, with important inter-linkages and feedback mechanisms that can reinforce development” (Rodríguez-Pose, Hardy 2015).

UN-HABITAT, ICLEI and others call for a new “green mosaic” connecting rural to urban areas through open spaces for recreation, biodiversity (including urban forests and horticulture) that provide many economic, social and environmental co-benefits (FAO 2011; UN-HABITAT 2011).

Such strategies could well fit into the “integrated landscape approach” suggested before, and should be seen as another key issue needing further attention.

⁵⁰ See e.g. de San Eugenio-Vela, Barniol-Carcasona (2015) for Spain, and other examples by Ohe, Kurihara (2013) for Japan, and Tobias, Müller Wahl (2013) for Switzerland.

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