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**THE STATE OF FOOD   
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**STRENGTHENING RURAL-URBAN LINKS   
IN TRANSFORMING FOOD SYSTEMS**

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# Chapter 1. Rural transformation: understanding the past, looking to the future

## Key messages

* Rural economic growth has helped millions escape poverty, and rural areas will remain central to the global objective of ending hunger by 2030
* For ‘late transforming’ low-income countries, where industrialization may be lagging, agroprocessing could be an important means of improving livelihoods.
* Improved economic opportunities and public services in rural areas, secondary cities and towns may reduce incentives for rural outmigration

## 1.1 Introduction

Recent decades have witnessed rapid socio-economic transformations worldwide. Structural changes to economies have boosted per capita incomes, reduced poverty and enhanced food security almost everywhere. Despite those positive trends, however, about 700 million people still live in extreme poverty, and around 800 million suffer from chronic hunger. If the trends of the last two decades continue, and economic growth is not made more inclusive, the first two Sustainable Development Goals – to end poverty and achieve zero hunger by 2030 – will not be reached. Instead, more than 650 million will be suffering from undernourishment (FAO, 2017). Achieving key SDGs is made even more difficult by other, interrelated global challenges, such as climate change, a protracted economic downturn, and environmental degradation.

Economic growth and population dynamics are key drivers of the transformations now taking place. Increases in world population, which is expected to reach more than 9.7 billion by 2050 (UN, 2015a), are driving higher demand for food, while income growth is leading a dietary transition away from traditional staples and toward greater consumption of fruits, vegetables and animal source foods. As a result, food and agriculture production is moving rapidly to more resource-demanding systems, which increase already intense pressure on the natural environment. In turn, the depletion of these resources, coupled with climate change, is constraining the agricultural productivity growth needed to meet increasing food demand.

Changing demographic structures and new patterns of urbanization present policymakers and planners with new challenges and opportunities. In previous decades, developed countries addressed the demographic trend of ageing populations with a combination of social policies and public investments. Today’s middle-income countries may not have similar capacity to cope with declining fertility and rapid ageing. In contrast, many low-income countries, mostly in sub-Saharan Africa, are facing an unprecedented expansion of their youth populations, which poses serious challenges to national economies in providing decent employment to millions of new entrants to their labour markets.

If it continues at current rates, urbanization will lead, in less than 20 years, to the emergence of urban majorities in all regions. By 2030, the urban population of the less developed regions will total 4 billion, and almost 80 percent of the world’s urban dwellers will be in Africa, Asia and Latin America (UN, 2015b). Increases in the size of urban populations in low-income countries is now fuelled more by reproduction than by rural-urban migration. Further, urban growth during the 21st century will occur mostly in rural towns and secondary cities, which typically lack the services and infrastructure found in megacities. In many developing countries, this pattern of urbanization is likely to exacerbate pressures on natural resources and infrastructure.

When their development is supported by policies and planning, rural towns and secondary cities can play a crucial role in structural and rural transformation by strengthening rural-urban linkages, creating higher demand for goods, services and food, and generating employment that leads to poverty reduction. Towns and smaller cities also provide a platform for the growth of the non-farm economy, by expanding the agri-food system’s non-farm segments – trading, processing, packaging, distribution and storage. In many countries, rural transformations are now being shaped largely by the rise of rural towns and secondary cities.

This report examines rural transformation within the context of economy-wide structural transformation. Developments in urban and rural areas are viewed together and seen as interconnected. A distinguishing feature of the report is that it looks at rural and urban areas not as separate domains but as a ‘rural-urban spectrum’ that ranges from the farm level to megacities. It recognizes the dynamic, intermediate roles that rural towns and secondary cities play in boosting the rural non-farm economy in ways that ensure that rural transformation is more sustainable and inclusive.

‘Inclusive rural transformation’ is a process in which growth in rural areas, whether it occurs on-farm or off-farm, benefits all the rural population, especially the poor. By generating decent employment opportunities, improving infrastructure and access to services, and boosting the capacity of rural stakeholders to influence policy, an inclusive transformation attenuates the ‘push’ factors that lead to rural-urban migration. Outmigration becomes not an attempt to escape from poverty, but a free choice made in response to the ‘pull’ factors of urban centres.

The report looks at how rural towns and secondary cities shape rural-urban linkages and influence transformation paths, and at the conditions that make them key actors in more sustainable and inclusive transformation. The analysis shows that rural transformation is not automatically inclusive – rather, it is the result of a deliberate choice by policymakers that makes reducing poverty and inequality top priority objectives to be achieved through economic growth.

This chapter explores rural transformation, how it develops in relation to broader economy-wide structural transformation, and the implications of these transformations for poverty reduction. It reviews transformation experiences worldwide and the features that distinguish the most recent experiences from historical models. The concept of the rural-urban spectrum is then presented, showing how urbanization patterns differ among the world’s regions, and how the differences affect transformation and inclusiveness. The spectrum concept provides a new lens for understanding urbanization and rural-urban migration, both crucial to rural transformation. The chapter concludes by examining developments in the agri-food system that accompany and drive rural transformation and by illustrating some of the challenges that come with new opportunities for rural populations.

## 1.2 Rural transformation is embedded in structural transformation

Development is a process of transformation of countries’ economies that is characterized by improvements in productivity and changes in the relative importance of sectors through the reallocation of factors such as labour and capital. The evidence shows that, over the past 50 years, the relative contribution of agriculture to gross domestic product (GDP) and employment has fallen almost everywhere as economic activity has progressively shifted towards the industrial and service sectors. The process has entailed a sectoral reallocation of labour, increases in sectoral productivities, and a decline in productivity gaps between sectors (FAO, 2017).

Rural transformation, the focus of this report, is embedded in structural transformation; it occurs as agriculture’s relationship to the rest of the economy changes. It involves a strengthening of rural-urban linkages, which connect agriculture to the manufacturing and service sectors as they expand in urban centres. It is a process that leads to increases in agricultural productivity and marketable surpluses, as well as to the diversification of production patterns and rural livelihoods and better access to public services and infrastructure (IFAD, 2016). Due to its profound impacts on rural society – in terms of income, food security, nutrition, resilience and social and cultural benefits – the transformation and its outcomes are of vital interest to all rural stakeholders.

The above is a highly stylized description of structural transformation. But how does it unfold in practice? A recent comprehensive study by Tsakok (2011) found a wide range of country experiences, with outcomes that depended on factors such as the distribution of income and land, the size of the economy, external influences, resource endowments, and public policies. Socio-economic and demographic factors, combined with local availability of technologies, determine production patterns, productivities, and how output is shared across and within countries and sectors, with implications for the socio-economic and environmental outcomes of transformation processes. All developing countries that succeeded in eradicating poverty have gone through this structural transformation. However, the growing challenges of climate change and environmental degradation will require concerted action to ensure that such transformations are not only inclusive but also sustainable.

**Box 1.1 Definitions of transformation**

**Structural transformation** is the reallocation of economic activities, away from the primary sectors (agriculture and natural resources) to industry and services, which accompanies economic growth. It includes increasing productivities across sectors, expansion of the urban economy, a declining share of agriculture in GDP, expanded domestic and international trade, and increased specialization and division of labour. In the long term, it drives increased migration of people from rural areas to urban centres and to urbanization of the countryside, usually combined with a reduction in birth rates, greater participation of women in the workforce, and deep political and socio-cultural changes (IFAD, 2016).

**Agricultural transformation** is both a cause and an effect of structural transformation. The process involves a shift from mainly subsistence agriculture to commercial agri-business characterized by highly diversified production systems. At the individual farm level, the process favours specialization, which allows economies to scale with the application of advanced technologies and modern delivery systems for both inputs and outputs; this, in turn, promotes tighter integration of the farming sector with the rest of the economy and with international markets.

**Rural transformation** captures all aspects of agricultural transformation but also includes the emergence of livelihood and income opportunities in the rural non-farm sector. It involves the expansion of remunerating off-farm employment and entrepreneurial opportunities, which all require improved access to services and infrastructure in rural areas.

**Inclusive rural transformation** is transformation that benefits the entire rural society, enabling all to exercise their economic, social and political rights, develop their abilities, and take advantage of local opportunities. Consequently, the improvements in agricultural productivity and in the rural non-farm sector should raise the incomes of rural people, especially the poor, reducing the push factors that lead to outmigration. An inclusive rural transformation enables rural poor households to escape poverty without having to migrate out of rural areas. Migration may still occur, but it is an active choice and not due to the lack of alternatives.

## 1.3 Impacts on poverty and food security: lessons from the past

The development economics literature suggests that agri­cultural growth, if broadly shared, has the most positive impact on non-farm income and employment (Mel­lor, 1976). Historically, improvement in agricultural productivity was a pre-condition for industrialization, since it al­lowed agriculture to produce the surpluses needed to feed urban industrial workers released from farm labour, supplied raw materials to support agro-industries, increased exports to pay for industrial inputs, such as machinery, and en­hanced the domestic market for industrial products. Virtually no country in the world has ever successfully transformed its economy to one with low poverty rates without sustained growth in agricultural productivity. Hence, structural and rural transformations have been the main pathways for the long-term, sustainable elimination of poverty and hunger (Timmer, 2014).

However, poverty reduction and improvements in food security and nutrition are not automatic outcomes of the transformation process. In fact, recent transformations have shown that outcomes are influenced by a number of factors, including initial poverty rates and levels of development. Figure 1.1 shows trends in urban and rural poverty over the last two decades, by region. In this Figure, the orange and red represent, respectively, the share of total population that is urban poor and rural poor. The Figure shows the relative contribution, over time, of structural and rural transformations to the shares of people who escape from poverty in urban centres (top blue) and rural areas (bottom blue).

In absolute terms, more than 800 million people escaped ‘moderate poverty’ (measured as income of less than US$3.10 a day) across the world between the 1990s and the current decade. In all, the population living above the moderate poverty line increased by more than 1.6 billion people, including 750 million in rural areas. These figures indicate that progress in rural areas is central to achieving the first Sustainable Development Goal of eradicating poverty.

Evidence from literature demonstrates that the patterns and the speeds of structural and rural transformations differ widely by region and in many cases by country, leading to considerable differences in welfare outcomes. Sometimes, transformations in rural and urban areas produce synergies that lead to significant poverty reduction. In the case in East Asia and the Pacific, productivity improvements in agricultural and non-agricultural sectors have reduced the number of poor by more than 800 million, in both rural and urban areas, since the 1990s. In contrast, in South Asia, where agriculture is still the main employer, the reduction in the number of poor has been modest, at 23 million.

#### Figure 1.1. Changes in proportions of rural and urban poor, and non-poor, in total population of selected countries, by region, 1990s–2010s

Note: Poverty level used is ‘moderate’, defined as living on less than US$3.10 purchasing parity power (PPP) a day

Source: SOFA Team elaboration from IFAD (2016).

Note: The graphs are based on the following countries, selected for data availability:

* East Asia and the Pacific – Cambodia, China, Indonesia, Philippines, Thailand, Vietnam
* South Asia – Bangladesh, Nepal, India
* Latin America and the Caribbean – Brazil, Colombia, Dominican Republic Guatemala, Nicaragua, Peru
* Sub-Saharan Africa – Burkina Faso, Ivory Coast, Mozambique, Mali, Malawi, Ethiopia, Nigeria, Rwanda, Tanzania, Uganda, Zambia.
* Near East and North Africa – Iran, Tajikistan, Tunisia, Turkey

In sub-Saharan Africa, where the transformation has been led by growth in the informal service sector, poverty is persistently high. With a few exceptions (mainly Ethiopia and South Africa), poverty rates in the region have remained constant or have been only marginally reduced, while the absolute number of poor has increased, by 30 million in rural areas and by 31 million in urban areas.

Two developing regions, Latin America and the Caribbean and the Near East and North Africa, had low poverty rates two decades ago. Given their high initial urbanization levels, the exit from poverty is now taking place mainly in urban areas, owing in Near East/North Africa to very limited improvements in agricultural productivity and in Latin America/Caribbean to low levels of rural inclusion, despite strong improvements in agricultural productivity. For example, in the period between 1990 and 2013, labour productivity nearly doubled in Mexico and Brazil, and more than quadrupled in Argentina. However, poverty reduction was relatively modest (IFAD, 2016).

From the early 1980s to 2010, the number of rural poor declined in Latin America and the Caribbean from 74 million to 62 million, while the number of extremely rural poor declined by only 2 million, from 41 million to 39 million. This low level of rural inclusiveness is explained by the persistence of high inequality of income, which governments have addressed by implementing large social protection programmes to provide income support to the poor and vulnerable, including smallholder farmers (FAO, 2017). Another reason for the lack of rural inclusion is the urban bias in policies as shown in Figure 1.1 – people are exiting poverty at faster rates in urban areas, where poverty has been more concentrated. The latest estimates indicate that 58 percent of poor people live in Latin America’s urban centres, compared to 25 to 30 percent in other regions (World Bank and IFAD, 2016).

Transformation processes can lead to accelerated rural-urban migration, depending on the dominant type of transformation. For example, despite noticeable improvements in agricultural productivity in East Asia and the Pacific, the fast pace of rural outmigration has caused the rural population to fall from 70 percent to approximately 50 percent of total population. Outmigration has been driven mainly by faster growth in manufacturing and associated services (IFAD, 2016). The synergy of increased productivities across sectors is the preferable dynamic for rural and structural transformation, since – as shown in the case of East Asia and the Pacific – it could lead to the most rapid reductions in overall poverty.

This may explain, at least in part, why poverty reduction has been slow in sub-Saharan Africa, where increasing urbanization is not supported by comparably strong growth in manufacturing. As a result, people leaving agriculture are moving mostly into the informal service sector, which is characterized by low productivity. In such cases, poor rural migrants, instead of finding a pathway out of poverty, are likely to enlarge the urban poor population. A similar dynamic is seen in South Asia, where the rural poor are more likely to escape poverty by remaining in rural areas than by migrating to cities.

## 1.4 Recent rural transformations: what is new?

### 1.4.1 The patterns and pace of change vary widely

Differences in the patterns and speeds of structural and rural transformations and their outcomes are largely shaped by geography, natural resources endowments, social factors, land availability and policies. These factors differ substantially by region and often by country. Most Asian countries have undergone relatively rapid transformations, but with some marked differences.

East and Southeast Asia, the Green Revolution brought a quantum leap in output and yields of rice and wheat, which boosted small farm productivity and profits. Farms became more commercial and agricultural value added per worker rose significantly (FAO, 2017). Government investments and strong support for smallholder agriculture and agrarian reforms through to the late 1990s paved the way for other industries to develop. Gradually, most GDP growth was in the services and industrial sectors.

The process in South Asia has been slower than in East Asia. The service sector has become predominant, and no mature manufacturing sector has developed. As a result, South Asia lags behind in the shift from low- to high-productivity employment, despite the decline in agriculture’s share in total GDP. In India, for example, agriculture’s GDP share fell gradually from 29 to 18 percent between 1990 and 2012, but the sector still employs 47 percent of the workforce, down from 61 percent in 1994. Agriculture still employs most workers in Bangladesh, Bhutan and Pakistan, with shares ranging from 44 to 62 percent, even though agriculture’s share of GDP has fallen significantly. The declining GDP shares, even while large numbers of people still work in the sector, reflect low rates of growth in agricultural labour productivity.

The movement of labour from low-productivity agriculture into low- (or even lower-) productivity service sector jobs is of particular concern in sub-Saharan Africa, where in many countries, the transformation process has reduced productivity, rather than increasing it (Timmer, 2014; McMillan and Headey, 2014; Badiane, 2011). Between 1970 and 2010, average GDP per capita in the region grew from US$530 to US$620, while China’s real GDP per capita rose from less than a quarter of Africa’s to five times the African average (Monga, 2016). Africa’s weak performance was due to the lack of structural transformation during that period – the labour force leaving agriculture was largely absorbed by the low productivity service sector and industry actually lost ground (Rodrik, 2014). Fox, Thomas and Haines (2015) note that the region’s high population growth rate also acts as a brake on structural transformation because the manufacturing sector is too small to absorb new entrants to the workforce.

### 1.4.2 For many late developers, industrialization is not an option

The economic role of agriculture is declining in all countries in transformation. However, industrialization – intended as the development of manufacturing and heavy industry, which was a main driver of transformation in many Asian and Latin American countries – is not occurring in the late transformers of sub-Saharan Africa. McMillan and Harttgen (2014) report that between 2000 and 2010, 19 African countries saw the share of the labour force in agriculture fall by an average of 10 percent; the decline was most rapid in the economies most dependent on agriculture. However, unlike the case of Asia and Latin America, Africans leaving agriculture are not moving to industry in most cases, but – as noted above – to low productivity informal non-farm activities, generally in the retail trade and services (World Bank, 2007).

#### Figure 1.2. Changes in shares of rural and urban non-poor, in selected countries, 1990s–2010s

Note: Poverty level used is ‘moderate’, defined as living on less than US$3.10 purchasing parity power (PPP) a day

Source: SOFA team elaboration from World Bank and IFAD (2016)

The move from low-productivity agriculture to the low-productivity service sector in sub-Saharan Africa is not producing substantial increases in household incomes. Although labour that exits agriculture overcomes the seasonality that characterizes farm employment, the increased working hours are not associated with higher productivity. As explained by McCullough (2015), households and individuals often earn more by working more hours, not by increasing their labour productivity. The benefits of this path of transformation, in terms of poverty reduction, have so far been very modest, as shown in Figure 1.2, which replicates Figure 1.1 for a selection of countries in East Asia and the Pacific, the region that has undergone the most rapid transformations and poverty reductions, and sub-Saharan Africa, where poverty status has changed very little. The arrows in the Figure illustrate changes in poverty levels, and their direction suggests the main driver of change – such as rural transformation in the case of Cambodia and urban economic growth in the case of China. The Figure indicates that poverty rates have declined only slightly in most African countries, and have actually increased in Kenya and Zambia.

Most countries in both regions had very similar proportions of non-poor in their total populations in the early 1990s. Since then, poverty rates have declined only modestly in Sub-Saharan Africa, and in some countries have increased. While the proportion of non-poor has increased considerably in East Asia/Pacific, in both rural and urban areas, poverty reduction has been accompanied in most countries by increasing inequality of income distribution, in both rural and urban areas. For example, in China, which has witnessed the most rapid poverty reduction, the Gini index increased by nine points in rural areas (from 30.6 to 39.5) and by 10 points in urban centres (from 25.6 to 35.4) between the 1990s and the current decade. Similar trends are observed in the other countries for which data are available, except Cambodia, where noticeable poverty reduction has been accompanied by a tangible increase in income equality in both rural and urban areas.

### 1.4.3 The growing importance of small cities and towns

Rapid urbanization, combined with income growth, has been driving the transformation of food systems and markets worldwide. The share of the world population living in urban areas rose from 30 percent in 1950 to 54 percent in 2014, and is forecast to reach 66 percent in 2050 (UN, 2015b). The popular image of urbanization is often of large, sprawling, densely populated megacities, and the perception is that today’s estimated 4 billion urban dwellers live in cities akin to New York or New Delhi. But urban areas come in a very wide range of sizes – from megacities to small market towns and administrative centres (Cohen, 2004). Most urban areas are, in fact, comparatively small and nearly half the world’s urban population lives in cities of fewer than 500 000 residents (Balk *et al.,* 2012; UN, 2015b). In addition, about one in four urban dwellers lives in an urban area with 100 000 to 500 000 inhabitants (Balk *et al*., 2012).

Recent urbanization is happening more in small cities and towns than in megacities for the following reasons. First, in countries with high rural population growth rates, such as most of those in sub-Saharan Africa, West Asia and South Asia, many large rural villages have been reclassified as small towns. Second, in a sample of countries with population exceeding 15 million (Figure 1.3), and assuming that our sample is representative, the majority (19) have registered higher population growth rates in small cities and towns (above the red line in the Figure) than in larger cities; they include some very highly populated countries, such as China, Egypt, Ethiopia, Indonesia and Sri Lanka. Only nine countries fall into the second category, those where urban growth occurs mainly in large cities (below the red line). Although this latter category includes some populous countries, such as India, Bangladesh and Pakistan, the growth rates of their large cities are only marginally higher than those of their small cities and towns.

#### Figure 1.3. Relative rates of annual population growth in large cities and in towns, in selected countries, 1990s-2010s

Note: Country selection is based on data availability for countries with populations of more than 15 million.  
Source: SOFA team calculations and elaboration. See Statistical Annex Table A1.

These observations are confirmed by evidence of the importance of small towns in urban market development (see Ruhiiga, 2013). In a study of urban agglomeration trends in East Africa, Snyder and Tschirley (2014) document the quantitative importance of growth in towns and smaller cities, noting that these urban centres are diversifying their economic base and generating strong linkages to rural areas. Tschirley, Haggblade and Reardon (2014) note that the spatial concentration of urban populations is declining, with smaller cities and towns capturing a greater share of total urban population growth. Other studies have documented the explosive growth of small towns during the last two decades, especially in Latin America and Asia, where they have played the role of ‘intermediate cities’, with economies closely linked, on one side, to surrounding rural areas and, on the other, to larger cities (Reardon, Stamoulis and Pingali, 2007; GRAL/CEDAL, 1994, p. 130; Hardoy and Satterthwaite, 1989; Jordan and Simioni, 1998).

## 1.5 Urban-rural linkages and the agri-food system

While population growth increases demand for agricultural products and stimulates farming activities, urbanization brings with it demand for food that can be easily stored and transported. This, in turn, gives rise to the need for food processing, the standardization of agricultural output and, in many cases, the concentration of primary production and the consolidation of farmland. Along with food processing, another key factor in the transformation of food systems is dietary change, which occurs as income growth drives demand for more diversified products and services not only in small cities and towns but also in rural areas themselves. This demand drives further economic development and income growth – because multiple supply chains for diverse agri-food products are more labour-intensive than cereal production and processing, their development, maintenance and operation have employment multipliers in rural areas and towns.

### 1.5.1 Transformations downstream and midstream

Urbanization leads to higher incomes, changes in lifestyles, and greater female participation in the workforce. These factors stimulate not only growth in food consumption, but also demand for a wider variety of foods and for greater convenience in food purchasing and preparation. The result is an ongoing ‘nutrition transition’ in developing countries that corresponds closely to that seen in industrialized and middle-income countries in earlier decades (Popkin, 1999; Popkin, Adair and Ng, 2012).

At higher incomes, an increasing share of the household’s diet typically comes from animal source foods, vegetable oils and fruits and vegetables, while the consumption of staples such as cereals, roots and tubers, declines (Regmi *et al.*, 2001). This dietary shift has been observed in Asia along with rapid economic and income growth, urbanization and globalization (Pingali, 2006). In Africa, too, growth in recent years has brought changes in food demand, away from cereals and tubers towards fish, meat, eggs, dairy products, fruits, vegetables and fats, along with a general shift to more processed foods (Tschirley *et al.,* 2015).

There has been an enormous shift to processed foods in Asia. For example, in India about 85 percent of all food undergoes some processing (Reardon and Timmer, 2014). This is true also in rural areas of Asia – processed food accounts for 60 percent of total food expenditure, of which 30 percent goes to highly processed foods (Reardon *et al.,* 2014). Increasing demand for processed food provides an opportunity for growth of agri-business, which includes the supply of production inputs as well as the distribution of outputs from agro-industry[[1]](#footnote-1). While agri-business development creates opportunities for more inclusive rural transformation[[2]](#footnote-2), it also presents challenges, as we will see below.

### 1.5.2 Upstream transformation: stronger demand and value chains

The biggest markets for agricultural products are located in urban centres. Therefore, urbanization not only changes patterns of demand, but also expands considerably economic opportunities for producers. In Asia, urban markets now consume about 60 to 70 percent of the food supply. Africa’s urban food markets have grown rapidly and now represent half or more of overall food consumption (Reardon *et al.,* 2015). Although comprehensive data are not available, it has been estimated that the value of urban food markets in sub-Saharan Africa will increase fourfold between 2010 and 2030 – from US$313 billion to US$ 1 trillion (World Bank, 2013). In East and Southern Africa, the share of urban consumers in the purchased food market is already 52 percent and is forecast to rise to 67 percent in 2040 (Tschirley *et al.,* 2014).

Growing demand for food and for a broader range of food products creates opportunities for domestic producers, provided they are able to satisfy the demand. Evidence from sub-Saharan Africa shows that, although the balance of trade in agricultural products has worsened, most of the increase in demand over the past 50 to 60 years has been met by domestic production (Vorley and Lanҫon, 2016; Badiane and Makombe, 2014). For example, more than 95 percent of the fresh fruits and vegetables consumed in Kenya is grown domestically, mainly by smallholders, and supplied mainly by small and medium-sized enterprises through informal chains (World Bank 2013).

While offering employment and income opportunities, the transformation of agri-food chains in low- and middle-income countries has, in many cases, created serious barriers to the participation of smallholder producers and small-scale agro-processors in local, national and global markets. Capital-intensive production and supply processes require much less labour (Neven *et al*., 2009). Reduced demand for labour, combined with barriers to smallholder access to supermarket channels, may undermine farmers’ livelihoods if they cannot diversify into rural off-farm activities. Ultimately, this may hinder rural transformation.

For many small-scale operators, lack of access to finance, transport and markets, as well as the barriers created by standards on quality, traceability and certification, often make participation in integrated value chains very difficult. To benefit from the transformation of food systems, smallholder farmers must be able to join value chains through fair contracts with processors and traders. In recent decades, a variety of business models, national and international value chain organizations, and institutional arrangements and policies have emerged to provide incentives and support services to smallholders, with the aim of sustainably increasing food production and facilitating their market access (Rao and Qaim, 2011).

## 1.6 The ‘rural-urban spectrum’: a new lens on urbanization and migration

The new pattern of urbanization described above, characterized by the emergence and growth of small cities and towns, has implications for rural and structural transformations, the development of the agri-food system, and opportunities for income growth and employment to lift people out of poverty. In general, urbanization can have a substantial and systematic poverty-reducing effect in surrounding rural areas, mainly through economic linkages rather than through the direct movement of the rural poor to urban areas. Calì and Menon (2012), using district-level data from India, found that urbanization has contributed considerably to poverty reduction in surrounding rural areas, mostly though improved consumer access to agricultural products.

While their role in urbanization has been neglected by researchers seeking generalizable urban models (Bell and Jayne, 2009), a growing body of evidence indicates that small cities and towns are more effective in reducing overall poverty than large cities, even though incomes rise comparatively faster in the latter. Dorosh and Thurlow (2013), using a general equilibrium model for Ethiopia, argue that growth in towns, rather than in large cities, leads to more inclusive economic growth and poverty reduction. Their study shows that agriculture has stronger growth and welfare linkages with small towns than with major cities. This was confirmed by a study which demonstrated that, in sub-Saharan Africa during the period 1980–2004, diversification into rural non-farm and small town activities typically facilitated more inclusive, even if slower, rural economic growth. This may be, in part, because the seasonality and underemployment typical of agriculture generally constrain rural incomes; therefore, having small towns nearby provides more diversified economic and employment opportunities. Because they are more distributed over a territory, multiple small towns provide options for a larger share of the rural population and, because a large share of poor is rural, they have a greater impact on overall poverty reduction (Christiaensen and Todo, 2014).

Related studies have shown that urbanization is far more effective in reducing poverty when it occurs in a relatively decentralized fashion, with robust growth in towns and smaller cities near production areas. Such growth builds stronger linkages with rural areas, and gives more rural households access to the means for improving their incomes and welfare (Christiaensen, De Weerdt and Todo, 2013; World Bank, 2009). In Asia and Latin America, growth in the rural non-farm economy was driven by considerable growth in the population of towns and small cities that had strong links to other urban areas and the rural hinterland (Reardon, Stamoulis and Pingali, 2007; Berdegué *et al.,* 2015).

The new urbanization pattern has blurred the distinction between urban and rural areas, especially those rural areas in closer proximity to urban centres. Indeed, the urbanization of rural regions is a central feature of rural transformation – it allows rural households to diversify their sources of employment and income while living and working across the urban-rural spectrum (Berdegué and Proctor, 2014). For example, Bhalla (1997) found that rural non-farm wage employment in India was mainly concentrated in small- and medium-size services firms located in ‘corridors’ of inter-urban transport and in broad swathes around cities; in contrast, rural non-farm employment was poorly developed in the rural hinterland. Elbers and Lanjouw (2001) and Escobal (2005) made similar findings in Ecuador and Peru. In Nepal, most wage and self-employment in non-farm activities is concentrated close to urban centres (Fafchamps and Shilpi (2003).

Looking at rural areas and urban centres as mutually exclusive, therefore, misses a crucial part of the transformation process. There is a great diversity in the patterns of urbanization occurring around the world, in the size of urban agglomerations, and in how rural and urban areas are classified at national level (see Box 1.2). Understanding and harnessing the potential of small cities and towns to drive rural transformation requires a more holistic perspective, one that considers commonalities and differences in the rural-urban spectrum within and across countries.

**Box 1.2 Definition of ‘urban’ a challenge to measurements of urbanization**

The main source of United Nations urban population and urbanization data is national population censuses, and data drawn from population registers and administrative statistics. The UN’s Population Division uses primarily administrative criteria to define urban populations, but also combines population size and density, and urban and economic characteristics, to distinguish urban from rural settlements. The criteria for what constitutes an urban setting may be based on one or a combination of characteristics, including a minimum population threshold, the proportion employed in non-agricultural sectors, and the presence of infrastructure such as paved roads, electricity and piped water (UN, 2015).

Countries’ definitions of ‘urban’ vary widely. For example, the United States Census Bureau defines an urbanized area as having 50 000 or more people and an urban cluster as having from 2 500 to 50 000 people, while France defines as urban those settlements with 2 000 people or more, living in houses separated by no more than 200 m. Uganda changed its urban definition from a settlement with 1 000 inhabitants or more in 1991 to 2 000 inhabitants or more in 2002 (UN, 2015). The great disparity in country definitions, and the fact that definitions often change, hinder measurement of urban population size and growth rates, comparisons of urban population between countries, and aggregations at regional and global levels (UN, 2015).

While the UN’s urbanization estimates and projections are the most widely cited and are based on a comprehensive data set, caution is needed when comparing urban trends between countries and across scales (Satterthwaite *et al*., 2010). For instance, a background paper to the 2009 *World Development Report* states that the share of India’s population classified as ‘urban’ in 1991 would have increased from 26 percent to 39 percent if the 113 million inhabitants of 13 376 ‘rural’ villages with populations of 5 000 or more were included. The share would be even higher with the Swedish definition of ‘urban’ – i.e. settlements with more than 200 inhabitants (Uchida and Nelson, 2010). Mexico’s urban population in 2000 was either two-thirds or three-quarters of total population, depending on whether the threshold were 2 500 residents or 15 000 residents (Satterthwaite, 2007).

In short, the net separation of rural and urban does not accurately describe how populations are distributed across what is really a rural-urban continuum (Cohen, 2004; Seto *et al.,* 2012).

Source: Tuholske, 2016.

Rural and urban areas have numerous interlinkages, created by households residing in settlements that range from single farms and isolated small villages to very large cities. Between these two extremes, the rural-urban continuum includes larger villages, towns, and small and medium cities. Urban and rural sectors are not clearly distinct, but form a continuum from the capital and other major cities to larger regional centres, to smaller market towns and finally to rural spaces.

Differences in the size of agglomerations have different implications for surrounding rural areas and the population residing in them. Large cities create greater demand for agricultural products than small ones. For example, Vandercasteelen *et al.* (2017) found that while Ethiopian farmers operating near urban areas, in general, practise more intensified production and receive higher prices for their produce, the level of intensification and output prices are significantly higher in areas surrounding *large* cities than those near small towns. On the other hand, as has been highlighted above, small towns are important in poverty reduction because they provide more inclusive non-farm employment compared to large urban agglomerations (Christiaensen and Todo, 2014).

Multiple pathways of rural transformation are possible for a country with a given set of agglomerations, associated geographic constraints, levels of institutional development and infrastructure linking rural and urban areas. The sizes of towns and the distances between rural areas and urban centres are key aspects in these rural transformation pathways. It is necessary to distinguish, therefore, rural populations living in the immediate proximity of towns, those residing in intermediate locations and those living in the rural hinterland.

### 1.6.1 Characterizing agglomeration, geography, and infrastructure

Apart from the UN Population Division estimates (UN, 2015), few other data sets are available for measuring urban population and urbanization at national, regional and global scales. The only alternative to the UN data is satellite-based estimations of urban land area[[3]](#footnote-3), combined with data on urban population density and total urban population (although some of these estimates still rely on the UN data as a population parameter). Such integrated models were used to measure urbanization and urban population in at least 180 case studies published between 1988 and 2008. A meta-analysis of these studies shows that India, China and Africa had the highest rates of urban land expansion between the 1970s and 2000 (Seto *et al*., 2012).

This report draws on the World Bank’s agglomeration index, developed for the 2009 *World Development Report*, which uses spatial data on population density, agglomeration size and travel time to urban centres as thresholds to estimate urban population (World Bank, 2009). The approach is refined here by adapting it to the ‘rural-urban spectrum’ concept, calibrating the thresholds in order to produce a breakdown of population that gravitates around cities of different sizes, and differentiating them by travel time. The result is a full rural-urban spectrum, with a consistent definition across all countries. For a full description of the methodology, see Annex 1.1.

#### Figure 1.4 Map illustrating the rural-urban spectrum concept



Source: FAO

#### Table 1.1 Distribution of global population in small, medium and large cities and of rural populations by proximity to them, 2007

|  |  |  |  |
| --- | --- | --- | --- |
|  | *Urban and peri-urban (Travel time < 1 hour)* | *Proximate rural*  *(Travel time 1 to 3 hours)* | *Rural hinterland (Travel time > 3 hours)* |
|  |  |  |
| *City/town size* | *Percentage of global population* | | |
| *Towns* | *10.2*  *(HD 6.7 ; LD 3.6)* | *4.4*  *(HD 1.9 ; LD 2.5)* | *15.3*  *(HD 5.0 ; 10.5)* |
| *(Population 50,000–100,000)* |
| *Small cities* | *23.4*  *(HD 17.8 ; LD:5.6)* | *11.5*  *(HD 5.4 ; LD 6.1)* |
| *Population 100,000–500,000* |
| *Large cities*  *(Population >500,000)* | *25.2*  *(HD 22.3 ; LD 2.7)* | *9.9*  *(HD 5.2 ; LD 4.6)* |
|  |

Notes: Figures in parenthesis are shares of population living in high density areas (HD) and in lower density areas (LD) with a threshold of 1000 people/km2. Towns of fewer than 50 000 people are not captured here as urban or peri-urban. See Annex 1.1 for an explanation of how the rural spectrum was computed.

Source: SOFA team calculations.

Figure 1.4 illustrates the concept of the rural-urban spectrum, showing relationships between large cities, secondary cities and towns (and their ‘catchment areas’) and the rural hinterland. Table 1.1 quantifies urban and peri-urban populations living, as of 2007, in large cities, small cities and towns, as well as the rural populations living around them, with proximity measured in travel time from their residence area to the closest urban centre. The Table distinguishes travel times of less than one hour (indicating urban and peri-urban areas), between 1 and 3 hours (indicating rural area in proximity to urban centres), and greater than 3 hours (indicating rural hinterland). The results show that half of the world’s population resides within or in proximity to small cities and towns (red and pink cells in Table 1.1), compared to 35 percent living in or near large cities (blue cells). The remaining 15 percent reside in the rural hinterland, located more than 3 hours of travel time from any urban centre of 50 000 inhabitants or more.

Proximity to urban centres does not, *per se,* translate into greater economic activity and opportunity, which depend also on levels of access to physical and human capital as well as the policy and institutional environment. However, the fact that 34 percent of urban and peri-urban dwellers live in small cities and towns, compared to 25 percent in larger cities, is evidence that, at least in terms of food demand, the former are likely to play at least as important a role in transforming the livelihoods of rural people. Since it has a very different set of needs, the rural hinterland poses a considerable challenge to policymakers seeking to promote inclusive rural transformation.

The urban and peri-urban shares in Table 1.1 differ from official UN data, as was the case for the World Bank’s agglomeration index. This can be seen at the global level where the ‘strictly urban’ population share – those living in high-density urban areas – amounts to approximately 47 percent, which is lower than the UN estimate for year 2007 of 50 percent. Including peri-urban areas with densities of less than 1 000 people/km2 increases this share to 59 percent, which is higher than the UN estimate. However, the purpose of the rural-urban spectrum concept is not to determine exactly who is ‘urban’ or ‘rural’; it is rather to understand the relative importance of different agglomeration sizes and the rural population living around them. In this respect, its portrayal is most informative when comparing how countries differ in their rural-urban structure. This is important in territorial planning, in which the demographic and geographical characteristics of a country, or of a region within the country, play a central role.

#### Figure 1.5 Distribution of total population along the rural-urban spectrum, globally and by region, 2007

* **LC\_Urban**: Large city population (residing within one hour travel time);
* **LC\_rural**: Large city’s surrounding rural population (residing within one to three hours travel time);
* **SCSTs\_urban**: Small city population (residing within one hour travel time);
* **SCSTs\_rural**: Small city’s surrounding rural population (residing within one to three hours travel time);
* **Rural hinterland**: Rural population residing more than three hours travel time from any city centre with population of more than 50 000.

Note: Towns of less than 50 000 people are not captured here as urban or peri-urban. See Annex 1.1 for an explanation of how the rural spectrum was computed.

Source: SOFA team calculations and elaboration.

Figure 1.5 shows the rural-urban spectrum for the world and by region. In sub-Saharan, the share of population residing in rural hinterlands, at 36 percent, is strikingly high compared to other regions, while hinterland shares are noticeably low in West Europe and North America (3 percent and 4 percent, respectively). The hinterland share in East Asia and the Pacific is slightly higher than the world average of 15 percent, while in the other regions it ranges from 9 to 13 percent. This indicates that adequate investments in physical infrastructure is important for improving market access for a considerable proportion of rural population in East Asia and the Pacific, and even more so in sub-Saharan Africa.

#### 1.6 Rural to urban population ratios for large cities, small cities and towns, and rural hinterlands, globally and by region

R\_U ratio in LCs: the ratio of rural population living around large cities to the associated urban population.

R\_U ratio in SCSTs: the ratio of rural population living around SCSTs to the associated urban population.

HL\_Urban ratio: the ratio of rural hinterland population to the total urban population.

Source: SOFA team calculations and elaborations.

The rural-urban spectrum also provides insights into the rural labour supply available around agglomerations of different sizes. This is important because increased urbanization and the exit of labour from agriculture into non-farm sectors are two key features of the rural transformation. Labour supply is reflected in rural to urban population ratios for large cities, small cities and towns, and rural hinterlands as shown in Figure 1.6. As rural hinterland populations have no specific city size of reference, we calculate its ratio to total urban population. The Figure shows that these ratios follow the familiar development path of rural population shrinking as incomes grow.

As expected, the ratios are highest in sub-Saharan Africa, East Asia and the Pacific, and South Asia, which also have the largest shares of rural population in the total population. However, while small cities and towns have a major role to play in absorbing excess rural labour in sub-Saharan Africa, it seems that large cities are more important for that in Asia. Moreover, while Figure 1.6 does not show which type of urban centres will be absorbing rural labour from the hinterlands, it is evident that the challenge for the urban sectors and the non-farm economy is greatest in sub-Saharan Africa. All the other regions show similar patterns, underscoring the finding that small cities and towns will play a role at least as important as large cities in the transformation process.

Nevertheless, the ability of cities and agglomerates of different sizes to absorb rural labour will depend on other factors. The literature provides evidence that economic opportunities are more lucrative within and in proximity to large cities. However, it also indicates that growth patterns typical of small cities and towns are more inclusive (Vandercasteelen *et al.*, 2017; Christiaensen and Todo, 2014). That inclusiveness is not a given – it depends on the available infrastructure and services, both ‘hard’ and ‘soft’, which are usually lower in quantity and in quality than those available in large cities, owing to a metropolitan bias in government policies and investments. Studies by Ferré, Ferreira and Lanjouw (2012) in eight countries worldwide, and by Coulombe and Lanjouw (2013) in 12 sub-Saharan African countries, found that access to basic infrastructure and services is much lower in towns than in the metropolises. Inclusiveness also depends on governance structure and the functioning of institutions that determine the efficiency and the transparency with which public resources and expenditure are allocated among different sectors and territories.

The state of infrastructure and services can determine not only the level of opportunities available in cities and towns, but also the strength of rural-urban linkages (Dercon and Hoddinott, 2005). Therefore, it largely determines the size of the rural population that will gravitate around urban centres, with implications for the labour supply in rural areas and demands on natural resources, especially land. The efficient functioning of infrastructure and basic services requires effective institutions and governance, which are largely shaped by historical and cultural factors.

### 1.6.2 Migration and the rural-urban spectrum

Structural and rural transformations lead to movement of people between sectors, and to shifts in the use of capital and natural resources. As economies undergo transformation, the movement of people in search of better employment opportunities within and between countries is inevitable. Whether migration is an opportunity or a challenge depends on both the speed of the transformation and how opportunities are distributed across sectors and territories. For example, immigrants may be viewed favourably as new labour resources, or as an unwanted burden on society, depending on whether they can be absorbed into their destination’s socio-economic system at the same pace at which they arrive. Similarly, outmigration that is too rapid leads to a decline in agricultural production and productivity, owing to the loss of farming knowledge and, in many cases, to a lack of labour-saving technologies.

Rural outmigration is rapid usually where there is a lack of opportunities, in both the rural area and its towns of reference, and where the metropolitan bias works against an equitable distribution of public investments in infrastructure and services, not only between rural and urban areas but also between different territories[[4]](#footnote-4). Therefore, improving basic infrastructure and services in secondary cities, towns and their surrounding rural areas, and creating better links between them, are key steps in ensuring a more inclusive transformation. Even with inclusive rural transformation, rural outmigration will continue, but it will be more by choice, in response to the pull factors of urban areas such as lifestyle preferences, and not due to a lack of economic opportunities in rural areas.

Rural outmigration takes different forms, including: permanent transfer to urban centres, which adds to urbanization; seasonal movements between urban and rural areas in search of employment; and the rural-rural migration that is very common in some Asian countries, such as India and Bangladesh. In order to understand the role that migration plays in rural transformation, the underlying forces driving internal migration need to be better analysed and the relative importance of key drivers across regions assessed. The rural-urban spectrum described above provides a new general framework for rethinking the interplay between the push factors in rural areas and the pull factors attracting rural people to urban centres. It suggests that rural-urban migration is likely to be not a jump from rural hinterland to megacity, but a more gradual transition – for example, people in rural hinterlands first move to more connected villages before moving to small towns, which are probably the main source of migrants entering the larger cities.

Rural outmigration often has important gender and age dimensions, with potentially negative impacts when migrants are overwhelmingly young males. Where agriculture is subsistence or low-income, rural outmigration usually increases the participation of female and older farmers in the agricultural labour force. Because women and elderly people working in agriculture often face higher hurdles in accessing credit, inputs and markets, outmigration of young males tends to slow agricultural productivity growth, further limiting improvements in rural livelihoods. In some cases, however, these negative impacts may be counterbalanced by positive developments. One is women’s empowerment – when men migrate, women become more involved in decision making (Lastarria-Cornhiel, 2008; FAO, 2017). Another potential benefit is an increased flow of remittances from migrants who find jobs in urban areas.

## 1.7 Rural transformation comes with opportunities and challenges

While structural and rural transformations are pathways to higher levels of welfare, through poverty reduction and enhanced food security, those desirable outcomes are not automatic. International, regional and national institutions have important roles to play by framing policies aimed at creating employment and decent work opportunities accessible to everyone – women and men, old and young. An inclusive approach will ensure that rural-urban migration, a phenomenon that usually accompanies the rural transformation, is a choice, and not a flight from poverty.

The transformation of agri-food systems is fundamental to employment creation in towns, small cities and rural areas. But while expanding demand provides opportunities for domestic producers, it also brings challenges: consolidated global and national value chains imply private standards of quality and safety as well as greater vertical integration and the use of contracts. Although the evidence is mixed, often it is the more educated and larger farmers who benefit, as they have the access to resources and the skills needed to service contracts. The consolidation that occurs in agri-food systems brings about capital intensification, posing challenges for less skilled labour, in particular, and potentially counterbalancing the employment generation benefits. Throughout the different phases of the transformation, therefore, social protection programmes may be needed to ensure inclusiveness. In rural areas, social protection can promote more efficient use of resources and allow poor rural households to invest in riskier but more remunerative livelihood activities (Slater and McCord, 2009). As seen in many middle-income countries, social protection can also help contain inequality and promote a more equitable and sustainable path of structural transformation and growth (ILO, 2014).

To take advantage of the opportunities that modern supply chains offer, smallholder farmers need productivity-enhancing technologies, such as irrigation, and access to transport, information, investment finance and skills training, as well as organizational capital, such as farmers’ associations (Neven *et al.,* 2009). Agri-businesses wanting to source produce from small farmers often provide the resources needed to overcome farmers’ lack of access to credit, inputs and extension. However, the World Bank (2013) has identified in sub-Saharan Africa other critical obstacles to small farmer participation in transformed agri-food systems, including poor infrastructure, high transaction costs, limited access to land, land tenure problems, and poorly functioning markets. Yumkella *et al.,* (2011) identified as a serious constraint the weak investment climate for agribusinesses in downstream processing and related activities. Strategies to promote agri-business must maintain competitive markets and prevent concentration of market power in the hands of a few large participants (da Silva *et al.,* 2009).

There is evidence that rural employment outside of agriculture remains largely associated with education levels and social status that are not common among the poor (Lanjouw and Murgai, 2009). A study in Ethiopia found that while non-farm employment benefited both the poor and non-poor in terms of consumption growth, the benefits were greater in wealthier households (Bezu, Barrett and Holden, 2012). For small rural family enterprises, the main constraints were inadequate financing and infrastructure, followed by disorder, lack of electricity and market information, and the poor state of roads (Jin and Deininger, 2008).

Equal opportunity for men and women is a central issue for inclusive rural transformation. For example, Misra (2014) finds that males accounted for most of the increase in rural non-farm employment in Maharashtra state, India. While the growth of rural non-farm activities, whether they originate in agri-business or elsewhere, presents rural people with an opportunity to increase their income, households and individuals that lack the skills needed to take advantage of those opportunities risk being left behind. Institutional and other constraints that limit women’s participation must be tackled to guarantee a more inclusive process. Social protection programmes can reduce the economic barriers to accessing education, nutrition and health services, and contribute to enhanced food security and dietary diversity. In this way, social protection can foster investment in a healthier, better educated and more skilled workforce capable of responding to changing demand and joining the transition to higher levels of productivity (ILO, 2015).

Higher labour productivity across the agriculture sector is a key characteristic of structural and rural transformations. However, some of the gain in labour productivity may actually be the result of more intense use of natural resources. Therefore, in the long run, transformations may lead to capital-intensive productivity growth which may boost incomes but degrade the natural resource base on which prosperity depends. This adds challenges to transformation paths dependent on non-renewable natural resources such as fossil energy.

## 1.8 Structure of the report

This report takes as a given that agricultural development and the creation of non-farm employment are essential for structural and rural transformations. The focus here will be on the changing conditions in the rural non-farm sector, which are brought about by the strengthening of rural-urban linkages. These linkages are enhanced by the improved organization of the retail and wholesale food sectors, increasing commercialization, concomitant changes in factor markets and the important role played by small cities and towns in the transformation process.

The report examines how these changes can increase the incomes of poor rural households as they diversify into the rural non-farm economic activities that emerge around urban agglomerations of different sizes. It explores the four key factors that determine the inclusiveness of the rural transformation: initial conditions, institutional factors, policies and investment. It acknowledges that the challenges and opportunities facing transforming countries are context-specific, varying widely across countries and regions. However, many of them are common, including those relating to nutrition outcomes, gender equality, and new communication technologies. These issues have been analysed in-depth in a number of recent publications (IFAD, 2016; AGRA, 2016); they are addressed here in the context of the report’s focus on rural transformation.

The report is structured as follows. In Chapter 2 we describe the process of agri-food system transformation and its implications for inclusive rural transformation. In Chapter 3, the recent trends in farming systems transformation are described. Chapter 4 focuses on the impacts of rural transformation on the non-farm economy and the role of the latter in employment creation, while Chapter 5 summarizes policy, institutional and other measures for achieving inclusive rural transformation using a territorial perspective.

**Annex 1.1: Computing the rural-urban spectrum**

Because of issues concerning population estimates (see p.xx), this report builds on the agglomeration index developed for the 2009 *World Development Report* (World Bank 2009). WDR 2009 proposed a new measure of agglomeration, based on a uniform definition of what constitutes an ‘urban’ or agglomerated area, using the technique outlined in Chomitz *et al*. (2007) and elaborated in Uchida and Nelson (2008). This approach allows international comparisons.

Whereas WDR 2009 focused exclusively on agglomeration aspects, here we are interested in the distribution of population along the rural-urban spectrum. This means capturing not only the share of urban population in total population, but also the relative share of population in different sized agglomerations and the population in rural areas that gravitate around them. The aim is to provide an overall picture of a country’s population based on agglomeration size, population density, and travel time to different agglomeration sizes.

The methodology underlying the calculation of the rural-urban spectrum can be summarized as follows:

**Step 1** – Computing urban and peri-urban populations for different agglomeration sizes

* *Specify thresholds.* To be classified as ‘urban and peri-urban’, an area must satisfy two criteria based on (1) minimum population size used to define a sizeable settlement, and (2) maximum travel time, by road, to the settlement. We distinguish three categories: cities larger than 500 000 people, those between 100 000 and 500 000, and towns between 50 000 and 100 000. We assume 60 minutes for travel time to the nearest city in a given category.
* *Locate the centres of sizeable settlements.* This mapping is done for cities that meet the minimum population size criterion using data from the Global Rural-Urban Mapping Project (GRUMP) human settlements database.
* *Determine the sizeable settlement’s border.* The border surrounding a sizeable settlement is calculated based on the maximum travel time to the centre.
* *Identify the areas and aggregate grid cell populations.* Identify the grid cells that satisfy thresholds for both criteria and add them to obtain the urban and peri-urban population in each agglomeration size category.

**Step 2** – Computing rural populations gravitating around each agglomeration size category

* *Calculate population in rural areas near agglomerations of different sizes.* These are populations that require 1 to 3 hours of travel time to reach a specific urban centre. Start from categorizing populations in this travel time range from agglomerations of 500 000 or more, then 100 000 to 500 000 and finally 50 000 to 100 000 people.
* *Calculate population in more remote rural areas (hinterland).* These are populations that face travel time greater than 3 hours to an urban centre of 50 000 people or more. These are calculated as residuals of populations that do not fall into any other of the preceding categories.

Following the rationale of the agglomeration index, it is also possible to distinguish between high population density areas (i.e. greater than 1,000 people/km2) and lower-density areas. However, this information is not used to determine whether an area is urban because there is a considerable share of population in settlements of less than 50 000 people. To try and accurately capture this component of the population, in each category developed in the above procedure, we then distinguish between population in high-density areas and in low-density areas. This is done by c*reating population density grids* at a 1 km spatial resolution using two global grid-based population data sources, GRUMP and LandScan, and then identifying the grid cells that are above and below the population density threshold of 1000 people/km2.

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# Chapter 2. Agri-food systems, urbanization, and dietary change: keeping up to move up

## Key messages

* + Rural people are buying more of the food they consume, and diets are diversifying in both urban and rural areas away from staple cereals toward higher-value products.
  + In a rapidly transforming food system, secondary cities and towns, which represent 60 percent of urban food demand, are points of intermediation and agro-industrialization that create off-farm income opportunities.
  + However, urban proximity can also bring to rural areas a steady flow of cheap, packaged, processed foods, which poses challenges to local producers.

## 2.1. Introduction

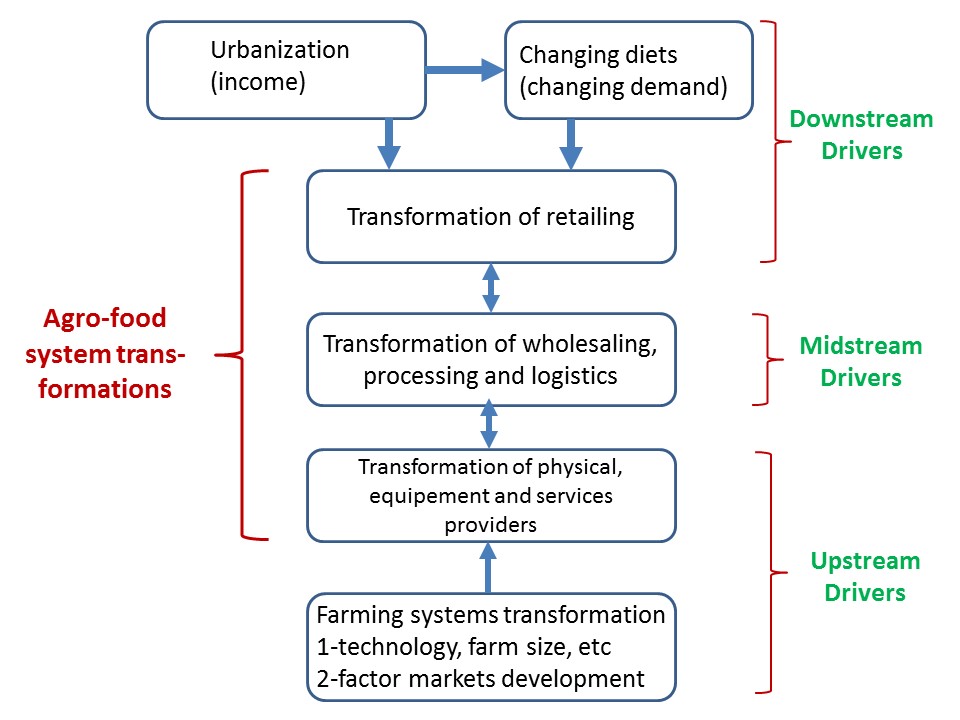
Reardon and Timmer (2014) distinguish five interlinked transformations of food and agriculture that are occurring rapidly in Asia, emerging rapidly in Africa (Reardon *et al*. 2015) and well established in Latin America: (1) urbanization; (2) diet change; (3) agri-food system transformation; (4) rural factor market transformation; and (5) the intensification of farm technology. They note that all five are linked in mutually causal ways – it is the confluence of the transformations that makes change so rapid; each alone would not have such profound impact.

In value chain parlance, urbanization and dietary change are considered as ‘downstream’, demand-side changes, while agri-food system transformation can be downstream (i.e., retail), midstream (wholesale, logistics and processing) and upstream (agricultural non-labour variables, equipment inputs and services supply). Together, these changes represent the ‘pull’ and ‘facilitation’ motors of the transformation of agricultural production factor markets, shown in Figure 2.1. They feed into, and are fed by, agricultural production processes (transformations 4 and 5 above), i.e., markets for land, labour and capital, and farm technology.

This chapter examines the first three of the above transformations: in urbanization, diets and agri-food systems. It reviews literature and experiences to show how changes in each shape rural transformation and its outcomes. Better understanding of the upstream, midstream and downstream changes that take place during transformation will help in the formulation of policies and strategies to ensure that the transformation is more inclusive and sustainable. (The fourth and fifth transformations will be dealt with in Chapter 3).

The focus here is on Africa and Asia, with occasional reference to Latin America, and on the domestic food market, since it is the most important in volume terms for rural areas and, therefore, for inclusive rural transformation. Domestic markets are by far the main markets for farmers in Africa and Asia and will probably be so increasingly. Only 5 to 10 percent of the agricultural output of these regions is exported, although the share is higher for specific items such as coffee; an estimated 90 percent of food consumed is produced domestically and only about 10 percent is imported. Tschirley *et al*. (2015) contend that as incomes increase in East and Southern Africa, the share of food imports will actually decline as households shift to non-cereal products that are mainly produced domestically.

#### Figure 2.1. Main drivers of agri-food system transformation



Source: FAO.

## 2.2. Downstream transformation: Urbanization

### 2.2.1. Rapid urbanization has deeply influenced the domestic food market so that it is now majority urban

The world population has urbanized rapidly over the past 60 years. In Africa, the share of urban population in total population has caught up with the developing world average, growing from 24 percent in 1970 to reach 40 percent in 2011. Africa’s rate of urbanization is now the world’s fastest and by 2030 the urbanized population is projected to reach 48 percent (UN, 2011). Africa’s sub-regions are urbanizing at different rates. UN (2014) reports that in Southern Africa, including South Africa, the urban share of population has reached 59 percent, while in developing East and Southern Africa (excluding South Africa) the share has risen from 21 percent in 2000 to 26 percent, and is projected to reach 44 percent by 2050. In contrast, the urbanization rate reached 44 percent in West Africa in 2014. Africa’s overall urban population was estimated at 414 million in 2011, when it was projected to increase by 2030 to 744 million, which is approximately the size of the combined total population of the United States and Europe. Nigeria’s current total population of 170 million includes 85 million urban residents, a figure that is projected to reach 170 million over the next 30 years (Bloch *et al.*, 2015).

Demographic patterns in Asia are remarkably similar, although rapid urbanization there began earlier. The region’s urban population stood at 45 percent of total population in 2011, which was the mid-point in the “rush to the cities” that took place over a half century (UN, 2011). Asia’s urban share is projected to reach 60 percent by 2025, up from 20 percent in 1960 (James *et al*. 2008). As in Africa, sub-regions in Asia display heterogeneity in urbanization rates, with shares of 32 percent in South Asia, 44 percent in Southeast Asia and 54 percent in East Asia by 2010 (UN, 2014). Therefore, rather than being starkly different in terms of urbanization, Africa and Asia are converging toward similar urban shares. Interestingly, East and Southern Africa’s urban share is close that of South Asia, while West Africa’s is similar to that of Southeast Asia.

The share of the urban population in total population substantially understates the importance of urban areas in national food consumption and trade, in value terms. Since urban areas tend to have higher incomes than rural areas, the individual urban household food budget is larger. Consequently, city dwellers in Malawi, the United Republic of Tanzania, Uganda and Zambia consume, on average, 48 percent of food produced and sold, although they make up only 26 percent of total population (Dolislager *et al.*, 2015). In studies encompassing Bangladesh, Nepal, Indonesia and Viet Nam, Reardon *et al*. (2014) found that while 38 percent of the population is urban, they account for 53 percent of food purchases – despite the fact that 70 to 80 percent of food consumed in rural households is purchased. The urban food market has grown very rapidly over the past several decades and, along with it, rural-urban food supply chains. Reardon *et al*. (2015) estimate this growth in East and Southern Africa at 600 to 800 percent over the last four decades; Reardon and Timmer (2014) place it at roughly 1 000 percent in Southeast Asia in the same period.

Finally, to a large extent, the locus of urban population growth – and thus of urban food markets – has shifted from megacities (those with more than 10 million inhabitants) to small cities and towns. Estimates of the urban population living in smaller agglomerations vary, but in general they fall in the range of about 50 percent globally and about 60 percent in Africa and Asia (Christiaensen and Kanbur, 2017, Berdegué and Proctor, 2014). The latter point out that small cities and towns are closer spatially to rural areas, and more integrated economically, than megacities and are thus more effective in alleviating rural poverty. Their economic integration extends both upstream and downstream in the agri-food system, since many upstream and midstream actors in the supply chain are based in small cities and towns. While providing farmers with inputs and other services, they also handle farm output, either to feed the local towns or larger cities. This is discussed further below.

### 2.2.2. Yet at the same time the rural market has grown substantially, just less fast than the urban market

The rural market has grown considerably as rural population has expanded. In Africa, in the period 1970 to 2011, the rural population grew by more than 124 percent, from 282 million to 632 million. In Asia in the same period, the rural population grew by 42 percent, from 1.63 billion to 2.3 billion. Furthermore, in value terms, the rural market has grown at a faster rate than the rural population, owing to growth in rural income in those four decades. This is very evident in Asia in general and particularly in East Asia and the Pacific, which has seen a considerable decline in the rural poverty, in both incidence and numbers, over the last two decades (see Chapter 1). This implies higher shares of income being spent on food at the low income range (following Engel’s Law[[5]](#footnote-5)) and a rapid growth in overall food consumption. There is also evidence that even in the poorest sub-regions, a rural middle class has emerged; Tschirley *et al*. (2015) estimate that, on average, 55 percent of the middle class across Ethiopia, Malawi, Mozambique, South Africa, the United Republic of Tanzania and Uganda resides in rural areas.

In addition, the share of purchased food in the total value of rural household food budgets is considerable in Africa and Asia. This, along with the growth in rural population and its overall food budget (whether in cash or in home production), implies a vast increase in the rural food market and development of rural-rural and even urban-rural food supply chains. It also implies that rural households are deeply engaged in food markets, not just as sellers but also as buyers, and not just at the margins as was the case several decades ago, but in a substantial way.

Traditionally, farm households in developing countries were either self-sufficient or purchased a small proportion of their food. While some early work, such as Mellor (1976) in India and Reardon *et al*. (1988) in Burkina Faso, found that many rural households, and even farmers, were net buyers of cereals, the proportion of overall food that was purchased was low. Situations differed, of course, depending on production conditions – in Senegal, purchases of food were much more common in drought-prone areas than in relatively lush areas (Kelly *et al*. 1993).

Recent data show that, in value terms, the share of purchased food in rural diets is now high in Africa and Asia. In Malawi, the United Republic of Tanzania, Uganda and Zambia, rural households buy an average of 44 percent of the food they consume (Dolislager *et al*., 2015); in Bangladesh, Nepal, Indonesia and Viet Nam, rural households purchase on average 73 percent of their food (Reardon *et al.*, 2014). This boom in purchased food in rural households is financed only in part by income from the sale of crops and livestock, and more by income from rural non-farm employment. The evidence suggests that very little food is purchased on credit, whether from informal or formal sources.[[6]](#footnote-6) In fact, the increase in food purchases has been made possible by the rise of rural non-farm employment as a source of cash, a trend that has been accelerating in recent decades (see Reardon and Mercado-Peters, 1993, and Kelly *et al.*, 1993 for early evidence from Burkina Faso and Senegal). In China, the share of rural non-farm income in total income rose from 34 percent in 1985 to 63 percent in 2000 and 71 percent in 2010 (Huang *et al*., 2012). In Africa and Asia, the non-farm income share averages around 40 percent, much greater than the share of income from migrant remittances (Haggblade *et al.*, 2007).

### 2.2.3. Implications of urbanization and the leap forward in the rural market for inclusive rural transformation

The changes in levels of urbanization and in rural markets have multiple implications for rural income opportunities and the rural transformation in general. First, urban markets are now the dominant force in developing regions, and will have an increasingly far-reaching influence on rural areas as the infrastructure connecting urban and rural areas is improved. The impacts of urban markets need to be programmed into the analysis of strategies needed to ensure an inclusive rural transformation.

The development of rural markets reflects what Prahalad (2004) termed, for the business investor community, the “fortune at the base of the pyramid”; for rural development practitioners, it represents an opportunity for inclusive rural transformation. Small cities and towns will be – for reasons of opportunity and challenge – especially important to that transformation. Recent research, cited above, has shown how the development of the rural market is often integrated with that of smaller urban centres in one broad rural territory that could be addressed with policies and programmes (Berdegué and Proctor, 2014).

The proximity of small cities and towns to rural markets is a two-edged sword. On the one hand, it brings the benefits of agglomerated upstream and downstream services in the supply chain, which farmers need for profitable intensification and commercialization. On the other hand, small towns are conduits to rural areas of a steady flow of cheap, packaged, processed foods, which may represent cost savings for consumers and, consequently, compete with existing or the would-be small-scale village enterprises (Reardon and Stamoulis, 1998; Reardon *et al.*, 2007). Among many examples of this are packaged instant noodles sold by an Indonesian enterprise in the rural towns of many African countries. There is also an archetypal case of ready-made tortillas or tortilla mixes sold in rural towns by urban processing firms in Mexico (Rello, 1996).

Owing to vastly expanded urban and rural markets, better infrastructure and long supply chains going in all directions – rural to urban, rural to rural, urban to rural – more or less fluidly, rural producers are essentially ‘de-protected’, with their traditional markets accessible by competitors from all sides. (Of course, to be ‘protected’, in this sense, means living in a hinterland behind a de facto wall of poor infrastructure and inaccessibility without links to dynamic sources of effective demand, particularly cities.) Since this exposure to competition is only likely to increase over time, the challenge is to foster a rural transformation that is inclusive and to help make rural producers competitive in the domestic market. Because engagement with domestic markets will be key to inclusivity, the focus should be on basic policy and infrastructure that helps the great mass of small farmers to sell to those markets main channels, i.e. wholesale markets and supermarkets.

**Box 2.1 The ‘quiet revolution’ in Bangladesh’s fish value chain**

The fish value chain in Bangladesh is evolving very rapidly, in all its segments. This ‘quiet revolution’ affects the farm and input supply segment, which represents 60 percent of the total value added of the sector, as well as the remaining 40 percent, which is composed mainly of the rural and urban wholesale, retail and logistics segments.

Hernandez *et al.* (2016) estimate that that over the past decade the sector’s volumes and number of participants have tripled thanks to capital investments by hundreds of thousands of smallholder farmers and small and medium enterprises throughout the aquaculture value chain. Linked to this process has been diversification and specialization beyond carp into production of more commercial species, such as tilapia and *Pangasius* catfish, which have boosted yields. One major positive externality of this process has been a gradual reduction in the price of farmed fish, an important contribution to food security. The sector’s growth has been predominantly oriented toward the domestic market, as very little of Bangladesh’s farmed fin-fish is exported. Hernandez *et al.* note that, while the investments of millions of farmers and enterprises played a major role in this growth, policy had a facilitating role, particularly through early investments in fish seed production, as well as investments in electricity supply and roads in rural areas.

Finally, longer rural-to-urban, rural-to-rural, and urban-to-rural supply chains are more exposed and vulnerable to shocks, such as climate change (Reardon and Zilberman, 2017), spikes in energy costs, disease outbreaks, food safety crises and civil strife. A case in point is the vulnerability of the dynamic south-north and north-south maize and egg supply chains in Nigeria (Liverpool-Tasie *et al.*, 2017). This vulnerability will be conditioned by the dietary change and agri-food system changes noted below.

## 2.3. Downstream transformation: Dietary change

Evidence at the global level strongly suggests that rising household incomes lead to greater variety in the diet. At higher incomes, an increasing share of the household’s diet comes from non-staple foods, such as animal source products, vegetable oils, and fruit and vegetables. Meat and dairy consumption increases strongly with income growth; fruit and vegetable consumption increases also but more slowly, and consumption of cereals and pulses declines (Figures 2.2 and 2.3).

The discussion here looks at how diets have been changing in value terms in many countries of Asia and Africa. The focus is not on the extreme poor – for whom the consumption in value terms is much smaller, compared to the national averages – although the transformation in diets is still relevant to food security because of its employment multipliers.

#### Figure 2.2. Correlation between changing shares of staple foods\* in total calories consumed and growth in GDP per capita, in selected countries in developing regions, 2010

\* Includes cereals, roots and tubers

Source: WDI and FAOSTAT.

#### Figure 2.3. Correlation between changing shares of animal products in total calories consumed and growth in GDP per capita, in selected countries in developing regions, 2010

Sources: World Bank (2017\*) and FAO (2017\*)

### 2.3.1. Diets in developing regions have rapidly transformed over several decades

Several trends in diets have been observed in recent decades. First, there has been a steady worldwide reduction of the share of cereals in total food expenditure. In general, the shift happens earlier in urban than in rural areas and, as Bennett’s Law predicts, increases as incomes rise (Bennett 1954). However, there is evidence that the shift takes place at lower income levels than previously thought, i.e. before the household enters the middle class (for an analysis of this phenomenon in selected countries of East and Southern Africa, see Dolislager *et al.*, 2015).

Most research on trends in spending on cereals has been done in Asia. Timmer (2013) and Timmer *et al.* (2010) show that, in most Asian countries, there has been a stagnant trend in rice consumption per capita, and in some cases a gradual decline. Data from India shows (Table 2.1) that the share of cereal consumption in the urban diet, in value terms, dropped between 1972 and 2006, and more rapidly in rural areas (by 24 percent) than in urban centres (13 percent), where the shift away from cereals took place in the 1970s.

#### Table 2.1. Share of cereals in total food expenditure in India

|  |  |  |  |
| --- | --- | --- | --- |
| Year | Urban | Rural | National |
|  | percent | | |
| **1972** | 36 | 56 | 52 |
| **2006** | 23 | 32 | 29 |

Source: Indiastat (various years) and Reardon and Minten (2012).

Evidence from India and some countries in South and Southeast Asia suggest that, by 2010, cereals represented one-quarter to one-third of Asian diets. Reardon *et al.* (2014), using Living Standards Measurement Study (LSMS) data, found that, on average, the share of cereals, mainly rice, was about 26 percent of intake for urban households and 37 percent for rural households in Bangladesh, Indonesia, Nepal and Viet Nam.

Again, contradicting the idea that Africa is sharply different than Asia in food trends, data from East and Southern Africa and from West Africa show that staples are about 35 to 40 percent of diets urban areas (Reardon et al., 2014; Dolislager et al., 2015). In general, Asian rural areas tend to be much like African urban areas in the share of staples in total diets. From LSMS data for urban and rural areas in Malawi, Uganda, the United Republic of Tanzania and Zambia, Dolislager *et al*. (2015) found that the share of cereals (mainly maize) was 31 percent of food expenditure in urban areas and 41 percent in rural ones. In selected Asian countries, these shares are 26 percent and 37 percent respectively, which is not all that different from the reported shares in African countries (Table 2.2). In addition, comparing expenditure by household income level reveals that, for Asian and African countries alike, the poor in the lower tercile spend a considerable share of their food budgets on non-staples – more than 50 percent in rural areas, and more than 60 percent in urban areas). Since the shares are in value terms, it is not possible to infer what this means in terms of dietary composition. However, it is striking that non-staples constitute such an important part of the poor’s spending.

#### Table 2.2. Shares of staple and non-staple foods in total food expenditure, in value terms, in rural and urban areas and by income terciles, by region

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Rural  Terciles | | |  | Urban Terciles | | |  |  |
|  | 1 | 2 | 3 |  | 1 | 2 | 3 | Rural | Urban |
|  | percent | | | | | | | | |
| **Africa** |  |  |  |  |  |  |  |  |  |
| Staples | 47.6 | 39.2 | 31.9 |  | 39 | 35.9 | 27 | 40.8 | 30.8 |
| Non-staples | 52.3 | 60.7 | 68.1 |  | 60.9 | 64.2 | 72.9 | 59.2 | 69.4 |
| **Asia** |  |  |  |  |  |  |  |  |  |
| Staples | 47.08 | 39.03 | 31.05 |  | 37.05 | 27.18 | 20.90 | 36.95 | 25.90 |
| Non-staples | 52.90 | 60.95 | 68.95 |  | 62.98 | 72.85 | 79.15 | 63.10 | 74.10 |

\* Other refers to oils, animal fats, sugar, spices, beverages, food consumed away from home, and other foods

Note: Asia data includes Bangladesh (2010), Indonesia (2010), Nepal (2010), Vietnam (2010); East and Southern Africa data includes Malawi (2010/2011), Tanzania (2010/2011), Uganda (2009/2010) and Zambia (2010).

Source: Reardon *et al.* (2014) and Dolislager *et al.* (2015).

There is diversity in food expenditure patterns across different regions in Africa. From an analysis of data from urban food expenditure studies in several West African countries (Table 2.3), Hollinger and Staatz (2015) found that, over the 1990s to 2000s, where the main staples are grains alone (Burkina Faso, Mali, and Senegal), the share of grains increased slightly (from 33 to 38 percent of expenditure); where cereals plus roots and tubers are the staples (Côte d’Ivoire, Ghana and Nigeria), the share of cereals dropped from 27 to 23 percent and tubers and roots rose from 14 to 17 percent. In the cereals-plus-roots-and-tubers countries, staples went from 41 percent to 40 percent.

#### Table 2.3. Changes in expenditure on staple foods in urban West Africa

|  |  |  |
| --- | --- | --- |
| **Main staple of country** | **1990s** | **2000s** |
|  | Share (percent) | |
| Cereals only | 33 | 38 |
| Cereals and roots/tubers | 41 | 40 |
| Cereals | 27 | 23 |
| Roots/tubers | 14 | 17 |

Note: ‘Cereals only’ countries include Burkina Faso, Mali and Senegal; ‘Cereals and roots/tubers’ countries include Côte d'Ivoire, Ghana and Nigeria

Source: Hollinger and Staatz, 2015.

In addition, there have been shifts in cereal production and consumption – from cereals that are less convenient to process and prepare to those that are more convenient; to more productive cereals; to cereals used as feed to support rapidly increasing animal production and consumption; and to higher quality varieties of a given cereal species. Again, in general, the shift happens earlier in urban than in rural areas.

With regard to wheat, and rice in some places, there has been a general shift to convenience in processing and preparation. This shift occurs when the opportunity cost of women’s time increases as they enter the away-from-home labour force. In Asia, this has led to a partial shift to wheat in traditional rice consuming areas. This has been the case in most of Asia outside China and India, where wheat cultivation began 5 000 years ago. Wheat has made inroads mainly thanks to its convenience, in the form of noodles and flatbreads (Senauer et al., 1986, for Sri Lanka; Pingali, 2007, for Asia overall; Timmer, 2013, for Southeast Asia). Between 1961 and 2010, wheat imports to Southeast Asia rose from 1 million tonnes to 13 million tonnes, while wheat consumption, as a proportion of rice consumption, rose from 2.8 to 11.5 percent (Timmer, 2013).

In northern China, and most of Africa, where millet and sorghum were the traditional cereals, production and consumption shifted – to rice and wheat in China, and partially to wheat in East and Southern Africa and rice and wheat in West Africa. This partial shift to wheat and rice was driven by convenience motives, like the partial shift to wheat in Asia. As in Southeast Asia with wheat, West Africa produces only a small share of the rice it consumes, and dependence on imports of rice especially have been a cause for alarm in West Africa (Reardon and Mercado-Peters, 1993; Hollinger and Staatz, 2015). Wheat consumption began to rise not only with the adoption of bread in middle-class diets, but as cheap, easily prepared noodles for the poor (Liverpool-Tasie et al. 2016).

Maize has also made new inroads as a productive food crop and as a main ingredient in animal feed. Since its introduction in the 19th century, along with bananas and cassava and other products, maize has displaced traditional crops In East and Southern Africa for reasons of productivity in all but the drier zones. Maize is still mainly a food crop in Africa, but its use as the main ingredient in feed is growing dramatically with the shift, over the past decade or two, to intensive production of poultry, fish, dairy and cattle. For example, in Nigeria, the maize-based feed industry grew by 600 percent in the past nine years (Liverpool-Tasie et al. 2016). In China, too, maize production has soared not for direct human consumption, but as an ingredient in animal feed – maize output went from half that of rice in 1993 to more than total rice production by 2013.

There has been an increased use of more drought-tolerant and disease-resistant cereal varieties, as well as better tasting and better looking varieties. The latter is exemplified in the shift from lower quality to higher quality rice varieties in Bangladesh (Minten et al. 2013).

Complementing the trend toward a reduction in the share of cereals in urban and even rural diets is the shift toward non-staple foods, especially meat, fish, dairy products, edible oils, vegetables and fruit. In nutritional terms, this shift is referred to as the ‘nutrition transition’. Globally speaking, as incomes increase, so too does the consumption of fruit, vegetables (in some regions only), animal source products, food cooked with vegetable oils, and processed foods high in fat, sugar or salt. At the same time, a marked decrease in the amounts of coarse grains, root crops and legumes consumed is observed (FAO, 2017; Hawkes and Popkin, 2015)[[7]](#footnote-7). Data available for low- and middle-income countries document this trend in all urban areas and increasingly in rural areas (Popkin *et al.*, 2012) (see Box 2.2)

However, again there is an important caveat. Data on Malawi, the United Republic of Tanzania, Uganda and Zambia, especially for the consumption of edible oils and meat, show that the diversification of the diets starts well below the threshold of ‘middle class’, suggesting that greater accessibility of these products – thanks to increased production, better transport, education and lifestyle changes – has induced even relatively poor households to sharply increase their intake of non-cereal foods items (Dolislager et al. 2015).

Similar patterns are evident in Latin America and the Caribbean. As reported in Anríquez(2017), average daily calorie consumption in the region has risen since the early 1960s by about 27 percent, and since the early 1990s by 12 percent, and rates of increase have been higher in the poorest countries. Haiti, Nicaragua and Peru are particularly noteworthy for the large increases in calorie consumption that have occurred since the early 1990s. Anríquez also reported a notable increase in the consumption of animal protein, mainly in the form of meat and milk products, but also found large proportion of the increase in average daily calorie consumption in many countries – and a good proportion for the region as a whole – was due to an increase in the consumption of sugar and other sweeteners.

**Box 2.2 Implications of dietary change for people’s nutritional status**

Recent decades have seen greater diversification of diets worldwide. For a number of countries, this has meant a more balanced diet. It is important to also bear in mind, however, a parallel rise in certain forms of malnutrition. Particularly worrisome is the global rise in overweight and obesity: estimates suggest that, by 2030, about one-third of the projected global population will be overweight or obese (Global Panel, 2016). In 2010, the cost of all non-communicable diseases (NCDs) related to obesity and overweight was estimated at US$1.4 trillion (FAO, 2013). The World Economic Forum has estimated that as much as US$47 trillion could be lost by 2030 owing to overweight and obesity-related NCDs (Bloom *et al.*, 2011).

While the consumption of more nutritious foods, such as fruit, vegetables, wholegrains and seafood, has increased worldwide in recent decades, there has been a parallel – and more rapid – increase in the consumption of highly processed foods, such as sugar-sweetened beverages and processed meat (FAO, 2017; Inamura *et al.,* 2015). This is particularly so in low- and middle-income countries, where no general improvements are noted in terms of healthier overall dietary patterns. Of particular concern is the rise in the consumption of highly processed foods with increasing amounts of added salt, refined carbohydrates or saturated fats (Hawkes and Popkin, 2015). Data from some high-income countries, such as the USA and Canada, show that around 60 percent of household calories come from food and beverage groups that are major sources of added sugars, fats and salts (Moubarac *et al.*, 2012; Stern *et al.*, 2016). In Brazil, China and Mexico, the shares are 26 percent (Monteiro *et al,* 2013), 30 percent and 58 percent respectively, and are growing at very fast rates (Popkin, 2014).

What are the implications of these dietary changes for food system transformation? While they may represent a formidable opportunity for upstream actors, policymakers should consider the need to ensure the quality of people’s diets and to prevent malnutrition in all its forms – for example, by providing incentives for higher production of fresh fruit and vegetables (Pingali, 2015) or the processing of convenience foods that contain less sugar and salt. A number of countries have begun to take preventive action to prevent obesity, with policies ranging from the taxation of sugary beverages in Mexico, health-promoting labelling in Chile, zoning to reduce the density of fast food outlets around schools in the USA, and the regulation on food marketing and advertising to children in Norway.

There are surprisingly similar patterns across sub-regions and between Africa and Asia, with Africa only slightly behind Asia in dietary diversification. The study by Dolislager et al. (2015) in Eastern and Southern Africa showed that the share of non-cereals in food expenditure, in value terms, was 66 percent in urban areas, and 61 percent in rural areas. It is interesting that rural consumption of these non-cereal products is so high, in relative terms. The West Africa study of Hollinger and Staatz (2015) found that for Sahelian countries where cereals are the main staples (Burkina Faso, Mali, and Senegal), the share of non-cereals held nearly steady in the 1990s to 2000s at 62 to 67 percent of the value of food expenditure. For the countries where cereals plus roots and tubers are the staples (Côte d’Ivoire, Ghana, and Nigeria), the share of non-staples was about 60 percent. Meat and fish account for 21 percent of expenditure, and horticulture products 17 percent; together, they are almost equal to the share of cereals and roots and tubers (40 percent). It is striking that non-cereals account for some two-thirds of urban expenditure, and that horticultural plus animal products represent roughly the same expenditure as staples. It is also interesting that East and Southern Africa and West Africa have roughly similar patterns, although poverty rates are higher in the former sub-region.

The study of Reardon *et al.* (2014), covering Bangladesh, Indonesia, Nepal and Viet Nam showed that an average of 74 percent of the food budget is spent on food items other than cereals in urban areas, and 63 percent in rural areas. It is striking not only how similar the pattern in rural areas is to that of urban Africa, but also that the rural and urban patterns are not extremely different. Despite average income differences between the South Asian sample (Bangladesh and Nepal) and the Southeast Asian sample (Indonesia and Vietnam), the shares of cereals in urban food budgets are similar (29 percent and 23 percent respectively) - a similarity reminiscent of those across sub-regions in Africa. Meat and fish accounted for an average of 30 percent of the urban budget, equal to the share of cereals. Horticulture products averaged 15 percent, similar to the figure in West Africa. Together meat, fish and horticulture average 45 percent of total spending, which is more than cereals.

The outcome for the agri-food system of the above dietary changes is the very rapid and massive rise of supply chains for feed grains and for animal and horticultural products. This may seem a bland point, until one considers a specific case – for example, in three decades, the domestic aquaculture supply chain in Bangladesh (see Box 2.1) grew in volume 25 times over, since very little is exported (Hernandez *et al.* 2016). Growth in agri-food systems for non-staple products is much larger than that of growth in the overall rural-urban food supply chain, which is itself in the order of the five to 10 times over. This is because, while the rural-urban food supply chains were expanding, their composition was changing at an even faster rate, as market structure and technology were transformed, supply chains lengthened, infrastructure was improved, and both cereal and non-cereal supply chains were developed. These changes in the food system are examined in the next section.

Finally, some evidence shows that processed food has penetrated deeply into diets in both Africa and Asia, and in both urban and rural areas. As with the other dietary changes, Asia is a somewhat more advanced than Africa, and urban areas are more advanced than rural areas. But, again, it is surprising that gaps among the trends are not greater, and that there appears to be a process of convergence under way. There are some differences between purchases of ‘minimally processed’ foods, such milled grain, and ‘highly processed’ foods, such as bread and potato chips. Substantial purchases of these processed products – accounting for 65 percent of the food budget -- was found among the poor in East and Southern Africa, as shown in Table 2.4.

#### Table 2.4. Proportion of food budget spent on minimally processed and highly processed foods, in rural/urban areas and by lowest and highest income classes, in selected countries of East and Southern Africa, 2010

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Minimally processed** | **Highly processed** | **All** |
|  | percent | | |
| Region-wide | 32.7 | 37.4 | 70.1 |
| Lowest-income ($0–2) | 34.7 | 31.2 | 65.8 |
| Highest-income (>$20) | 24.1 | 62 | 86.1 |
|  |  |  |  |
| Rural | 36.7 | 33 | 69.7 |
| Lowest income ($0–2) | 36.2 | 29.5 | 65.8 |
| Highest-income (>$20) | 38.5 | 52 | 90.6 |
|  |  |  |  |
| Urban | 28.4 | 42.1 | 70.5 |
| Lowest-income ($0–2) | 30.3 | 35.7 | 66 |
| Highest-income (>$20) | 20.4 | 64.6 | 85 |

Notes: Lowest-income is US$0-2 per day, highest-income is >US$20 per day. Includes Ethiopia, Malawi, Mozambique, South Africa, Tanzania, and Uganda

Source: Tschirley *et al.,* 2015

In the study of East and Southern Africa by Dolislager *et al.* (2015), it was found that urban households earmarked 56 percent of food expenditures for processed foods, compared to 29 percent in rural households. In the Asia study (Reardon *et al.* 2015), urban households were found to allocate 73 percent of food spending to processed foods, compared to 60 percent among rural households in the sample countries. As with the diversification patterns described above, patterns in urban Africa are similar to those in rural Asia, and moving along a similar continuum. The figures here are far higher than they were in the 1980s and 1990s.

### 2.3.2. Implications of dietary change for inclusive rural transformation

Dietary change affects agri-food supply chains and rural incomes. Shifts in the product composition of diets, and the value added composition of diets, have important impacts on demand for services from farm areas and from secondary towns. The development, maintenance and operation of supply chains has required and driven the expansion of off-farm services in rural areas and secondary towns – to pack the fruit and vegetables, to collect, cool and ship milk, to butcher animals and distribute the meat, and to collect feed grains and mill them. This has entailed the massive development of wholesale, transport, packing and processing activities. These are important opportunities for inclusive transformation of rural territories linked to the towns that service them.

The emergence of these activities creates employment multipliers in rural areas and small towns: being non-cereal based, they are more labour-intensive than the cereal-related activities, both at the farm and off-farm levels. This has generated employment and increased rural inclusiveness, at least in the ‘first round’ of the transformation.

## 2.4 Downstream, midstream, and upstream change: Agri-food system transformation

### 2.4.1. Broad Determinants of pre-farmgate and post-farmgate agri-food system transformation

Transformation of the agri-food system is the result of the downstream ‘pull’ factors of urbanization and dietary change and the upstream ‘push’ factors of farming intensification and factor market development (see section 2.1). Urbanization and dietary change are the demand-side forces driving the whole set of transformations, while factor market and farm technology change are the upstream supply-side forces feeding the rest of the changes.

The agri-food system acts as an intermediate link between supply and demand. Thus, the determinants of change at the upstream and downstream ends of the system – including income increases, technology change, and changes in employment of consumers, producers and workers, leading to changes in the opportunity costs of time – are themselves determinants of system transformation. The demand ‘pull’ of the downstream segments, in addition, rewards investment and transformation in the other agri-food system components – for example, the purchase of a truck to transport tomatoes to an expanding urban market. The supply ‘push’ from upstream does the same: production of more tomatoes encourages an entrepreneur to buy a truck to collect and transport them. This is the essence of the inter-sectoral production and consumption linkages, downstream and upstream, that determine investments in and transformation of the wholesale, logistics, and processing segments.

Finally, there are contextual and policy conditioners of the above linkages that favour system transformation. These include public sector investments and policy actions in: the development of hard and soft infrastructures that affect transport and other transaction costs and risk, as well as technology research; and policies which may start with direct public sector intervention to develop off-farm segments followed by liberalization or/and privatization of those segments. Contextual factors include the rise of small cities and towns which generate economies of agglomeration which favour investments in the agri-food system.

Dietary changes, combined with urbanization, have led to the composition of farm output shifting in relative terms toward non-cereal foods and feed grains, leading to a very rapid development of supply chains for both in Africa and Asia. This transformation, in turn, has required the expansion of off-farm services in rural areas and in small towns and cities, e.g. to pack fruit and vegetables, or collect and ship milk. These services tend to be town-based, further raising the profile of the small cities and towns in rural transformation (see Figure 2.4).

**Box 2.3 Definitions and concepts**

The agri-food system is a set of value chains (VCs). Each VC is a chain moving inputs (upstream segments) to farms and fisheries, and moving their output through midstream segments (wholesalers, logistics agents, and processors) to downstream segments (retail and export) and on to consumers in the country, the region and abroad. The ‘off-farm components’ include all the segments except the farm segment.

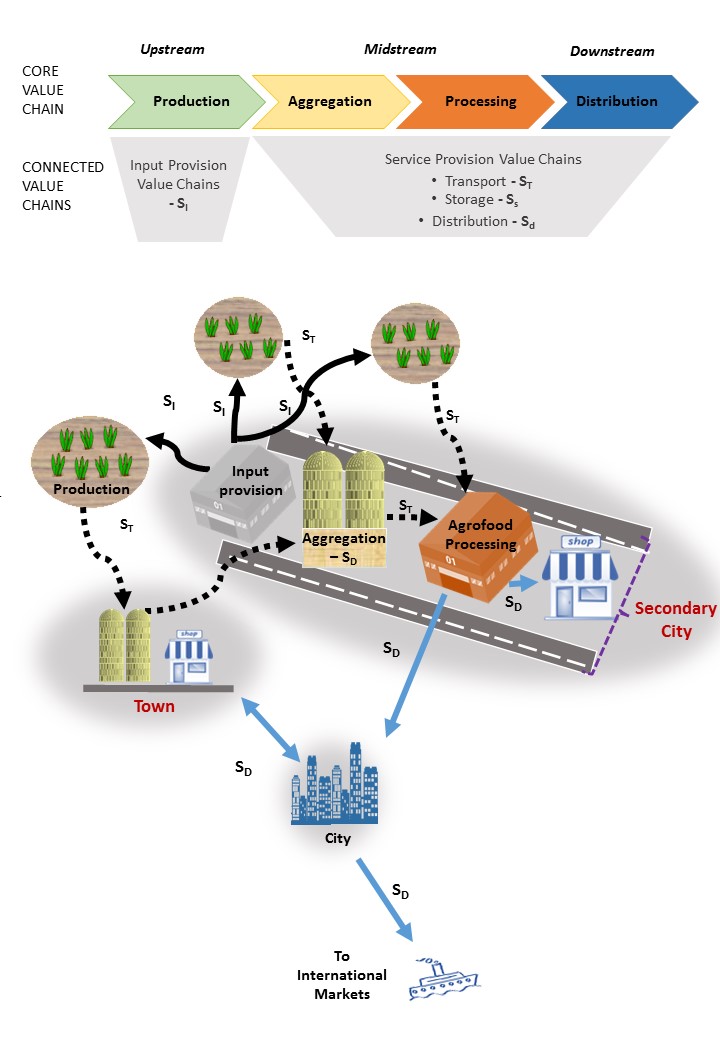
Each product VC is itself a ‘cluster’ of VCs. That is, each of the segments of a given product’s value chain is in turn the end point of value chains leading into that segment. For example, the fertilizer input to rice farms is delivered by a ‘fertilizer value chain’, from the mining of components and manufacture to their wholesaling and their retailing to a farmer. As a midstream example, the wholesale service to the rice VC is an ‘inputs-to-wholesale value chain’, including the manufacture of trucks and warehouses as inputs to wholesaling, through to trading of those inputs to wholesalers.

A product VC can be of any length – from a very local VC, such as from a farm to its village centre; an intermediate length chain, say from a farm to a district town; a long ‘domestic’ one, from a farm to a distant city, or an international VC (which is then classified as international trade) stretching from the farm to some point that exports to midstream or downstream segments in another country.

The ‘spatialization’ of a product value chain is the linking a VC to a cluster of VCs, to a rural territory, to a secondary city or town, and to a megacity. For example, the mango value chain in Indonesia links small cities and secondary towns, which contain most of the input and farm services components of the chain, the rural areas where mangoes are grown, small cities and towns which are the main bases of mango transporters, brokers, wholesalers and processors, and secondary and primary cities, which are the main final wholesale and retail markets and outlets for the mangoes. Seen this way, one can ‘map’, the distribution over space of the cluster of chains for the mango sector. This allows us to discern the roles in the mango system of the rural space and the secondary city/rural town space and their links.

The development of the off-farm components of the agri-food system has led to further spatial shifts that are important to our discussion of inclusive rural transformation through enhanced linkages and integration between rural areas and smaller urban centres. These include shifts in the locus of processing and trading activities, first from farm to village then from village to town or city. These shifts tend to imply an increase in capital requirements and scale, and re-location to towns for greater capacity utilization of fixed investments, such as plant in the off-farm segments of both non-cereal food and feed grain supply chains.

#### Figure 2.4 Map of the value chain linking the rural space and secondary cities in upstream, midstream and downstream segments of agri-food value chains



Source: FAO.

These investment and spatial shifts suggest that there are several stages in the transformation of the agri-food system. The first stage occurs in rural areas and is usually focused on cereals with a tiny scale (fragmentation) of off-farm components. The second stage involves a proliferation in rural areas of small-scale off-farm enterprises linked to the supply chain, along with product diversification. In the third stage, these off-farm activities migrate to local towns, while activities in rural areas become more diversified and eventually more capital-intensive and mechanized, with less of a role in off-farm operations, except for immediate handling. The tactical implication is that the rural-urban configuration needs to be analysed at each of these three stages and development policies and programmes geared to address them.

### 2.4.2. Transformations of the post-farm gate agri-food system

Five major transformations are taking place in the post-farm agri-food system. First, there is transformation of system’s spatial structure. Second, there is a structural shift on the supply side, in which the value share of the post-farmgate – i.e. the midstream and downstream – segments has increased. Third, there is a shift from fragmentation to a more consolidated structure. Fourth, there is a transformation of the technology used in the off-farm components of the system, leading generally to an increase in the capital/labour ratio. In the final change, new commercial transaction requirements, standards and contracts emerge once the above transformations in market structure have taken place.

Spatial structural transformation of the agri-food system follows two tendencies. One is a structural shift from a fragmented system in villages to the agglomeration of midstream and downstream actors in and near intermediate cities and megacities. This process is correlated with rapid growth not just in megacities but also in small cities and towns. A further tendency of the process is a structural shift from geographically shorter to longer value chains, correlated with urbanization.

The increasing length of supply chains from rural to urban areas also means that food supply chains will be more vulnerable to climate and energy shocks; addressing these vulnerabilities is important for feeding cities but also for managing income shocks to rural suppliers who will depend more and more on urban sales. The spatial lengthening of value chains differs substantially according to product types, perishability and the geography of production zones. The ‘catchment areas’ of cities are different for different product types:

* **Vegetables** are typically sourced from within a radius of 3-4 hours travel time from a city;
* **Fish** are typically sourced from a closer radius, especially as aquaculture displaces fresh water capture fisheries and aquaculture develops around the large cities. However, with rapid development of the frozen fish industry, fish is increasingly shipped for longer distances within countries – for example, Bai *et al.* (2017) found a rapid increase in fish consumption in Beijing and a fast growing share of that market being filled by frozen fish shipped from southern China;
* **Poultry and pig production** is gradually shifting from scattered home enterprises to larger farms and integrated operations. These tend to be in similar catchment areas to vegetables – because frozen poultry and pork still account for a relatively small share of consumption, production points tend to be close to cities;
* **Fruit** is usually shipped over longer distances than vegetables – e.g. a large amount of fruit is exported from Thailand and China to Indonesia. As fruit consumption diversifies and longer supply chains develop, there appears to be an increase in the mean distance of the fruit source from large urban markets. For example, while most mangoes sold in Jakarta are grown in Java, inter-island mango supply is increasing rapidly and could be promoted by ‘product cycle’ changes that are correlated with geography (Qanti *et al.*, 2017).
* **Cereal production** is still located somewhat near the cities they supply (e.g. the Mekong River Delta supplies most of the rice consumed in Ho Chi Minh City), but long-distance grain movement within countries is growing in importance. Over the past five years in Hangzhou, China, *japonica* rice sourced from northeast China 1 500 km away has displaced local *indica* rice;
* **Processed products,** such as milled rice, edible oil and snacks now appear in national and sub-regional markets as they can be shipped and stored. Examples include maize and wheat processed products shipped from Dar es Salaam to rural towns in central Tanzania; milled *japonica* rice from northeast China and frozen fish from Guangdong being consumed all over China, , and processed foods being regularly available in most parts of the Philippines.

The structural shift on the supply side, in which the value share of the post-farmgate midstream and downstream segments has increased, is difficult to quantify per product in each country. There are, however, reasons to believe that it is growing and is already substantial. This expansion of the midstream and downstream segments and their share of the food economy appears to be closely correlated with the level of development and degree of economic liberalization. Emerging evidence indicates that there are no marked exceptions to the trend, such as deviation from growth in the length of supply chains. The following are indicators of growth in the value share of the midstream and downstream segments:

* The share of home consumption in production has gradually fallen, accompanied by a shift in food composition toward more profitable products such as vegetables and animal source foods. This implies de facto a rise in marketing and logistics services.
* The urban share of the food market has risen rapidly. As cities grow, they need ever longer supply chains to feed themselves, with the lengths varying according products and the state of transport infrastructure. This implies a growth in the transport and wholesale segments in order to move food over longer distances. Studies in Africa (Ethiopia, Nigeria, Senegal and the United Republic of Tanzania) and Asia (China Indonesia, Myanmar, Philippines and Viet Nam) show substantial investments by wholesalers and transport operators in vehicles, warehouses and cold storage for rice, potatoes, mangoes, lettuce, shrimp, fish and dairy products (Reardon *et al.*, 2012; Reardon *et al.*, 2015).
* The share of processed food in total food consumed has risen over time can be inferred from the high share, noted above, of both low and high processed food in diets. Growth is reflected on the supply side by the growth in national food processing companies and the entry into national markets of both regional and global foreign companies.
* Retailing has developed in two ways over the past several decades. On the one hand, there has been a substantial rise in consumption of food away from home, giving rise, on the supply side, to the rapid spread of fast food chains and restaurants. On the other hand, there has been a rapid spread of supermarkets in Asia and Africa (Reardon et al., 2012).

**Box 2.4 The potato value chain supplying New Delhi: a confluence of events**

There has been a rapid transformation of food supply chains in India over the past two decades. Modern retail sales are growing at almost 50 percent per year and have rapidly penetrated urban and even rural food markets (Reardon and Minten, 2012). For example, Das Gupta *et al*. (2010) found that cold storage has assumed a vast and multi-faceted role in the potato value chain in Agra district and from Agra to Delhi. Fully 80 percent of Agra potatoes now pass through cold storage, up from an estimated 40 percent six years ago. Some 95 percent of the farmers use cold storage. This is significant for the value chain inter-seasonally: whereas in the early 1990s traditional storage dominated, and only allowed storage for 3 months beyond harvest, cold storage extends storage to around 7 months.

Cold storage has given farmers a choice among several types of traders competing for their potatoes, including Agra wholesalers, Delhi wholesalers and rural brokers. It also provides financial services, with 60 percent of farmers, large and small, obtaining credit in the form of advance payments using the stored or to-be-stored potato as collateral.

Rapid development of cold storage in Agra district appears to have been driven on the demand and supply sides. On the demand side, farmers’ rewards for cold-storing are 26 percent of the total rewards of the value chain, versus 18 percent for farming itself, while cold store costs are only 19 percent of the costs of the value chain. Costs and rewards have roughly 50/50 shares in the formation of the overall potato price for consumers. It pays for farmers to store.

On the supply side, both the internal rates of return and profit rates are healthy. The investment context is positive, thanks to an abundant supply of potatoes, government subsidies on construction and expansion of cold storage, a good power grid, improvements in road links to Delhi and rising incomes in Delhi itself. With the expansion of secondary cities and improved road links, commercial horticulture areas near Hyderabad, Bangalore, Chennai, Kolkata and Mumbai are growing and flourishing. The development of this horticultural potential will require continued investment in the power grid, water infrastructure and roads.

The consolidation of the value chain structure in Africa and Asia has taken various paths, depending on the country and food product. The first path of concentration did not involve participation from parastatal agencies – segments of traditional small-scale enterprises were gradually, or quickly, concentrated with domestic or foreign direct investment. Most perishables – poultry, fish, pork, and non-plantation/export fruit and vegetables – are examples of this. The recent Asian literature provides similar examples for vegetables (e.g. Gorton *et al.*, 2011, for Thailand; and Moustier et *al.*, 2003 and Moustier, 2009 for Vietnam).The second path involved a public-sector induced ‘semi-concentration’ of traditional small-scale firms, with one or several parastatals functioning alongside informal, small-scale operators. After the dissolution of parastatals post-1980s, there was sometimes a proliferation of small formal or informal firms in their stead, followed by consolidation led by the private-sector, using large local, regional or international capital, which led to the displacement, acquisition or sometimes mergers of the small and medium firms. Most value chains for cereals and pulses are examples of this. It is reasonable to say that the process of consolidation has gone further in Asia, but there are many signs that Africa is moving in the same direction.

The fourth transformation is the change in the technology used in off-farm components of the food system, with a general tendency toward an increase in the capital/labour ratio. This has implications for employment – for example, volume increases in processing in India led to the diffusion of small enterprises, but it was followed by capital intensification and concentration.

Finally, once the above transformations have taken place (in market structure, and in sector composition, scale and technology), changes in commercial transaction requirements, standards and contracts emerge, leading to new demands in the midstream and upstream segments. These institutional and organizational changes emerge mainly at the third stage – large processors, supermarkets, and wholesale agents working for them, impose these changes on their supply chains in order to coordinate suppliers, minimize costs and maximize food quality and safety. They do this in order to compete or create symbiosis with each other (or to compete with the remnants of the small-scale fragmented traditional systems), and in response to laws and regulations requiring safety and phytosanitary outcomes.

### 2.4.3. Implications of upstream and midstream/downstream system change

The development of wholesale, transport, packing and processing has had employment multipliers in rural areas and towns. As these activities, at both on-farm and off-farm level, are more labour-intensive than cereal production and handling, they have created employment and contributed to more inclusive rural transformation (see Box 2.5). However, over time, there is gradually capital intensification and, with it, challenges for low-skilled labour in particular.

**Box 2.5 Investing in ‘*milk money*’ – inclusive dairy value chains in Afghanistan**

Economic, social and political constraints often prevent rural women from contributing fully to, and sharing fully in the benefits of, rural transformation. Rural women face higher barriers than men to participating in dynamic markets, entering high-value agri-food supply chains, and accessing land, agricultural inputs and other productive resources. For rural transformation to be inclusive, policies and investments must help smallholders to overcome market barriers. For rural women, easier access to and control over productive resources and assets, as well as involvement in decision-making processes, are essential.

In Afghanistan, FAO is helping women participate in more lucrative markets through a programme for integrated dairy development, implemented in collaboration with the Ministry of Agriculture, Irrigation and Livestock, IFAD and the Italian Government. The aim is to build an inclusive smallholder-based dairy value chain. Support has included technical assistance and inputs, the formation of smallholder cooperatives, and the establishment of milk collection and chilling centres. Four milk processing plants have also been set up, in Herat, Kabul, Kunduz and Mazar-i Sharif. More than 4 500 smallholder farm families, including 1 540 headed by women, sell their milk surplus directly for processing and benefitting daily from regular “milk money” income.

Women’s increased control over their earnings, and greater access to training opportunities, has allowed them to invest and expand their productive activities. It has also helped improve the nutritional status of household members, particularly children, increased school enrolment of girls and boys, and strengthened women’s status within the household and community.

Source:

These shifts tend to put pressure on midstream and upstream segments to comply with requirements that are relatively new to the traditional agri-food system. This accelerates, first and foremost, changes in the structure and spatiality of off-farm segments of the supply chain, such as a contraction of the initial proliferation of small and medium enterprises. Depending on land tenure laws, agrarian structures and a host of other factors, these forces may or may not induce concentration of farmland.

Moreover, the finance required for investments in the above transformations usually comes mainly from self-financing, and certainly not from banks, traders or informal credit. When farmers seek finance externally, they usually deal with input dealers and traders, and usually from a weak bargaining position. This relationship needs to be considered in the development of credit schemes to overcome barriers facing smallholder farmers.

The above underscores the fact that the goal of competitiveness must dovetail with that of inclusiveness, if policymakers are to ensure that rural livelihoods are sustainable and that the rural sector remains competitive on the domestic market. As farmers emerge from the rural hinterland, their market opportunities are increasing. Competitiveness is no longer an ‘agribusiness niche’ discussion, but a central issue in the rural transformation.

## 2.5. Conclusions and policy implications

This chapter has examined the role that urbanization, diets and agri-food systems have been playing in rural transformation, providing evidence of how changes in all three drive the transformation and have implications for inclusiveness. It highlighted the growing importance of small cities and towns in the agri-food system in developing countries, and how their role needs to be programmed into strategies for inclusive rural transformation. The markets of smaller urban centres are often integrated with rural markets in a broader rural territory that can be addressed with policies and programmes. This is especially true if we consider that the inclusiveness of rural transformation will depend on domestic market opportunities, since most of the food consumed in developing countries comes is from domestic production.

However, there are two emerging challenges: towns are conduits for a steady flow of cheap, packaged, processed foods, which may benefit consumers at the expense of local small-scale producers. A linked challenge is that vastly expanded, multi-directional supply chains leave rural areas exposed and vulnerable to external shocks. The implication here is that the competitiveness agenda needs to be extended to a territorial scale, rather than focus on traded products, and incorporated as one more tool for risk management and enhanced resilience.

The importance of small cities and towns in rural transformation is underscored by ongoing dietary changes, which are driving the massive development of supply chains and of wholesale, transport, packing and processing activities. Since these activities are more labour-intensive, they have employment multipliers in rural areas and present important opportunities for inclusive transformation of rural territories.

However, over time, capital intensification will pose challenges, especially for low-skilled labour, which will need to be addressed in the design of rural development policies and strategies. Moreover, dietary change tends to put pressure on midstream and upstream segments of the agri-food system to comply with new, unfamiliar requirements, which accelerates the shift in the structure in the off-farm segments of the supply chain. These forces may or may not induce concentration of farmland, and issue examined in the following chapter.

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# Chapter 3. What does the future hold for farming systems?

## Key messages

* Farmers are benefiting from multiple options for buying and selling, from modern information and communication technologies, and from off-farm income used to finance investments
* The exit of labour from agriculture in transforming countries is accompanied by higher demand for machinery, even on small farms, making rental markets a key to farm mechanization.
* In most developing countries, there is a decline in average farm size and fragmentation of holdings, but medium-sized farms are emerging in high-potential areas.

## 3.1 Rural transformation and farming systems

Structural and rural transformations are not driven exclusively by the demand side and the associated development of value chains, as outlined in Chapter 2. Another important factor is the commercialization of agriculture and, with it, the transformation of farming systems and rural factor markets. In countries where agriculture is the primary source of employment, agricultural productivity growth is a key driver of the transformation process. Agricultural productivity growth is achieved through technological innovation, changes in the mix of agricultural produce, and improved access to markets.

In a typical rural area, the earnings accruing to farms selling larger surpluses create demand for goods and services in the local rural economy. This, in turn, generates employment opportunities in the non-farm economy, movement of labour from farm to non-farm activities, and gradual farm consolidation by those who remain in agriculture. This process hinges on the availability of, and access to, markets that can absorb surplus production. In most cases, it requires the close proximity of the rural area to urban centres and rural-urban linkages that connect agricultural activities, forwards and backwards, to the rest of the economy.

In this respect, developments in the agri-food system and supply chains are changing farming systems. They do so directly through their impacts on farm production mixes and technologies, but also indirectly by modifying factor markets, leading to the re-allocation of labour and capital, as well as land at later stages. Initiating and sustaining a process of transformation requires modes of exchange that trigger sustainable agricultural productivity growth for a broad segment of the rural population. This is often achieved by lowering transactions costs in ways that increase farmgate prices relative to input costs, and fostering supply chain exchange mechanisms that favour the participation of small farms in agricultural supply chains (Poulton *et al*. 2006; Barrett, 2008; Reardon and Timmer, 2012).

## 3.2 What is changing relative to past transformations: the farmers’ perspective

### 3.2.1 The changing role of intermediaries as entry point

Farmers’ relationships with intermediaries are changing rapidly. The example of the potato value chain that supplies New Delhi (see Chapter 2, page ##), showed how cold storage only recently emerged thanks to a confluence of factors, and has become more than a simple storage mechanism. Reardon and Minten (2012) find that Agra farmers now sell only 10 percent of their potatoes to rural brokers at the farmgate, and only 20 percent are sold to local brokers while in cold storage. Almost 60 percent goes directly from farmer to the Agra or Delhi wholesale markets. This constitutes a ‘dis-intermediation’ with respect to the traditional chain. Dis-intermediation means shorter chains, and suggests efficiency gains. This same sidelining of the rural field broker has been observed recently in Mexico (Berdegue *et al.*, 2006), Indonesia (Natawidjaja *et al.*, 2007), and China (Huang *et al.*, 2007), among others. It appears that the proliferation of rural wholesale markets, better road links to cities and the diffusion of mobile phones among farmers, which gives them more information about options, all contribute to changing their relationship with intermediaries. In the case of potato supply to Delhi, the cold storage companies are providing financial services, with 60 percent of farmers, large and small alike, receiving credit.

Other important elements of change for farmers in transforming countries include new avenues for accessing finance and investments, and the increasing role of non-farm incomes as a source of funds for the purchase of physical inputs, as seeds and fertilizers (see Chapter 2). Finance is also crucial for farmers’ investments in new technologies, irrigation and mechanization.

For large farmers, these changes are probably not significant, since they are typically better-informed, use their own savings for buying inputs, and have the collateral banks need to concede loans for investments. Private sector banks usually lend little to farmers owing to the high transaction costs and their lack of collateral. Small farmers, generally, face serious difficulties accessing formal credit sources, and typically depend on local moneylenders, often with onerous conditions and high interest rates. Adjognon *et al.* (2016) report that in several countries of sub-Saharan Africa, farmers use non-farm income to buy farm inputs. However, for many smallholders, this income is barely sufficient for operational expenses, especially where non-farm employment is limited.

The rise of new intermediaries directly connected to farmers has the potential to fill the vacuum left by the decline, starting in the 1990s, of policies to facilitate agricultural credit, which had played an important role in developing countries for several decades. The informal financing arrangements associated with today’s evolving value chains can be a boon for smallholders, provided they do not become hostage to a single source of credit that dictates terms. Evidence suggests a very heterogeneous situation in rural areas, with small farmers at different stages in the transition toward greater access to financing resources and markets. Because interlocking factor markets[[8]](#footnote-8) are dominant in more remote villages, and can be exploitative of farmers (Lebbe, 2015), improvements in rural infrastructure will play a key role in improving farmers access to production factors and inputs. For example, in Pakistan, Shami (2010) found that the construction of a superhighway altered bargaining power between landlords and the rural poor, in favour of the latter. Smallholder participation in social networks can serve the same function, as reported by Abay *et al.* (2014) in the case of Ethiopia. In Kenya and Zambia, the entry of large-scale traders into maize markets is bringing small-scale producers higher prices and better access to inputs (see Box 3.1)

**Box 3.1 Large-scale cereal trading in East Africa**

The recent emergence of large-scale traders (LSTs) holds potential for improving rural livelihoods in East Africa (Jayne *et al*. 2010). In Zambia, farmers’ maize sales to LSTs have quadrupled, rising from 3 percent to 12 percent of total maize sales volume between 2012 and 2015; in Kenya, sales to LSTs rose from virtually nil in 2004 to 37 percent of all maize sales in 2014.

Compared to traditional commercial channels, large-scale traders pay farmers 3.6 percent more for their maize in Kenya and 4.9 percent more in Zambia. However, LSTs do not always offer farmers a price advantage. In the United Republic of Tanzania, where LSTs handled 34 percent of maize sales by volume in 2016, they typically paid farmers 5.7 percent less per kg.

Large-scale traders are attracted to an area by medium-size and large farms but, once established, even small-scale farmers are more likely to sell to them. To coordinate supply chain activity, most LSTs in East Africa have upstream contracts with processors and downstream contracts with small traders, suggesting an important shift away from typical spot market arrangements in cereal markets. Increasingly, LSTs are also providing smallholders with services, including extension advice, price information and input credit.

The role of LSTs in East Africa is evolving with other important transformations in the demand and production segments of regional agri-food systems. Growth in large-scale trading is attributed to rapid and sustained demand growth, both in domestic and regional export markets, and changing supply conditions, particularly increased production in the medium-scale farm sector.

Sitko *et al.* (2017) stress an important policy concern: how to effectively leverage the benefits of growing LST investment in grain markets, while managing downside risks associated with market power and limited market participation by the poor. They point to four possible policy responses: fostering competition among domestic traders (e.g. by leveraging grain stocks through warehouse receipts or moveable collateral legislation); supporting horizontal aggregation structures to help small farms with limited surpluses to effectively link and sell to LST market channels; implementing policies to improve cereal price predictability; and developing innovative financial tools to help defray the risk and costs to LSTs of providing input credit and other services to smallholders.

Source: Sitko *et al.*, 2017

### 3.2.1. Access to information: trends in extension services and ICT

The roles of agricultural extension and rural advisory services in developing countries have changed significantly since the 1980s, in response to cuts in public funding, the increased complexity of farming systems and rural landscapes, and the ongoing commercialization of agriculture. Traditional, top-down, mainly public sector extension systems focused on production and technology transfer have given way, in many countries, to more participatory approaches. These foster farmers’ empowerment, catalyse and facilitate innovation through stronger linkages between farmers and other stakeholders, help to strengthen entrepreneurship, enhance organizational development and improve access to inputs and credit. The mandate of extension and advisory services now includes food security, climate change, nutrition, gender and health, among other issues.

Rural services are being delivered to farmers from a variety of sources, including the public sector, private agents, civil society organizations and NGOs. The role of public extension services has declined in most countries owing to budget cuts and institutional weakness. Recent data from a sample of 10 countries indicate that the outreach of public extension services covers no more than 25 percent of the farming community at best and less than 10 percent in some cases (FAO, 2014). Therefore, most farmers are relying largely on other sources of information, such as other farmers, input dealers, radio, television, internet and mobile phones (Bitzer *et al.*, 2016).

Gomez *et al.* (2016) surveyed more than 100 organizations providing advisory services to small farmers in 42 countries.[[9]](#footnote-9) The survey covered different types of organizations, including private businesses (52 percent), NGOs (31 percent), farmer-based organizations (7 percent) and social enterprises (5 percent); it also considered their roles in the value chain by organizational type (Figure 3.1). Of the sampled organizations, 84 percent reported that their clientele included farmers with less than 2 ha.

#### Figure 3.1 Types of value chain advisory services provided by private/social enterprises and non-governmental/farmer-based organizations



Note: based on data from 42 developing countries   
Source: Gómez, Mueller and Wheeler, 2016.

Survey results show a relationship between an extension provider’s main role in the value chain and its performance. For example, downstream organizations, which assist in distribution of agricultural produce to processors and final consumers, are more effective at achieving goals related to product quality, while upstream organizations, which work in the supply of inputs, are more effective at achieving goals related to technology adoption. Organizations that were successful overall, across different roles, were more likely to be those that provided outside support to the value chain through consultancy services and certification.

Gomez *et al.* (2016) also found that organizations whose funding and activities were controlled mainly by private business had more innovative extension approaches and were more active in fostering the use of ICTs and tactics such as ‘farmer-buyer’ and ‘farmer-farmer’ networking. On the other hand, NGOs were much more likely to address social development objectives in their extension approach; while they had a positive impact on marginalized groups and on technology adoption, they were not as effective in improving market access.

Although recent decades have seen the emergence of more pluralistic agricultural extension and advisory services, this trend should not be seen as the demise of the public extension system. Rather, it allows limited public resources to be channelled to complement privately-run services – for example, to reach specific farmers or to coordinate the roles of different actors. Governments need to ensure that the advisory services provided by the private sector and civil society are sound and feasible, not only in their technical aspects but also economically and socially. Governments have a special role to play in meeting the needs of small farmers, since those needs may not be met by the private sector. Therefore, government can support the formation of producers’ organizations and cooperatives to play a central role in providing services and voicing farmers’ concerns. In this way, advisory services become more demand-driven (FAO, 2014).

Given the plurality of today’s rural advisory approaches, it is important to understand which type of advisory service provider is suitable for different farming categories. For example, small-scale farmers include, at one extreme, producers who are completely market-oriented and fully integrated with value chains and input providers, and at the other extreme, subsistence producers in rural hinterlands with few if any links to urban markets and only basic access to inputs and technologies. Farmers needs will differ substantially, depending on where they are found along this range. Without effective coordination, theplurality of advisory systems tends to be inefficient. Furthermore, the declining role of the public sector in extension services raises the question of who pays for these services. While commercial farmers can cover the costs of advisory services through high-value production, subsistence and semi-commercialized small-scale farmers will need external support (see Box 3.2).

**Box 3.2 Private sector advisory services in India**

Developed by an Indian agri-food conglomerate, the e-Choupal initiative aims at linking the firm directly with farmers in order to facilitate the supply of production inputs and the procurement of outputs, such as soybeans, wheat, coffee and prawns.

Since 2000, the company has installed computers with Internet access in rural villages to deliver real-time information and customized knowledge that help farmer to better align output with market demands and consumer segments. This has helped farmers to raise their quality standards and discover the best price for their produce. The system helps aggregate demand, while facilitating access to higher quality farm-inputs at lower cost to the farmer. It creates a direct marketing channel which, by eliminating wasteful intermediation and multiple handling, reduces transaction costs and makes logistics more efficient. E-Choupal preserves the identity of different product types through a 'farmgate to dinner plate' supply chain.

The costs of the e-Choupal platform are recovered through various business models, such as service charges, margins from distribution of products and embedded charges in transactions. Farmers pay a nominal registration fee.

Sources: Singh *et al.*, (2016) and Goyal (2010).  
For further information, see APAARI (2014).

Direct, face-to-face extension services are increasingly being complemented – and sometimes replaced – by information channelled through modern information and communications technology (ICT). While infrastructure investments remain low in many developing countries, one area in which there has been dramatic change over the past two decades is mobile phone coverage and adoption. In sub-Saharan Africa, for example, mobile phone networks covered less than 10 percent of the population in 1999; today, coverage is more than 90 percent. In terms of actual subscribers, the penetration in sub-Saharan Africa is now 42 percent of the population, and is expected to surpass 50 percent by 2020 (GSMA, 2016). More broadly, in developing countries as a whole, penetration stood at 59 percent in 2016 and should reach 70 percent by 2020 (GSMA, 2016).

Mobile phones help overcome isolation, in effect shortening the distance between previously isolated smallholders and the other actors involved in producing, processing, transporting, marketing and regulating farm produce (Conway, 2016). As 3G broadband coverage extends to rural areas, rural people are moving increasingly from basic mobile phones, with voice and text message capabilities, to feature phones, which support media formats such as photographs and video and can access the internet (FAO, 2013). Between 2011 and 2015, the proportion of the world’s population with 3G coverage jumped from 45 percent to 69 percent; however, broadband penetration lags behind in Africa, where coverage is below 20 percent (FAO, 2016). As mobile phone use changes, information services are adapting. In India, for example, the national government’s Kisan Call Centre, launched in 2004, responds to questions raised by farmers in local dialects. In 2013, the Kisan Portal became an online service with location-specific information for farmers (FAO, 2016).

Whether mobile phones are basic or feature, they allow farmers to seek out solutions from peers or through the expanding range of information sources. In Sri Lanka, a virtual trading floor, FarmerNet, connects produce buyers and with farmers via SMS (FAO, 2016). Mobiles can also speed up the supply of inputs through e-vouchers and real-time tracking of inventory. For example, Nigeria has recently launched an e-wallet programme which delivers seed and fertilizer vouchers directly to farmers through their mobile phones. The platform has recently been extended to deliver other benefits, such as vouchers for nutritional supplements (Adesina, 2016). In Kenya, the Kilimo Salama (or “safe agriculture”) pilot programme uses weather stations to detect excessive and inadequate rainfall, and sends a payment to affected farmers through M-PESA, a mobile money transfer service (FAO, 2016). In the near future, such systems could provide a platform for interacting with millions of once inaccessible smallholders in Africa. Local access to credit can also be made more timely and efficient through digital technology.

## 3.3 Mechanization and technology key drivers of farming system change

Increasing agricultural output and diversification of products is a pre-condition for development of the agri-food processing sector and accompanying increases in rural employment and income. As land shortage is a major factor limiting increased production, achieving higher rates of productivity is crucial and will continue to rely on advanced physical inputs, such as high-yielding varieties and improved combinations of fertilizer. In most of West Asia and North Africa, where water is critically limiting factor, further growth in agricultural productivity will depend on more efficient irrigation and the effective mobilization of water, both of which require investments in infrastructure and technologies.

Agricultural mechanization is crucial because it enhances the productivity of the other production inputs, such as seed, fertilizer and water, and has significant implications for the other factors, especially land and labour. Mechanization has increased substantially worldwide, especially in the countries that have undergone rapid transformations. Available data on mechanization (Figure 3.2) show that it is more common among the third and fourth quartiles (larger farmers) because they have easier access to the finance needed for investing in machinery. In addition, larger farmers have stronger incentives to mechanize as it helps them to ‘gain scale’ – not only by cutting labour costs but also by reducing supervision costs.

However, experiences indicate that mechanization can be profitable even for small-scale farmers. Once a certain level of transformation is achieved, agricultural labour costs rise, which encourages even small farmers to mechanize. This, in turn, creates incentives for the development of a rental machinery market, which has become a key to mechanization among smallholders. In Cambodia, only 20 percent of mechanized farms use their own machinery; the rest rely exclusively on rented machinery.

Country experiences in mechanization are influenced by context-specific factors, including the stage of rural transformation reached and the role played by public policies and existing incentives (Box 3.3). It is noteworthy that mechanization in Asian countries has been driven by the private sector, and that government incentives in India were not for the adoption of a particular technology but rather for mechanization *per se*. Poorly designed government interventions can undermine the private sector and influence the choice of technology. As reported in Poapongsakorn *et al.* (2017), the level of mechanization also varies across different farming operations and different crops. In Thailand, the development of farm mechanization began with power-intensive machines such as irrigation pumps, power tillers and threshers (Viboon and Anucit, 2009); by the early 2000s, all kinds of farm tasks in rice, sugar cane and maize production, and rice post-harvesting, had been mechanized. However, the harvesting of some important crops, such as cassava, rubber and fruit trees, had not yet been successfully mechanized largely because of the technical difficulties in machine design.

#### Figure 3.2 Levels of mechanization in selected countries by land quartiles and source of mechanization

Notes: Cross-country comparisons are limited because the tools and equipment included in estimates vary from country to country, with some countries considering only tractors and water pumps and others considering additional types of machinery.

Sources: Authors' compilation using Government of Albania (2005); Government of Bangladesh (2005); Government of Cambodia (2004); Government of Guatemala (2006); Government of Kenya (2005); Government of Nepal (2003); Government of Nicaragua (2005); Government of Tajikistan (2008) and Government of the United Republic of Tanzania (2009).

**Box 3.3 Mechanization patterns vary by country conditions**

In China, the use of farm machinery, measured in kilowatts, rose seven-fold between 1985 and 2009. From the early 1980s, the use of small tractors increased at a steady rate, with the stock growing more than 20 times over by 2010. On the other hand, the adoption of medium-size and large tractors coincided more or less with the sharp increase in farm wages that began in the mid-2000s. Rapid farm mechanization was facilitated by the rise of private farm mechanization services, which provide specialized labour and large harvesting machines. Tasks such as land preparation and harvesting have been increasingly outsourced to the tens of thousands of such services, which migrate across agro-ecologic zones throughout the country and operate for up to eight months a year (Yang *et al.*, 2013).

Bangladesh, with its small farm sizes and high population density, has undergone rapid farm mechanization, led by the adoption of machines adapted to the country’s conditions, such as low-cost water pumps, power tillers and threshers that are easily used by smallholder farmers. Today, Bangladesh’s agriculture is highly mechanized but still labour-intensive, due to the dominance of small-scale machinery – for example, four-wheel tractors account for only 8 percent of total tractor horsepower (Diao *et al.*, 2014). Moreover, while only 2 percent of farmers in Bangladesh own power tillers, 72 percent of farmers used a power tiller, indicating a well-functioning rental market (Ahmed, 2013).

Mechanization in India took yet another path. In general, medium-sized tractors (of 20 to 40 horsepower) are the most common type in India and were first adopted by medium and large farmers. Draught animals remain important for small and marginal farmers, who may also use tractor hire services (Kulakarni, 2009). Unlike Bangladesh, India has subsidized a wide range of farm machinery, encouraging uptake of machinery use but also ensuring that the choice of machinery was demand-driven, rather than subsidy-driven (Diao *et al.*, 2014).

In Africa, mechanization has received renewed interest. Diao *et al.* found that high demand for agricultural products in Ghana has led to an expansion of land used, an increase in the number of medium- and large-scale farmers and a rising land to labour ratio. These developments, along with rising wages, have caused farmers to adopt labour-saving technology. Even small-scale farmers now use tractors for operations such as ploughing. Indeed, private investors import about as many tractors as the government imports. As in India, tractor ownership is most common among medium and large-scale farmers. Since 2003, Ghana has subsidized agricultural mechanized service centres, similar to the Chinese model. The aim of the programme is to provide to farmers affordable and timely access to farm machinery, such as tractors for land preparation, planters for precision planting, boom sprayers and pumps for crop maintenance, and combine harvesters for harvesting.

In Ghana, machinery is bought from countries which provide concessional loans (Diao *et al.*, 2014). Other African countries, such as Cameroon, the Democratic Republic of the Congo, Mali, Nigeria and the United Republic of Tanzania have followed similar policies of supporting mechanized services with subsidized pricing.

Improvements in agricultural productivity are also driven by the increased use of physical inputs and access to sources of affordable energy. The use of physical inputs, such as fertilizer, pesticide, irrigation and improved seed, usually go hand in hand in order to achieve maximum technical efficiency through agronomic synergies. Among physical inputs, fertilizer is the most widely used and the extent of its use can be taken as an indicator of production intensification. Available data indicates that fertilizer use is highest in East Asia and the Pacific, where it exceeds 300 kg per ha, and lowest in sub-Saharan Africa, at less than 10 kg per ha, reflecting different levels of transformation and productivity (FAO, 2017a).

Farmers in sub-Saharan Africa generally operate in very difficult conditions on very small farm sizes. Many lack access to modern agricultural inputs and machinery, owing to the poor state of rural infrastructure. The lack of irrigated land makes production vulnerable to the vagaries of weather and limits the intensive use of modern inputs, resulting in low yields (Filmer and Fox, 2014; Adjognon *et al.*, 2016). Increasing agricultural productivity in the region requires, therefore, investments in roads and other infrastructure in order to improve access to purchased inputs and improved varieties, and to produce markets.

## 3.4. Land transformations: fragmentation, consolidation, and markets

Rural transformation, as it occurred in the past, was a process in which less efficient farmers exited agriculture, and either sold or rented out their land, while the more successful farmers stayed in business and consolidated land holdings. The ongoing evolution of the agri-food industry in developing countries, illustrated in Chapter 2, presents smallholders with the challenge of trading in an increasingly complex system with specific standards and quantity requirements. In this context, farm size matters, as it can bring cost advantages.

Collier and Dercon (2013) found that large farmers are much faster than small-scale farmers at adopting modern technologies because they are usually more skilled at handling information and managing the risks associated with technology adoption. In addition, they have better access to resources, being able to buy or rent machinery to use over more hectares, while smallholders rely more on labour inputs and mixed-cropping systems that are more appropriate to small farm sizes (Rapsomanikis, 2015).

In this section, we examine trends in average farm size and farmland distribution to see whether this pattern is confirmed in today’s rural transformations. It should be noted that, even though they occupy only 15 percent of the world’s agricultural land, 85 percent of farms are smaller than 2 ha (Lowder and Bertini, 2017). Most farms are in the smallest cohort – i.e. smaller than 2 ha – in all developing regions except for Latin America and the Caribbean.

### 3.4.1. The evolving distribution of farm size

Analysis of how farm sizes may evolve must consider different income groups. The average farm size is positively linked to a country’s income level – i.e. larger in high and upper middle-income countries that have already undergone transformation or are well advanced in the process, and considerably smaller in low- and lower middle-income countries (Figure 3.3).

As for the distribution of land holdings, for nearly all income levels, on average, a large share of farms – between 40 and 85 percent – is smaller than 2 ha and they occupy between 1 percent and 40 percent of farmland. The farmland share represented by the larger cohorts increases with income level. Farms larger than 5 ha cover 27 percent of the farmland in low-income countries, 41 percent in lower middle-income countries, 93 percent in the upper middle-income countries (excluding China) and 98 percent in the high-income countries. The situation is reversed for smaller farms, which account for a bigger share of farmland in lower-income countries and regions than in higher-income countries and regions (see Annex for details). This static cross-sectional picture would appear to confirm the standard narrative; however, to understand whether past patterns of transformation still apply, it is necessary to examine how the distribution of land holding size is evolving among recent transformers.

Leaving aside the difference in average farm size across countries at different income levels, which has become more pronounced over time, changes in land holding distribution are not pre-determined by the transformation process: in low- and middle-income countries, average farm size steadily decreased from the 1970s to the 2010s, with the exception of the decade 2000-2010, when the average for low-income countries increased (Fig. 3.3). The surprising decrease in average landholding size in upper middle-income countries is driven in large part by the fact that 75 percent of the countries for which we have data in Latin America and the Caribbean show decreasing average farm size, but starting from a higher average.

Differences in average farm size can be attributed to demographic dynamics in rural areas (e.g. population growth or rural exodus), the prevailing land distribution and the functioning of land and labour markets. The problem is that, in low-income countries, small farms are becoming smaller, which will mean that, at some point, the livelihoods of smallholder farming households will no longer be economically viable. These declining sizes may hinder the capacity of producers to become more market-oriented and to adopt the technologies needed for sustainable productivity increases (Rapsomanikis, 2015).

#### Figure 3.3. Changes in average farm size in selected countries by income group, 1970–2010

#### (Hectares per holding)

Source: Lowder and Bertini, 2017.

While the aggregate data shows a decrease in average farm size for all country income categories except the high-income, disaggregation by country provides a more nuanced view. There is, in fact, a diversity across countries within the same income group, with one third of upper middle-income countries exhibiting an increase in average farm size. The same is true at the regional level – for a number of regions, there has been an increase in average farm size in countries for which data are available. In sub-Saharan Africa, there has been a trend toward increased size in six out of 27 countries (Table 3.1).[[10]](#footnote-10)

#### Table 3.1. Changes in average farm size by income and regional group, 1960–2010

|  |  |
| --- | --- |
|  | **Share of countries with increasing average farm size**  **(percent)** |
| **Income group** |  |
| Low-income countries | 16 |
| Lower-middle-income countries | 8 |
| Upper-middle-income countries | 33 |
| High-income countries | 74 |
| **Low- and middle-income countries, by region** | |
| Europe and Central Asia | 80 |
| East Asia and the Pacific, excluding China | 27 |
| Latin America and the Caribbean | 25 |
| Middle East and North Africa | 9 |
| South Asia | 0 |
| Sub-Saharan Africa | 22 |

Source: Based on Lowder and Bertini, 2017.

The data suggest that, in recent years, average farm size in some low-income countries, after generally decreasing, has now stabilized or is increasing slightly. The country-level data shows that, during the period from 2000 to 2010, average farm size increased in five of the seven low-income countries for which we have data – Bangladesh, Ethiopia, Malawi, Tanzania and Togo – but continued to fall in Myanmar and Nepal. [[11]](#footnote-11) Depending on the underlying change in the distribution of holding sizes, and taking into account high levels of population density, this has important implications for youth in agriculture. For example, Bezu and Holden (2014) find that youth in rural areas of southern Ethiopia face severe land constraints and that youth outmigration has increased significantly over the past six years. This is consistent with the evolution in the distribution land holdings and the amount of land they occupy, which indicates that farm consolidation is occurring in Ethiopia (Figure 3.4)

#### Figure 3.4. Change in share of land by landholding size, Ethiopia, 1990s–2010s

Source: Federal Democratic Republic of Ethiopia, 2012

The increase in farm size in some sub-Saharan African countries can be attributed to land acquisitions by wealthy Africans, described as an underappreciated ‘megatrend’ by Jayne and Traub (2016). They note that land acquisitions by local, often urban, investors are much larger than those by foreign investors. In Ghana, Kenya and Zambia, the area of land controlled by medium-scale farmers now exceeds that of foreign and domestic large scale-holdings combined (Jayne, 2014). In Ghana and Zambia, holdings of between 5 and 100 ha now account for more land than holdings of up to 5 ha (Jayne, Chamberlin and Headey, 2014). In seven African countries, urban-based people control 15 to 35 percent of land (Jayne and Traub, 2016). These emerging investors reduce the amount of land available to rural young people, leading to further outmigration. The emergence of medium-size farms has also given rise in Africa to levels of landholding inequality that are much higher than in Asia (Jayne *et al.*, 2014). This trend may help explain the dramatic increase in land prices in areas with high agro-ecological potentials (AGRA, 2016), which is where medium-size farms have been mostly concentrated and where factor markets have been functioning better than elsewhere in Africa (Dillon and Barret, 2016).

How will farmland distribution evolve in the future? One approach to this question is to consider how many people will be living in rural areas relative to the amount of available agricultural land. If land is scarce, in terms of available hectares per capita, consolidation into large farms, such as in the United States, Argentina and Brazil, will be difficult. Therefore, while land consolidation may take place over the long term, it is unlikely that average farm sizes in Asia and sub-Saharan Africa will increase to those seen in the USA. As Figure 3.5 shows, the Americas had considerably more land available per capita of rural inhabitant in the 1970s than any of the other regions have today or will have to 2050. In the future, countries in Europe and Central Asia may have more room for farmland consolidation, compared to sub-Saharan Africa, which is the region where rural population is predicted to grow the most in the decades ahead.

Farm size can be expected to remain small in most of sub-Saharan Africa although land is abundant in many African countries (Filmer and Fox, 2014). In East and Southern Africa, there was little growth in arable land between 1980 and 2010, but a three-fold increase in the percentage of households engaged in agriculture (Jayne, 2014). Although population densities are quite low in general, they are high in 12 countries, which account for 58 percent of the region’s total population (Headey and Jayne, 2014). Jayne and Traub (2016) also note that 91 percent of Africa’s remaining arable land is located in fewer than 10 countries. In four of these, surplus land is under forest cover, indicating that expansion of agricultural land is already constrained (Headey, Dereje and Taffesse, 2014; Jayne, Chamberlin and Headey, 2014).

#### Figure 3.5. Changes in agricultural land area per capita of rural population, by region, 1970–2050

Source: Calculations based on World Bank data on Health Nutrition and Population Statistics: Population estimates and projections (assuming agricultural area in 2050 stays constant at 2014 levels). See: <http://databank.worldbank.org/data/reports.aspx?source=311>

Filmer and Fox (2014) note that farm size in most African countries is also limited owing to the lack of mechanization. Since farm machinery is expensive and cannot be purchased without credit, most African small farmers limit themselves to farm sizes that can be cultivated manually. The widespread ambiguities in land markets and tenure, governed by customary rules on purchase, sale, leasing, inheritance, assignment and mortgage, further complicate farmland acquisition (World Bank, 2012). Faced with these constraints, the children of farmers will either farm a portion of the family’s original holding or decide to leave their rural areas. Therefore, the future may see, on the one hand, the consolidation of larger farms by urban or foreign investors, and on the other, the continuing fragmentation of already small holdings, alongside the ageing of the traditional farming community (a trend reported by Filmer and Fox (2014) in three African countries).

### 3.4.2. Land tenure and land markets

Several studies indicate that strengthening property rights leads to increases in land productivity (Dercon and Ayalew 2007; Holden *et al.*, 2009; Deininger and Jin, 2008). A recent meta-analysis by Lawry *et al.* (2017) found that that the titling of land formerly under customary tenure led to investment and productivity gains in the Asia and Latin America, but not in Africa. This may mean that land tenure reform is very much context-specific, and that productivity gains are affected by other factors, such as credit, input supply and product markets. Along the same lines, Holden and Ghebru (2016) conclude that land tenure is a necessary but not sufficient condition for investments in agricultural land.

However, as found by Ali *et al.* (2015), clarifying land rights is crucial for the development and efficient functioning of land rental and sales markets, which in turn are essential for smooth structural transformation and rural transformation. By helping reach economies of scale, efficient land sale and rental markets can increase farm productivity, raise the incomes of farmers with limited land, and even facilitate the transition to off-farm activities (Deininger, Hilhorst and Songwe, 2014).

While comprehensive data on trends in land rental markets worldwide are not available, these markets appear to be growing. Just 1 percent of land in China was rented in 1988; by 2008, the figure was 18 percent (Jia, 2013). Recent evidence from Deininger, Savastano and Xia (2016) shows that land rental markets are more common than previously thought in six sub-Saharan African countries and that they have potential to advance off-farm development in the region. Chamberlin and Ricker-Gilbert (2016) found that rural land rental markets are more active in densely populated Malawi than in lower density Zambia. Lowder and Bertini (2017) present evidence from agricultural censuses in 26 countries to show that, in most, the majority of land holdings are operated by their owners. The share that is rented from others is small, ranging from zero in some countries up to 22 percent in Ethiopia. Holdings with land under more than one form of tenure are also found: for example, in Bangladesh and Togo, 40 percent of holdings are categorized as rented, owned or operated under other tenure systems.

## 3.5. The challenges and opportunities of transforming farming systems

### 3.5.1. The challenge for labour

One trend in low-income countries that does not appear to be diverging from those of past transformations is labour exit from agriculture. In early stages of transformation, the pace of labour exit is high, as even a small increase in agricultural productivity is usually accompanied by a disproportionate reduction in the agricultural labour force. This is shown in Figure 3.6 for countries such as China, India and the United Republic of Tanzania, which were all low-income countries in the 1990s. At a certain level of transformation, labour exit from agriculture slows substantially even though increases in productivity continue, as seen in the cases of Brazil, South Africa and Turkey.

#### Figure 3.6. Changes in share of non-agricultural employment relative to increases in agricultural productivity, 1990s–2010s

Source: SOFA team calculations from FAO (2017a).

Two types of factors explain the trends described above. First, push factors, driven mostly by mechanization, reduce agricultural wages; second, the growth of the non-farm economy pulls labour into industry and services by offering better wages (Tsakok, 2011). The combination of these push and pull factors in early stages of transformation creates the conditions for a rapid exit of labour from agriculture, as seen in the cases of China and Viet Nam. At later stages, agricultural labour supply falls in rural areas, which pushes up agricultural wages, which prompts farmers to invest further in farm machinery. So, while labour exit from agriculture continues, it does so at a slower pace, as in the case of Brazil and Turkey.

Over the past 15 years, the share of employment in agriculture has fallen in most countries, despite a modest rise in the absolute number of hours in worked in agriculture. This change is taking place in all regions, but is faster in Asia and the Pacific (-15 percent) and much slower in Latin America and the Caribbean (-1.6 percent), where the large exit from agriculture has already occurred. In sub-Saharan Africa, despite a small average change in hours worked (-3 percent), considerable differences exist across sub-regions. The change is most marked in West and Southern Africa (-11 percent and -8 percent respectively), while East Africa has witnessed an increase of 3 percent, probably due to the sharp rise in agricultural employment in Ethiopia (+23 percent). Even in Asia and the Pacific, the rates of change are uneven – it is highest in East Asia (-18 percent), but averages around -12 percent in Central, South and West Asia (SOFA team calculations from FAO, 2017a).

The drop in employment in agriculture creates a major challenge for transforming countries, which need to generate employment in the non-farm economy for a large number of people. This is especially so in countries where, owing to slow transformations and limited industrialization, the non-farm sector is not generating enough jobs to absorb the new entrants (Jayne and Traub, 2016). For example, Filmer and Fox (2014) find that 62 percent of the labour force in sub-Saharan is employed in family farming. Fine *et al.* (2012) estimate that, between 2010 and 2020, some 122 million young people will enter the labour force in sub-Saharan Africa; of these, only 72 million are expected to find employment in the non-farm sector.

Growth in agriculture will need to be sustained by a parallel growth in off-farm agriculture-related activities, such as food processing and trading. Thus, agriculture’s role in job creation needs to go beyond farm employment, by boosting the non-farm economy through the development of agro-food processing, trading and other related activities.

### 3.5.2. Urban agglomeration and its impact on farms

As urbanization and the growth of secondary cities accelerates, many farmers will find themselves living closer and closer to urban areas. The economic changes faced by farmers who find themselves on the urban fringe will bring both pressures to adapt and opportunities and rewards for those doing so.

Expanding urban populations provide opportunities for farmers to grow new crops and to market them in new ways, such as through local urban markets. Proximity to urban centres may also provide easier access to a larger pool of seasonal or part-time labour that is especially needed during the harvest of high-value crops. In high income countries, one reason farms close to urban areas have been able to adopt high-value crops is because local labour are available during peak periods (Jordan, 1989). As mentioned in Chapter 2, off-farm employment opportunities may help farming households supplement income from their farming operation. In many developed countries, the proximity of farms has also allowed a transition to part-time farming by urban dwellers; this is a growing phenomenon also in parts of Africa (Yeboah and Jayne, 2016).

Proximity to urban centres also increases the value of farmland, which often leads to its being sold for urban development. However, urbanization also brings increased demand for locally-grown, perishable and high value crops, such as vegetables, which can offer landowners returns commensurate with those from urban uses. The area devoted to horticulture may increase as the urban agglomeration size increases. Since vegetable production is typically labour-intensive, it contributes to employment creation in agriculture (Midmore and Jansen, 2003). At the same time, farming activities on the fringes of urban areas may face intense competition for water, an increasingly scarce resource in many parts of the world.

The dynamic forces of urbanization create a city-region system in which a variety of farm types co-exist, reflecting different paths that farms have taken in adapting to urban pressures. The system is shaped primarily by changes in the input and product markets in which farmers buy and sell, and through the actions of local government institutions, which by law and tradition exercise control over land use (Heimlich and Brooks, 1989). Compared to farms in more distant rural areas, farms in close proximity to urban areas are generally smaller, produce more per hectare, support more diverse enterprises, and are more focused on high-value production (Heimlich and Anderson, 2001).

### 3.5.3. Meeting the environmental and natural resources challenge

Food systems use natural resources, such as land and water, and energy to produce agricultural products, process them, and deliver the final product to consumers. The agricultural production system is, therefore, intimately tied to the environment and requires an array of energy inputs for its functioning.

Currently, agriculture uses 11 percent of the world’s land surface for crop production, and accounts for 70 percent of all water withdrawn from aquifers, streams and lakes (FAO, 2011b). In addition, the food value chain accounts for about 30 percent of global energy consumption, and emits annually greenhouse gases estimated at 10 gigatonnes of carbon dioxide equivalent (FAO and USAID, 2015). With growth in global population, world food demand in 2050 is expected to be 50 percent higher than it was in 2013, intensifying pressures on the finite natural resource base (FAO, 2011b). This is especially true for land and water resources. Agriculture is the prime driver for around 80 percent of deforestation worldwide (FAO, 2017b). Pressure on water resources is also increasing globally – FAO estimates that more than 40 percent of the world’s rural population lives in river basins that are water-scarce (FAO, 2011b).

The resource-intensive systems that characterized Green Revolution agriculture relied on high levels of inputs and have had severe environmental impacts, including widespread deforestation and soil depletion, massive greenhouse gas emissions and accompanying climate change, and increases in water scarcities (FAO, 2011b). Intensive systems cannot guarantee food security in the long run if they compromise the very natural resources that are needed for sustainable food production.

Past transformations in today’s developed countries took place in an environment of relative abundance of natural capital (UNESCAP, 2016). Growing awareness of planetary boundaries indicates that this is no longer the case. Future transformations will need to be carried out within unprecedented environmental limits and require that countries act to both mitigate and adapt to climate change and natural resource scarcity. Rural transformations need to be compatible with environmental sustainability by, for example, reducing resource use in agriculture without compromising yields, and optimally managing livestock residues, which are a major source of greenhouse emissions from agriculture.

The climate impact of fossil fuels used in agriculture can be reduced by optimizing energy use efficiency, as well as by replacing fossil fuels with renewable sources of energy. Both directly and indirectly, energy is an important input to agricultural production. Energy is used directly on the farm in the form of fuel for machinery and equipment, such as tractors, or electricity for irrigation pumps. Globally, around 225 petajoules of energy is used annually to power the pumps that irrigate some 300 million ha of land (Smil, 2008). The use of fossil fuels can be reduced through the use of more efficient pumps and machinery. For example, tractor fuel consumption can be reduced by matching tractor size to field requirements, and combining operations such tilling, seeding and fertilizing.

**Box 3.4 Solar water irrigation Zimbabwe**

After completing construction of the Ruti Dam, in central Zimbabwe, the country’s government found it lacked the finance to complete a planned 250 ha irrigation scheme in the surrounding countryside. With funding from the European Union and Oxfam, a project helped to install solar-powered booster pumps to pump water into a storage reservoir, from where it is used for irrigation.

As a result, around 240 subsistence maize farmers are able to produce a saleable surplus from yields of 4 to 5 tonnes per ha. Irrigation has also allowed the farmers to diversify production and grow cash crops such as potatoes and beans, in addition to maize.

Source: Oxfam, 2012

Irrigated land is often more productive than rainfed land because it allows farmers double or triple cropping (FAO, 2011a). However, excessive pumping of groundwater can lead to a permanent reduction in the water table. Therefore, irrigation systems need to be designed to optimize energy and water use. Gravity-fed systems from water storage reservoirs are common for paddy rice and use little external energy. However, in those parts of the world where water resources are already stressed, systems such drip irrigation, which is more efficient than flood irrigation or overhead sprinklers, are needed. Although these irrigation systems may consume more energy than gravity systems, combining them with renewable energy, such a solar-powered pumps (see Box 3.4), could be a viable way of minimizing environmental externalities.

Energy is also used indirectly in agricultural production. Fertilizer, insecticide, herbicide and other chemical inputs have substantial energy embedded in them during their manufacturing processes. Nitrogen fertilizer, which is an essential nutrient for plant growth, accounts for about half of the fossil fuel used in primary production, and contributes significant amounts of the nitrous oxide emissions from farmland (GoS 2011). Farmers can save on indirect energy inputs by using techniques such as ‘precision placement’ to reduce the quantity of fertilizer they apply to crops and pastures. This can lower greenhouse gas emissions per unit of production output and avoid excess nitrates being discharged into aquifers and surface waters. Precision farming, which use GPS-guided systems to optimally apply agro-chemicals, is just one example from a broad range of sustainable farming practices which are not yet widely adopted, but are both economically viable and environmentally friendly (FAO, 2016)

Using renewable energy is a cross-cutting strategy aimed at reducing both dependence on fossil fuels and levels of greenhouse gas emissions. Currently, biomass is the most widely used source of renewable energy worldwide (see Box 3.5). Sustainable ways of producing bioenergy from biomass can help expand access to energy in the form of heat, electricity and transport fuel. A wide variety of solid biomass resources, including vegetative grass crops, forest residues, animal wastes, and crop residues such as nutshells and rice husks can be utilized to produce sustainable energy. For bioenergy to be truly sustainable, any tree, crop or plant residue harvested for energy purposes should ideally be replaced by a new plant (FAO and USAID 2015).

**Box 3.5 Bioenergy potential from crop and livestock residues in Turkey**

Strong economic growth and urbanization in Turkey has led to a steady increase in electricity consumption, deepening the country’s dependence on imported fossil fuels. To reduce this dependency, the government has set ambitious targets, including raising the share of renewables in total energy sources from 13.5 percent in 2013 to 20.5 percent in 2023.

Turkey’s agricultural sector produces large amounts of residues that could be used to produce energy and offset fossil fuel use. FAO’s Bioenergy and Food Security (BEFS) Assessment for Turkey shows that more than 25 million tonnes of crop residues – mainly from sunflower, maize and cotton – and some 150 million tonnes of residues from cattle, buffaloes and layer hens could generate more than 1 gigawatt of electricity, or 100 percent of the national target for renewable energy from biomass.

Cotton stalks, in particular, have enormous potential for bioenergy production. The FAO assessment suggests that if only 20 percent of stalk residues were used to make briquettes and pellets, an additional 1 million tonnes of oil equivalent could be produced annually. That is equivalent to 30 percent of the biomass heating and cooling targets set out in the Turkish Renewable Energy Action Plan. Overall, the identified bioenergy potential could result in greenhouse gas emission reductions of 6 million tonnes of carbon dioxide equivalent annually.

Source: FAO, 2016.

Livestock manure is a key source of greenhouse gas emissions in many countries. As countries develop, consumption of dairy and meat products is also expected to increase, which would further contribute to emissions and climate change. Methane is produced when manure is managed in liquid form, such as in deep lagoons or holding tanks. During storage and processing, nitrogen is mostly released into the atmosphere as ammonia, which can be later transformed into nitrous oxide. The production of biogas from livestock manure provides a good opportunity for utilizing these wastes for sustainable rural development, increasing farm income from a traditional source, and reducing the overall environmental impact of the livestock sector. Biogas can also be produced from crop residues, food process wastes, or any other biodegradable feedstock.

### 3.5.4. Farmers associations as tools to gain scale, overcome market failures, and enhance environmentally sustainable and socially inclusive rural transformation

Smallholder farmers in most developing countries generally face a number of constraints that make them less responsive to emerging market opportunities. Being dispersed and fragmented in tiny economic units, they face high transaction costs that affect their access not only to input and access markets, but also to a number of rural services, such as information and credit. Producer organizations and cooperatives allow small farmers to pool their resources and reduce transaction costs, thereby gaining scale, and increasing their access to markets and productive assets. For example, small supply shops in Niger have developed effective local input markets by pooling farmers’ input requirements and supplying them in quantities and types that are adapted to farmers’ needs and financial capacities. Producers’ organizations have also facilitated access to credit, directly thought managing microcredit systems, or indirectly through innovative arrangements such as warehouse-receipt systems, in which stored produce is used as a collateral guarantee to obtain short-term credit (Herbel et al. 2012).

Associations or cooperatives enable small producers to engage in collective marketing, which reduces their transaction costs, allows them to share risks and improves bargaining power. When they are linked to other private and public actors, farmers can participate in multistakeholder coordination along the value chain and make effective use of contract farming and fair-trade schemes. For example, in Kenya, small-scale producers of leafy vegetables used groups to respond to modern market requirements. Being organized in associations, farmers could comply with food quantity, quality and time delivery requirements set by supermarkets through contractual arrangements (Herbel et al. 2012).

Producer organizations also give political weight to smallholder farmers, allowing them to voice their concerns and interests in policy-making processes. Multistakeholder platforms and consultative forums can be good mechanisms for small-scale producers to participate in the formulation of public policies and their implementation. In the Gambia, for example, the National Fisheries Post-Harvest Operator Platform helps governments to learn about small producers’ needs and producers to express their concerns and preferences.

As trust is a precondition for the successful design and implementation of development policies, transparent dialogue is essential for the emergence of shared views and values. When linked to NGOs and public and private actors, producer organizations can also function as channels of communication and knowledge-sharing that help small-scale farmers improve their skills, access and use appropriate information and knowledge, and innovate and adapt to changing markets (Herbel et al. 2012).

Regarding sustainable management of natural resources, examples of collective action include mediation committees for conflict resolution of land issues or for securing land-use rights, women’s groups for reclaiming land, and forest community-based enterprises. Herbel *et al.* (2012) provide details on how such organizations have helped ensure natural resources use and management in a way that is both inclusive and sustainable in various contexts, such as Benin, Egypt, Gambia and India. They are effective because they provide incentives for small producers to manage natural resources in a sustainable way while creating benefits for rural communities as a whole.

## 3.6. Conclusions and policy implications

In rural areas of countries in transformation, the emergence of new trading intermediaries directly connected to farmers has the potential to improve farmers’ incomes, while value chain development can facilitate access to providers of inputs, information and finance, with better terms for farmers. Mobile phones are playing an increasingly important role in connecting farmers to markets.

However, to be inclusive, rural transformation must reach and benefit the rural poor, especially small-scale farmers. This chapter has shown how public sector extension systems reach a very small proportion of the farming community, especially in low-income in developing countries. Even so, they are expected to help farmers respond to new challenges, such as climate change, and to advise on new farming approaches, such as nutrition sensitive agriculture and sustainable intensification. Given these challenges, a better targeting of resources and greater coordination with private rural advisory services could help extension services improve their effectiveness.

Much attention has been paid to how rural advisory services reach out, or fail to reach out, to the poor. As transformation proceeds, new questions arise: how can farmers themselves reach out to services and ensure that they in ways that meet farmer needs? What set of services do farmers need most, under what circumstances, and who can deliver them? What type of interaction with advisory services is most useful for farmers? Exploring answers to those questions would move the focus of attention from the assertion that ‘All farmers need advisory services’ to a more nuanced understanding of specific farmers’ specific needs and priorities.

The important ‘bridging’ function of rural advisory services – particularly in linking farmers to the private sector, market agents and research institutions – needs to be reinforced with training in new skills and competencies, such as brokering. Connecting small-scale farmers to sources of knowledge, inputs and finance, and to profitable value chains, also requires action to strengthen producer organizations. Stronger producer organizations will be better positioned to cope with the increasingly rapid transformation of the developing world’s rural areas. For example, issues related to land tenure, land holding fragmentation and consolidation can be better addressed through collective action. The same applies to the benefits brought by mechanization in terms of increased productivity.

Efforts to raise agricultural productivity to meet the growing demand for food is also impacting strongly on natural resources and agricultural systems, posing a threat to their sustainability. Rural transformations needs to be made compatible with sustainability, through innovations that reduce resource use without compromising yields and can optimally manage sources of greenhouse emissions. This underscores the importance of rural advisory systems in making the rural transformation socially inclusive and environmentally sustainable.

Urbanization will continue to change people’s diets and change demand composition more towards high value products such as meat, fruit and vegetables, with implication for farmers’ production systems. If farming systems are able to satisfy the emerging demand, urbanization will become an opportunity for more inclusive growth in rural areas. Otherwise, urbanization will open the doors to increasing dependence on food imports.

The exit of labour from agriculture will continue and may create pressure on natural resources and infrastructure of rural areas, if not properly addressed. Growth in the rural non-farm economy becomes crucial as a means of absorbing the excess supply of labour leaving the agricultural workforce. Diversification into off-farm rural activities is increasingly recognized as a key strategy for helping small-scale farmers raise their income and manage risks. Policies to support development of the non-farm economy will be dealt with in more depth in next chapter.

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# Chapter 4. The non-farm sector: household income, employment and welfare

## Key messages

* By allowing rural households to diversify their activities and boost their incomes, growth of the non-farm economy has reduced poverty in many countries
* The agri-food sector generates new employment opportunities, both rural and urban, by adding value to primary agricultural production and creating stronger links to small cities and towns
* Social protection enables inclusive transformation, promotes more efficient use of resources, and enhances the productive capacity of even the poorest.

## 4.1 Industry and productivity growth: prospects for late transformers

As described in Chapter 1, many low-income countries are beginning to see a decline in the size of the labour force engaged in agriculture. In sub-Saharan Africa, the decline has not been matched by a comparable increase in the growth of formal employment in the industrial and service sectors, which was a feature of structural transitions in the past (see, for example, McMillan and Harttgen, 2014). Those leaving agriculture are moving instead to informal non-farm activities, generally concentrated in the retail trade and services, and characterized by low productivity (World Bank, 2007). Fostering inclusive transformation will require, therefore, action to promote development of the rural non-farm economy, and especially the agro-industrial sector (IFAD, 2016).

As economies transform, an increasing number of households complement their incomes with non-farm activities. This is happening in parts of sub-Saharan Africa, where a budding service sector and the growth of household enterprises are changing rural non-farm economies in countries such as Uganda and the United Republic of Tanzania. However, generating substantial non-farm employment remains a challenge. In Africa’s fast-growing economies, it is unlikely – even under optimistic conditions – that formal, private-sector, non-agricultural wage employment will account for a large share of the jobs market in the foreseeable future.

Fox and Sohnesen (2012) estimate, hypothetically, for 12 African countries with an average of about 10 percent of the labour force employed in the private wage sub-sector in 2010, that with an annual growth of 10 percent in private sector jobs, only 20 percent of the labour force would find jobs in the sub-sector by 2020. Countries with smaller shares of labour in private wage employment – such as Burkina Faso, Malawi and Sierra Leone – are unlikely to reach Uganda’s current share even after 10 years of significantly higher private investment in labour-intensive medium and large businesses. Under these scenarios, the largest share of the labour force would remain in agriculture or find employment in non-farm enterprises, either as a primary or secondary activity (Fox and Sohnesen, 2012).

Household enterprises are often indicated as a solution to unemployment among the bulging youth population of sub-Saharan Africa. However, most of those under 25 years of age have a very low probability of success in household enterprises, since they lack basic technical and business skills and the start-up capital required (Fox and Sohnesen, 2012). In Malawi, where agriculture is the main sector for youth entering employment, not only are young people obliged to provide farm labour to the household – they are also unlikely to have sufficient capital to engage in small-scale trade in the service sector (Thurlow *et al.*, 2016).

Where surplus labour abounds, the lack of decent jobs is likely to limit the incentives to increase labour productivity in agriculture. Low labour productivity is also likely to lead to unsatisfactory working conditions. Conforti *et al.* (2016) found that an increase in the marginal productivity of family labour in the United Republic of Tanzania significantly reduced the probability of holding a vulnerable job or of using children’s labour. Therefore, they conclude, an increase in labour productivity is a suitable entry point for generating decent jobs.

## 4.2. Diversification strategies differ by socio-economic characteristics

The non-farm economy has grown rapidly in recent decades. In the 1970s, it typically contributed to less than 20 percent of rural incomes; its contribution is now is estimated to have reached 35 percent in Africa and 50 percent in Asia and Latin America (Haggblade, Hazell & Reardon, 2010).

Analysis of FAO’s Smallholder Farmers’ Dataportrait data set (Figure 4.1) shows the shares of rural income generated by different economic activities in selected countries of all developing regions. In sub-Saharan Africa, more than half of total income came from on-farm activities in four of the six countries examined. That share is smaller in the Europe and Central Asia region, and ranges between 25 and 50 percent in the Asian countries (although data is relative to the beginning of the 2000s). The shares of income from non-agricultural wages in total income is higher in Europe/Central Asia and Latin American countries, while self-employment was a more important source of income in the sub-Saharan African and Asian countries.

Source: FAO, 2017c

However, the share of non-farm income in total rural household earnings varies widely by household typology. Analysis of the Rural Income Generating Activities (RIGA) data[[12]](#footnote-12) shows that wealthier rural households rely more on non-farm income (FAO, 2017). In a sample of nine African countries, for which data are disaggregated by quintiles, the non-farm income share was highest for fifth quintile (i.e. the wealthiest) rural households, exceeding 50 percent of total income in eight countries, the exception being Ethiopia.

However, in six countries, off-farm income (including wage employment, self-employment and transfers) accounted for a slightly higher share of total income in the poorest households than it did in the second quintile households; moreover, in five countries, the non-farm share of the poorest was higher even than that of the third quintile. The same trend is confirmed in data from six Asian and four Latin American countries[[13]](#footnote-13). For example, using national household surveys for three Latin American countries – Chile, Nicaragua and Peru – Anríquez (2017) found a very clear increase in rural areas of non-farm households, and of households dependent on agricultural wages, while households that depend mostly on ‘own-farm’ income declined, between 2005 and 2014.

These general trends confirm the findings of other studies. First, higher welfare levels are usually associated with lower reliance on agriculture (Davis *et al.*, 2017). Second, non-farm income is essential for rural landless and near-landless households, while other agricultural households rely on it to a lesser extent, using it as a means of diversifying risk, mitigating seasonal income swings, and financing agricultural input purchases (Haggblade, Hazell & Reardon, 2010; Adjognon *et al.*, 2017; Kangasniemi, Karfakis & Knowles, 2017).

Disaggregation of on-farm and non-farm income shows that, across countries and regions, the lower the level of household wealth, the higher the contribution of agricultural wage and transfer contributions and the lower the contribution of non-farm activities (i.e. non-farm wage labour and self-employment). This can be explained by the wide variation in levels of productivity found in non-farm employment – wealthier households have better access to more remunerative opportunities, such as those requiring skilled labour (Davis *et al.*, 2017; Kangasniemi, Karfakis & Knowles, 2017).

The impact on agricultural productivity of diversification to non-farm activities depends on whether they complement or substitute on-farm activities. They can lead to higher agricultural productivity if they complement on-farm production (Kangasniemi, Karfakis & Knowles, 2017), but they can also be used to manage risks to income and to smooth consumption expenditure if they are not related to farming (Davis *et al.*, 2017). When non-farm diversification activities are substitutes for farming, they may represent a specialization within households, as members engage in activities in which they have a comparative advantage (Losch *et al.*, 2012). In this case, diversification is probably a transitional step towards completely exiting agriculture, and is usually carried out by young household members. For example, in Viet Nam, 20 percent of labour exiting agriculture is driven by changing household demographics (McCaig and Pavcnik, 2014).

Despite historical trends showing a strong and positive correlation between wealth and non-farm jobs (Box 4.1), the relationship between diversification and welfare is not straightforward and depends on the original socio-economic status of the household before it began to diversify. Wealthier households may tend to specialize to gain from experience, but they may diversify as a transition to another activity, using profits from the previous activity to overcome threshold barriers. On the other hand, poorer households tend to use diversification to overcome market failures and manage risks (e.g. cash constraints to financing agriculture, or multiple activities to spread risk), but they may face serious barriers to entry to a second activity, which limits their ability for further diversification.

**Box. 4.1. Rural transformation and non-farm income diversification**

Structural and rural transformation involve a reallocation of labour away from agriculture. At the household level, this involves different degrees of diversification or specialization, depending on the household’s socioeconomic characteristics and level of wealth, including its human capital. Although there is no straightforward relationship between wealth and diversification or specialization, wealthier households have access to more lucrative non-farm employment, whereas agricultural wage labour or self-employment are poorer households’ means of diversifying their activities (Davis *et al.*, 2010; Davis, Di Giuseppe and Zezza 2016).

Under perfect market conditions, specialization is more efficient because it allows individuals to accumulate experience and gain scale; this is what wealthier people choose to do. However, for poor households, specialization is not a viable option due to the risks inherent to relying on one source of income; hence, they choose to diversify to spread their risks, even though it may mean adopting a low-return production system, which perpetuates low productivity and poverty (Carter and Barrett, 2006; Dercon and Christiaensen, 2011; Barrett and Carter, 2013)

Losch *et al.*, (2012) point out that to understand diversification and specialization choices, it is necessary to consider the patterns of change both within and between households during structural and rural transformations. At early stages of transformation, the economy is dominated by subsistence farming, with very little diversification at both the country and household levels, and the majority of the farming community is underemployed. When transformation begins, it accelerates the growth of agricultural productivity, leading some farmers to leave agriculture. However, since it is unlikely that subsistence farmers will risk their food supply by leaving farming altogether, early diversification will be largely within households, with some family members working outside agriculture while others continue to produce food. Another form of within-household diversification is part-time farming, in which an underemployed farmer begins to work additional hours in the non-farm sector (Davis, Di Giuseppe & Zezza, 2017).

As transformation continues, markets grow and become more reliable, creating a new institutional environment in which people can specialize and trade. At this point, many part-time farmers or diversifying farming households cease farming and move to other sectors, while other farmers become more specialized in agricultural production. At this point, within-households diversification begins to fall; however, diversification among households continues to grow at the national level, leading to an economy in which most households and individuals are specialized, while the economy as a whole has become highly diversified.

#### Figure. Stylized representation of effects of household diversification on income growth



Source: Losch *et al.*, (2012)

The Figure above is a highly stylized representation of diversification/specialization process along the transformation path. The process is much more complicated in reality and involves many other factors that characterize the transformation. The nature of growth (whether led by manufacturing or services), urbanization patterns, and the strengths of rural-urban linkages will all be important factors determining what opportunities are available and accessible to the poor. A vast literature confirms that household income diversification is the norm, rather than the exception, in most rural areas of the developing world. Although endowments and wealth play an important role in driving engagement in different economic activities, some degree of diversification off the farm is common at all levels of welfare (World Bank, 2007; IFAD, 2016; Davis, Di Giuseppe & Zezza, 2017).

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## 4.3. Agro-industry presents potential opportunities for late developers

### 4.3.1. Importance of agro-industry in non-farm economy: recent trends

The rural non-farm economy consists of a wide variety of trading, manufacturing and service activities, ranging from small part-time artisanal enterprises to large-scale multinational industrial firms. Agroprocessing, in its wider definition, extends over the full range of the non-farm economy, including not only agro-industries but also distribution and trading. Within manufacturing, the agroprocessing sector occupies an important place in overall turnover and value added in most developing countries.

Agri-food industries have grown very rapidly in the developing world over the last three decades. FAO (2007) estimates that, over the period 1980-2005, the share of developing countries’ value addition in global manufacturing of food, beverages, tobacco and textiles almost doubled. Henson and Cranfield (2009) found that agro-industry accounted for more than 50 percent of total manufacturing value added in low-income countries, and 30 percent in middle-income countries. The share exceeds 66 percent in agriculture-based countries and 35 percent in both transforming and urbanized countries.

In developing countries, enterprises in the food and beverages sub-sector are scattered, numerous, small to very small, and generally family-based, lacking economies of scale. Using ILO data, Henson & Cranfield (2009) found that, on average, 60 percent of those working in the food and beverage industry in developing countries are employed, with little or no social protection, by small-scale informal firms. Despite that, the sub-sector accounts for the bulk of agro-industry, or more than 50 percent of the formal agroprocessing sector’s value added, in both low- and lower middle-income countries, and more than 60 percent in upper middle-income countries. In some African countries, such as Ethiopia and Senegal, food and beverages represent more than 70 percent of agro-industry value added; tobacco and textiles have played a noticeable role only in Asia and, to some extent, in the Near East and North Africa (Henson and Cranfield, 2009).

Recent UNIDO data indicate that the contribution of the food and beverages sub-sector in overall manufacturing value addition is important in most developing regions. Its share ranges from 20 to 30 percent. In Latin America and from 10 to 25 percent in most Asian and North African countries. One common trend across these three regions is that the food and beverage sector’s share seems to have changed little over the last decade, except in Egypt and Tunisia where it has declined in recent years. The lowest shares are observed in Asia, especially in China and India, where they do not exceed 10 percent; in Bangladesh and Malaysia, the share is less than 15 percent. This trend is probably due to the boom, in most Asian countries, in other manufacturing sub-sectors, which has led to a sharp increase in the sector’s total value added since the 1990s (UNIDO, 2017)[[14]](#footnote-14). Figure 4.2 shows the trend in Indonesia, where the share of the food and beverages sub-sector and the absolute value of manufacturing are both increasing.

#### Figure 4.2. Changes in manufacturing value added and share of the agri-food Industry in Indonesia, 1990–2013

Source: UNIDO, 2017.

The relative importance of the food and beverages sub-sector is highest in Africa where it represents from 30 to 50 percent of total manufacturing value added in most countries.[[15]](#footnote-15) Recent trends in share vary. It is declining in countries such as Cameroon, Ethiopia, Malawi and Senegal, but is increasing in Kenya and the United Republic of Tanzania. In the latter two countries, there was a sharp increase, in the period 2010-2013, in the total value-added of the manufacturing sector, of more than 400 percent and 800 percent respectively (UNIDO, 2017), which may be partially explained by recent growth in the value added share of food and beverages as noted by Thurlow *et al.* (2016).

Because food processing is more labour-intensive, and labour productivity in food processing is higher than the average in manufacturing, as noted by Henson & Cranfield (2009), the food and beverages industry is a promising source of employment for those exiting agriculture. Over the last two decades, employment in the manufacturing sector has increased almost everywhere, and it has been a key driver of poverty reduction, especially in East Asia and Pacific. In China, the number of workers employed in manufacturing increased by more than 60 percent, of which the share of agri-food industry was around 8 percent. In Malaysia and Indonesia, the agri-food industry accounts for higher shares of manufacturing employment, reaching 12 percent and 16 percent respectively in 2012.

In sub-Saharan Africa, manufacturing does not seem to have registered a sizeable increase in number of people employed, even in countries such as Kenya and the United Republic of Tanzania, where the manufacturing sectors have achieved significant shares of growth since the 1990s. What is common in Africa, however, is that the share of the agri-food sub-sector in total manufacturing employment is noticeably higher than in other regions, ranging from 35 to 50 percent, compared to no more than 25 percent in Latin America and North Africa.

These trends indicate that, despite the importance of the agro-processing in general, and the food and beverage sub-sector in particular, in Africa, the sub-sector seems to have experienced stagnation. This is due perhaps to structural flaws of an industry based on numerous small-scale, family-based enterprises which, although they offer employment opportunities for a large proportion of rural households, are fragile, lack scale and often provide only seasonal employment. Although a few large-scale multinational firms also operate in Africa, they have only minor impact on employment, owing to their high capital intensity.

In order to harness the opportunities offered by the agri-food sector for rural non-farm employment, income diversification and poverty reduction, agro-industrial development should occupy a central position in government policies and strategies, especially in countries with potential for agricultural productivity growth. Agro-processing can also play an important role in unlocking the potential comparative advantages of perishable products, such as fruit and vegetables (as in the case of the Near East and North Africa, Box 4.2)

**Box 4.2. Agroprocessing could unlock production potentials in the Near East and North Africa**

Structural and rural transformation in much of the Near East and North Africa is constrained by the lack of alternatives to agriculture – those leaving sector usually move to employment in low-productivity services. At the same time, agricultural productivity growth is handicapped by the region’s arid climate and by water scarcities which limit the scope for expanding the irrigated area, thus creating comparative disadvantage for agriculture in the region (Breisinger et al., 2017). The rapid expansion of irrigation that began in the 1970s has left many countries with depleted aquifers and water deficits. In addition, much of the surface water in many countries of the region is provided by transboundary rivers, such the Nile, Euphrates and Tigris (FAO-Aquastat, 2016).

Despite water scarcities, cropping mixes in the region are dominated by crops with low productivity per unit of water, such as cereals, which require irrigation for good yields (Elbehri & Sadiddin, 2016). This is due to policies that have historically favoured cereals and were reinforced in some countries, such as Egypt, following the food price inflation of 2007/2008. Even so, domestic natural resources are insufficient to significantly reduce the region’s high dependency on cereal imports (Elbehri and Sadiddin, 2016; Breisinger et al., 2017).

However, the region’s agriculture does have a comparative advantage for specific commodities, particularly fruit, vegetables, oil crops and some livestock products (Breisinger *et al.*, 2017). There are potentials for increasing efficiency in the allocation of resources by reducing cereal production in favour of crops with high water productivity. There are also potentials for improving technical efficiency, especially in the use of water, in countries such as Egypt, Lebanon and Jordan (Elbehri and Sadiddin, 2016).

Development of market opportunities along the value chain, through agroprocessing, would motivate farmers to unlock these potential comparative advantages. Although agroprocessing is a fairly small subsector in Egypt, in terms of its contribution to the GDP (6.1 percent), the share of agroprocessing products in total exports is 14.2 percent. In Tunisia, agroprocessing’s contribution to value added is less than half of that of agriculture, but its contribution to exports is four times greater (Breisinger et al., 2017). At present, agroprocessing in the region is dominated by small and scattered enterprises with low productivity. Making the most of its potential will require consolidation of these enterprises to gain scale.

### 4.3.2. Growth in agro-processing: the challenge of inclusiveness

The composition of non-farm opportunities varies spatially as well, with home-based processors and retailers predominating in rural areas, while manufacturing, services and wholesaling, including agro-processing and its supplementary non-farm activities, are concentrated in small cities and towns (Haggblade, Hazell & Reardon, 2010). This heterogeneity results in a wide variation in productivity and profitability across space, gender and household typologies, as returns vary substantially, according to differences in physical and human capital requirements.

Much high-value agroprocessing is characterized by increasing levels of female participation. Data from UNIDO (2017) show increasing numbers and shares of women employed in the food industry. Although trends vary substantially across regions and countries, generally there have been impressive increases in female participation in many low-income countries. For example, between 1990 and 2011, the number of female workers in Bangladesh’s agri-food sector increased ninefold, while the share of females employed grew from 6 percent to 23 percent. In Ethiopia and Kenya, over the same period, the number of female employees increased by 137 percent and 90 percent respectively, while the share of women employed increased by 5 percent and 12 percent.

Some sources indicate variations in the extent of female participation within the agri-food industry. In the Dominican Republic, women comprise roughly 50 percent of the labour force in horticultural processing, while in Mexico, around 90 percent of employees in horticultural packaging are women (Barrón, 1999). In Kenya and Zambia, more than 65 percent of workers in horticulture (both farms and pack-houses) are women (Barrientos *et al.*, 2001). These figures indicate that, just as women occupy a more vulnerable position than men in small-scale agriculture and are, together with the youth, overrepresented in the most vulnerable farming typologies, they are relegated to the lowest paying jobs in agroprocessing (Bitzer *et al.*, 2016).

In general, poor households are concentrated in low-return activities, such as small-scale trading and unskilled wage labour (Haggblade, Hazell & Reardon, 2010). Agricultural wage labour is also primarily the domain of the poor; its share of rural household income is generally the highest in the poorest household quintile, especially in countries with a strong agricultural base, such as Ethiopia, Malawi and the United Republic of Tanzania (FAO, 2017). The low capital requirements of engaging in small-scale agro processing businesses make them accessible to poor households. However, their low productivity indicates that they may be “distress diversification”, which the poor are pushed to adopt in the absence of more profitable alternatives.

Data from IFAD and World Bank (2016) indicate that rural inequality has increased across the world in the last two decades. The increase has been greatest in rapidly transforming countries which have also been successful in a mass reduction in rural poverty, such as China and Viet Nam, where rural Gini index went up from 30 to 40, and from 26 to 32, respectively, between the 1990s and 2010s. In Africa, where the industrial transformation has been very limited, rural poverty reduction was modest and inequality increased slightly in most countries. Inequality fell only where it was already high, such as in most countries of South America, which are highly urbanized compared to other developing regions.

## 4.4. towards more inclusive growth in the non-farm economy

Typically, rural non-farm activities are conducted close to the household residence, produce basic consumer goods and services, and in most cases do not operate continuously over the year. Since they are used mostly as a risk management tool, they are not reliable sources of sustained employment growth (Nagler & Naudé, 2014). On the other hand, Jin & Deininger (2008) found that, although rural enterprises in several African countries were small, with less than 2 percent employing more than 10 employees and only 15 percent employing a non-family member, they nevertheless provided employment and income to 17 to 27 percent of the working population. With a value added per person comparable to urban-based informal enterprises, they make a significant contribution to overall GDP and employment, even in the United Republic of Tanzania, a predominantly agrarian economy.

Page and Shimelis (2014) note that sub-Saharan Africa does not have a severe unemployment problem – the jobless rate was about 6.4 percent in 2008, compared to the global average then of 4.7 percent. Noting that economic growth in recent years has created little wage employment, except in Botswana, Nigeria and South Africa, the authors argue that unemployment was kept low by growth of the informal sector. It is estimated that of the 220 million young people who will enter Africa’s labour force by 2035, only 25 percent will find wage employment, even under optimistic projections (AGRA, 2016). Although the modern wage sector *has* been creating jobs rapidly in sub-Saharan Africa, this growth will not absorb the new entrants, since it is starting from a very small base (Filmer and Fox, 2014).

Given the region’s high population growth rate, higher levels of investment in industry are needed to achieve the same levels of employment as countries with lower rates of population growth (Fox, Thomas and Haines, 2015). For example, because Viet Nam’s labour force grew at only two-thirds the rate of Senegal’s, the latter would have needed 50 percent more investment in manufacturing than Viet Nam over the past decade, just to raise the share of employment in industry to that of Viet Nam in 2008 (Filmer and Fox, 2014). This highlights the important interaction between population growth and investment strategies, and the fact that people will move to where there are opportunities.

### 4.4.1 Toward a better understanding of rural-urban migration decisions

Big increases in rural-urban migration have been a feature of past structural and rural transformations. However, the processes driving migration decisions are not well understood. Certainly, people migrate in search of better opportunities. However, it is not easy to predict who will migrate, where they will migrate and why. While migration is extremely important in determining a country’s development path, how it unfolds and its impacts depend on national policies and planning, and how resources are allocated between rural areas and cities of different sizes. Therefore, a better understanding of the decisions behind migration can help in shaping national policies and strategies aimed at achieving inclusive growth of the rural non-farm economy since, by definition, such growth will alter the relationship between rural and urban areas.

Workers exiting agriculture, if faced with limited opportunities in the local non-farm economy, may seek employment elsewhere on a temporary or permanent basis, leading to seasonal or permanent migration. Therefore, if rural outmigration is driven by a lack of jobs in the local area, providing non-farm employment opportunities is a way meeting the needs of potential migrants before they leave. Where outmigration is driven by the attraction of more prosperous conditions in destination regions, usually urban centres, where education and health services are of higher quality and more accessible, a different strategy may be needed – one that provides investments in “agglomeration” services in small cities and towns distributed over a territory and in proximity to rural areas.

For example, rapid economic growth in China beginning in the early 1980s led to a large-scale migration to urban areas. By the late 1980s, about 30 million people had moved to towns and cities. Migration increased sharply from the 1990s, with the removal of urban household registration restrictions (Zhang, Yang & Reardon, 2017). By 2010, the total number of migrants from rural areas was estimated at up to 180 million (Fan, 2009). In parallel, the Chinese government has fostered the development of Town-and-Village Enterprises, which promote the industrialization of rural areas by giving farmers who exit agriculture the option of manufacturing jobs without moving to cities. The rural share in Chinese manufacturing output grew from 14.3 percent in 1980 to 70.4 percent in 2002, demonstrating the capacity of these enterprises to absorb labour or create jobs.

Song *et al.* (2012) observe that patterns of migration will depend on the agglomeration effects of cities, transportation costs, the cost of migrating, spatial differences in firms’ technological efficiency, and the heterogeneity of potential rural-urban migrants. All of these factors are determined, to some degree, by a country’s development policy. In the case of China, while substantial migration occurred, the success of rural industrialization, combined with the growth of secondary cities and the costs of migration that were put in place by policies, is likely to have moderated migratory flows. Putting in place an economically viable source of rural non-farm income was a key element in China’s rural-urban strategy. It has generated widespread rural-to-urban commuting, which has also become significant in densely populated areas of Asia and Latin America.

Migration in general, and rural outmigration in particular, are mostly driven by economic motives, but these can be quite diverse. Data on five African countries (World Bank, various years) shows that the search for employment drove the highest proportion of rural out-migrants, with shares ranging from 47 percent in Nigeria up to 74 percent in Senegal. The data indicate that education and family reasons are also important drivers of rural outmigration (Box 4.3).

**Box. 4.3 Drivers of rural outmigration in selected African countries**

Migration is the common response of people seeking to mitigate or cope with adverse conditions. But individuals also migrate to take advantage of new opportunities – Lucas (2015, p. 6) writes that “measurably equivalent persons earn considerably more in town than in the countryside”. In countries where agriculture is the largest economic sector, rural-to-rural movement tends to dominate (Lucas, 2015).

While data is scarce, several studies show migration produces welfare benefits. For example, Beegle, De Weerdt and Dercon (2011) analysed the impact of migration on poverty in the Kagera region of the United Republic of Tanzania and found that between 1991 and 2004, the consumption levels of migrants increased by 36 percent compared to those that stayed behind. Among migrants who moved to urban areas, the difference was 66 percentage points; therefore, the returns were better when individuals moved to better connected places. However, transfers from migrants to non-migrating household members were relatively limited.

Data on migration within five African countries (Ethiopia Kenya, Nigeria, Senegal and Uganda) indicate that people moving from rural to urban areas represented from 40 percent of total migrants in Nigeria to 55 percent in South Africa. Migrants are mostly male and young, with 60 to 70 percent being aged between 15 and 34 years. In all countries considered, women migrate less and when they do so, it is mostly for family reasons, while men migrate in search of employment.

#### Figure. Drivers of rural outmigration in selected African countries

(percent)

Source: World Bank (various years)

As shown in the Figure above, the motivations for migration are mainly work-related (47 to 74 percent), reflecting the lack of decent employment opportunities in rural areas. Family and education come next, but their ranking varies by country. In Ethiopia and Nigeria, a noticeable proportion of people migrate for study. The comparison of migrants’ employment status before and after migration shows that most individuals who moved away from rural areas have found better employment opportunities. In addition, households with at least one member who has migrated are wealthier and tend to have better education than those without.

Although poverty is a key driver of migration, the poorest often lack the resources needed to migrate. Therefore, the relationship between wealth and migration seems to be mixed. While job opportunities and economic development can dampen the reasons for migration, they can also stimulate migration, by providing the resources needed to move seeking better opportunities.

The overall impact of migration and remittances on rural household welfare is highly context-specific, varying both across space and time. Migrants’ remittances can be one of rural households’ main sources of finance for investment, schooling, house construction and agricultural inputs. However, remittances may also have negative consequences, by increasing inequality at local level when households with migrants are wealthier than those without (Box 4.3). In addition, male outmigration is one of the key drivers of the feminization of agriculture, which is now under way in many low-income countries (Box 4.4). Especially when migrants have difficulty finding decent jobs at their final destination, or in sending remittances to their families, women and children left behind may be forced to adopt negative coping strategies, such as taking on extra workloads to compensate for the income loss (FAO, 2017a).

**Box 4.4 Women’s changing roles in agriculture in transformation**

With rural transformation, employment opportunities increase in non-farm sectors for both women and men. However, in many developing countries, when men move out of agriculture, women tend to stay or move out much more slowly. Their responsibilities in agriculture may actually increase.

The ‘feminization of agriculture’ is evident in many countries, but is hard to accurately assess owing to difficulties in capturing all of the employment activities, including secondary and seasonal work. The Figure below shows that the share of women in agricultural employment is increasing in all developing regions except for East Asia, Southeast Asia and the Pacific. The lack of an upward trend in those regions is not surprising, given that women already form near to or even more than 50 percent of the agricultural workforce.

In sub-Saharan Africa, women have traditionally been heavily engaged in agriculture. The average share of women in agriculture in the region is 47 percent, and well over 50 percent in many countries. While women’s employment rates in the sector have not changed significantly in the last few decades, their roles and responsibilities may be changing – e.g. from subsistence farming to wage employment, and from contributing household members to primary producers. However, these changes are hard to detect at the national level from the data currently available.

In the rest of the developing world, women’s employment in agriculture relative to that of men is on the rise. The change in women’s role is most dramatic in Near East and North Africa. In the Near East, the share of women in agricultural employment has almost doubled since 1990. In North Africa, it has increased from 25 percent to more than 30 percent in the same period.

Women’s share in agriculture employment is rising in South Asia and the Central and Eastern (non-EU) Europe and the Commonwealth of the Independent States. More remarkable than the regional averages are the trends in some countries. For example, the share of women in the agricultural workforce in Bangladesh has risen from 50 percent in 1990 to 66 percent; in Nepal, from slightly more than half in 1990 to 60 percent in recent years; and in Afghanistan and Pakistan from slightly more than 15 percent in 1990 to 21 percent and 36 percent, respectively.

Even in Latin America, where farming has traditionally been a male occupation, the share of women in agricultural employment is increasing. For example, in both Colombia and Panama, few women were employed in agriculture in 1990, but in both countries their share has increased to more than 20 percent in recent years. In Ecuador and Paraguay, the share has more than doubled – from slightly more than 15 percent in 1990 to 32 percent and 37 percent respectively in recent years. In Peru, the increase has been about one-third to almost 40 percent.

Male outmigration and the growth of commercial farming are among the key factors driving women’s increasing employment in agriculture, along with agro-technological change, conflicts and climate change. More research is needed to understand whether women’s expanding roles in agriculture leads to welfare improvements or merely perpetuates existing gender inequalities in access to resources and human capital.

#### Figure. Female share of agricultural employment

Source: ILO, 2014.

### 4.4.2. Labour skills & the role of social protection

Since decent non-farm employment remains largely associated with education levels (Lanjouw & Murgai, 2009), the growth of rural non-farm activities is an opportunity for poor rural households provided they have, or can acquire, the skills needed to take advantage of the opportunities,. Jin & Deininger (2008) find that, for small rural family enterprises, the most common perceived constraints are a lack of finance and infrastructure, followed by electricity shortages, insecurity, and lack of access to market information. Filmer & Fox (2014) report that virtually all household enterprises in sub-Saharan Africa reported that their own funds, or loans from friends and relatives, not formal credit, enabled them to start their business. They also note that a borrower must be able to save regularly and that having a saving mechanism is essential. Mobile banking, pioneered in Kenya, where it is used today by 50 percent of the adult population, can help connect savers in remote areas and also reduce the transaction costs of serving small savers.

Agriculture, being still the largest employer in rural areas and the main provider of raw materials, especially in late transforming countries, will play a predominant role in influencing the size and structure of the rural non-farm economy. The patterns of growth in the rural non-farm economy will differ substantially in speed and in composition between countries in which agriculture is transforming rapidly, and those where the agriculture sector is stagnant. Stifel (2014) found that in Ethiopia, a country that has recorded good agricultural productivity growth, 51 percent of households started a non-farm activity using income from farming. On the other hand, recent research in Bangladesh indicates that non-farm employment growth and transformation, resulting from an adverse agricultural productivity shock, has a significant positive impact (Shilpi and Emran, 2016).

Growth in agricultural productivity is essential for the food and nutrition security of vulnerable groups and for strengthening the competitiveness of small farmers, both priorities in developing and late transforming countries. The development of a sustainable agri-food industry will depend largely on policies that look beyond the farm gate and seek to add value through agroprocessing. Therefore, agro-industrial policies should occupy a central position in government strategies, and be integrated into a social policy framework aimed at enhancing food and nutrition security and reducing poverty. This implies an emphasis on supporting small and medium agri-food enterprises with capacity building, clustering and modern technologies, to enable them to reach scale and improve competitiveness. This requires recognizing the limitations of the informal sector in policy formulation, by facilitating the inclusion of small food processors in supply chains under formal contracts.

Social protection also has a key role to play by enabling the poor to access high-productivity employment and income-generating opportunities. Social protection programmes boost productivity by strengthening human capital, increasing access to financial resources, and allowing low-income people to take risks, for example by adopting new production methods or starting a small business.

A number of micro-level constraints (e.g. lack of liquidity, credit or insurance) may hinder individuals, households or firms in their efforts to increase productivity in agriculture or in other sectors. These constraints may curb investments in human and physical capital or in activities such as establishing a small business. Social protection helps to overcome such barriers by allowing households to strengthen their livelihoods, which reduces households’ need for protection.

Human capital formation is essential not only to boost the non-farm economy, but also for the process of structural and rural transformation in general. Adequately skilled labour is necessary to increase the productivity of agriculture and also for the growth of high productivity services and industrial sectors. Skills are complementary to technology[[16]](#footnote-16) and necessary for accessing better paid jobs[[17]](#footnote-17). Policies supporting education at all levels are thus a key to inclusive rural transformation, though their impacts will be felt long-term. In the short-term, social protection programmes can contribute through cash transfers, conditional or unconditional, which lead to increased school attendance among children in beneficiary households (Barrientos, 2012; Bastagli, 2016).

## 4.5. Conclusions

Informal non-farm activities are a common feature of household diversification in the early stages of structural transformation, and provide an important link between rural and urban areas. To reduce rural poverty sustainably, policies should focus on both agriculture and non-farm activities. This is because, first, agriculture is the most important source of food and income for the poor, and second, because agriculture can play a key role in stimulating non-farm activities, especially in high-potential areas. This approach is very relevant in many countries of sub-Saharan Africa, where farm productivity is still low despite high potential for agricultural growth.

Public policies and interventions aimed at the rural non-farm sector need to place greater emphasis on infrastructure both, physical and institutional, hard and soft. Such interventions should continue to aim at increasing agricultural production and productivity. But they should also focus more on linking farm activities to the rural non-farm economy, through innovations in the post-farm phases of value chains that enable smallholder farmers to add value and increase their incomes. More generally, policies should seek to incentivize rural entrepreneurship, improve rural infrastructure, and capitalize on potential territorial comparative advantages. Facilitated access to affordable sources of credit and energy, and improving education and skills, in a gender-balanced way, are also necessary conditions for sustainable and inclusive rural transformation.

Rural people may stay in rural areas if the economic activities accessible to them are sufficient for satisfactory livelihoods. The allocation of natural resources and infrastructure largely govern how population is distributed across rural areas in any country. In many rural areas, the economic base includes also other natural resources—such as minerals, forests or amenities—which could sustain income generating opportunities. Transport corridors could also be used to promote and sustain activities reaching out to remote rural locations. To take advantage of these emerging opportunities, the rural poor need to tackle the numerous constraints they currently face.

Promoting household enterprises should be explicitly incorporated in national and local development plans in low-income countries in transformation. At present, very few countries do so. In order to be effective, support to enterprise development should be accompanied by institutional reforms aimed at reducing transaction costs and enhancing rural-urban linkages. This, in turn, calls for a ‘territorial approach’ that supersedes the narrow sectoral focus currently dominant in policy making. Such an approach takes into account the rural-urban continuum and the major role being played by small cities and towns. It would also take account of the rapid changes in territorial dimensions, such as those introduced by modern telecommunication technologies, which are making farmers and rural households more connected than ever to various sources of information.

Overall, the economy of any rural area is based on activities in which the area has a comparative advantage and remains competitive when exposed to external market forces. However, competitiveness depends also on the size of the economic base and the demand it generates locally. Since potentials for agricultural growth, and agro-industry’s demand for agricultural products, are not randomly allocated across space, concerted actions are needed to avoid, or reduce, the growth biases created by current patterns in the allocation of infrastructure and other public investments. As sectoral policies are likely to have differential impacts across space, explicitly incorporating spatial issues into policy design, through a ‘territorial approach’, can help counter territorial distortions in development patterns. This approach is the focus of next chapter.

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# Chapter 5. A territorial perspective for inclusive rural transformation

## Key messages

* Policymakers can promote inclusive transformation by reconnecting sectoral and territorial approaches and strengthening rural-urban linkages.
* Interconnected, functional rural-urban territories are the key to creating jobs, eradicating poverty, ensuring food security and providing alternatives to rural-urban migration.
* Institutions facilitating development of the agri-food system will need to manage the risks of market concentration and its impacts on smallholders and the rural poor

## 5.1. Agro-territorial options for inclusive rural transformation

One of the defining themes of this report is urbanization and the rapid evolution of the agri-food system in developing countries, and the opportunities and challenges this creates in domestic food markets. Another is the role of small cities and towns in urbanization, and their relationship to rural areas and the agri-food system. For many low-income countries now in transformation, the path followed by countries in the past – industrialization focused on manufacturing – is not a viable option. For this reason, the agri-food sector has an important role to play in economic development and inclusive rural transformation.

However, inclusiveness is not a natural outcome of these transformations**.** Many smaller-scale producers and agro-enterprises could be marginalized with the development of capital-intensive, vertically integrated value chains. Governments, therefore, have a role to play by formulating policies and providing public goods that support agribusiness development, while ensuring that it does not exclude small-scale producers and the rural poor. For example, they can work with all participants in the agri-food system to facilitate horizontal and vertical linkages, and direct policies and programmes to help vulnerable stakeholders to remain competitive.

One option of growing interest to policymakers is a spatial, or territorial, approach which entails the coordination, or integration, of the spatial dimension of policies in a territorially based strategy (Cullingworth and Nadin, 2006).

For our purposes, a territorial approach encompasses all policies that have locational impacts – for example, those dealing with transport and the environment – and sectoral policies, such as those on agriculture, tourism, social, taxation and industry, which can be targeted in practice to specific territories. Central to the approach is the need to understand a ‘territory’ as a functional space defined as a dynamic socio-economic system consisting of a set of actors, institutions and material and immaterial resources (Cistulli *et al*., 2013, p. 7).

Territorial development inherently takes an integrated, multistakeholder, multidimensional approach. Of particular interest here is its potential to help policymakers set public investment priorities, taking into account the economic, social, cultural and physical assets of a particular territory; foster a conducive environment for private investments; and promote multi-sectorial collaboration. Even more importantly, the participatory nature of the territorial approach moves the focus away from projects led by central government to ones that require involvement of government and non-government actors at various levels.

As envisioned in this report, the purpose of taking an agro-territorial perspective is to address three challenges associated with ongoing transformations: (i) the potential exclusion of small-scale producers and businesses from the agri-food system; (ii) the expected increase in rural unemployment in the years ahead; and (iii) the need to close the infrastructure deficit in rural areas and to increase rural-urban connectivity. This chapter focuses on how the agri-food sector can contribute, through a territorial perspective, to inclusive rural transformation. It is a narrower approach than that typically taken in territorial development, and does not capture all the complexities of territorial development and its inter-sectoral nature. However, the benefit is that it reconciles the *sectoral aspects* of the agri-food sector with its *spatial dimensions*, which are at the core of agriculture and the food system.

Agro-territorial instruments can ensure the inclusion of smallholder farmers, especially youth and women, by brokering collaborative arrangements between farmer organizations and agro-enterprises in the targeted location (see sections 5.1 and 5.5). They also foster small and medium agri-food enterprises (SMEs) by helping them achieve economies of scale through co-location and dedicated services, as illustrated later on in this Chapter.

As outlined in Chapter 3, the decline of agriculture’s share of employment in national economies, coupled with the inability of the rural non-farm sector to create enough jobs to absorb new entrants, will likely create increasing levels of unemployment in rural areas and drive increased outmigration. Agro-territorial interventions can help to generate new jobs, in both urban and rural areas, by creating or capturing industrialization opportunities in the agri-food system such as: labour-intensive manufacturing jobs in cities, on-farm employment, and off-farm employment opportunities in the ancillary services that develop around agribusiness and agro-industrial production.

### 5.1.1. Spatial solutions and rural-urban linkages

Agro-territorial planning recognizes that income opportunities, food availability and access, and household resilience to shocks differ significantly across regions. Consequently, different territories will require different sets of interventions, taking into account their demographic and geographical characteristics (see Box 5.1).

Half the global population now lives in or within the ‘sphere of influence’ of small cities and towns. This phenomenon is observed across all country income categories, and does not decrease as transformation unfolds. Therefore, strategies for reducing poverty in rural areas requires solutions that foster access to economic assets and enable the poor to invest in income-generating activities, both on- and off-farm in proximity to these smaller urban areas.

Another 15 percent of the global population lives in therural hinterland, three hours or more from urban areas; in sub-Saharan Africa this figure rises to 36 percent of the region’s total population. Extending connective infrastructure to these hinterlands is typically an efficient means of substantially reducing poverty there, because it reduces transaction costs, creates linkages between farmers and markets, and generates income. Social protection can also be instrumental in mitigating crisis, extreme poverty or inequality, which usually hit the hinterland hardest.

**Box 5.1 The city region food system approach, Sri Lanka**

The term ‘city region food system’ (CRFS) encompasses the complex network of actors, processes and relationships involved in food production, processing, marketing and consumption in a given geographical region. It includes a more or less concentrated urban centre and its surrounding peri- urban and rural hinterland. A global programme on city region food systems, initiated with the support of FAO and partners, focuses not only on the rural-urban food supply chain, but related environmental and socio-economic dimensions.

As part of the programme, Sri Lanka’s capital, Colombo, is implementing a CRFS assessment in collaboration with the International Water Management Institute. Colombo district has more than 2.3 million inhabitants, with a population density of more than 3 300 people per sq kmand increasing. To feed this growing population, food flows in from various parts of the country. But due to the particularities of the wholesale market system, food prices are high, resulting in high levels of food insecurity. There is also concern for food safety, as pesticide use is not well controlled. The food system is also affected by climate change, making environmentally sound agricultural land and coastal management important.

The Sri Lankan government has set up a dedicated ministry to implement Megapolis, a large-scale, multi-billion dollar urban development initiative in Western province, where Colombo is located. The results of the Colombo city region food system assessment is being scaled out by the Megapolis project, in order to map the entire province’s food system and ensure the inclusion of food system sustainability in urban and territorial planning. The plan is expected to:

* Open up new opportunities for urban and peri-urban farming, create jobs and improve the sustainability of local food systems
* Prioritize protective mechanisms in the use and expansion of urban, peri-urban and rural hinterland agricultural land
* Improve territorial ecology through better use and management of land, water and waste.
* Develop shorter value chains originating from peri-urban and urban production areas
* Integrate climate change adaptation and risk reduction strategies into urban planning.
* Address food safety concerns and product quality issues proactively to ensure the health and wellbeing of the population.
* Prioritize social protection for low-income marginalized communities, children and other vulnerable groups.

Source: FAO, 2017

Territorial approaches consist not only in offering different solutions to different spaces, but also in improving the connectivity among those spaces. This is why a territorial approach to inclusive rural transformation will typically seek to improve physical and business connectivity along the rural-urban continuum. Instead of treating rural and urban areas as separate entities, territorial development models focus on the interactions between them and, particularly, on how to build sustainable urban-rural linkages in the agri-food sector. This strategy focuses on the ‘two middles’ of the agri-food system – the rural towns which facilitate downstream links of the agri-food value chain; and the farmers, agro-industrial manufacturers, marketing players, and ancillary players that provide non-agricultural services (e.g. financial and logistics services), across the rural-urban continuum.

Agro-territorial planning addresses the challenge of supplying food to urban consumers by linking the urban centre more effectively with its ‘catchment areas’, while at the same time creating rural income opportunities and using agro-ecological zoning and landscape approaches to ensure sustainable development. The following sections describe the agro-territorial planning and policy options that are available once a territory has been identified for intervention. We start by highlighting the importance of collective action by smallholders, through their formal and informal organizations and networks, as a means of reaching economies of scale and ensuring they have a voice in the territorial development process. We then describe a set of agri-territorial investment tools, which are based on a combination of public goods provision and investments in infrastructure.

## 5.2. Farmer organizations are rooted in the territory

To make rural transformation an inclusive process, small farmers must be connected to sources of knowledge, inputs and finance, and to profitable value chains. As explained in Chapter 3, rural advisory services can play an important role in linking farmers to the private sector, market agents and research institutions. However, as smallholder farmers are often scattered over a territory, they may be unable to reap the benefits unless they are organized in associations, which help them to manage their resources efficiently; access input and output markets, information and knowledge effectively; and influence the policy-making process. For example, small-scale producers in many developing countries were not able to reap the benefits of high food prices in 2007-2008 (Herbel *et al.* 2012).

Strong producer organizations are fundamental to territorial planning for rural development. Issues such as insecure land tenure and land fragmentation, which can hinder effective territorial development, can be better addressed through collective action. The same applies to mechanization – the benefits in terms of increased productivity are obvious, but adoption requires minimum scale that cannot be reached by smallholder farmers acting individually. In addition, because rural transformation must also be compatible with environmental sustainability, innovations that enable higher output using fewer resources are essential, and this underlines the importance of strong farmers associations to facilitate adoption and spread knowledge on best available practices that are locally adaptive and economically viable.

An interesting application of collective action in a territorial context is provided by agri-food products with ‘geographic indications’ (GI), such as ‘champagne’ and ‘parmigiano’. They identify a product as originating in the territory of a particular country, region or locality, where its quality, reputation or other characteristic is linked to its geographical origin (WIPO, 2003). Typically, a GI reflects local conditions, natural resources and traditional practices, allowing reproduction of resources and inclusion of local producers, especially small-scale who are often the best guardians of traditions. Geographic indications have been initiated by producer-based groups that have organized specifically for establishing and protecting the originality and authenticity of a specified product. The development of geographic indications involves a public–private approach that underscores credibility and aims at enhancing consumer awareness and confidence. It is a tool that requires the full participation of local actors and often some external support. FAO has developed a methodology, the virtuous origin-linked quality circle, which sets out a process of value creation and preservation, starting with the local stakeholders’ awareness about their product’s potential and their decision to protect and promote it. (FAO, 2010).

Producer organizations require institutional arrangements to make them sustainable and effective in dealing with market actors and policymakers. These arrangements consist of three interdependent relationships: among small producers within organizations; between small-producer organizations in order to create apex organizations; and between small producer organizations and other market actors and policy-makers (Herbel et al. 2012).

Local associations are the basis for the development of strong rural organizations. Through bonding relations, small producers gain self-confidence and the knowledge needed to analyse their problems, make informed decisions, and act collectively as they develop a sense of ownership of their organizations. In addition, farmer field schools and business schools help small farmers improve their understanding of the complexity of territorial development through trial and error experimentation. However, to be able to influence policy making, similar producer organizations need to connect with each other to form larger groups or organizations, such as unions, federations and networks.

On the one hand, this enables farmers to pool their assets and skills to overcome market barriers. On the other hand, they may enlarge their market shares, obtain access to better quality information, and gain greater political power. When linked with external economic and policy actors, such as private businesses and governments, they can gain access to national and international markets, and may also have the opportunity to discuss their needs, such as those for agro-territorial investments, with national and local policymakers.

## 5.3 Agro-territorial investment tools[[18]](#footnote-18)

As well as encouraging collective action, combined with policies to overcome barriers to entry into smallholder output markets, policymakers may need to foster major investments in rural infrastructure. In this case, several agro-territorial development options are available to stakeholders for use in shaping rural transformation in a way that is inclusive and capitalizes on the benefits of improved rural-urban linkages. The five most commonly used are: agro-corridors, agro-based clusters, agro-industrial parks, agro-based special economic zones (SEZs), and agribusiness incubators. They are defined in Box 5.2.

**Box 5.2 Definition of different types of agro-territorial development tools**

**Agro-corridor** – a territory connected by lines of transportation such as highways, railways, ports or canals, in which an economic development programme fosters agriculture and other promising economic sectors. These programmes enhance the so-called ‘three Cs’: connectivity, competitiveness and community.

**Agro-based cluster** – a geographic concentration of interconnected producers, agribusinesses and institutions that are engaged in the same agricultural or agro-industrial subsector, and build value networks in addressing common challenges and pursuing common opportunities.

**Agro-industrial park** – a centrally managed platform that offers high-quality infrastructure, logistics and specialized facilities and services to a community of tenants, formed by agro-industries, related agribusiness firms, service providers and knowledge institutions.

**Agro-based special economic zone** – a demarcated geographic area where firms engaged in agribusiness and agro-industrial activities benefit from a more favourable regulatory, business and fiscal environment than those in the rest of the economy.

**Agribusiness incubator** – an enterprise that provides a common environment for nascent agriculturally based companies, where they have access to shared infrastructure, networking, coaching, and business and financial services.

Source: Gálvez Nogales and Webber, 2017: p. 3.

The success of these solutions requires a clear understanding of how agri-food system players decide on where to locate their activity. Their location decisions are shaped by the interplay of two factors: on the one hand, influences external to the identified territory, such as opportunities in global agri-food markets, which push entrepreneurs to look for opportunities in new geographic areas; and on the other, attractive economic and institutional conditions in the location selected.

The employment multipliers associated with the agri-food sector, discussed in Chapter 2, are an integral part of agro-territorial approaches and options. Gálvez Nogales and Webber (2017) report several initiatives that have successfully generated jobs in an efficient manner, including the corridors supported by Peru’s Poverty Reduction and Alleviation programme, which generated more than 100 000 new jobs between 2000 and 2014 from investment of only US$28 million. Some initiatives, particularly agribusiness incubators, are critical to generating youth employment. They create new start-ups that shift the focus from necessity-driven, informal entrepreneurship to high-impact new ventures with greater capacity for employment generation. For instance, in Egypt, the Flat6Labs incubator created more than 400 jobs over three years in Cairo from an investment of US$1.2 million.

### 5.3.1. Determinants of location decisions by agri-food system actors

Location decisions are usually based on three considerations: ease of access to markets, to raw materials and to infrastructure such as water, railways, roads and energy. Agri-food companies are attracted to cities and nearby rural areas because being near consumer markets is essential. Companies are also pulled towards urban locations because they offer productive assets, such efficient labour markets and input and support services. Political, institutional and macroeconomic stability also matter, as do a deregulated environment and an enabling investment policy.

Furthermore, agri-food companies locate where the supply of agricultural products is efficient and assured. Supply is influenced, at a macro level, by the availability of land, water and other natural resources, and at a micro level, by product weight and perishability. Perishability of raw materials means that factories must sometimes locate closer to rural production areas. This is the case, for example, with nearly all zones producing sugar cane, since the sugar content of the cut cane begins to fall dramatically with each passing hour. As a result, sugar refineries in the Dominican Republic are located near the fields around La Romana, a small city of 100 000 inhabitants, rather than in the sprawling capital of Santo Domingo. When agricultural raw materials are much heavier than their final product, transportation costs can be reduced if processing is carried out near the source of production, especially if ship or rail transport is not available.

Another major determinant of agri-food business location is infrastructure and logistics. Good access to road and rail networks reduce the cost and travel time of agricultural raw materials from farm to factory for processing, and of final products from factory to market. Infrastructure for waterborne transport on seas, lakes and rivers also offers advantages. Access to electrical power plays a critical role in location decisions – the operating costs of rural agro-industries can be as much as 30 percent higher than those of plant closer to the national grid. Reliable access to energy provided the cold chain facilities that were the key to the rise of meat, dairy and horticulture value chains in newly competitive regions of Argentina. Today, it is critical to the rapid development of cold chains in China and Viet Nam.

To create those attractive economic and institutional conditions for agri-food system investment, governments can engage in zoning exercises that identify the vocation of various areas and target them for agri-food, commercial and residential uses. This process may include setting aside zones to attract agro-industry, thereby adding value to the agricultural base of a territory. Zoning needs to be accompanied by infrastructure development that helps to maximize the potential of the economic activities, including agro-industry, to be carried out in the various zones.

Governments should also recognize that agri-food links extend beyond the specific territory targeted for inclusive rural transformation. Paradoxically, the more the forces of globalization expose the agricultural sector to far-reaching change, the more territorial initiatives are crucial to local outcomes. These solutions need to take into account just how globalized many domestic agri-food systems have become – they are typically populated by overwhelmingly multinational supermarkets and processors, who may be driven by different business and investment strategies than their nationally owned counterparts (Reardon *et al.*, 2003). Similarly, highly-processed food products that travel long distances from field to consumer’s table may not necessarily be affected by the territorial development approach discussed here. This means that consideration of geographies that are essential for the outward flow of agri-food products – such as gateways, coastal areas and cross-border regions – is indispensable.

### 5.3.2 Characteristics of agro-territorial development tools

Agro-territorial tools vary in terms of their overall purpose, their geographic range and their defining features, as summarized in Table 5.1. All five tools analysed address the goals of creating rural employment and improving rural-urban connectivity, but not in equal measure. For example, not all of them attach the same importance to infrastructure. Integrating infrastructure, policy and regulatory frameworks, institutional strengthening and agri-food interventions are the main features of agro-corridors. Agricultural clusters also provide infrastructure, such as irrigation, roads, power and telecommunications, but the investments they make in backbone infrastructure are much less. Conversely, the provision of infrastructure in an agro-park is limited to shared facilities within the park and perhaps an access road beyond the park gate. For incubators, the infrastructure offered is usually kept to a minimum and typically consists of serviced workspaces.

#### Table 5.1. Prominent features of agro-territorial solutions

|  |  |  |  |
| --- | --- | --- | --- |
| Solution | Purpose | Geographic range | Defining feature |
| Agro-corridor | Integrated planning of infrastructure and agribusiness interventions | Regional, national or supranational; linear agglomeration spanning across hundreds or thousands of km and linking several urban centres | Couples infrastructure investments with trade and regulatory policy reforms and sectoral development plans |
| Agro-based cluster | Network linkages | Regional or provincial agglomeration around production area; from hundreds to thousands of ha | Benefits of agglomeration economies and promotion of collective action |
| Agro-industrial park | Value addition through processing and innovation | Urban; a few ha | Common infrastructure, logistics facilities and dedicated services |
| Agro-based SEZ | Provision of a favourable regulatory, business and fiscal environment | Urban; a few ha | Advantageous economic and regulatory frameworks |
| Agribusiness incubators | Entrepreneurship development | Urban; a few hundred square metres | Common infrastructure and dedicated services to create and coach new agribusiness firms |

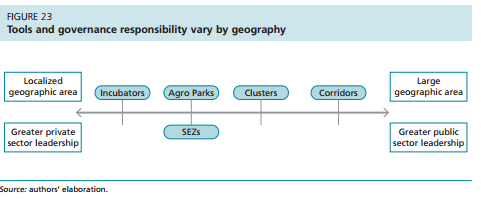
Source: Gálvez Nogales and Webber, 2017.

In addition to their shared objectives, each agro-territorial solution pursues different specific goals, as illustrated in Table 1. For example, increasing value addition through agro-industrialization and innovation is given priority in the case of agro-parks, whereas incubators focus on developing entrepreneurship; clusters focus on building network linkages and agro-based SEZs on the provision of a more favourable regulatory, business and fiscal environment than those in the rest of the country.

### 5.3.3. Geographic range

The analysed tools are fairly distinct in terms of their geographic range, which also results in different governance models, as shown in Figure 5.1. The broadest instrument, in terms of geographic range, is the agro-corridor, which can spread over a very large space. The Tarapoto corridor in northeastern Peru stretches for 500 km, the Southern Agricultural Growth Corridor of the Tanzania (SAGCOT) for 1 000 km, and the Central Asia Regional Economic Cooperation (CAREC) programme promotes six corridors that extend over 4 000 km along historic trade routes in Central Asia, linking western China to the Caspian Sea.

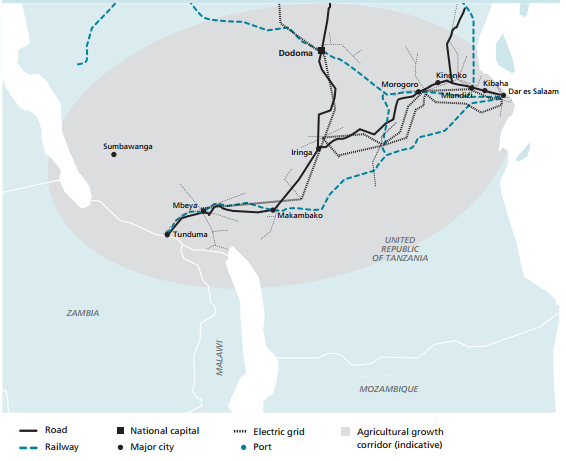
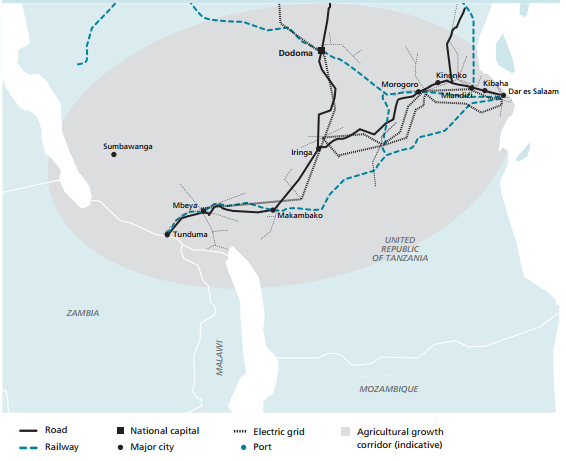
#### Figure 5.1: Geographic range of agro-territorial tools and type of governance responsibility



Source: Gálvez Nogales and Webber, 2017: p. 360.

An agro-corridor may include one or several cities, often secondary cities or towns, which act as hubs for agribusiness activity, providing distribution points for goods entering or leaving the corridor, and also as a home to businesses that constitute the proximate point of demand for agri-food services. Typically, the transport axis of the corridor links rural areas to small cities and towns, and these intermediate cities, in turn, to broader domestic and international markets. For instance, SAGCOT in the United Republic of Tanzania connects the secondary towns of Makambako and Mldandizi, and several small cities, including Mbeya, Makambako, Iringa, Morogoro and Dodoma, to Dar es Salaam, Tanzania’s largest city with over 4 million inhabitants (see Figure 5.2). Similarly, the Tarapoto corridor in Peru links the city of Tarapoto (population: 120 000) to the secondary towns of Juanjui, Moyobamba and Yurimaguas.

#### Figure 5.2. Cities and towns of the Southern Agricultural Growth Corridor of Tanzania



Source: Gálvez Nogales, 2014: p. 47.

Agro-clusters extend over a province or department, which often give the agro-cluster its name – for example, the Colima lemon cluster in Mexico, the Santa Catarina apple cluster in Brazil, and the Maharashtra grape cluster in India. Some cover thousands of hectares. For example, the Bío Bío cluster in Chile has more than 3 400 ha of blueberry bushes. Agroprocessing, marketing and logistics services tend to agglomerate in the main cities within the cluster area.

The geographic range of an agro-park or agro-based SEZ is smaller, with a maximum size of a few hundred hectares, and both are limited to a single city and its hinterland. The Agro Food Park on the outskirts of Aarhus, Denmark, a city with a population of 320 000, covers 9.2 ha and is expected to grow to 32.5 ha. The Bizerta food technopark in Tunisia is much larger, including a 150 ha industrial estate and a 45 ha area dedicated to innovation and knowledge. Most agro-food parks and SEZs are located in small cities and towns. Examples include the Greenport Venlo in the Netherlands, the Mega food park in Chittoor, India, the Baguio SEZ in the Philippines, Agri-food City in Tudela, Spain, and the Jericho agro-industrial park in the West Bank.

At the other end of the size spectrum are agribusiness incubators, which require only a few hundred square metres – the CENTEV incubator in Brazil, which has fostered a biotechnology business specializing in a fungus control of crop parasites, occupies a 1 000 sq m building; incubator sizes in the United States average 3 700 sq m.

Given their diverse geographical ranges, these instruments can often be combined in useful ways. Incubators can operated within agro-parks and clusters, for example. Clusters, SEZs and agro-parks are often part of corridor initiatives. In other words, instruments that are delimited in geographic range can be effective components when combined in broader programmes for agri-food system development. The larger the geographic range, the more complex the intervention becomes in terms of actors, levels and sectors, and the higher the budget tends to be. This results in a gradation in the governance requirements, as noted in Figure 5.1 – greater public support and leadership is needed for the larger interventions, owing in part to the related connective infrastructure investments required, while private participation is a feature of smaller-scale solutions, such as agribusiness incubators and agro-parks.

### 5.3.4. Defining features and commonalities of agro-territorial solutions

The applicability of the various agro-territorial tools will depend on the level of economic development of a particular location. For countries with substantial civil and political stability, which can afford to invest in platform infrastructure and education, the approaches can be highly effective in building subsequent steps in agricultural value addition in underdeveloped regions.

Agro-corridor initiatives appeal to countries and regions where governments recognize the urgent need to improve transport and energy infrastructure as a means of boosting agricultural productivity. However, corridor promoters must accept the need to embrace an all-round approach full of complexities that calls for strong collaboration among sectors, central and decentralized levels, and public-private partners. For middle-income countries and advanced agro-industrial regional economies, the more sophisticated forms of regional agro-cluster development will be applicable. Clusters can be the tool of choice when participants in an agri-food value chain agglomerate in a given location, or where there is potential for agglomeration to occur. The emergence of collective action by cluster stakeholders, if facilitated, can help solve common problems and promote competitiveness and, potentially, inclusiveness.

Policymakers will adopt the agro-park model when their specific goal is to generate or capture opportunities for industrialization in the agri-food system, which generates labour-intensive manufacturing jobs in urban and peri-urban areas and helps to move the system towards higher-value activities. This solution is indicated when policy-makers seek to add value through processing, which means increasing the efficiency and value-capturing capacity of park tenants and their suppliers of raw materials, while reducing transaction costs. Agro-parks can also support a multiplicity of agri-food chains, and combine the pursuit of value addition and industrial efficiency with principles of industrial ecology and innovation, such as through the so-called ‘green park’ model (see section 5.4.7).

When the regulatory environment is a constraint on agri-food system development, agro-based SEZs can offer a regulatory and policy haven for agri-food firms, as well as a testing ground for innovative policy recipes in a controlled environment before going sectoral or country-wide. Finally, agribusiness incubators are the right tool to use when there is a need to address market failures that are hindering entrepreneurship and the development of a healthy entrepreneurial ecosystem in a specific location.

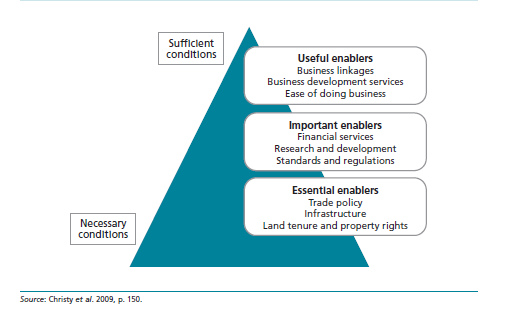
Regardless of these differences, when designing agro-territorial solutions, policy-makers need to take into account that the key to success lies in achieving a balanced mix of infrastructure development and ‘soft’ enabling interventions across the rural-urban spectrum, as described in Box 5.3. Successful territorial approaches achieve hardware-software-orgware synergies by guaranteeing the continuity of infrastructure, policies, and regulatory coordination in ‘hard’ investments such as linking producers to markets, and organizational strengthening and governance.

**Box 5.3 Agro-territorial approaches and the need to find policy balance**

Da Silva *et al*. (2009) offer a comprehensive framework for analysing the importance of different enabling policies in the transformation of agri-food systems. They highlight the existence of different categories of ‘enablers’ that governments can draw upon to enhance system competitiveness (see Figure below).

At the base of the pyramid are ‘essential enablers’ such as infrastructure development and enforcement of land tenure systems, which will make possible the functioning of markets and agro-enterprises. ‘Important enablers’ are second-order activities that governments can and often do provide, such as finance, research and development, and information. ‘Useful enablers’ are sufficient but not necessary conditions, such as providing access to business development services.

#### Figure. Enablers of agri-food systems



Source: Da Silva *et al.,* 2009, p. 150

Governments can provide such enablers in a sector-wide manner, or focus on specific territories. Territorial policy instruments, such as those discussed in this Chapter, are part of the second category. They deal with the provision of enablers in a specific territorial jurisdiction, with the aim of improving the competitiveness of the agri-food system in the selected location.

For many years, territorial policy tools primarily focused on infrastructure provision, but it soon became clear that infrastructure, although essential, was not sufficient. The current territorial planning paradigm maintains that a combination of investments in physical connectivity, trade and regulatory policy reforms and agribusiness policies, can yield increasing returns. With this comprehensive approach, it is possible to mediate the agri-food system’s complex and ever-changing dynamics – consolidation, integration and externalization – to make it more inclusive and to mitigate the forces of exclusion.

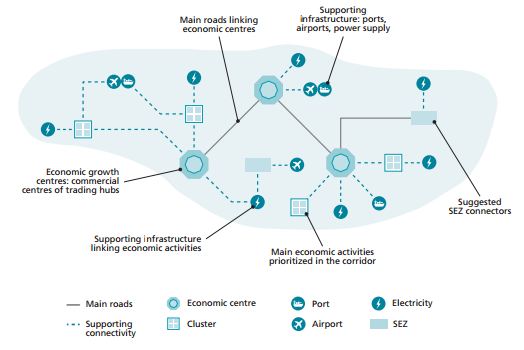
### 5.4. What type of rural infrastructure is needed and where?[[19]](#footnote-19)

Agribusinesses are acutely aware of the impact on their costs and competitiveness of the ease or difficulty in moving products. In fact, their location decision might be altered by infrastructure investments capable of modifying the equation of transportation costs (Carciofi, 2012).

The agro-territorial tools proposed in this section combine, in different ways, interventions in infrastructure with specific actions aimed at strengthening and expanding the agri-food system. Infrastructure investments include creating, expanding or rehabilitating transport infrastructure and related logistics services, urban and regional infrastructure networks, ‘last-mile’ and agri-food-specific infrastructure, and common, centrally-managed infrastructure and facilities for agri-food parks, SEZs and incubators (Figure 5.3).

The development of large connecting infrastructures tends to be publicly funded, most often with support from international financial institutions through loans and grants. For example, the Asian Development Bank plays a lead role in the regional corridor initiatives in Central Asia and in the Greater Mekong Subregion (GMS) of Southeast Asia. Conversely, lighter infrastructure investments are usually funded from a mix of public and private resources.

#### Figure 5.3. Infrastructure investments in agro-territorial initiatives



Source: Gálvez Nogales, 2014: p. 89.

It is the responsibility of the public sector to ensure the efficient movement of agri-food products. When key connective infrastructures and facilities are not in place, or require upgrading and upscaling, strategies that apply agro-territorial tools can address these bottlenecks. By providing more efficient transport services – in terms of time, and economic and environmental costs – these tools facilitate integration across rural-urban areas within the country and on into global markets. Improvements in transport infrastructure along agro-corridors reduces average travel time by 40 to 50 percent and transport costs by 40 to 80 percent. When government fails to improve critical connective infrastructure, access to input, output and labour markets is blocked, and all other investments risk becoming ineffective (Box 5.4). Another important aspect is the expansion of the connective infrastructure to remote rural areas or the agricultural hinterland – or ‘last-mile’ infrastructure – is often crucial for rural transformation and territorial development (Box 5.5).

Developing gateways, such as ports and airports, is also crucial to move agricultural products to domestic and international markets, as long as they are well connected with production areas within the targeted territory.

**Box 5.4 The importance of connectivity to markets and skilled labour**

The Srini Food Park, which was developed by the Infrastructure Investment Corporation of Andhra Pradesh, India, is located just 30 km from the city of Chittoor, but is not well connected by transport infrastructure. It occupies an area of 57 ha and could host up to 100 agro-enterprises sharing state-of-the-art facilities. Due to its isolation, and despite close proximity to mango-producing areas, the park has not been successful in attracting businesses or skilled labour.

To demonstrate some forward movement to prospective tenants, the park developers established three mango pulping operations, but had difficulty securing raw material because of competition from other established businesses in the area (Aggarwal, 2014). At last report, the park remained underutilized, with only 60 percent occupancy.

Source: Gálvez Nogales and Webber, 2017

The private sector, and particularly logistics firms, can play an important role in reducing costs and increasing the intermodal exchange of agri-food products and services across the rural-urban continuum. Besides expanding road networks, finalizing incomplete infrastructural linkages and funding multimodal transport initiatives that benefit the targeted area, public authorities should address private sector concerns about transport and logistics and support the development of logistics companies. Improved territorial coordination is critical to solving logistics bottlenecks and inefficiencies, which often arise in decentralization initiatives – for example when city or regional authorities try to exert authority on agri-food movements, or try to impose taxes or levies on the movements of goods. Furthermore, the expansion of the connective infrastructure to remote rural areas or the agricultural hinterland – or ‘last-mile’ infrastructure – is often crucial for rural transformation and territorial development.

Overcoming transport bottlenecks enhances agribusiness and food security, but comes at a cost: the magnitude of the resources needed may be substantial. In fact, Gálvez Nogales (2014) concluded that removing infrastructure bottlenecks was the biggest budget item, ranging from 60 to 80 percent of total budget, in the corridor programmes analysed. For example, the infrastructure pillar of the CAREC programme in Central Asia – which included some 3 600 km of road building and improvements, almost 2 000 km of railway track, the upgrading of ports and border crossings, as well as energy security, efficiency and distribution – accounted for 80 percent of the total budget (ADB, 2011). Therefore, the participation of both public and private sectors is required. Should the infrastructure gap be considerable, incentives and other support measures may be provided for greenfield developments, as noted in agro-territorial initiatives in sub-Saharan Africa.

In agro-territorial interventions, the development of strategic transport infrastructure goes hand in hand with territorial planning of metropolitan areas, small cities and towns, and other regional infrastructure networks required to support urban growth, particularly energy, water, sewage and telecommunications infrastructure. A long-term strategy for the integrated development of agricultural, agro-industrial and mixed-use areas is also required.

Investments in connective infrastructure are essential for reducing transportation costs and travel time. Telecommunications and energy infrastructure reduce business costs for agroprocessors, and for agri-food marketing and logistics firms. Agro-territorial solutions often consider spreading these infrastructural networks from intermediate cities over an area vastly exceeding their municipal boundaries towards peri-urban and proximate rural areas in order to remove bottlenecks in key agri-food chains.

**Box 5.5 ‘Last-mile’ infrastructure building backward linkages in Jamaica**

Last-mile infrastructure integrates rural and remote areas into the economic activities of small cities and towns. It includes feeder or farm-to-market roads, and access to water (e.g. irrigation and small dams), electricity and communications. Building last-mile infrastructure opens up the agricultural hinterland to urban centres, creating conditions that foster agribusiness development.

Jamaica’s Ministry of Agriculture and Fisheries aims at fostering tripartite investments, by government, farmer organizations and buyers, in selected territories and agri-food chains (e.g. potatoes, ginger and turmeric) by using a three-pronged approach. The approach combines the establishment of agro-food parks, the development of irrigation systems and other last-mile infrastructure, and the promotion of supply agreements between irrigated farm and consortia of agro-park tenants.

One planned initiative is the Yallahs Park for processing onion and other vegetable crops in the parish of St Thomas, near Kingston. The park investment is complemented by a US$4 million investment in irrigation facilities, farm roads and a packing house, implemented through funding from the Inter-American Development Bank. The 300 farmers benefiting from this irrigation scheme sell their crops to the agro-park.

Source: Gálvez Nogales and Webber, 2017

Infrastructure specific to the agri-food system provides the basis for a diversified agri-food service industry that includes warehousing, cold storage, fresh primary and wholesale markets, collection points, dry ports, logistics platforms and retail operations. This is a critical step towards more efficient management of the agri-food supply chain. It is possible to tap the potential savings of efficiency in private sector logistics by streamlining areas such as warehousing, shipping, certification and inventory control. Such infrastructure may be targeted to specific agri-food chains – Indonesia dedicates $2.36 billion out of its national agro-corridor programme to creating and improving supporting infrastructure for palm oil, rubber, cocoa, timber and other crops.

Investments in last-mile and infrastructure specific to the agri-food system can be financed from a mix of private and public sources. Some investments will be in purely public goods, for example rural or feeder roads, and as such will be provided by governments and their development partners; others with potential to generate financial returns will likely come from the private sector. Partnership arrangements that pool public and private resources are essential.

## 5.5. Beyond agri-business-as-usual

As pointed out in Box 5.3, infrastructure is an essential enabler. Even so, it needs to be part of a broader, multistakeholder territorial planning process. Therefore, along with improvements in infrastructure, policymakers need to recognize the need for public goods and services that facilitate business operations along the urban-rural continuum and the agri-food system, by reducing the costs of doing business, providing incentives for new investment and creating conditions for the development of inclusive economic activities in the targeted territory. These public goods are described below.

### 5.5.1 Spatially-bound value chain interventions

The five territorial instruments incorporate in their planning and implementation supply chain and value chain interventions that reduce the costs of services, increase competition in providing services, and improve the quality of services. The selection of value chains that stand out as strategically important helps avoid the dispersal of limited resources. These initiatives start with the selection of value chains that have comparative advantages in the territory, and continue with the implementation of infrastructural and enabling interventions to overcome existing constraints in the targeted value chains and to improve their performance at all levels. Interventions includeimproving supply chain management, engineering value-chain finance schemes, creating a database of inputs and services providers for the value chain, and launching value chain-wide partnerships. Successful value chain interventions promote active links between farmers and markets, and support farmer aggregation and broad-based access to finance. Agro-corridors, parks, SEZs and agribusiness incubators typically cover multiple value chains, so they seek to find spatial synergies across them.

### 5.5.2 Integrating the value chain interventions in a broader territorial strategy

The above interventions are often part of broader *area development plans* that integrate inter-related policy initiatives, acknowledging the potential synergies and trade-offs among them. These area plans aim at developing rural and remote areas and strengthening their linkages to the rest of the economy through policies that mediate, soften and redirect, as needed, the impacts of structural and rural transformation. They seek the right mix of agricultural, social and tax policies, including compensating for the potential negative impact of productivity improvements with social protection systems.

### 5.5.3 Policy and regulatory frameworks that foster an enabling business environment and improved governance

These frameworks aim at reducing excessive transaction costs that impede smooth market functioning and prevent farmers from adopting new technologies and exploiting opportunities for profitable sales of output (Stifel and Minten, 2008; Calderon, 2009; Jacoby and Minten, 2009; Gollin and Rogerson, 2010). Ensuring an enabling environment is critical during rapid structural transformation. Carraro and Karfakis (2017), using data on 11 sub-Saharan African countries, found a positive and significant relationship between the functioning of these enabling measures and the speed of the transformation. Steps to improve the enabling environment include policy interventions on land use, quality standards, agro-industrial development, agribusiness investment promotion, food security and public-private collaboration. Land tenure security, in particular, has been found to be essential – Barrett *et al.* (2017) point out that insecurity of land rights is a major obstacle to transformation in African agriculture. Some territorial interventions, notably in sub-Saharan Africa, seek to overcome this barrier by creating land banks that allocate land to investors following consultation with local governments and communities. This type of intervention is the cornerstone of agro-SEZs, which embody streamlined regulatory environments, including streamlined delivery of public services, such as customs approvals.

### 5.5.4 Brokerage of inclusive collaborative arrangements benefitting smallholder farmers

***C***ontract farming and outgrower schemes are at the heart of most cluster, agro-park and SEZ initiatives, including the Chilean raspberry clusters in the Maule and Bío regions, Chinese livestock clusters, the Maharashtra grape cluster in India. The promotion of legal, regulatory and policy frameworks have enabled contract farming in the Greater Mekong Subregion corridor programme, which covers Cambodia, China, Lao People’s Democratic Republic, Myanmar, Thailand and Viet Nam.

Another approach is incorporating in the design of a territorial intervention a dedicated financial facility and non-financial services for smallholder farmers in the selected area and the agribusiness firms working with them under responsible arrangements. For example, the Beira Agricultural Growth Corridor Initiative in Mozambique provides favourable funding options for companies that invest in agro-clusters with high agricultural potential, provided they adopt inclusive business models that ensure a win-win relationship with smallholder producers. Another case in point is the catalytic fund created for the Southern Agricultural Growth Corridor of Tanzania, which comprises a cereal facility for large-scale agribusiness companies that develop supply chains with smallholder farmers, as well as a social venture capital fund targeting youth agro-enterprises.

### 5.5.5 Improving and expanding business development services supporting agro-enterprises located in the territory

In transforming rural economies, agri-food systems usually undergo a transition from segmented markets, in which small and medium enterprises (SMEs) play an important role, to increasing concentration and integration, which leads to a loss of SME competitiveness and, eventually, their disappearance. Agro-parks can help to reverse or mitigate this trend. In fact, many parks target SMEs or a mix of SMEs and large-scale agribusiness companies, so that they can learn from each other. They offer an enabling environment that helps small-scale firms to grow, exploit economies of scale through modern technology, and gain access to capital, land and a qualified workforce.

Dinh *et al.* (2012) validated this hypothesis in China, where industrial parks have helped small-scale park tenants to grow into medium and large enterprises. Likewise, India has supported the establishment of food parks that improve the access of SMEs to infrastructure and facilities such as cold storage, quality control laboratories and warehouses. Among other things, parks create the scope for joint purchasing that reduces the cost of inputs, allowing participating SMEs to scale up within a short time.

The Bahamas has promoted domestic SMEs by creating a parastatal, the Bahamas Agricultural and Industrial Corporation (BAIC), which operates a broad portfolio of industrial parks and incubators supporting SMEs, notably in the agri-food sector. One such park is the Gladstone Road agro-industrial park, which comprises 40 ha of land identified for the development of SME agro-industrial projects (e.g. fruit and vegetables, meat products and tropical plants) and other activities targeting the local market.

Many governments promote a mix of firms of various sizes and encourage them to collaborate and support one another (Murray, 2009; Gálvez Nogales and Webber, 2017). For instance, China fosters business models that stimulate the relocation of different sized-businesses to industrial parks and nurture linkages among all the tenants. In India, cohesion among park users is essential for self-resilience (Saleman and Jordan, 2014). To achieve this mix of firm size, a ‘leader-follower’ dynamic is established – the ‘leader’ firms, usually large agribusiness companies, attract SME ‘follower’ firms that decide to set up base in the park, generating win-win results.

### 5.5.6 Adoption of improved financial inclusion and investment vehicles

The lack of insurance and credit availability in many rural areas traps farming households in low-risk, low-return production systems, thereby perpetuating low productivity and poverty (Carter and Barrett, 2006; Dercon and Christiaensen, 2011; Barrett and Carter, 2013). Financial market failures are directly associated with relatively low rates of uptake of more sustainable and productive practices and technologies, in particular irrigation and machinery. To correct these failures, dedicated financial facilities and investment vehicles are increasingly being designed, as part of agro-territorial interventions, to provide financial support to farmers and agribusiness. The Beira Agricultural Growth Corridor Initiative (BAGCI) in Mozambique, for example, envisioned three types of financial facilities for companies and farmers in the corridor: working capital to support agricultural production; social venture capital to promote pioneer investments; and long-term capital for agriculture-supporting infrastructure within the corridor.

### 5.5.7 Green practices in agro-territorial interventions

Environmental concerns need to be identified and integrated into the a ‘greenprint’ of the territorial intervention, i.e. an investment framework for green growth and for minimizing potential negative environmental impacts in the targeted location

In 2012, the Southern Agricultural Growth Corridor of Tanzania laid out a strategy for implementing ‘agriculture green growth’ in the corridor in order to intensify agriculture for both smallholder and commercial farmers, while conserving the natural resource base. Research on sustainable green growth models was seen as crucial. As part of the SAGCOT investment greenprint, some agribusiness firms, the University of Life Sciences in Norway and the University of Sokoine in the United Republic of Tanzania launched a research project which examined the effects of best practices in sustainable farming. They demonstrated the high potential of some value chains to double yields and farmer income levels without expanding the farm area, without increasing greenhouse gas emissions.

Green agro-parks, such as Suiker Unie, in the Netherlands, have a strong focus on environmental aspects and on value-added agri-food products. The scope of green agro-parks is to generate sustainable development through the optimization of natural resources used in agri-food production, processing and distribution. In particular, more efficient and sustainable water use is encouraged. Commonly adopted techniques include the use of a bioreactor to process biomass into a fuel that is efficient and environmentally friendly.

### 5.5.8 Innovation programmes

Innovation are particularly important in so-called food technopoles, which are agri-food parks that place a special emphasis in technology and innovation, and university-led agribusiness incubators, such as the CENTEV initiative in Brazil, the Monterrey Tech incubator affiliated with the Monterrey Institute of Technology and Higher Education, in Mexico, and the agribusiness incubator promoted by the Consortium for enhancing University Responsiveness to Agribusiness Development (CURAD) at Makerere University in Kampala. Both approaches combine the provision of infrastructure – shared office space and facilities built explicitly for the processing of agricultural products – with an emphasis on multipartner research and industrial development programmes, and financial and fiscal incentives for tenants. In this way, technopoles and incubators adapt and disseminate already existing revenue-generating innovations that allow for the inclusion of small-scale producers in a sustainable manner.

### 5.5.9 Developing human capital through skills development programmes

These are a common feature of all five of the agro-territorial development approaches examined here. These programmes seek to build the productive and agribusiness skills of smallholder and SMEs, as well as to ensure that agribusinesses can find personnel with the up-to-date skills needed in competitive agri-food systems. Initiatives include public programmes of technical assistance to build enterprise capacities and the use of payroll taxes to finance training.

### 5.5.10 Strengthening relevant public and private organizations

The success of the agro-territorial approach is linked to the strength of institutions, and notably commodity boards and interprofessional associations (see Shepherd, Cadilhon and Gálvez Nogales, 2009). For example, India’s Mega Food Parks Scheme supported the establishment of industry organizations such as the National Meat and Poultry Processing Board and Indian Grape Processing Board to promote collective action within the food agro-parks and beyond. Similarly, support provided to the federation of cooperatives in Mendoza, Argentina, (Fecovita) was instrumental for increasing collective bargaining power and forging alliances with domestic and international distributors, which eventually contributed to the success of the Mendoza wine and grape cluster.

## 5.6. Institutional arrangements in support of agro-territorial interventions

Multilevel, multistakeholder institutional arrangements and institutional reforms in the public sector are needed to respond to the challenges of rural transformation. Special attention needs to be paid to the decentralization processes taking place in developing countries, and to ensuring coordination across different levels of institutions with mandates in targeted territories (Box 5.6).

Streamlining public governance systems is paramount for successful agro-territorial interventions. Sound public governance means putting in place enabling institutional and regulatory processes that will make agro-territorial initiatives more likely to succeed. It also involves complying with good governance principles related to inclusiveness, transparency, leadership and engagement of all stakeholders. Good governance requires clarification of the roles of public and private organizations working in the design and implementation of agro-territorial plans. The governance of these processes and planning instruments is complex, requiring the balancing of a multitude of government entities, representatives of civil society, the private sector and international development partners. Within government, entities responsible for agriculture, industry, commerce, education and investment, as well as local development agencies, must find ways to work together and reconcile interests and policies that do not necessarily fit seamlessly (Gálvez Nogales and Webber, 2017).

**Box 5.6 Four pillars of territorial development strategies**

To be effective, development strategies for rural poverty reduction must put in place four pillars, which can be summarized as the four ‘I’s:

**Integration** in a multi-sectoral approach. Progress in reducing hunger and improving food security has been faster where dynamic economic diversification processes emerged to provide better income and employment opportunities for a broad range of rural workers. Integration also means linking the social agenda with the growth agenda through social protection programmes that go beyond merely providing safety nets but engage with productive and employment initiatives. For example, the Transfer Project coordinated by FAO in 13 African countries has shown that cash transfers have a positive impact on human capital, including better dietary diversity, education and health care. Cash transfers not only help smooth consumption – they also provide a stimulus to households to invest in agricultural and other assets and boost local economies through income multiplier effects.

**Information** and decision support systems for spatial analysis. To capture both the spatial and the multi-dimensional aspects of food systems and livelihoods, and to identify spatial inequalities, information systems need to allow for adequate disaggregation of indicators. This will help tailor policy responses to local needs and potential, from remote rural areas through to densely populated urban slums.

**Inclusion**, by increasing the effectiveness of multi-level governance and inclusiveness mechanisms. Multi-level governance involves experts from several tiers of government who share the task of making regulations and forming policy, usually in conjunction with relevant interest groups. It has vertical dimensions, in multiple territorial layers, and horizontal dimensions (linkages among different sectors and actors) (Hague and Harrop, 2007: 282). For example, in a number of countries, governments have made decentralization reforms, which affect the vertical dimension, and established inter-ministerial and inter-sectoral committees to better coordinate food security actions (horizontal dimension). Results have been mixed in practice. In most cases, food security interventions retain a strong sectoral focus. While much effort has gone into reforming governmental structures, little progress has been made in engaging non-government actors – the private sector, farmer associations, and other civil society organizations.

**Innovation**, encompassing technological changes, including digital ICT, as well as social innovation. Innovation is increasingly being recognized as a fundamental aspect of rural poverty reduction. Of particular importance are bottom-up social innovations, based on the capacity of local communities to share knowledge, value local entrepreneurship and develop social networks and social capital, all of which help local communities to develop ideas and initatives. Marginalized rural areas have yet to reap the benefits of technological advances. Studies have shown that technology adoption among poor farmers tends to be slow, pointing to the need for adapting technologies and innovations to local conditions and incorporating local knowledge (FAO, 2014). Rural development policies should combine ‘soft’ enabling innovations with more traditional forms of ‘hard’ infrastructure innovation, such as telecommunications links, transport systems and power grids).

Source: Cistulli, 2015.

In 2013, FAO conducted a scoping survey in 71 developing countries and in-depth analysis of 21 case studies to appraise the functions and organizational models that governments were using to deliver public goods and services to the agri-food system. The study found that agribusiness and agri-food systems usually fell under the mandate of multiple agencies that were poorly coordinated. To improve coordination, several countries were creating interministerial committees or similar mechanisms to manage decentralization processes and implement agro-territorial initiatives. This decentralization trend is reflected in the evolution of India’s food park programme, which has granted responsibilities for creating, supporting and monitoring agri-food parks to state governments.

Another organizational option is the establishment of dedicated centres or authorities responsible for developing and managing agro-territorial initiatives. For example, agro-corridor centres are being established to coordinate activities and provide agribusiness services to farmers, agro-enterprises and other clients of the corridor. Mozambique’s Beira corridor initiative set up two centres to coordinate corridor interventions and provide agribusiness support services to investors, farmers and other users. Similarly, Peru’s Poverty Reduction and Alleviation programme set up a centre in each corridor to provide business development services to farmers and firms. Many agro-food parks, SEZs and incubators also have a dedicated authority that is responsible for planning, construction and management, and coordinates the operations of tenants and other stakeholders. Such an authority can be public, public-private or, exceptionally, privately run.

The private sector plays a key role in designing and implementing agro-territorial initiatives. Because some initiatives seek to attract both public and private investments in functional territories, it is clear that public-private partnerships will remain an important vehicle for financing, governance and implementation of these initiatives. Private leadership is critical mainly in the case of agro-parks, clusters and incubators, where government leadership and involvement are generally reduced and more discretionary. For example, in Honduras, a new law allowing the private development of special economic zones transformed a dormant government-run initiative. The government then focused instead on providing an improved regulatory framework and necessary infrastructure and services for investors (Farole and Akinci, 2011).

## 5.7 Conclusions and policy implications of this report

Chapter 1 presented evidence that transformations taking place in the world’s rural and urban areas since the 1990 have led to an increase in the population living above the ‘moderate poverty’ line of more than 1.6 billion people, including 750 million in rural areas. These figures indicate that economic activities in rural areas are reducing poverty, and that many people are exiting poverty without leaving rural areas. Rural transformations in developing countries have occurred along with rapid urbanization and rapid change in the agri-food system, which have created both opportunities and challenges in domestic food markets. Understanding rural transformation, particularly the rapid changes in demand and the emergence of agri-food value chains to meet that demand, requires a food systems perspective. At the same time, rural transformations are often the result of a confluence of events in the agri-food system that are location-specific. A food systems perspective alone, therefore, risks overlooking territorial aspects that are essential to observed outcomes.

This has become particularly relevant with the increasingly important role of smaller cities in urbanization and economic development. An analysis done for this report showed how urban and rural areas, far from being separate entities, form a spectrum ranging from megacities to large regional centres, market towns and the rural hinterland. The locus of urban population growth appears to have shifted along that spectrum to smaller cities and towns. One third of today’s population resides in cities with fewer than 500 000 inhabitants, and another sixteen percent reside in rural areas surrounding these cities and towns. Therefore half of the global population today gravitates around secondary cities and towns. These smaller urban centres are rapidly diversifying their economic base and generating strong linkages to rural areas. Urbanization, in general, helps to reduce poverty in rural areas through economic linkages; small cities and towns appear to do so in a more inclusive, sustainable way.

As points of intermediation and agro-industry, small cities and towns can play a key role in rural development and poverty alleviation. For example, if outmigration is driven by a lack of employment in rural areas, creating jobs in the non-farm economy around secondary cities is a way of meeting the needs of potential migrants. When out-migration is driven by ‘pull’ factors of more prosperous urban centres, a different strategy may be needed – one that provides investments in ‘agglomeration’ services in small cities and towns distributed over a territory and in closer proximity to rural areas. Being more widely distributed over a territory, multiple small towns give more rural households access to the means of improving their incomes, livelihoods and welfare. It is important, therefore, to reconcile the agri-food system approach with a territorial perspective.

Without farmers, herders, fishers and forest communities, there is no food system. Clearly, establishing the enabling conditions that allow farmers to be economically viable and earn sufficient incomes remains the centrepiece of any strategy for the development of rural areas. To take advantage of new opportunities, farmers need productivity-enhancing technologies and better access to transport, information, investment loans and skills training. This report also confirmed the importance of non-farm income to farming households and their investment strategies.

On the farming side, the new opportunities presented by expanded demand are often accompanied by a tendency towards capital-intensive consolidation of value chains, stricter quality and safety standards, and contractual obligations that pose high barriers to small farmer participation. On the non-farm income side, while the development of supply and value chains have employment multipliers in rural areas, over time, capital intensification will pose challenges, especially for low-skilled labour. Those challenges will need to be addressed in the design of rural development policies and strategies. Vastly expanded, multi-directional supply chains provide new opportunities, but also leave rural areas exposed to outside competition. Agro-territorial strategies and initiatives will be key in helping small farmers overcome barriers and benefit from the ongoing transformations. It is a challenge, but it can be done.

The implication here is that the competitiveness agenda needs to be extended to a territorial scale, and incorporated as another important tool for risk management and enhanced resilience. If policymakers are to ensure that rural livelihoods are sustainable, they will need to ensure that the desire for competitiveness in the agri-food system dovetails with their goal of inclusiveness. The first challenge is to keep small-scale producers competitive in the domestic market, through policies and infrastructure improvements that facilitate their access to inputs suppliers, traders and consumers. The other, longer-term challenge is generating non-farm employment in rural areas, whether in the agri-food sector or other manufacturing.

In today’s rapidly changing food systems, a major challenge is to bridge the gap created by the decline of public sector extension services, through a better targeting of resources and greater coordination with private advisory services so that farmers can adapt to the changes in demand. Connecting small-scale farmers to sources of knowledge, inputs and credit also requires action to strengthen producer organizations and build on the potential of information and communication technologies. Through stronger organizations, smallholders can address issues inherent to transformation, such as value chain and landholding consolidation. Rural transformation also needs to be made environmentally sustainable, through incentives along the value chain to use natural resources wisely and investments in research and technology transfer.

Food system approaches and territorial approaches are not a panacea. They are proposed here as a means of analysing the confluence of events that affect rural transformation, its impacts and outcomes. The outcome of agro-territorial initiatives will depend on stakeholder involvement, on how they are designed, and on their implementation. Every system has unique characteristics, and each country and region has its own history, topography, culture and economic philosophies, making it very difficult to generalize about the application of best practices. Consequently, effective planning and implementation of an agro-territorial approach requires stakeholders to make sound choices.

This is not a simple task when major infrastructural investments are needed in rural areas and funds are limited. The World Bank (2011) estimates that, in low- and middle-income countries, the infrastructure gap at US$1 trillion, including roads, ports, airports, access to networked electricity, improved water supply and sanitation, telecommunication and internet services, irrigation, cold storage and warehousing facilities. Agro-territorial approaches allow clear targeting of infrastructure needs, and their value-for-money is comparatively easier to measure. The rural-urban spectrum approach introduced in this report, by looking not only at travel time to urban centres, but also at the population density in rural areas, can help in supporting the evaluation of the type of territorial interventions that would be most economically viable.

Gálvez Nogales (2014) and Gálvez Nogales and Webber (2017) list a number of good practices in implementing agro-territorial initiatives. For example, infrastructure development is most effective when planned in a comprehensive manner and implemented within an appropriate environmental and social regulatory framework. This means an understanding of how road, power and telecommunication networks interact with each other and affect populations and the economic potential of value chains present in a territory. If infrastructure is being built, stakeholders need to carefully select the governance model that is most suited to the implementation and maintenance of planned infrastructure investments.

Emphasis should be given to integrating inter-related policy initiatives, acknowledging the potential synergies and trade-offs among them. For example, area plans in rural and remote areas strengthen their linkages to the rest of the economy. In light of the issues raised concerning social protection in the context of broader structural transformation (see Chapter 4), social protection systems that use spatial information as part of an agro-territorial investment initiative would be a welcome innovation.

Finally, enabling institutional and regulatory processesare needed to make agro-territorial initiatives more likely to succeed. From collective actions – such as geographic indication to enhance product value – to large-scale agro-corridors and small agro-incubators, accumulated experience has led to well-defined good practices in terms of governance and institutional arrangements, which can be summarized here:

* To coordinate policy measures in targeted territories, foster collaboration among ministries and decentralized public institutions – for example, by setting up interministerial coordination committees or dedicated authorities.
* Build synergies between the private and the public sectors including, for example, the use of partnerships for infrastructure and agribusiness development (Rankin *et al.*, 2016a; b)
* Build synergies also between education and innovation institutions and actors of the agri-food system to give a competitive edge to the selected agro-territorial approach.
* Prioritize interventions according to value-for-money principles, where the value being considered should include social value, such as the value of employment generation in rural areas.

The options proposed in this report will involve all stakeholders in developing and implementing agro-territorial initiatives, and their interests will need to be taken into account in the design of any intervention. In a rapidly transforming world, the agri-food sector, rooted in territorial experiences, is an asset for a more inclusive rural transformation. Fostering rural-urban linkages through appropriate territorial strategies can create both a favourable business environment for farmers – small and large – and the non-farm income opportunities that are vital for the longer-term sustainability of rural areas.

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#### Notes on the statistical annex

**Key**

The following conventions are used in the tables:

.. = data not available

0 or 0.0 = nil or negligible

blank cell = not applicable

Numbers presented in the tables may differ from the original data sources because of rounding or data processing. To separate decimals from whole numbers a full point (.) is used.

**Technical notes**

**Table A.1 Share of the national population residing in areas of different travel time distances from cities larger than 500 000, 100 000 and 50 000**

**Large City Urban**: Share of total population that lives within one hour travel time from the center of a large city (population greater than 500 000)

**Large City Rural**: share of total population residing between one to three hours travel time from a large city (population greater than 500 000)

**Small City Secondary Town Urban:** share of total population residing within one hour from a small city or secondary town (population between 50 000 and 500 000)

**Small City Secondary Town Rural:** share of total population residing between one to three hours from a small city or secondary town (population between 50 000 and 500 000)

**Rural Hinterland**: rural population residing farther than three hours from any city center with a population greater than 50 000

***Notes***: Towns of less than 50 000 people are not captured here as urban or peri-urban. See Annex 1.1. for how the rural spectrum was computed.

*Source: SOFA team elaboration based on GRUMP data set, 2007*

**Country groups and regional aggregates**

Regional groupings and the designation of developing and developed regions follow a similar classification to the UNSD M49 classification of the United Nations Statistics Division, available at **unstats.un.org/unsd/methods/m49/m49.htm**

Data for China exclude data for Hong Kong Special Administrative Region of China and Macao Special Administrative Region of China.

# Statistical Annex

**Table A.1 Share of the national population residing in areas of different travel time distances from cities larger than 500 000, 100 000 and 50 000**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | **Large City Urban** | **Large City Rural** | **Small City Secondary Town Urban** | **Small City Secondary Town Rural** | **Rural Hinterland** |
|
|  | *percent* | | | | |
| **World** | **25** | **10** | **34** | **16** | **16** |
| **North America** | **37** | **6** | **45** | **8** | **4** |
| Canada | 55 | 7 | 22 | 6 | 10 |
| Marshall Islands | 0 | 0 | 0 | 0 | 100 |
| Nauru | 0 | 0 | 0 | 0 | 100 |
| United States of America | 35 | 6 | 47 | 8 | 4 |
|  |  |  |  |  |  |
| **Western Europe** | **36** | **6** | **47** | **8** | **3** |
| Albania | 0 | 0 | 72 | 22 | 6 |
| Andorra | 0 | 100 | 0 | 0 | 0 |
| Armenia | 52 | 10 | 24 | 4 | 10 |
| Austria | 32 | 13 | 48 | 4 | 3 |
| Azerbaijan | 25 | 2 | 26 | 30 | 17 |
| Belarus | 20 | 7 | 52 | 17 | 4 |
| Belgium | 11 | 2 | 84 | 3 | 0 |
| Bosnia and Herzegovina | 0 | 3 | 50 | 36 | 11 |
| Bulgaria | 19 | 5 | 61 | 13 | 2 |
| Croatia | 31 | 17 | 27 | 16 | 9 |
| Cyprus | 0 | 0 | 72 | 27 | 1 |
| Czech Republic | 23 | 8 | 63 | 4 | 2 |
| Denmark | 24 | 17 | 33 | 18 | 8 |
| Estonia | 0 | 6 | 52 | 36 | 6 |
| Finland | 24 | 4 | 42 | 19 | 10 |
| France | 51 | 8 | 35 | 4 | 2 |
| Georgia | 30 | 8 | 25 | 27 | 10 |
| Germany | 56 | 8 | 32 | 2 | 2 |
| Gibraltar | 0 | 0 | 7 | 93 | 0 |
| Greece | 34 | 6 | 30 | 20 | 10 |
| Hungary | 29 | 6 | 57 | 6 | 2 |
| Iceland | 0 | 0 | 60 | 9 | 30 |
| Ireland | 35 | 22 | 16 | 19 | 8 |
| Isle of Man | 0 | 0 | 0 | 0 | 100 |
| Italy | 39 | 4 | 50 | 6 | 2 |
| Latvia | 46 | 17 | 12 | 19 | 6 |
| Liechtenstein | 0 | 91 | 0 | 8 | 1 |
| Lithuania | 21 | 13 | 45 | 18 | 3 |
| Luxembourg | 0 | 4 | 85 | 8 | 3 |
| Malta | 0 | 0 | 92 | 8 | 0 |
| Moldova, Republic of | 28 | 22 | 35 | 10 | 4 |
| Monaco | 0 | 100 | 0 | 0 | 0 |
| Montenegro | 0 | 0 | 45 | 42 | 13 |
| Netherlands | 44 | 2 | 49 | 3 | 1 |
| Norway | 28 | 8 | 29 | 13 | 22 |
| Poland | 25 | 7 | 60 | 6 | 1 |
| Portugal | 22 | 8 | 45 | 16 | 8 |
| Romania | 14 | 3 | 68 | 13 | 2 |
| San Marino | 0 | 0 | 73 | 27 | 0 |
| Serbia | 26 | 8 | 53 | 10 | 3 |
| Slovakia | 0 | 5 | 74 | 18 | 3 |
| Slovenia | 0 | 15 | 57 | 19 | 10 |
| Spain | 41 | 5 | 44 | 6 | 4 |
| Sweden | 8 | 3 | 61 | 20 | 8 |
| Switzerland | 0 | 5 | 84 | 10 | 1 |
| The former Yugoslav Republic of Macedonia | 0 | 0 | 78 | 19 | 3 |
| U.K. of Great Britain and Northern Ireland | 39 | 4 | 53 | 3 | 1 |
|  |  |  |  |  |  |
| **Europe and Central Asia** | **29** | **7** | **41** | **14** | **9** |
| Israel | 6 | 2 | 86 | 4 | 1 |
| Kazakhstan | 9 | 2 | 41 | 13 | 35 |
| Kyrgyzstan | 21 | 6 | 25 | 24 | 25 |
| Russian Federation | 35 | 8 | 36 | 11 | 10 |
| Tajikistan | 19 | 13 | 31 | 21 | 16 |
| Turkey | 30 | 8 | 38 | 18 | 5 |
| Turkmenistan | 15 | 3 | 41 | 19 | 22 |
| Ukraine | 29 | 10 | 46 | 12 | 3 |
| Uzbekistan | 12 | 1 | 55 | 24 | 7 |
|  |  |  |  |  |  |
| **Other high-income countries** | **67** | **3** | **27** | **2** | **1** |
| Australia | 61 | 7 | 17 | 6 | 8 |
| Japan | 63 | 2 | 33 | 2 | 1 |
| New Zealand | 0 | 0 | 72 | 19 | 9 |
| Republic of Korea | 76 | 5 | 15 | 2 | 2 |
| Singapore | 97 | 3 | 0 | 0 | 0 |
|  |  |  |  |  |  |
| **Latin America and the Caribbean** | **41** | **7** | **31** | **11** | **10** |
| Antigua and Barbuda | 0 | 0 | 0 | 0 | 100 |
| Argentina | 48 | 5 | 29 | 12 | 7 |
| Bahamas | 0 | 0 | 65 | 6 | 29 |
| Barbados | 0 | 0 | 96 | 4 | 0 |
| Belize | 0 | 0 | 4 | 31 | 64 |
| Bolivia | 47 | 7 | 13 | 7 | 26 |
| Brazil | 41 | 6 | 32 | 13 | 8 |
| Chile | 40 | 2 | 42 | 11 | 5 |
| Colombia | 44 | 7 | 22 | 12 | 14 |
| Costa Rica | 0 | 0 | 60 | 19 | 21 |
| Cuba | 22 | 2 | 51 | 21 | 4 |
| Dominica | 0 | 0 | 0 | 0 | 100 |
| Dominican Republic | 32 | 3 | 54 | 8 | 3 |
| Ecuador | 23 | 18 | 35 | 10 | 15 |
| El Salvador | 55 | 11 | 28 | 4 | 3 |
| Falkland Islands (Malvinas) | 0 | 0 | 0 | 0 | 100 |
| French Guiana | 0 | 0 | 45 | 21 | 33 |
| Grenada | 0 | 0 | 0 | 0 | 100 |
| Guatemala | 28 | 24 | 11 | 14 | 23 |
| Guyana | 0 | 0 | 42 | 20 | 38 |
| Haiti | 26 | 19 | 16 | 22 | 18 |
| Honduras | 16 | 17 | 32 | 18 | 17 |
| Jamaica | 50 | 13 | 30 | 4 | 3 |
| Mexico | 52 | 7 | 27 | 7 | 7 |
| Nicaragua | 34 | 11 | 22 | 14 | 18 |
| Panama | 0 | 0 | 59 | 14 | 26 |
| Paraguay | 0 | 0 | 47 | 15 | 37 |
| Peru | 34 | 3 | 27 | 15 | 22 |
| Puerto Rico | 0 | 0 | 97 | 3 | 0 |
| Saint Lucia | 0 | 0 | 89 | 10 | 0 |
| Saint Vincent and the Grenadines | 0 | 0 | 0 | 0 | 100 |
| Suriname | 0 | 0 | 74 | 8 | 18 |
| Trinidad and Tobago | 0 | 0 | 85 | 10 | 5 |
| Uruguay | 55 | 10 | 13 | 13 | 9 |
| Venezuela | 52 | 5 | 32 | 6 | 5 |
|  |  |  |  |  |  |
| **Middle East and North Africa** | **31** | **6** | **40** | **11** | **12** |
| Algeria | 5 | 1 | 68 | 18 | 9 |
| Bahrain | 0 | 0 | 97 | 2 | 0 |
| Egypt | 37 | 5 | 55 | 3 | 1 |
| Iran (Islamic Republic of) | 34 | 5 | 39 | 14 | 8 |
| Iraq | 47 | 12 | 28 | 7 | 5 |
| Jordan | 62 | 9 | 21 | 4 | 4 |
| Kuwait | 0 | 0 | 98 | 2 | 0 |
| Lebanon | 49 | 13 | 32 | 4 | 2 |
| Libya | 46 | 3 | 40 | 6 | 5 |
| Morocco | 31 | 16 | 32 | 9 | 12 |
| Oman | 0 | 0 | 76 | 17 | 7 |
| Qatar | 0 | 0 | 95 | 5 | 0 |
| Saudi Arabia | 54 | 2 | 29 | 7 | 8 |
| Sudan | 13 | 2 | 26 | 24 | 35 |
| Syrian Arab Republic | 45 | 12 | 25 | 12 | 6 |
| Tunisia | 24 | 12 | 35 | 22 | 7 |
| United Arab Emirates | 40 | 9 | 41 | 7 | 3 |
| Yemen | 10 | 5 | 16 | 13 | 56 |
|  |  |  |  |  |  |
| **South Asia** | **22** | **13** | **36** | **16** | **13** |
| Afghanistan | 13 | 6 | 19 | 21 | 42 |
| Bangladesh | 14 | 9 | 38 | 25 | 14 |
| Bhutan | 0 | 3 | 5 | 15 | 78 |
| India | 23 | 15 | 37 | 15 | 11 |
| Maldives | 0 | 0 | 0 | 0 | 100 |
| Nepal | 9 | 7 | 23 | 26 | 35 |
| Pakistan | 27 | 9 | 37 | 14 | 12 |
| Sri Lanka | 23 | 11 | 21 | 28 | 17 |
|  |  |  |  |  |  |
| **East Asia and the Pacific** | **15** | **12** | **31** | **21** | **21** |
| Brunei Darussalam | 0 | 0 | 74 | 11 | 16 |
| Cambodia | 16 | 32 | 12 | 11 | 29 |
| China, PR of | 12 | 14 | 30 | 22 | 22 |
| Dem People's Rep of Korea | 28 | 13 | 32 | 17 | 9 |
| Indonesia | 25 | 8 | 34 | 14 | 19 |
| Lao People's Democratic Republic | 0 | 0 | 20 | 34 | 46 |
| Malaysia | 26 | 5 | 49 | 9 | 11 |
| Mongolia | 30 | 3 | 3 | 2 | 61 |
| Myanmar | 12 | 6 | 28 | 28 | 27 |
| Philippines | 28 | 3 | 36 | 18 | 15 |
| Thailand | 15 | 4 | 28 | 35 | 18 |
| Timor-Leste | 0 | 0 | 0 | 0 | 100 |
| Viet Nam | 11 | 8 | 41 | 25 | 14 |
|  |  |  |  |  |  |
| **Sub-Sahara Africa** | **14** | **8** | **19** | **22** | **36** |
| Angola | 18 | 9 | 5 | 3 | 65 |
| Benin | 22 | 17 | 19 | 19 | 23 |
| Botswana | 0 | 0 | 32 | 26 | 41 |
| Burkina Faso | 7 | 14 | 9 | 20 | 49 |
| Burundi | 0 | 0 | 38 | 39 | 23 |
| Cameroon | 18 | 6 | 27 | 25 | 24 |
| Cape Verde | 0 | 0 | 46 | 25 | 29 |
| Central African Republic | 16 | 7 | 7 | 13 | 56 |
| Chad | 8 | 3 | 8 | 22 | 59 |
| Comoros | 0 | 0 | 0 | 0 | 100 |
| Congo | 50 | 6 | 8 | 6 | 30 |
| Cote d'Ivoire | 18 | 11 | 21 | 26 | 24 |
| Democratic Republic of the Congo | 17 | 4 | 13 | 20 | 46 |
| Djibouti | 0 | 0 | 59 | 25 | 16 |
| Equatorial Guinea | 0 | 0 | 28 | 30 | 42 |
| Eritrea | 24 | 25 | 2 | 6 | 43 |
| Ethiopia | 5 | 5 | 10 | 20 | 60 |
| Gabon | 38 | 4 | 4 | 0 | 55 |
| Gambia | 0 | 0 | 47 | 9 | 44 |
| Ghana | 23 | 16 | 16 | 22 | 23 |
| Guinea | 13 | 23 | 8 | 18 | 38 |
| Guinea-Bissau | 0 | 0 | 22 | 22 | 57 |
| Kenya | 13 | 6 | 14 | 28 | 39 |
| Lesotho | 0 | 0 | 33 | 29 | 39 |
| Liberia | 9 | 13 | 8 | 13 | 56 |
| Madagascar | 13 | 13 | 12 | 27 | 35 |
| Malawi | 21 | 36 | 6 | 8 | 29 |
| Mali | 13 | 5 | 10 | 21 | 51 |
| Martinique | 0 | 0 | 97 | 3 | 0 |
| Mauritania | 24 | 0 | 9 | 8 | 59 |
| Mauritius | 0 | 0 | 96 | 1 | 3 |
| Mozambique | 9 | 2 | 18 | 30 | 41 |
| Namibia | 0 | 0 | 13 | 3 | 83 |
| Niger | 10 | 5 | 12 | 29 | 44 |
| Nigeria | 12 | 13 | 33 | 22 | 21 |
| Reunion | 0 | 0 | 98 | 2 | 0 |
| Rwanda | 0 | 0 | 19 | 49 | 32 |
| Saint Helena | 0 | 0 | 0 | 0 | 100 |
| Sao Tome and Principe | 0 | 0 | 55 | 39 | 5 |
| Senegal | 23 | 4 | 24 | 24 | 25 |
| Seychelles | 0 | 0 | 0 | 0 | 100 |
| Sierra Leone | 22 | 6 | 14 | 33 | 26 |
| Somalia | 12 | 7 | 13 | 8 | 60 |
| South Africa | 37 | 4 | 17 | 18 | 24 |
| Swaziland | 0 | 0 | 26 | 43 | 31 |
| Togo | 21 | 8 | 22 | 22 | 27 |
| Uganda | 11 | 12 | 22 | 30 | 24 |
| United Republic of Tanzania | 7 | 2 | 23 | 33 | 36 |
| Western Sahara | 0 | 0 | 58 | 14 | 29 |
| Zambia | 13 | 4 | 21 | 12 | 51 |
| Zimbabwe | 25 | 13 | 11 | 16 | 35 |
|  |  |  |  |  |  |
| **Oceania** | **0** | **0** | **6** | **10** | **84** |
| Fiji | 0 | 0 | 22 | 44 | 33 |
| Kiribati | 0 | 0 | 0 | 0 | 100 |
| Micronesia (Federated States of) | 0 | 0 | 0 | 0 | 100 |
| Palau | 0 | 0 | 0 | 0 | 100 |
| Papua New Guinea | 0 | 0 | 5 | 8 | 87 |
| Saint Kitts and Nevis | 0 | 0 | 0 | 0 | 100 |
| Samoa | 0 | 0 | 0 | 0 | 100 |
| Solomon Islands | 0 | 0 | 1 | 2 | 98 |
| Tonga | 0 | 0 | 0 | 0 | 100 |
| Tuvalu | 0 | 0 | 0 | 0 | 100 |
| Vanuatu | 0 | 0 | 0 | 0 | 100 |

1. Agro-industry includes the manufacture of food, beverages, tobacco, textiles, clothing, wood products, furniture, paper, paper products, and rubber and rubber products (da Silva *et al.*, 2009). [↑](#footnote-ref-1)
2. In more developed countries, the post-farm gate creates far more value for the economy than farming itself. For example, post-farm activities in the United States create 93 percent of value added in the agri-food system. In agriculture-based countries, the ratio of GDP generated by agribusiness to that generated by farming is 0.57, while it is 1.98 for transforming countries and 3.32 for transformed countries. For the United States, the ratio stands at 13 (Wilkinson & Rocha, 2009). [↑](#footnote-ref-2)
3. Important data sets include: The Global Rural-Urban Mapping Project (GRUMP) led by NASA’s Socioeconomic Data and Application Center (SEDAC) at Columbia University, USA; Worldpop, based at the University of Southampton, UK; and, Africapolis, funded by the Agence francaise de développement. Africapolis data is often cited by scholars who argue that Africa is not urbanizing as fast as UN estimates suggest (Potts, 2012). [↑](#footnote-ref-3)
4. Migration can be also caused by non-economic factors such as conflict, political instability, food insecurity, limited access to land and credit, natural resource depletion and degradation, and the impacts of climate change, many of which operate concurrently. [↑](#footnote-ref-4)
5. According the German economist Ernst Engel (1821-1896), as income rises, the share of income spent on food decreases, even as total food expenditure rises [↑](#footnote-ref-5)
6. That same explanation for the purchase of farm inputs Africa was echoed by Adjognon *et al*., 2016.) [↑](#footnote-ref-6)
7. Most analyses of dietary trends are based on food balance sheets, which estimate food availability. While these are useful proximate indicators for monitoring general dietary changes at national and regional levels, individual food consumption data is often scarce, especially in low-income countries, making it more difficult to do more refined analyses of dietary trends. Efforts are therefore underway to enhance the collection and use of individual dietary data. See www.fao.org/nutrition/assessment/food-consumption-database/en/. [↑](#footnote-ref-7)
8. Interlocked factor markets exist when access to one factor of production (e.g. credit) is conditional on providing another factor. The best-known example is sharecropping, when the tenant offers labour to landlords in exchange for accessing land and credit, and shares the output with the landlord, on usually exploitive terms. [↑](#footnote-ref-8)
9. The Gomez *et al.* (2016) study is likely to be more representative of Africa, since 72 percent of respondents were in Africa, 17 percent in Latin America, and only 9 percent in Asia. [↑](#footnote-ref-9)
10. These trends are merely *indicative* of broad trends, as about 40 percent of the data points were interpolated. [↑](#footnote-ref-10)
11. The authors note that, while the sample is not globally representative, nor is it representative of many regions, it is representative of trends for high-income countries, Latin America and the Caribbean and South Asia. A notable exclusion from the sample is China. [↑](#footnote-ref-11)
12. The RIGA database, a collaborative project of FAO, the World Bank and American University, USA, covering 19 countries in Africa, Asia, Eastern Europe and Latin America [↑](#footnote-ref-12)
13. Only in Viet Nam was the level of wealth associated with greater reliance on farm income. [↑](#footnote-ref-13)
14. The manufacturing value added, over the period 1990s-2010s, has doubled in Philippines, and increased by more than fivefold, six-fold, eightfold, thirteen-fold, and fifteen-fold in India, Malaysia, Bangladesh, Indonesia and China respectively (SOFA team calculations from UNIDO, 2017). [↑](#footnote-ref-14)
15. Recent and complete data are available only for the following: in sub-Saharan Africa, Cameroon, Senegal, Malawi, Ethiopia, Tanzania and Kenya and South Africa.; in Asia, Bangladesh, China, India, Thailand, Indonesia, the Philippines, and Malaysia; in Latin America, Brazil, Colombia, Mexico and Peru; in West Asia and North Africa, Egypt, Morocco, Tunisia and Turkey. [↑](#footnote-ref-15)
16. There is ample literature on skill-biased technological change. See, for example, Acemoglu (2002) Technical change, inequality, and the labor market. *Journal of economic literature,* 40**,** 7-72., who argues that technical change has been skill biased for at least the last 60 years. [↑](#footnote-ref-16)
17. A misconception is that job creation is a process separate from the availability of labour. Although mismatches can occur, typically production and technology choices also reflect the amount and type of labour available. [↑](#footnote-ref-17)
18. Note: This chapter draws on FAO’s extensive recent work in the field of territorial tools for agro-industrial development. See Gálvez Nogales, 2010, 2011 and 2014; Gálvez Nogales et al., 2014; and Gálvez Nogales and Webber, 2017. [↑](#footnote-ref-18)
19. Note: This chapter draws on FAO’s extensive recent work in the field of territorial tools for agro-industrial development. See Gálvez Nogales, 2010, 2011 and 2014; Gálvez Nogales et al., 2014; and Gálvez Nogales and Webber, 2017. [↑](#footnote-ref-19)