



Food and Agriculture
Organization of the
United Nations

2017

THE STATE OF FOOD AND AGRICULTURE

**LEVERAGING FOOD
SYSTEMS FOR INCLUSIVE
RURAL TRANSFORMATION**

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ISBN 978-92-5-109873-8

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HOI AN, VIET NAM

Preparing food at a stall in the market.
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2017
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Food and Agriculture Organization of the United Nations
Rome, 2017

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FOREWORD

In adopting the 2030 Agenda for Sustainable Development two years ago, the international community committed itself to eradicating hunger and poverty and to achieving other important goals, including making agriculture sustainable, securing healthy lives and decent work for all, reducing inequality, and making economic growth inclusive. With just 13 years remaining before the 2030 deadline, concerted action is needed now if the Sustainable Development Goals are to be reached.

There could be no clearer wake-up call than FAO's new estimate that the number of chronically undernourished people in the world stands at 815 million. Most of the hungry live in low-income and lower-middle-income countries, many of which have yet to make the necessary headway towards the structural transformation of their economies. Successful transformations in other developing countries were driven by agricultural productivity growth, leading to a shift of people and resources from agriculture towards manufacturing, industry and services, massive increases in per capita income, and steep reductions in poverty and hunger. Countries lagging behind in this transformation process are mainly concentrated in sub-Saharan Africa and South Asia. Most have in common economies with large shares of employment in agriculture, widespread hunger and malnutrition, and high levels of poverty. According to the latest estimates, some 1.75 billion people in low-income and lower-middle-income countries survive on less

than US\$3.10 a day, and more than 580 million are chronically undernourished.

The prospects for eradicating hunger and poverty in these countries are overshadowed by the low productivity of subsistence agriculture, limited scope for industrialization and – above all – by rapid rates of population growth and explosive urbanization. Between 2015 and 2030, their total population is expected to grow by 25 percent, from 3.5 billion to almost 4.5 billion. Their urban populations will grow at double that pace, from 1.3 billion to 2 billion. In sub-Saharan Africa, the number of people aged 15–24 years is expected to increase by more than 90 million by 2030, and most will be in rural areas. Young rural people faced with the prospect of a life of grinding poverty may see few other alternatives than to migrate, at the risk of becoming only marginally better off as they may outnumber available jobs in urban settings.

The overarching conclusion of this report is that fulfilling the 2030 Agenda depends crucially on progress in rural areas, which is where most of the poor and hungry live. It presents evidence to show that, since the 1990s, rural transformations in many countries have led to an increase of more than 750 million in the number of rural people living above the poverty line. To achieve the same results in the countries that have been left behind, the report outlines a strategy that would leverage the enormous untapped potential of food systems to drive agro-industrial development, boost small-scale farmers' productivity and incomes, and create off-farm employment in expanding segments

FOREWORD

of food supply and value chains. This inclusive rural transformation would contribute to the eradication of rural poverty, while at the same time helping end poverty and malnutrition in urban areas.

A major force behind inclusive rural transformation will be the growing demand coming from urban food markets, which consume up to 70 percent of the food supply even in countries with large rural populations. Thanks to higher incomes, urban consumers are making significant changes in their diets, away from staples and towards higher-value fish, meat, eggs, dairy products, fruit and vegetables, and more processed foods in general. The value of urban food markets in sub-Saharan Africa is projected to grow from US\$150 billion to US\$500 billion between 2010 and 2030.

Urbanization thus provides a golden opportunity for agriculture. However, it also presents challenges for millions of small-scale family farmers. More profitable markets can lead to the concentration of food production in large commercial farms, to value chains dominated by large processors and retailers, and to the exclusion of smallholders. To ensure that small-scale producers participate fully in meeting urban food demand, policy measures are needed that: reduce the barriers limiting their access to inputs; foster the adoption of environmentally sustainable approaches and technologies; increase access to credit and markets; facilitate farm mechanization; revitalize agricultural extension systems; strengthen land tenure rights; ensure equity in supply contracts; and strengthen small-scale producer organizations. No amount of urban demand alone will improve production and market

conditions for small-scale farming. Supportive public policies and investment are a key pillar of inclusive rural transformation.

The second pillar is the development of agro-industry and the infrastructure needed to connect rural areas and urban markets. In the coming years, many small-scale farmers are likely to leave agriculture, and most will be unable to find decent employment in largely low-productivity rural economies. A dynamic agro-industrial sector and growth of services in rural areas would create jobs in local economies, especially for women and youth, improving incomes and supporting overall gains in nutrition, health and food security.

Agro-industry is already an important sector in many agriculture-based economies. In sub-Saharan Africa, food and beverage processing represents between 30 percent and 50 percent of total manufacturing value added in most countries, and in some more than 80 percent. However, the growth of agro-industry is often held back by the lack of essential infrastructure – from rural roads and electrical power grids to storage and refrigerated transportation. In many low-income countries, such constraints are exacerbated by a lack of public- and private-sector investment.

The third pillar of inclusive rural transformation is a territorial focus in rural development planning, designed to strengthen the physical, economic, social and political connections between small urban centres and their surrounding rural areas. In the developing world, about half of the total urban population, or almost 1.5 billion people, live in cities and towns of

500 000 inhabitants or fewer. Too often ignored by policy-makers and planners, territorial networks of small cities and towns are important reference points for rural people – the places where they buy their seed, send their children to school and access medical care and other services.

Recent research has shown how the development of rural economies is often more rapid, and usually more inclusive, when integrated with that of these smaller urban areas. In the agroterritorial development approach described in this report, links between small cities and towns and their rural “catchment areas” are strengthened through infrastructure works and policies that connect producers, agro-industrial processors and ancillary services, and other downstream segments of food value chains, including local circuits of food production and consumption. Examples of the approach include agro-corridors, in which lines of transportation, sometimes stretching for hundreds of kilometres, connect production areas to small urban hubs, and agroclusters, which link food producers, processors and institutions in networks to address common challenges.

Policy-makers are urged to recognize the catalytic role of small cities and towns in mediating the rural–urban nexus and providing smallholder farmers with greater opportunities to market their produce and share in the benefits of economic growth. Small cities and towns can also serve as hubs for a thriving services sector, which would drive broad-based economic growth in rural areas and structural transformation of the economy as a whole.

FAO has published *The State of Food and Agriculture* reports annually since 1947. Advances in agriculture since then have achieved a quantum leap in food production, bolstered world food security and supported the structural transformations that have brought prosperity to a large part of the world population. However, with an estimated 815 million people worldwide still suffering from chronic hunger, and millions more living in poverty, much more remains to be done. Unless economic growth is made more inclusive, the global goals of ending poverty and achieving zero hunger by 2030 will not be reached. The international community must work together now to ensure that those “left behind” take their rightful place in a world serving people, planet, prosperity, partnerships and peace.



José Graziano da Silva
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ACKNOWLEDGEMENTS

The State of Food and Agriculture 2017 was prepared by a multidisciplinary team of the Food and Agriculture Organization of the United Nations (FAO) under the direction of Rob Vos, Director of FAO's Agricultural Development Economics Division, and Andrea Cattaneo, Senior Economist and Editor of the publication. Overall guidance was provided by Kostas Stamoulis, Assistant Director-General of the Economic and Social Development Department (ES). Guidance was also provided by the ES Department management team.

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STATISTICAL ANNEX

The annex was prepared by Raffaele Bertini and Theresa McMenemy.

Table A1 is based on data provided by Andrew Nelson (University of Twente, the Netherlands) and processed by the FAO team as explained in the Notes on the statistical annex.

Tables A2 and A3 are based on World Bank data commissioned for the IFAD's *Rural Development Report 2016* and kindly provided by Rui Benfica (IFAD).

Table A4 is based on the Industrial Statistics Database 2, ISIC Revision 3 dataset, which was kindly provided by the United Nations Industrial Development Organization.

ADMINISTRATIVE SUPPORT

Paola Di Santo and Liliana Maldonado.

Translation services were coordinated by the Meeting Programming and Documentation Service of FAO's Conference, Council and Protocol Affairs Division.

The Publishing Group in FAO's Office for Corporate Communication provided editorial support, design and layout for all six official languages.

ACRONYMS AND ABBREVIATIONS

CAREC

Central Asia Regional Economic Cooperation Program

CENTEV

Technological Centre for Regional Development of Viçosa (Brazil)

CIRAD

French Agricultural Research Centre for International Development

CRFS

city region food system

CSA

climate-smart agriculture

FDI

foreign direct investment

GDP

gross domestic product

GRUMP

Global Rural-Urban Mapping Project

ha

hectare

ICT

information and communications technology

IFAD

International Fund for Agricultural Development

IFPRI

International Food Policy Research Institute

ILO

International Labour Organization

ISIC

International Standard Industrial Classification

LSMS

Living Standards Measurement Study

LST

large-scale trader

NCD

non-communicable disease

NGO

non-governmental organization

RAS

rural advisory service

SDG

Sustainable Development Goal

SEZ

special economic zone

SMES

small and medium-sized enterprises

UN

United Nations

UNIDO

United Nations Industrial Development Organization

USA

United States of America

US\$

United States dollar

EXECUTIVE SUMMARY

Economic progress in developing countries since the 1990s has led to an increase of more than 1.6 billion in the number of people living above the moderate poverty line. They include 750 million rural people who continue to live in rural areas – demonstrating that rural development has been, and will continue to be, essential to eradicating hunger and poverty. This report analyses the structural and rural transformations now under way in low-income countries, their impact on food systems, and the opportunities and challenges they present to millions of small-scale food producers. It shows how an “agroterritorial” planning approach, focused on connecting cities and towns and their surrounding rural areas, along with agro-industrial development, can leverage food systems to drive sustainable and inclusive rural development. It underscores the fact that rural transformation does not automatically lead to poverty reduction or improve food security. The choices of policy-makers are critical.

In the past, transformations from agriculture-based to industry- and service-based economies led to large-scale rural–urban migration. In East and Southeast Asia, despite considerable improvements in agricultural productivity, rural out-migration has caused the rural share of the total population to fall since the 1960s from 70 percent to about 50 percent. The main drivers of this out-migration have been faster growth and higher incomes in manufacturing and associated services. Productivity increases across all sectors have generated a positive dynamic for rural and structural transformation, which, while leading to rural–urban migration, has also resulted in major reductions in overall poverty. The challenges of the twenty-first century suggest that today’s rural transformations will be different from those of the past.

OVERARCHING CHALLENGES OF ONGOING TRANSFORMATIONS

Industrialization, the main driver of past transformations, is not occurring in most countries of sub-Saharan Africa and is lagging in South Asia. Rapid urbanization in sub-Saharan Africa has not been matched by comparable growth

in manufacturing and modern service sectors. People exiting low-productivity agriculture are moving mostly into low-productivity informal services, usually in urban areas. The benefits of this transformation have been very modest. Since the 1990s, poverty rates in sub-Saharan Africa have changed very little, and the absolute number of poor has increased. Instead of finding a pathway out of poverty, poor rural Africans who migrate to cities are more likely to join the already large numbers of urban poor. 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 moving to cities.

In the decades ahead, sub-Saharan Africa, in particular, will face large increases in its youth population and the challenge of finding them jobs. Between 2015 and 2030, the combined population of Africa and Asia is projected to increase from 5.6 billion to more than 6.6 billion. In the same period, the number of people aged 15–24 years is expected to grow by about 100 million to 1.3 billion worldwide. Almost all of that increase will take place in sub-Saharan Africa, and particularly in rural areas. With unprecedented growth in their youth populations, many low-income countries face the challenge of providing decent employment to millions of new entrants to their labour markets. Workers exiting agriculture and unable to find jobs in the local non-farm economy must seek employment elsewhere, leading to seasonal or permanent migration. Although educational opportunities and improved access to services are also important drivers, migration is driven mainly by the search for better jobs and income opportunities.

The world’s 500 million smallholder farmers risk being left behind in structural and rural transformations. The agribusinesses that dominate global input markets have little incentive to develop technologies for resource-poor smallholder farmers in developing countries. However, small-scale and family farmers produce 80 percent of the food supply in sub-Saharan Africa and Asia, and investments to improve their

EXECUTIVE SUMMARY

productivity are urgently needed. Many small-scale producers will have to adjust to ongoing changes in “downstream” food value chains, where large-scale processors and retailers, who are taking centre stage, use contracts to coordinate supply and set strict standards to guarantee food quality and safety. Those requirements can marginalize smallholder farmers who are unable to adjust. While increased international trade could stimulate higher productivity and competitiveness, it may also limit local producers’ access to the domestic market if urban consumers opt for cheaper imported food. The challenges facing domestic producers are exacerbated by the fact that import restraint measures, which helped East Asia and Latin America to develop their domestic markets, are now more restricted.

Urbanization, population increases and income growth are driving strong demand for food at a time when agriculture faces unprecedented natural-resource constraints and climate change.

The global population is projected to grow from some 7.3 billion today to almost 9.8 billion by 2050, with most of that increase coming in the developing regions. In low-income countries, the population may double to 1.4 billion. Feeding humanity will require a 50 percent increase in the production of food and other agricultural products between 2012 and mid-century. Meanwhile, urbanization and rising affluence are driving a “nutrition transition” in developing countries towards higher consumption of animal protein, which will require large increases in livestock production and its intensive use of resources. These increases have implications for agriculture and food systems – they need to adapt significantly to become more productive and diversified, while coping with unprecedented climate change and natural-resource constraints. Producing more with less, while preserving and enhancing the livelihoods of farmers, is a global challenge.

Addressing those four overarching challenges requires an understanding of food systems and

how they are changing both rural and urban economies, of rural–urban linkages, and of how farmers and farming systems that feed the world will need to adjust to complex evolving demands. Improved understanding may provide insights into how to leverage food systems for an inclusive rural transformation that leads to prosperity and the eradication of hunger and poverty.

LEVERAGING FOOD SYSTEMS FOR RURAL TRANSFORMATION

In late-transforming countries with limited prospects for industrialization, agro-industry may be an important source of employment for those exiting agriculture. By one estimate, if nothing is done to change present trends, the integration of agricultural markets could lead 1.7 billion male and female farmers to leave agriculture over the next few decades. As labour exits agriculture, and pressure for rural out-migration increases, transforming countries will need to create jobs in off-farm agriculture-related activities, such as food processing and trading. The development of midstream and downstream segments of the food system expands off-farm employment, providing opportunities for inclusive transformation of rural territories linked to the smaller urban areas servicing them. Food industries have grown rapidly in the developing world in the past three decades. Agro-industry accounts for more than 50 percent of total manufacturing value added in low-income countries, and 30 percent in middle-income countries. Because food processing tends to be more labour-intensive, and labour productivity is above the average in manufacturing, the food and beverages subsector has high potential for creating non-farm employment. Female employment in high-value agroprocessing has expanded considerably in many countries. However, in Africa, growth in food processing seems to have stagnated, possibly as a result of a market structure based on a multitude of small-scale family-based enterprises, which lack economies of scale and provide only seasonal jobs for non-family labour.

Growing demand for food, and the dietary transition away from staple foods, can present an important opportunity for industrialization in late-transforming countries. The urban food market has grown very rapidly in recent decades and, along with it, so have rural–urban food supply chains. Urbanization stimulates demand for food, but also a dietary transition away from staples such as cereals, roots and tubers towards fish, meat, eggs, dairy products, fruit and vegetables, and towards more processed foods in general. This transition is also evident in rural areas, with the share of purchased (and processed) food increasing in rural diets in sub-Saharan Africa and Asia. The dietary transition is also driving demand for feedgrains and for animal and horticultural products. Increasing urban demand for more food, and for higher-value processed food, provides opportunities for producers and for agribusiness, including suppliers of production inputs. By expanding the food system’s non-farm segments – trading, processing, packaging, distribution and storage – cities become the hubs of a growing non-farm rural economy. As transformation proceeds, rural areas may become incubators of small-scale off-farm enterprises linked to rapidly expanding supply chains and a diversifying economy. Fragmented village-based processing and trading will give way to the agglomeration of processing, logistics, wholesaling and retailing in and near intermediate cities and towns, and a lengthening of value chains.

Small cities and towns can play a catalytic role in rural transformation, as points of intermediation and agro-industrial development. Rural and urban areas are not separate domains but form a “rural–urban spectrum” ranging from megacities to large regional centres, market towns and the rural hinterland. In developing countries, most urban areas are relatively small – about 50 percent of the total urban population, or almost 1.5 billion people, lives in cities and towns of 500 000 inhabitants or fewer. In all developing regions except Latin America and the Caribbean,

more people live in or around small cities and towns than larger cities. In addition, smaller urban areas account for about 60 percent of urban food demand. This indicates that smaller urban areas will play a role at least as important as that of larger cities in rural transformation. In East Africa, small cities are rapidly diversifying their economic base and generating strong linkages to rural areas; Latin America has seen explosive growth in towns economically linked to both surrounding rural areas and to larger urban agglomerations. While 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 and lasting way. Being more evenly spread over a territory, multiple small towns give more rural households access to the means of improving their incomes, livelihoods and welfare.

Agroterritorial development that links smaller cities and towns with their rural “catchment areas” can greatly improve urban access to food and opportunities for the rural poor. An agroterritorial development approach seeks to reconcile, through a multistakeholder planning process, the sectoral economic aspects of the food sector with its spatial, social and cultural dimensions, which are at the core of agriculture and food systems. Implementing an approach that addresses food-system dynamics and territorial realities requires, first, an understanding of how the population is distributed across a territory and how its complex web of stakeholders interact. The next step is to strengthen rural links with small cities and rural towns in order to connect producers, agro-industrial processors and ancillary non-agricultural services, and other downstream segments of food value chains. Because there are significant differences across countries and regions in income-generating opportunities, food availability, food access and household resilience to shocks, agroterritorial planning recognizes that interventions must take into account specific demographic, geographical and socio-economic contexts.

EXECUTIVE SUMMARY

The key to the success of an agroterritorial approach is a balanced mix of infrastructure development and policy interventions across the rural–urban spectrum. The five most commonly used agroterritorial development tools – agro-corridors, agroclusters, agro-industrial parks, agro-based special economic zones and agribusiness incubators – provide a platform for growth of agro-industry and the rural non-farm economy. These agroterritorial development tools vary in terms of overall purpose, geographic range and defining features. All five address the goals of creating rural employment and improving rural–urban connectivity, but not in equal measure. For example, the main features of agro-corridors are large-scale integration of infrastructure development, policy and regulatory frameworks, institutional strengthening and food system initiatives. Such corridors can extend for thousands of kilometres and use numerous cities and towns as hubs for agribusiness activity. Agroclusters also provide infrastructure, but the investment in backbone infrastructure is much less. Regardless of differences, all successful territorial approaches integrate policies, regulatory coordination and organizational strengthening with “hard” infrastructure investments that link producers to markets.

Public goods and services are needed to facilitate business in the food system and along the urban-rural spectrum. As well as improving infrastructure, governments have a key role to play in reducing the costs of doing business, providing incentives for investment, and creating conditions for the development of inclusive economic activities in the food system of a targeted territory. Legal, regulatory and policy frameworks can reduce excessive transaction costs that impede smooth market functioning and prevent farmers from adopting new technologies and joining markets. Moreover, they can ensure efficient and equitable contract farming arrangements. Government also has a role in promoting farmer organizations, financial vehicles that support farmers and agribusiness,

“green growth” investment frameworks, university-led agribusiness incubators, and public programmes of technical assistance to build enterprise capacities. When applied to a specific territory, an agroterritorial approach can help inform the choice of interventions needed in terms of investments, institutions and policy frameworks.

FARMING SYSTEMS NEED TO ADJUST

To meet growing food demand, it is necessary to develop more productive and sustainable farming systems. Agricultural transformations in the late twentieth century relied on large-scale intensification using high levels of inputs. In many countries, that approach has resulted in severe environmental impacts, including massive deforestation, the depletion of soil and water, and high levels of greenhouse gas emissions. Future transformations face unprecedented environmental constraints, requiring action to both mitigate and adapt to climate change and natural-resource scarcities. Farmers will need to reduce resource use in agriculture without compromising yields, and optimally manage livestock residues, a major source of greenhouse gases.

Hurdles posed by excessive fragmentation of landholdings need to be overcome. Some 85 percent of the world’s farms are smaller than 2 hectares. In most low-income and lower-middle income countries, small farms are becoming smaller, to the point where many are no longer economically viable. At the same time, in many sub-Saharan African countries, the number of medium-sized farms is increasing in high-potential areas. In the long term, the consolidation of farmland by investors may occur alongside the continuing fragmentation of land operated by traditional farming communities. Declining farm size may not necessarily hinder productivity, for although the labour productivity of small farms is low, they have the highest land productivity. However, smallholders must have either the necessary scale to access markets and adopt new technologies (underscoring the

importance of public rural services and farmers' collective action), or access to technologies that are specifically adapted to small-scale operations. Productivity can also be improved by strengthening property rights, essential for efficient land rental markets, which could help farmers achieve economies of scale. Recent evidence suggests that land rental markets are more common than previously thought.

Agriculture will need substantially increased investment in order to meet the growing demand for food, adjust to changing dietary patterns and make farming systems sustainable. In terms of their production costs, smallholder farms can be competitive with large-scale commercial farms. However, they are often disadvantaged by factors unrelated to their size, such as the institutional environment. Small-scale producers need the support of policy frameworks in order to invest in productivity-enhancing technologies and sustainable farming practices. In many countries, smallholders still have limited access to the innovations, technology, knowledge and information needed to enhance productivity and incomes. It will be crucial to connect smallholder farmers to sources of knowledge, inputs and credit, and public investment in research and development tailored to their needs. In many countries, there is a clear need to bridge the gap created by the decline of public-sector extension services. Improved targeting of resources and greater coordination with private advisory services will help farmers adapt to changes in demand. Investments are also needed to strengthen producer organizations and build on the huge potential of information and communications technologies.

Mechanization and advanced inputs are essential for the transformation of farming systems. Land shortage is a major factor limiting increases in smallholder production. Therefore, achieving higher rates of productivity will need to rely on more-efficient resource use and advanced physical inputs, such as high-yielding crop varieties and improved formulations of fertilizer with fewer negative

externalities, and in some cases on approaches such as agroecology, which takes into consideration both traditional and scientific knowledge. Agricultural mechanization is crucial because it enhances the performance of other inputs. Mechanization has increased worldwide, especially in those countries that have undergone rapid transformation, and has proved profitable for small-scale farmers. With demand for machinery increasing, even on small farms, rental markets and shared use through farmer cooperatives have become key to successful mechanization. In parts of East Asia, the use of farm machinery has increased sevenfold since 1985, facilitated by the development of rental markets. Smallholder uptake of more-efficient farming practices would also be enhanced through the adaptation of farming equipment to their needs.

KEEPING AN EYE ON THE BIGGER PICTURE

Amid great plenty, billions of people still face pervasive hunger, poverty, joblessness, environmental degradation, disease and deprivation. One of the greatest challenges facing humanity is to achieve the Sustainable Development Goals (SDGs) of ending hunger and poverty while making agriculture and food systems sustainable. The challenge is made more daunting by huge, but uneven, demographic pressures, profound changes in food demand, and the threat of mass migration of youth in search of a better life. Achieving the SDGs will require food system transformations and strategies that leverage the food system to boost economic growth in countries where industrialization is lagging. This entails resetting priorities on a broader front.

Economic development of rural areas is as important as that of urban areas in reducing overall levels of poverty. This holds an important message for policy-makers. Resources need to go to rural areas not only because that is where most of the poor and hungry live, but also because broad-based rural

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economic development is a powerful force for change. Prosperous rural economies provide alternatives to rural people who see out-migration as their only chance of escaping poverty and hunger. Given the challenges arising from the ongoing transformations, the agroterritorial approach addresses: the risk that small-scale producers and other vulnerable groups will be excluded from participating in and benefiting from rural transformation; the expected increase in rural unemployment in the years ahead; and the need to close the infrastructure deficit in rural areas and increase rural–urban connectivity. Addressing these three challenges will be central to poverty reduction.

Understanding the drivers of rural–urban migration, and its cost and benefits, should be high on policy agendas. The structural transformations of the past led, in some cases, to massive migration out of rural areas, with associated benefits and costs. Future transformations are likely to be different in terms of the economic potential of urban areas, which may be characterized in sub-Saharan Africa and South Asia by relatively low levels of industrialization combined with growing populations. This does not mean that rural–urban migration will be reduced. On the contrary, where rural employment creation does not keep pace with rural population growth, the pressure to migrate will increase. However, there may be fewer options for migrants to exit poverty in urban areas as well. A territorial development approach can help resolve this dilemma. As it goes hand in hand with the territorial planning of metropolitan areas, small cities and towns, and of improved regional infrastructure networks, it addresses the drivers of rural out-migration. For example, where local jobs are lacking, investments in connective infrastructure specific to the food system – such as warehousing, cold storage and wholesale markets – can generate employment in both agriculture and the non-farm economy. This is a way of meeting the needs of potential migrants before they leave. Where rural people

are attracted by more prosperous conditions in urban centres, investments in “agglomeration” services, such as education, health, communication and leisure facilities, in small cities and towns distributed over a territory and in proximity to rural areas can dampen rates of out-migration to overburdened larger cities.

It is time to reassess the role of agriculture and rural development in national development strategies. As a result of state withdrawal and excessive segmentation in sectoral policy-making, overall strategy design has been neglected in recent decades. This has weakened public information and statistical systems, and reduced the capacity to analyse and understand the dynamics at work in agriculture and rural economies. This is a major handicap for policy-makers, and reinvesting in knowledge creation is an urgent priority. In particular, regional diagnoses will be indispensable for prioritizing objectives, targeting interventions and sequencing actions. Re-engaging in development strategies at both the national and subnational levels implies reinvesting in processes. Consultation with stakeholders is essential for securing ownership, the foundation of shared vision and commitment. It takes time, adequate planning and a significant effort in capacity building to manage information systems, analyse results and monitor processes.

Territorial approaches should be considered in order to help ensure policy coherence and address local needs. Rural transformations are often the result of a confluence of location-specific changes in the food system. A policy and planning focus on the food system alone risks overlooking territorial dimensions that are essential to observed outcomes. Leveraging the food system for rural transformation will require engaging in territorial location-specific approaches in order to break the urban bias in public policies and reconcile the sectoral aspects of the food system with its spatial, social and cultural dimensions. This might

entail, for example, assessing urban and rural demands on the food system and how to meet that demand by investing in measures that overcome bottlenecks. Barriers to be addressed may be in infrastructure, such as the lack of rural roads or cold storage. They may also be institutional, requiring improved coordination with producer groups so as to better understand their needs for information, financing and rural services. Such constraints tend to be context-specific. A territorial approach can overcome those hurdles by leveraging the potential and addressing the needs of each area.

Fostering rural entrepreneurship and employment diversification, especially for women and youth, requires the development of skills. A more skilled labour force in low-income countries would increase the productivity of agriculture and stimulate the growth of high-productivity services and industrial sectors. Skills are complementary to technology and necessary for accessing better-paid jobs. Policies supporting education at all levels are important to inclusive rural transformation, although their impacts will be felt in the long term. Measures that facilitate the employability of rural youth include the strengthening of vocational training and education, establishing mechanisms for the recognition of labour experience in the informal sector, and creating greater awareness of job opportunities and labour rights.

Social protection is crucial to risk management during transformation and for building resilient rural livelihoods.

In rural areas, social protection allows poor households to invest in riskier but more-remunerative livelihood activities, mainly by reducing liquidity constraints and supporting labour mobility. A recent positive trend is the design of social protection programmes that link social benefits to direct promotion of rural employment and agricultural production – for example, by linking public food purchase schemes and school feeding programmes to smallholder family farmers as suppliers. Experience in many middle-income countries shows that social protection can also help contain income inequality and promote a more equitable and sustainable pathway of structural transformation and growth. Social protection programmes foster a healthier, better-educated population and a more skilled workforce capable of responding to changing demand and joining the transition to higher levels of productivity.


In a rapidly transforming world, the food system rooted in specific territories is a valuable asset that can be leveraged 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 vital for building prosperous and sustainable rural economies.



MANZINI, SWAZILAND

Fresh-produce wholesale markets facilitate market access for smallholders and link them with buyers.

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CHAPTER 1 RURAL TRANSFORMATION: UNDERSTANDING THE PAST, LOOKING TO THE FUTURE

Key messages

- Economic growth in rural areas has helped millions escape poverty and, when supported by policies for social protection, infrastructure development and the promotion of local economies, will be critical for ending hunger by 2030.
- For “late transforming” low-income countries, where industrialization is lagging, agro-industrial development and strengthened rural–urban linkages have large potential for improving livelihoods and contributing to the eradication of poverty.
- Stronger links between rural areas and small cities and towns can lead to more dynamic growth of economic opportunities and reduce out-migration as a means of escaping poverty.

RURAL TRANSFORMATION: UNDERSTANDING THE PAST, LOOKING TO THE FUTURE

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 these positive achievements, some 700 million people still live in extreme poverty, and about 815 million suffer from chronic hunger (FAO, 2017a; FAO, IFAD, UNICEF, WFP and WHO, 2017). Unless economic growth is made more inclusive, the first two Sustainable Development Goals (SDGs) – to end poverty and achieve zero hunger by 2030 – will not be reached. Instead, more than 650 million people will be suffering from undernourishment (FAO, 2017a). Achieving the key SDGs is made more difficult by other, interrelated global challenges, such as climate change 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 almost 9.8 billion by 2050 (UN DESA PD, 2017), coupled with income growth, are driving higher demand for food and leading a dietary transition away from traditional staples and toward greater consumption of fruit, vegetables, animal products, and more processed food in general. One option for increasing food production is a shift to more-intensive systems, which would increase already severe pressure on natural resources. The depletion of land, water and biodiversity, coupled with climate change, is already holding back the agricultural productivity growth needed to meet increasing food demand.

Changing demographic structures and new patterns of urbanization present policy-makers and planners with both 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 the same capacity to cope with declining fertility and rapid ageing. In contrast, many low-income countries, mostly in sub-Saharan Africa, are facing unprecedented growth in their youth populations and the challenge of providing decent employment to millions of new entrants to their labour markets.

If it continues at current rates, urbanization will lead to the emergence of urban majorities in all regions within 20 years. By 2030, the urban population of the less-developed regions will total 4 billion, and 80 percent of the world's urban dwellers will be in Africa, Asia and Latin America (UN DESA PD, 2014a). Increases in the size of urban populations in low-income countries are now fuelled more by reproduction than by rural-urban migration. Although future population increases will be greater in larger cities and megacities, in 2030 the majority of the urban population, globally and in all developing regions, will continue to be found in intermediate and smaller cities with populations of 1 million or less; and 80 percent of those people will live in urban areas with fewer than 500 000 inhabitants (UN DESA PD, 2014b).

As smaller cities in developing countries typically lack the services and infrastructure found in larger cities, this polycentric pattern of urbanization could exacerbate pressure on natural resources and stretch government budgets for the provision of services and infrastructure. However, when their development is supported by sound policies and planning, rural towns and small cities can play a crucial role in structural and rural transformations, by strengthening rural-urban linkages, creating higher demand for goods, services and food, and generating employment that leads to poverty reduction. Towns and small cities also provide a

BOX 1 DEFINITIONS OF TRANSFORMATION

platform for the growth of the rural non-farm economy, by expanding the food system's non-farm segments – trading, processing, packaging, distribution and storage. In many countries, rural transformations are being shaped as much by rural towns and small cities as they are by larger urban agglomerations (Box 1).

This report examines rural transformation within the context of economy-wide structural transformation. 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 small 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 of the rural population, especially the poor. By generating decent employment, improving infrastructure, enhancing access to services, and boosting the capacity of rural people to influence policy, an inclusive transformation attenuates the “push” factors that are behind often high levels of rural–urban migration. An inclusive approach will ensure that rural–urban migration, a phenomenon that usually accompanies structural transformation, is not driven by a lack of local opportunities.

The report looks at how improvements in infrastructure and services linking small cities and rural areas can help steer development pathways towards 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 policy-makers to make reducing poverty and

Structural transformation is the reallocation of economic activities away from the primary sectors (agriculture and natural resources) to industry and services. It is characterized by 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 leads to increased migration of people from rural areas to urban centres and urbanization of the countryside, usually combined with a reduction in birth rates, greater participation of women in the workforce, and deep political and sociocultural changes.

Agricultural transformation is both a cause and an effect of structural transformation. The process involves a shift from mainly subsistence farming to commercial, highly diversified production systems. At the individual farm level, the process favours specialization, which allows economies of scale through the application of advanced technologies and modern delivery systems for both inputs and outputs; this, in turn, promotes tighter integration of a more diversified 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-generating opportunities in the rural non-farm sector. Improvements in access to services and infrastructure in rural areas lead to the expansion of remunerative off-farm employment and enterprises.

Inclusive rural transformation benefits the entire rural society, enabling all to exercise their economic, social and political rights, develop their abilities, and take advantage of local opportunities. Improvements in agricultural productivity and the rural non-farm economy should raise the incomes of rural people, especially the poor, weakening the “push” factors that lead to out-migration. Migration may still occur, but as an active choice and not due to the lack of alternatives. Inclusive rural transformation favours forms human mobility across spaces and sectors that bring productivity improvements and benefits to migrants and their communities of origin and destination.

SOURCE: Adapted from IFAD, 2016.

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 change, and the implications of these transformations for poverty reduction, food security and improved nutrition. It reviews transformation experiences worldwide, the features that distinguish the most recent experiences from historical models, and developments in the food system that accompany and drive transformation processes. 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 rural–urban spectrum concept provides a new lens for understanding urbanization and rural–urban migration, both of which are crucial to rural transformation. The chapter concludes by illustrating some of the challenges that come with new opportunities for rural populations. ■

RURAL TRANSFORMATION IS EMBEDDED IN STRUCTURAL TRANSFORMATION

The structural transformation of economies is characterized by improvements in productivity, especially of labour, and changes in the relative importance of sectors through the reallocation of production factors such as labour and capital. In 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 (Figure 1). The process has entailed a sectoral reallocation of labour, increases in sectoral productivities, and a reduction in productivity gaps between sectors (FAO, 2017a).

Rural transformation is embedded in structural transformation, and 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 livelihoods, and better access to public services and infrastructure in rural areas (IFAD, 2016). Owing 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 people.

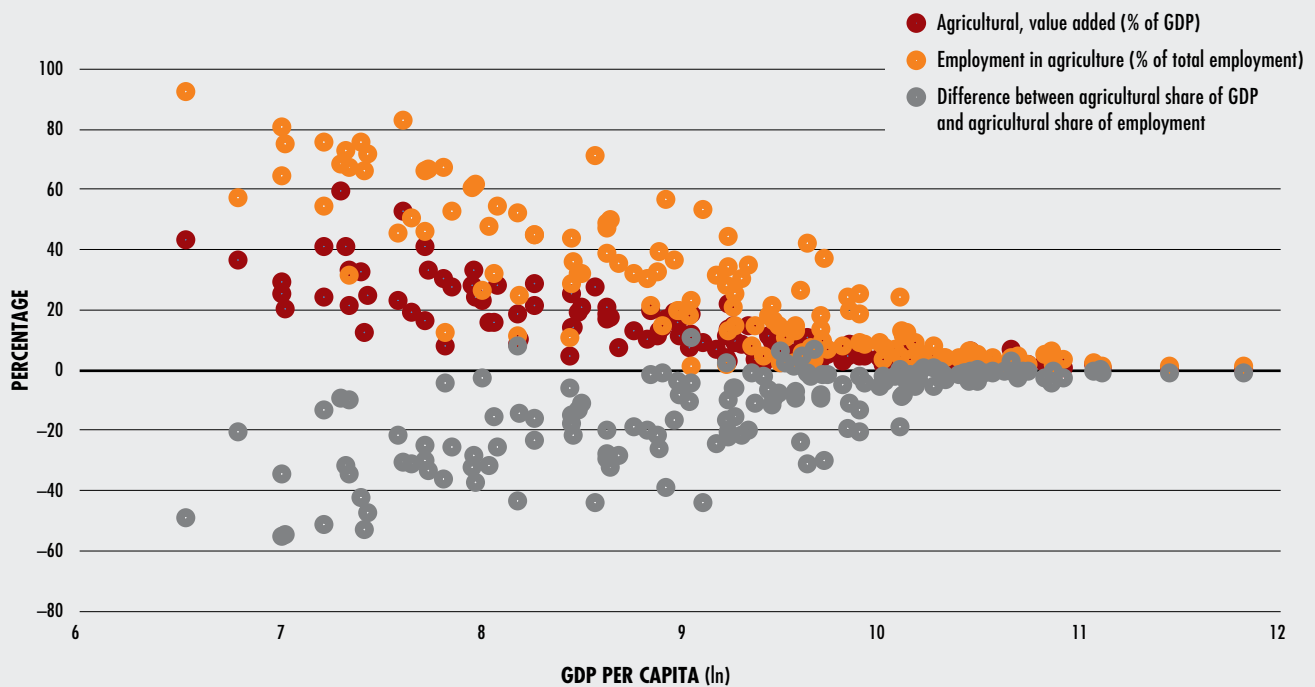
Developing countries that have succeeded in drastically reducing poverty have all gone through this structural transformation. However, the positive socio-economic outcomes of the transformation have largely depended on public policies to make the process inclusive. The growing challenges of climate change and environmental degradation require concerted action to ensure that today’s structural and rural transformations are not only inclusive but also sustainable. ■

PAST TRANSFORMATIONS LED TO UNEVEN OUTCOMES

The development economics literature suggests that agricultural growth, if broadly shared, has the most positive impact on non-farm income and employment (Tsakok, 2011). Historically, improvement in agricultural productivity was a pre-condition for industrialization, as 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 investments, and enhanced the domestic market for industrial products. Almost no country in the world has successfully transformed its economy to one with low poverty rates without sustained growth in agricultural productivity (Timmer, 2014).

Although social protection policies can play a crucial role in poverty reduction, their costs

FIGURE 1
SHARES OF AGRICULTURAL VALUE ADDED IN GDP AND
AGRICULTURE IN EMPLOYMENT IN SELECTED COUNTRIES



NOTE: Includes data for 151 developed and developing countries in 2015.
SOURCE: World Bank, 2016a.

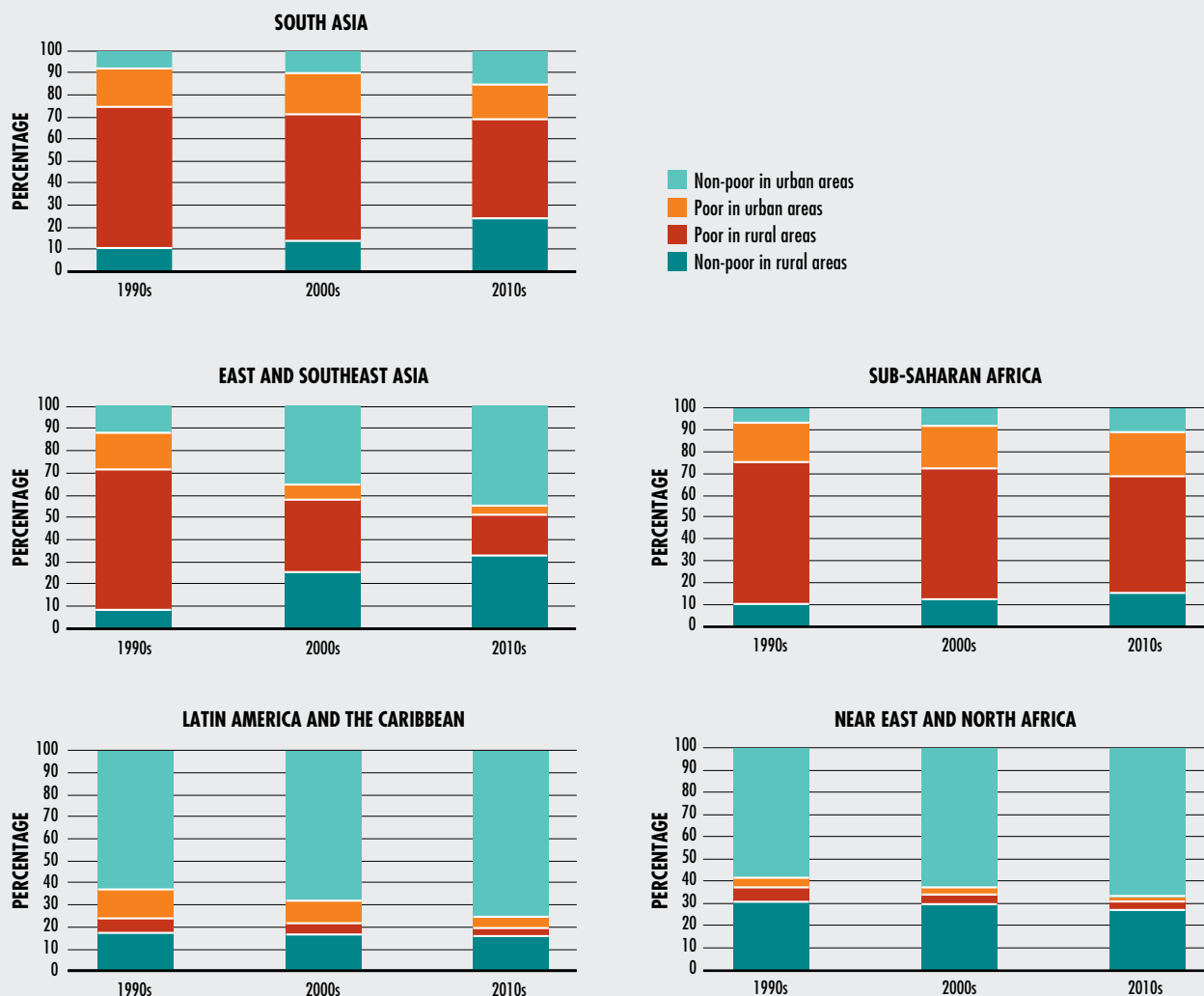
cannot be sustained in the long run unless they are accompanied by productivity growth across sectors. Recent transformations have shown that outcomes are influenced by a number of factors, including initial poverty rates, levels of development and social policies. Figure 2, based on World Bank data for 31 countries with a total population of 4.2 billion, shows regional trends in urban and rural poverty in the last two decades. In the figure, the orange and red represent, respectively, the shares of total population that are urban poor and rural poor, while the shares of non-poor people in urban and rural areas are represented in light and dark blue at the top and bottom, respectively.

The World Bank data indicate that in absolute terms, more than 800 million people escaped “moderate poverty” – defined as living on less than US\$3.10 a day – between the 1990s and the

current decade.¹ Including internal growth of non-poor households, with offspring remaining in the non-poor category, the population living above the moderate poverty line has increased by more than 1.6 billion people, and included 750 million in rural areas (World Bank and IFAD, 2016). This indicates that progress in rural areas has been central to poverty reduction and will be central also to achieving the first SDG of eradicating poverty.

¹ Although this sample of 31 countries includes 4.2 billion people, the number of people who have exited poverty remains an underestimate for each region. As each country case is different, the share to apply to the total population of a region is not extrapolated. The poverty reduction trend in East and Southeast Asia is heavily influenced by China, owing to its population size. Nonetheless, all of the East and Southeast Asian countries included in Figure 2 (p. 6), except for the Philippines, have recorded poverty reduction in both rural and urban areas, although its extent differs by country. While people in China and Indonesia have been exiting poverty at similar rates in rural and urban areas, in Cambodia and Viet Nam most poverty reduction has been in rural areas.

FIGURE 2
CHANGES IN PROPORTIONS OF RURAL AND URBAN POOR, AND NON-POOR, IN
TOTAL POPULATION OF SELECTED COUNTRIES, BY REGION, 1990s–2010s



NOTES: Poverty level used is “moderate”, defined as living on less than US\$3.10 a day (2011 PPP US\$). The charts refer to the following countries, selected for data availability: East and Southeast Asia – Cambodia, China, Indonesia, Philippines, Thailand, Viet Nam; South Asia – Bangladesh, Nepal, India; Latin America and the Caribbean – Brazil,

Colombia, Dominican Republic, Guatemala, Nicaragua, Peru; Sub-Saharan Africa – Burkina Faso, Côte d’Ivoire, Ethiopia, Mali, Malawi, Mozambique, Nigeria, Rwanda, South Africa, Uganda, United Republic of Tanzania, Zambia; Near East and North Africa – Iran (Islamic Republic of), Tajikistan, Tunisia, Turkey.

SOURCE: FAO calculations from World Bank and IFAD (2016).

As illustrated in Figure 2, trends in poverty reduction differ noticeably across regions. Rural poverty has been substantially reduced in the last two decades only in East and Southeast Asia, where the share of the rural non-poor in total population increased from 9 percent in the 1990s to 33 percent in the

2010s, while the share of all poor fell from 79 percent to 22 percent. Although the initial poverty rates in South Asia and sub-Saharan Africa were comparable with those of East and Southeast Asia, the shares of urban and rural poor in both regions have been only modestly reduced.

Evidence from the 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. In the case of East and Southeast Asia, transformations in rural and urban areas produced synergies that contributed to significant poverty reduction. Productivity improvements in agriculture and non-agriculture sectors have reduced the total number of poor, both urban and rural, by more than 800 million since the 1990s. In contrast, in South Asia, where agriculture is still the main employer and population growth rates were higher than those of the East and Southeast Asian countries in the sample, the reduction in the number of poor has been modest, at 23 million (FAO calculations based on World Bank and IFAD, 2016). In this period, a larger share of people exited poverty in South Asia while remaining in rural areas than those that exited poverty 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 the Near East and North Africa to very limited improvements in agricultural productivity, and in Latin America and the Caribbean to low levels of rural inclusion, despite strong improvements in agricultural productivity. Between 1990 and 2013, labour productivity almost doubled in Mexico, and more than quadrupled in Argentina, but poverty reduction was relatively modest (IFAD, 2016).

From the early 1980s to 2010, the number of poor in rural areas of Latin America and the Caribbean declined from 74 million to 62 million, while the number of extremely rural poor fell by only 2 million, from 41 million to 39 million (Anríquez, 2016, as cited by FAO, 2017a). This disparity is explained by the persistence of high inequality of income, which governments are addressing with large social protection programmes that provide income support to the poor and vulnerable, including smallholder farmers (FAO, 2017a). Another reason for the lack of progress in eliminating extreme rural poverty is the urban bias in policies, as indicated in [Figure 2](#) – people are

exiting poverty at faster rates in urban areas, where poverty has been more concentrated. The latest estimates indicate that 58 percent of Latin America's poor live in urban centres, compared with rates of 25–30 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 and Southeast Asia, the fast pace of rural out-migration has caused the rural population to fall from 70 percent to about 50 percent of total population. Out-migration 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, because – as shown in the case of East and Southeast Asia – it leads to rapid reductions in overall poverty.

The lack of such synergies 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, instead of finding a pathway out of poverty, poor rural migrants 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.

One key finding that emerges from [Figure 2](#) is that, in all regions, rural areas are just as important a contributor to lifting people out of poverty as urban areas are. This is in part due to the larger proportion of the poor who live in rural areas, but also to the fact that, whether through agriculture or non-farm employment, many rural poor are improving their incomes and exiting poverty. The essential message to policy-makers is that resources need to be allocated to rural areas not just because that is where most of the poor are, but because their economic development can help reduce high levels of migration to, and poverty in, urban centres. The linkages and interplay of rural areas with urban centres are critical, and

investing to connect rural areas to the services, institutions and markets provided by cities and towns is particularly important, as is discussed further in this report.

Enhancing rural–urban linkages will be critical for making food systems more effective and inclusive, and also contribute to achieving multiple SDGs, especially ending poverty, hunger and all forms of malnutrition. Addressing the challenges of urbanization will only be possible when the synergies between rural and urban spaces are harnessed through strong physical, political and market linkages (Graziano da Silva and Fan, 2017). ■

RECENT RURAL TRANSFORMATIONS: WHAT IS NEW?

Patterns and pace of change vary widely

Differences in the patterns, pace and outcomes of structural and rural transformations are largely shaped by geography, social factors, land availability and trade policies, as well as each country’s endowment of natural resources and skilled and unskilled labour. These factors differ substantially by region and often by country.

In Latin America, changes that occurred in the structure of the agriculture sector are associated with policy reforms that began in the 1980s (Box 2). Following these reforms, overall growth and trade were fundamental contributors to increases in rural income, the reduction of poverty and improvements in welfare indicators (see, for example, De Ferranti *et al.* [2005]). There was a notable acceleration in growth of the region’s agricultural exports – from an annual average of 1.6 percent before the reforms to 6.6 percent. According to Anríquez, Foster and Valdés (2017), this growth was a response not only to shifts in resources within agriculture, but also to a strong inflow of human and physical resources into agriculture from the non-farm sector, the adoption of new technologies and management techniques, and a growing capacity to tap new export markets. Trends in total factor productivity in agriculture moved from negative during the 1970s to a positive 0.9 percent per year

in the 1980s and 2.2 percent in the 1990s. This growth coincided with the first impacts of economic reforms, with countries such as Argentina, Brazil and Chile recording total agricultural factor productivity growth of more than 3 percent a year. An important factor in the positive outcome of the reforms was the relative stability of institutions and, in some countries, policies to support family farming, which provided a new source of dynamism. Also important was the commitment in the longer term to an overall reform package, which attracted foreign direct investment (FDI).

Most Asian countries have undergone relatively rapid transformations, but with some marked differences. In East and Southeast Asia, the green revolution brought a quantum leap in yields and output of rice and wheat, which boosted small farm productivity and profits. Farms became more commercial and agricultural value added per worker rose significantly (FAO, 2017a). 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 service and industrial sectors.

Although the green revolution also played an important role in South Asia, the process of transformation in the region 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 percent to 62 percent, although agriculture’s share of GDP has fallen significantly. The falling 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-)

BOX 2 WHAT LESSONS FROM LATIN AMERICA?

Compared with sub-Saharan Africa and Asia, Latin America has a high level of urbanization, which was a major determinant of agricultural policies directed at ensuring low food prices in urban areas. The region's rapid urbanization, and the concentration of the urban population in larger cities, was linked to industrialization and the introduction of capital-intensive production in rural areas. Rural–urban migration was the main determinant of urban growth throughout the twentieth century and was accelerated by policies favouring urban areas. Following the reforms in the 1980s, the specialization of production, the increased use of capital-intensive technologies, and the expansion of agro-industry deepened the segmentation among producers and added to rural–urban migration.

Although the Latin America region is very heterogeneous, the farm sector shares broadly common elements: relatively low population densities in rural areas, land abundance and ample natural resources. Another feature is “scale-dualism”: a large number of small farms co-exist with fewer medium and large commercial farms, but with a land tenure structure that is relatively highly concentrated (Anríquez, Foster and Valdés, 2017). In most countries, medium-sized and large commercial farms account for the bulk of agricultural output and exports; with a few exceptions, they are also the most dynamic in the adoption of new varieties and the introduction of new food products. Smaller operations, while employing a large number of rural people, contribute

proportionally less to aggregate production value, although they do contribute significantly to local food production.

Chaherli and Nash (2013) found that, in Latin America countries, transport costs accounted for between 18 percent and 32 percent of final price of food products. In contrast, the average for countries that are members of the Organisation for Economic Co-operation and Development is 9 percent. Despite these higher transport costs – due mainly to long distances between cities, the diversity of the terrain and infrastructure challenges – Latin America is competitive in international agricultural markets. This is encouraging for “late transformers” that face infrastructure challenges.

The question for late-transforming countries is whether the Latin American model of structural transformation is viable, or even desirable, based on individual countries' development goals. In some respects, the region's rapid urbanization and agricultural transformation have led to a drastic reduction in poverty. At the same time, rapid urbanization may have put unnecessary strain on both rural and urban areas. In addition, income inequality has been historically high in Latin America.

The import-substitution policies that were central to the initial stages of Latin American countries' transformation pathways are no longer viable in the current international policy environment. While industrialization remains a possibility for late transformers, it is more likely to be successful if guided by comparative advantages associated with skilled labour and reliable institutions for business. While some aspects of the Latin American experience may not be applicable, some more recent transformations in the region, such as that of Peru since the late 1990s, may provide insights for late transformers.

productivity service-sector jobs is of particular concern in sub-Saharan Africa, where the transformation process has led to reduced productivity in many countries (Badiane, Ulimwengu and Badibanga, 2012; McMillan and Headey, 2014; Timmer, 2014). 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 one-quarter of sub-Saharan Africa's to five times the sub-Saharan African average (Monga,

2012). Sub-Saharan 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 informal service sector, and industry actually lost ground (Rodrik, 2014). Fox, Thomas and Haines (2017) 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.

Industrialization is lagging in many “late transformers”

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 major driver of structural changes in many Asian and Latin American countries – is lagging in the late-transforming countries of sub-Saharan Africa. McMillan and Harttgen (2014) report that 19 countries of North Africa and sub-Saharan Africa saw the share of the labour force in agriculture fall by an average of 10 percent between 2000 and 2010; the decline was most rapid in the economies most dependent on agriculture. However, unlike their counterparts in East Asia and Latin America, Africans leaving agriculture are not moving into industry in most cases, but rather (as noted above) into low-productivity informal non-farm activities, generally in the retail trade and services (World Bank, 2007). While the move from low-productivity agriculture to the service sector overcomes the seasonality of farm employment, it is not associated with higher productivity and is not producing substantial increases in household incomes. As explained by McCullough (2015), households and individuals often earn more by working longer 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 3](#). The figure shows a selection of countries in sub-Saharan Africa, where poverty status has changed very little, and in East and Southeast Asia, the regions that have undergone the most rapid transformations and poverty reductions. The arrows illustrate changes in the shares of rural and urban populations above the poverty line (see [Figure 2](#), dark and light blue column sections), relative to the total population. 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. [Figure 3](#) indicates that poverty rates have declined only slightly in most sub-Saharan 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

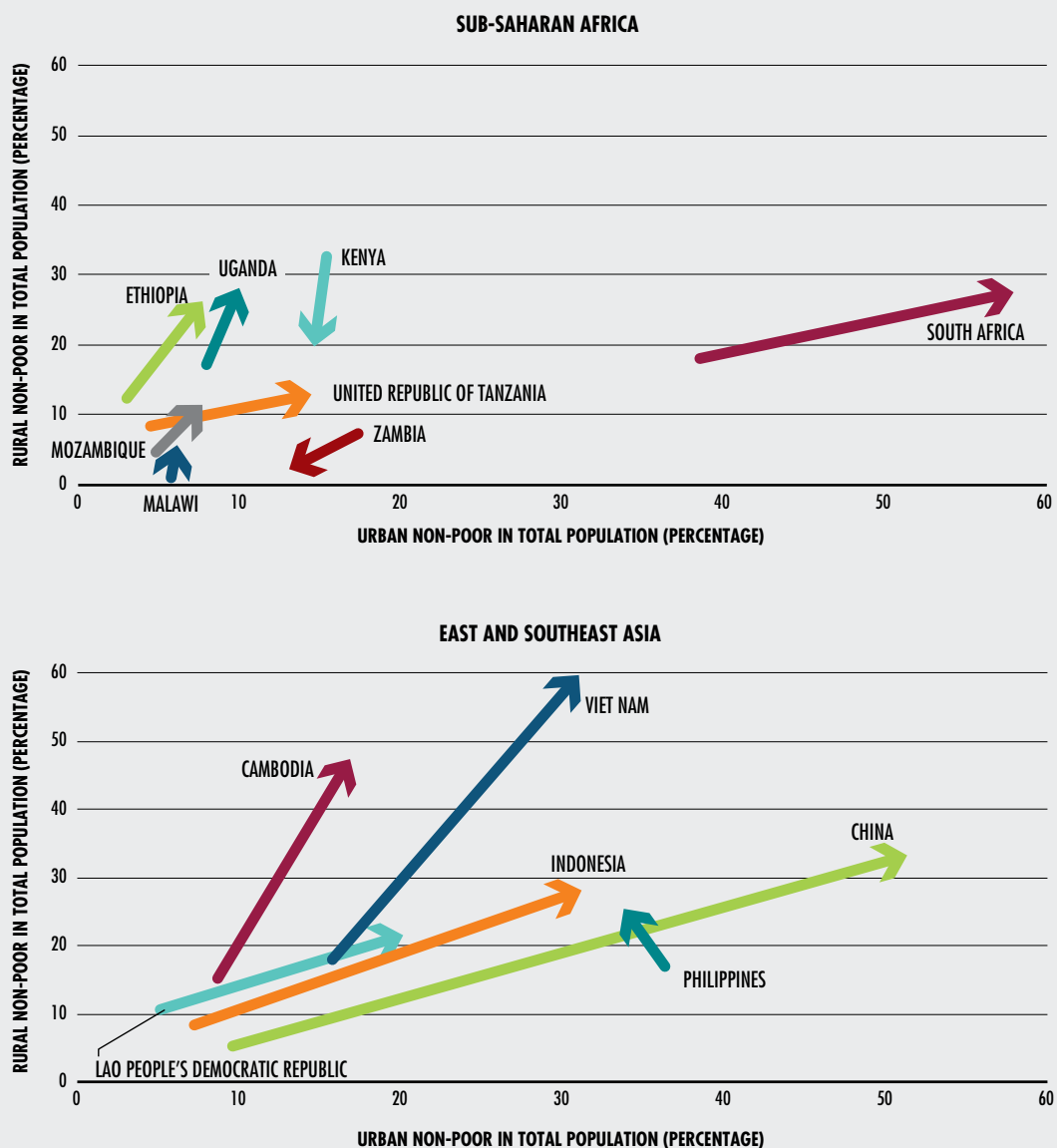
in the early 1990s. While the proportion of non-poor has grown considerably in East and Southeast Asia, in both rural and urban areas, poverty reduction has been accompanied in most countries by increasing inequality of income distribution, in both rural and urban areas. For example, in China, which 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 ten points in urban centres (from 25.6 to 35.4) between the 1990s and the current decade (World Bank and IFAD, 2016). Similar trends are observed in the other countries for which data are available, except Cambodia, where noticeable rural poverty reduction has been accompanied by a tangible increase in income equality in both rural and urban areas.

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 an estimated 54 percent in 2015, and is forecast to reach 66 percent (6.3 billion people) in 2050 (UN DESA PD, 2014a). Urbanization in developing countries is often associated with megacities such as Delhi, Lagos and Shanghai. However, the developing world’s 3 billion urban dwellers live in cities with a very wide range of sizes, from megacities to small market towns and administrative centres (Cohen, 2004). In fact, large cities with populations from 5 million to 10 million, and megacities of 10 million inhabitants or more, are home to only about 20 percent of the world’s urban dwellers. In developing countries, most urban areas are relatively small – about 50 percent of the total urban population, or 1.45 billion people, live in cities and towns of 500 000 inhabitants or fewer (UN DESA PD, 2014b).

The pattern of urbanization in smaller centres reflects the fact that, as rural villages grow in countries with high rural population growth rates, such as most of those in sub-Saharan Africa, West Asia and South Asia, they are being reclassified as urban areas (Cohen, 2004). In addition, analysis of recent trends in urban growth shows that, in many countries, small

FIGURE 3
CHANGES IN SHARES OF RURAL AND URBAN NON-POOR IN
SELECTED COUNTRIES, 1990s–2010s

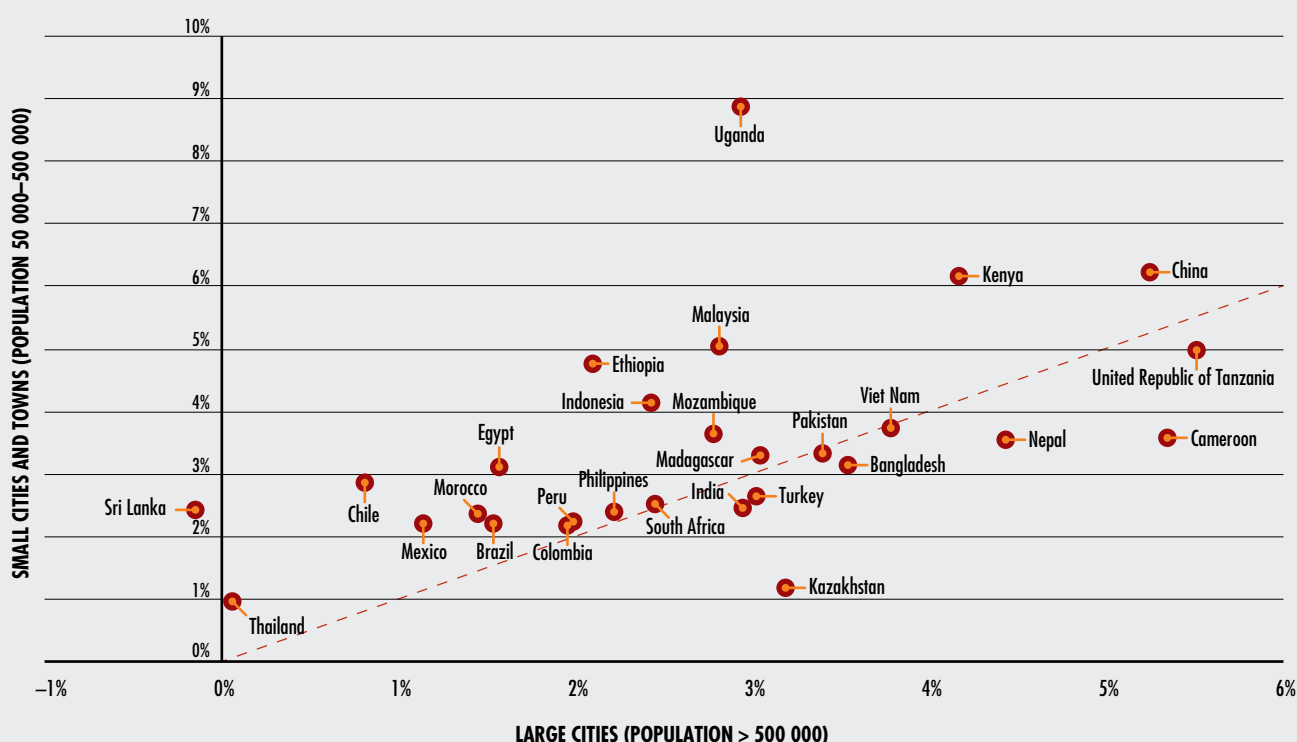


NOTE: Poverty level used is “moderate”, defined as living on less than US\$3.10 a day (2011 PPP US\$). See also Annex Table A3 (p. 133).
 SOURCE: FAO elaboration from World Bank and IFAD (2016).

cities and towns are growing at faster rates than larger cities. Figure 4 shows, for a sample of 28 developing countries with a population exceeding 15 million, that the majority have registered higher population growth rates in

small cities and towns (above the red line in the figure); they include some very highly populated countries, such as China, Egypt, Ethiopia, Indonesia and Sri Lanka. Only nine countries fall into the second category, where the growth rate

FIGURE 4
RATES OF ANNUAL POPULATION GROWTH IN LARGER CITIES AND
IN SMALL CITIES IN SELECTED COUNTRIES, 1990s–2010s



NOTES: For definitions of larger cities and small cities, see Table 1. Country selection is based on data availability for countries with populations of more than 15 million.
 SOURCE: FAO calculations and elaboration.

is higher in larger cities (below the red line). Although this latter category includes some populous countries, such as Bangladesh, India and Pakistan, the growth rates of their larger cities are only marginally higher than those of their small cities and towns.

Even with lower growth rates, larger cities of 1 million residents or more in developing regions are expected to see a larger increase in absolute numbers of inhabitants between 2015 and 2030, from 1.2 billion to 1.85 billion. However, in the same period, the number of people living in smaller cities and towns, with fewer than 500 000 inhabitants, is expected to grow by some 290 million to more than 1.7 billion (UN DESA PD, 2014b).

Recent studies have confirmed the importance of small towns in urban market development (see Ruhiga, 2013). In a study of urban agglomeration trends in East Africa, Snyder and Tschirley (2014) document the quantitative importance of growth in towns and small cities, noting how they are diversifying their economic base and generating strong linkages to rural areas. Other studies have documented the explosive growth of small towns in the last two decades, especially in Latin America and Asia, where they have played the role of “intermediate cities”, with economies closely linked to both surrounding rural areas and to larger cities (GRAL/CEDAL, 1994; Hardoy and Satterthwaite, 1989; Jordan and Simioni, 1998; Reardon, Stamoulis and Pingali, 2007). ■

RURAL–URBAN LINKAGES AND THE FOOD SYSTEM

Urbanization leads to higher incomes, changes in lifestyles and greater female participation in the workforce. 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, which, in turn, gives rise to increased food processing and the standardization of agricultural output. Urban growth stimulates not only an increase in food demand, but also demand for a wider variety of foods and for greater convenience in food purchasing and preparation.

These transformations are driving a “nutrition transition” in developing countries, which corresponds closely to the one seen in industrialized and middle-income countries in earlier decades (Popkin, 1999; Popkin, Adair and Ng, 2012). At higher incomes, an increasing share of a household’s diet typically comes from animal source foods, vegetable oils, fruit 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 growth, urbanization and globalization (Pingali, 2007). In sub-Saharan Africa, too, growth in recent years has brought changes in food demand, away from cereals, roots and tubers towards fish, meat, eggs, dairy products, fruit, vegetables and fats, along with a general shift to more processed foods (Tschirley *et al.*, 2015a). There has been an enormous shift to processed food in Asia. For example, in India, about 85 percent of all food undergoes some processing (Reardon and Timmer, 2014). Dietary changes occur not only in cities and towns but also in rural areas as incomes grow. This is true in rural areas of Asia, where processed food accounts for 60 percent of total food expenditure, of which 30 percent goes on highly processed food (Reardon *et al.*, 2014).

In Asia, urban markets now consume about 60–70 percent of the food supply. Urban food

markets in Africa 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\$150 billion to US\$500 billion (World Bank, 2013a). 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 by 2040 (Tschirley *et al.*, 2014).

Evidence from sub-Saharan Africa shows that although the balance of trade in agricultural products has worsened, domestic production has met most of the increase in demand over the past 50–60 years (Reardon *et al.*, 2015; Vorley and Lançon, 2016). For example, more than 95 percent of the fresh fruit and vegetables consumed in Kenya is grown domestically, mainly by smallholders, and supplied mainly by small and medium-sized enterprises (SMEs) through informal supply chains (World Bank, 2013b).

This urban and rural demand drives economic development and income growth in rural areas. The development, operation and maintenance of multiple supply chains for a wider variety of food products is more labour-intensive than staple food production and processing, and has employment multipliers in rural areas and towns. The shift to processed foods also stimulates growth of agro-industry,² including the supply of production inputs and the distribution of outputs.

However, while transformation of food systems provides opportunities for producers, it also presents challenges, especially to smallholders. Often, it leads to the capital-intensive concentration of primary production, the consolidation of smaller parcels of farmland into larger holdings, and the exclusion of smallholders from expanding value chains. Small farmers may need support if they are to benefit fully from emerging opportunities. Their lack of access to finance, markets and transport, as well as the

² “Agro-industry” is a broad concept that refers to the establishment of linkages between enterprises and supply chains for the development, transformation and distribution of specific inputs and products in the agriculture sector.

barriers created by standards on quality, traceability and certification, often make their participation in integrated value chains very difficult. In many countries, the ongoing fragmentation of farmland may further hinder smallholder farmers' capacity to adopt new technologies. ■

THE "RURAL-URBAN SPECTRUM": A NEW LENS ON URBANIZATION AND MIGRATION

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 a rural-urban continuum (Berdegue and Proctor, 2014). For example, Bhalla (1997) found that rural non-farm wage employment in India was concentrated in small- and medium-size service firms located in "corridors" of interurban 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).

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. Using district-level data from India, Cali and Menon (2012) found that urbanization had contributed significantly to poverty reduction in surrounding rural areas, mostly through improved consumer access to agricultural products.

Differences in the size of agglomerations have different implications for surrounding rural areas and the population residing in them. Large cities create higher demand for agricultural products than small ones. For example, Vandecasteele *et al.* (2017) found that while Ethiopian farmers

operating near urban areas generally practise more intensified production and are paid more for their produce, the level of intensification and output prices are higher in areas surrounding large cities.

However, while the role of small cities and towns in urbanization has been neglected by researchers seeking generalizable urban models (Bell and Jayne, 2009), a growing body of evidence indicates that they are also effective in reducing overall poverty, even though incomes rise at a comparatively slower rate. Dorosh and Thurlow (2013) found that, in Ethiopia, agriculture had stronger linkages with small cities and towns than with larger cities, and that redirecting urban growth to smaller urban centres could lead to broader economic growth and poverty reduction. Their finding was confirmed by a study that demonstrated that, in sub-Saharan Africa in the period 1980–2004, diversification into rural non-farm and small town activities typically facilitated more-inclusive, even if slower, rural economic growth, compared with agglomeration in megacities (Christiaensen and Todo, 2014). A more recent study found that growth of the rural non-farm economy is more important for reducing rural poverty than is the growth of small cities and towns; however, the study confirmed that growth of large cities has no rural-poverty-reduction effects, and has increased poverty levels in some cases (Imai, Gaiha and Garbero, 2016). This suggests that the pattern of urbanization deserves more attention when considering strategies for poverty alleviation.

Related studies have shown that multiple small towns, being more distributed over a territory, provide livelihood options for a larger share of the rural population, allowing underemployed farming households to diversify activities and overcome constraints imposed by the seasonality of agriculture. Because a large share of the poor is rural, smaller urban centres can make a significant contribution to overall poverty reduction by giving the poor access to the means for improving their incomes and welfare. In Asia and Latin America, growth in the rural non-farm economy was driven by growth in the population of towns and small cities that had strong links to other urban areas and the rural hinterland

BOX 3 MULTIPLE DEFINITIONS OF “URBAN”: A CHALLENGE TO MEASUREMENT

The main source of UN urban population and urbanization data is national population censuses, and data drawn from population registers and administrative statistics. The UN Population Division uses primarily administrative criteria to define urban populations, but it also uses 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 of residents employed in non-agriculture sectors, and the presence of infrastructure such as paved roads, electricity and piped water (UN DESA PD, 2015).

Country definitions of “urban” vary widely. For example, the United States Census Bureau defines an urbanized area as having 50 000 people or more 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 DESA PD, 2015). The great disparity in country definitions, and the fact that definitions change, hinder

SOURCE: Tuholske, 2016.

measurement of urban population size and growth rates, comparisons of urban population between countries, and aggregations at the regional and global levels (UN DESA PD, 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, McGranahan and Tacoli, 2010). For example, the share of India’s population classified as “urban” in 1991 would increase from 26 percent to 39 percent if the 113 million inhabitants of 13 376 “rural” villages with populations of 5 000 people or more were included (Uchida and Nelson, 2010). The share would be even higher using 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 was 2 500 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).

(Berdegúe *et al.*, 2015; Christiaensen, De Weerd and Todo, 2013; Reardon, Stamoulis and Pingali, 2007).

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 3**). Looking at rural areas and urban centres as mutually exclusive misses a crucial part of the transformation process. The growing number of small cities and towns has blurred the distinction between urban and rural areas, especially those rural areas in closer proximity to urban centres. 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 sphere within and across countries.

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 are larger villages, towns, and small and medium cities. Urban and rural sectors are not 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.

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 of these rural transformation pathways. It is necessary to distinguish, therefore, between rural populations living in the immediate proximity of towns, those residing in intermediate locations and those living in the rural hinterland.

Characterizing agglomeration, geography and infrastructure

Apart from the United Nations Population Division estimates (UN DESA PD, 2014a), few other data sets are available for measuring urban population and urbanization at national, regional and global scales. The only alternatives to the UN data are satellite-based estimations of urban land area,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 used spatial data on population density, agglomeration size and travel time to urban centres as thresholds to estimate urban population (World Bank, 2008). 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 used, see [Notes on the statistical annex](#), p. 120.

The purpose of the rural–urban spectrum concept is not to determine exactly what "urban" or

"rural" is; it is rather to understand the relative importance of different agglomeration sizes and the implications for the rural population living around them. It is most informative when used to compare 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 5](#) illustrates the rural–urban spectrum, showing relationships between larger cities, small cities and towns, their "catchment areas", and the rural hinterland. [Table 1](#) quantifies urban and peri-urban populations living, as of 2000, in larger 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 1 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 (orange cells in [Table 1](#)), compared with 35 percent living in or near larger cities (blue cells).⁴ 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 the global population lives in small cities and towns, compared with 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. However, because infrastructure investments are costly and priorities should go to higher-density areas, the rural hinterland poses a »

³ Important data sets include the Global Rural-Urban Mapping Project (GRUMP), Worldpop and Africapolis. Africapolis data are often cited by scholars who argue that sub-Saharan Africa is not urbanizing as fast as UN estimates suggest (Potts, 2012).

⁴ The shares of population residing in or gravitating around small cities and towns may be higher than those reported in [Table 1](#) (p. 17) and illustrated in [Figure 6](#) (p. 18). This is because towns of fewer than 50 000 inhabitants are not captured owing to lack of data.

FIGURE 5
MAP ILLUSTRATING THE CONCEPT OF THE RURAL–URBAN SPECTRUM



SOURCE: FAO.

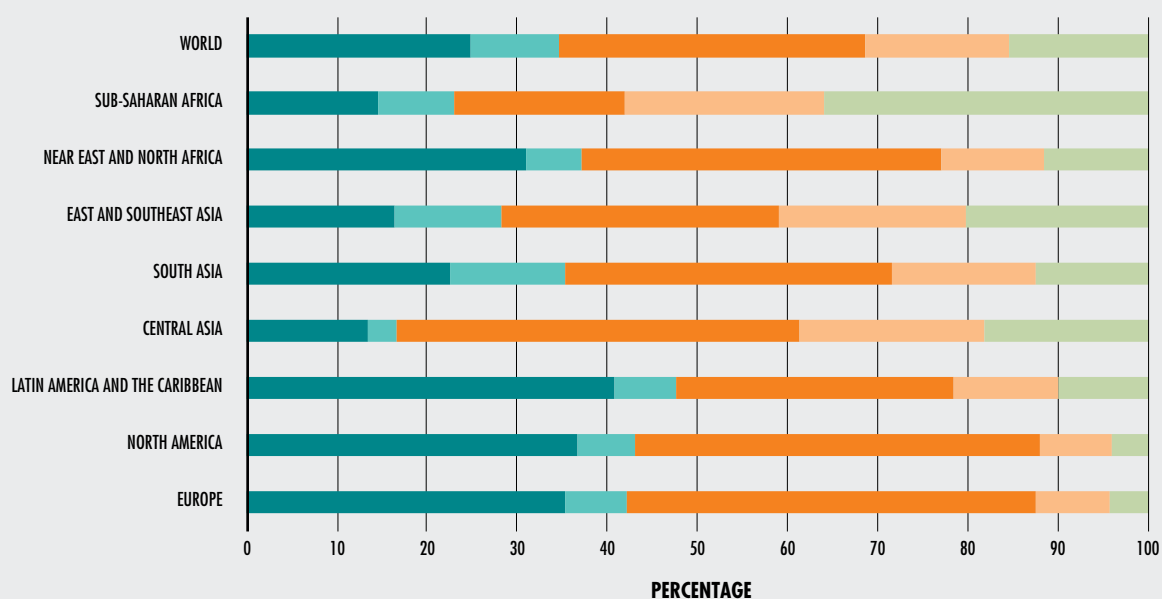
TABLE 1
DISTRIBUTION OF GLOBAL POPULATION ALONG THE RURAL–URBAN SPECTRUM IN 2000

	Urban and peri-urban (Travel time to urban centre < 1 hour)	Proximate rural (Travel time to urban centre 1–3 hours)	Rural hinterland (Travel time to urban centre > 3 hours)
Percentage of global population			
Towns (Population: 50 000–100 000)	10.3 (HD 6.7; LD 3.6)	4.4 (HD 1.9; LD 2.5)	
Small cities (Population: 100 000–500 000)	23.6 (HD 18.0; LD 5.7)	11.6 (HD 5.5; LD 6.1)	15.6 (HD 5.0; LD 10.6)
Larger cities (Population: > 500 000)	24.8 (HD 22.1; LD 2.7)	9.8 (HD 5.2; LD 4.6)	

NOTES: Figures in parentheses are shares of population living in higher-density (HD) areas and in lower-density (LD) areas with a threshold of 1 000 people/km². Towns of fewer than 50 000 people are not captured here, as urban or peri-urban. See Notes on Annex Table A1 (p. 120) for an explanation of how the rural spectrum was computed. The GRUMP and LandScan grid-based population density datasets for 2000 are the most-recent global estimates.

SOURCE: FAO calculations.

FIGURE 6
DISTRIBUTION OF POPULATION ALONG THE RURAL–URBAN SPECTRUM, GLOBALLY AND BY REGION, 2000



NOTES: For definitions, see Table 1 (p. 17). See also Annex Table A1 (p. 124). The GRUMP and LandScan grid-based population density datasets for 2000 are the most-recent global estimates. SOURCE: FAO calculations and elaboration.

Legend:
 ■ Larger cities, urban and peri-urban
 ■ Larger cities, proximate rural
 ■ Small cities and towns, urban and peri-urban
 ■ Small cities and towns, proximate rural
 ■ Rural hinterland

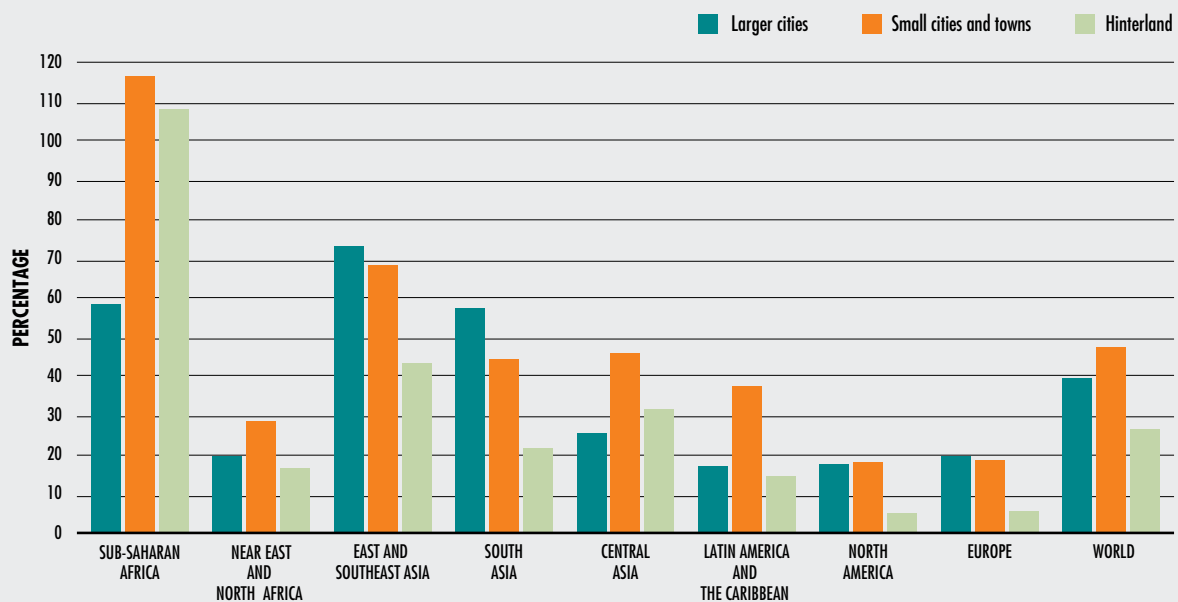
» considerable challenge to policy-makers seeking to promote inclusive rural transformation.

The shares of urban population drawn from official UN data differ from the estimates provided in Table 1, as they differed from those found by the World Bank’s agglomeration index (World Bank, 2008). This can be seen at the global level, where the “strictly urban” population share – those living in high-density urban areas – amounts to about 47 percent in Table 1, which is slightly higher than the UN estimate for 2000 of 46 percent. Including peri-urban areas with densities of less than 1 000 people/km² increases this share to 59 percent, which is much higher than the UN estimate. These differences are caused by different definitions of rural and urban between the two sources. While the UN estimates rely on national definitions that differ across countries, estimates in Table 1 are based on a unique definition across the world.

Figure 6 shows the rural–urban spectrum for the world and by region. In all developing regions, except for the highly urbanized Latin America and the Caribbean, the share of people living in or gravitating around small cities and towns is higher than the share of people living in or gravitating around larger cities. The respective shares are: 51 percent compared with 37 percent in Near East and North Africa; 52 percent compared with 28 percent in East and Southeast Asia; 52 percent compared with 35 percent in South Asia; and 41 percent compared with 23 percent in sub-Saharan Africa.

In sub-Saharan Africa, the share of population residing in rural hinterlands, at 36 percent, is strikingly high compared with other regions, while hinterland shares are noticeably low in Western Europe and North America at 4 percent. The hinterland shares in East and Southeast Asia,

FIGURE 7
RATIO OF RURAL TO URBAN POPULATION FOR SMALL CITIES, LARGER CITIES AND RURAL HINTERLANDS, GLOBALLY AND BY REGION



NOTES: "Larger cities" and "small cities and towns" shows the ratio of proximate rural population to the associated urban population. "Hinterland" is the ratio of rural hinterland population to the total urban population. For definitions, see Table 1 (p. 17). See also Annex Table A1 (p. 124).
 SOURCE: FAO calculations and elaboration.

and in Central Asia, are slightly higher than the world average of 16 percent, while those in South Asia, and in the Near East and North Africa, are around 12 percent. This indicates that adequate investment in physical infrastructure is important for improving market access for a considerable proportion of the rural population in East and Southeast Asia and in sub-Saharan Africa.

The rural–urban spectrum also provides insights into rural labour supply availability around agglomerations of different sizes. This is important because urbanization and the exit of labour from agriculture into non-farm sectors are two key features of the rural transformation. Rural labour supply can be reflected in the ratio of the rural population to the urban population of the closest city of reference, whether it is a larger city, a small city or a town. This is illustrated in [Figure 7](#), where:

blue columns represent ratios of rural to urban populations for larger cities; orange columns represent ratios of rural to urban population for small cities and towns; and green columns represent rural hinterland. As rural hinterland populations have no specific city size of reference, the ratio is calculated to the total urban population of the country of reference.

[Figure 7](#) shows these ratios at the regional level and indicates that they follow the familiar development trend of rural population shrinking as incomes grow. The ratios are highest in sub-Saharan Africa and 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 larger cities are more important for that in Asia. Moreover, while [Figure 7](#) does not

show which type of urban centre 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, which underscores the finding that small cities and towns will play a role at least as important as larger cities in the transformation process.

Nevertheless, the ability of cities and agglomerations of different sizes to absorb rural labour will depend on other factors. The literature provides evidence that economic opportunities are more lucrative in and near large cities (Vandercaesteelen *et al.*, 2017). Other sources indicate that growth patterns typical of small cities and towns have greater linkages with agriculture and are more effective in poverty reduction (Christiaensen and Todo, 2014; Dorosh and Thurlow, 2013).

However, inclusiveness is not a given – it depends on the availability of infrastructure and services, which are usually lower in quantity and in quality in and around small urban centres, owing to a metropolitan bias in government policies and investments. This has been confirmed in studies by Ferré, Ferreira and Lanjouw (2012) in 8 countries worldwide, and by Coulombe and Lanjouw (2013) in 12 sub-Saharan African countries. 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. This will affect human capital, and thus the ability to take and manage risks and to make investments.

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 Hodinott, 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.

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. For example, out-migration 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 the absence of labour-saving technologies. On the other hand, migration can bring opportunities and benefits through the transfer of knowledge, skills and technology. Remittances to, and direct investments in, their areas of origin by diaspora communities can enhance human capital and support development of farm and off-farm activities.

Rural out-migration happens at a large scale 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.⁵ Therefore, improving basic infrastructure and services in small cities and towns, and in their surrounding rural areas, and creating better links between them, are key steps in ensuring a more inclusive transformation. Even with inclusive transformation, rural out-migration 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.

⁵ 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.

In many cases, rural out-migration from areas with limited economic opportunities is directed towards other rural areas with more dynamic agriculture, where demand for labour, and labour productivity, is higher.

Rural out-migration takes different forms, including: temporary or 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 Bangladesh and India. 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 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 less a jump from rural hinterland to megacity and more a 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 larger cities. International migration from rural areas is less common, as people may face more constraints owing to distance and the economic resources required to migrate abroad (FAO, 2017b).

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

flow of remittances from migrants who find jobs in urban areas. ■

RURAL TRANSFORMATION COMES WITH OPPORTUNITIES AND CHALLENGES

The transformation of food systems is fundamental to employment creation in towns, small cities and rural areas. However, while expanding demand provides opportunities for domestic producers, it also brings challenges. Consolidated global and national value chains imply high 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 food systems brings about capital intensification, posing challenges for less-skilled labour in particular, and potentially counterbalancing the employment generation benefits (Neven *et al.*, 2009).

In many cases, the transformation of food supply and value chains in low- and middle-income countries has created serious barriers to the participation of smallholder producers and small-scale agroprocessors in local, national and global markets. 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, the barriers they face created by standards on quality, traceability and certification, and their lack of access to finance, transport and markets often make participation in integrated value chains very difficult. This is especially true in the case of female small-scale farmers, entrepreneurs or agricultural workers, who face gender-based discrimination in access to productive resources and services (Dey de Pryck and Termine, 2014).

Smallholder farmers can only benefit fully from the transformation of food systems if they are able to join value chains through fair contracts with processors and traders. To take advantage of the opportunities that modern supply chains offer, smallholder farmers also 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). Critical obstacles to small-farmer participation in transformed food systems in sub-Saharan Africa include poor infrastructure, high transaction costs, limited access to land, land tenure problems and poorly functioning markets (World Bank, 2013a). There is also a weak investment climate for agro-industry in downstream processing and related activities (Yumkella *et al.*, 2011). A major challenge for strategies to promote agro-industry is the need to maintain competitive markets and prevent concentration of market power in the hands of a few large participants (Da Silva *et al.*, 2009).

Agro-industrial enterprises sourcing produce from small farmers often provide the resources needed to overcome farmers' lack of access to credit, inputs and extension. In recent decades, various 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 market access (Rao and Qaim, 2011).

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 public disorder, lack of electricity and market information, and the poor state of roads (Deininger and Jin, 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 in rural non-farm activities, whether they originate in agro-industry or elsewhere, presents rural people with an opportunity to increase their income, households and individuals that lack the skills to take advantage of those opportunities risk being left behind. Institutional and other constraints that limit women's participation must be tackled in order 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 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, mainly by reducing liquidity constraints and supporting labour mobility (Slater and McCord, 2009). As seen in many middle-income countries, social protection can also help contain income inequality and promote a more equitable and sustainable pathway of structural transformation and growth. 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 (Kangasniemi, Knowles and Karfakis, 2017).

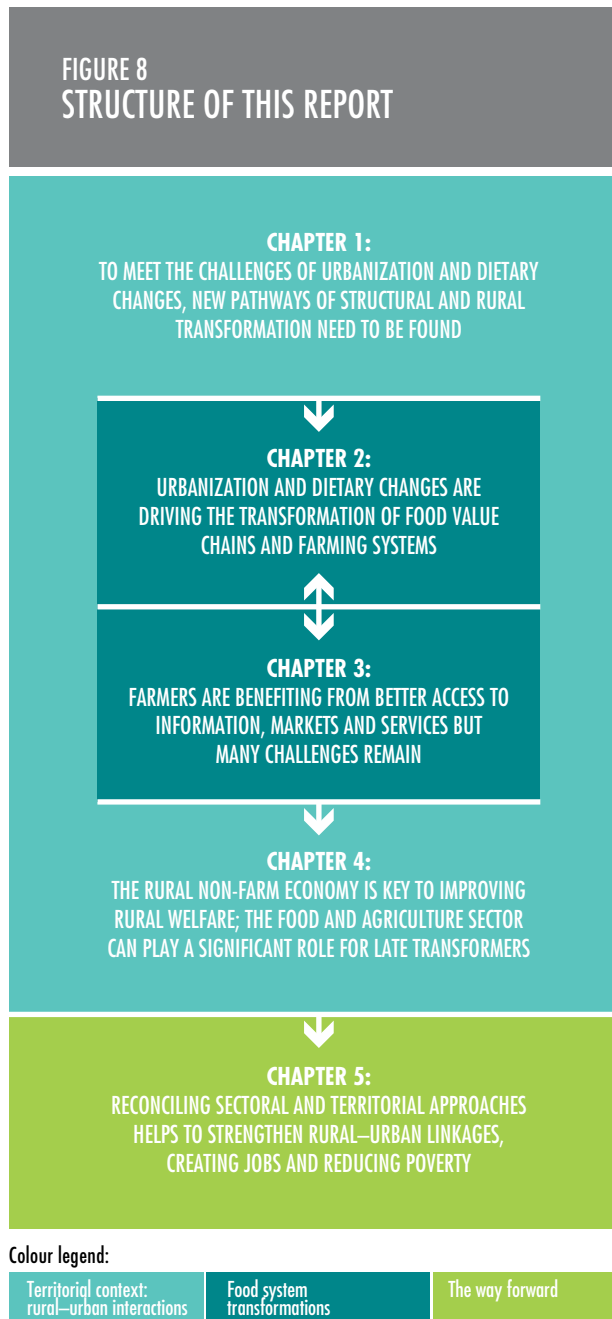
Higher labour productivity across the agriculture sector is a key characteristic of successful transformations. However, some of the gain in labour productivity may actually be the result of more intense use of natural resources. In the long run, transformations may lead to capital-intensive productivity growth that boosts incomes but degrades the natural resource base on which prosperity depends. This adds challenges to transformation pathways dependent on non-renewable natural resources such as fossil energy. ■

STRUCTURE OF THE REPORT

This report takes as a given that agricultural development and the creation of rural non-farm employment are essential for successful structural and rural transformations. The focus here is on the changing conditions in the food system and 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 catalytic role played by small cities and towns in the transformation process. **Figure 8** highlights the interplay between food system transformations and rural–urban interactions.

The report examines how these changes can increase the incomes of poor rural households as they diversify farm production and move 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 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 (AGRA, 2016; IFAD, 2016; OECD, 2016); they are addressed here in the context of rural transformation.

This report is structured as follows. Chapter 2 shows how urbanization, dietary changes and the transformation of food systems are interlinked trends that shape rural transformation and its outcomes. Chapter 3 looks at recent trends in farming systems transformation and how a key driver of this transformation is agricultural productivity growth, achieved through technological innovation, diversification and improved access to markets. Chapter 4 focuses on the effects of rural transformation on the



SOURCE: FAO.

non-farm economy, and especially agro-industry, and its role in employment creation. Chapter 5 summarizes policy, institutional and other measures for achieving inclusive rural transformation using a territorial perspective that helps to generate rural and urban employment by creating or capturing industrialization opportunities in the food system. ■




HAVANA, CUBA

Cultivating crops at a peri-urban agriculture cooperative.

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CHAPTER 2 FOOD SYSTEMS, URBANIZATION AND DIETARY CHANGES

Key messages

- Urbanization and dietary changes in both rural and urban areas are driving the transformation of food systems and strengthening rural–urban linkages.
- As points of intermediation and agro-industrial development, small cities and towns can stimulate non-farm economic growth, which broadens opportunities for the farming sector.
- However, urban proximity can also bring to rural areas a steady flow of processed foods, which may benefit consumers at the expense of local farmers and small-scale processors.

FOOD SYSTEMS, URBANIZATION AND DIETARY CHANGES

Recent research indicates that five interlinked transformations of food and agriculture are occurring rapidly in Asia, emerging rapidly in sub-Saharan Africa, and well established in Latin America: (1) urbanization; (2) dietary changes; (3) food system transformation; (4) rural factor market transformation; and (5) the intensification of farm technology. 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 (Reardon and Timmer, 2014).

In value-chain parlance, urbanization and dietary changes are considered “downstream”, demand-side changes, while 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 9](#). They feed into, and are fed by, agricultural production processes (transformations 4 and 5 above), i.e. markets for land, labour and capital, and farming technology.

This chapter examines the first three of the above transformations in urbanization, diets and food systems. It shows how changes in each have a role in shaping 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. Chapter 3 examines the fourth and fifth transformations.

The focus here is on the domestic food market, as it is the most important for rural areas in

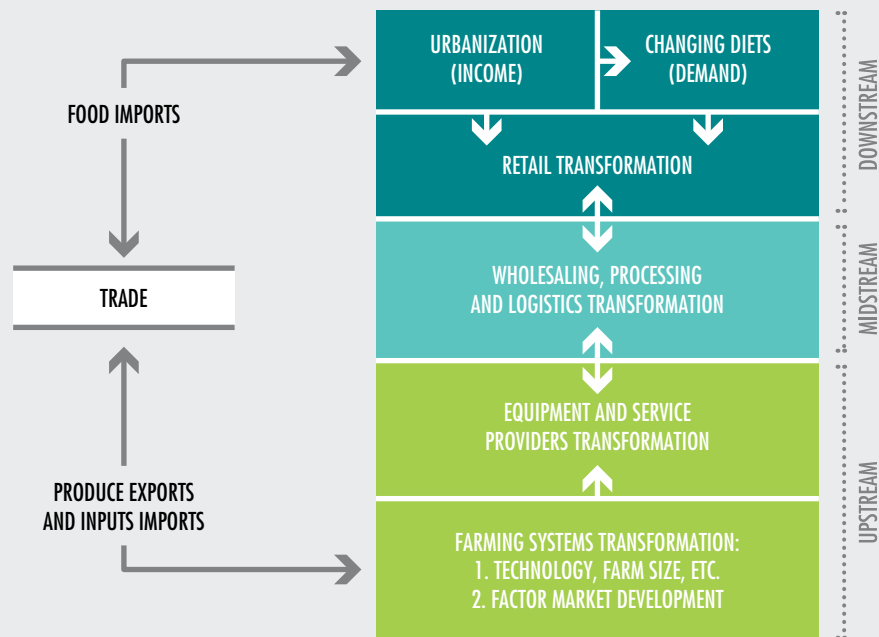
volume terms and, therefore, for inclusive rural transformation. Domestic markets are by far the main markets for farmers in Africa and Asia and will probably be so increasingly. Only 5–10 percent of the agricultural output of these regions is exported, although the share is higher for specific items such as coffee; an estimated 90 percent of food consumed is produced domestically and only about 10 percent is imported (Reardon and Timmer, 2007). Tschirley *et al.* (2015b) contend that, with income growth in East and Southern Africa, the share of imports in the food supply will actually decline as households shift to non-cereal products that are mainly produced domestically. On the role of trade in food system transformation, see [In focus: International trade, foreign direct investment and globalization of the food system](#), p. 44. ■

DOWNSTREAM TRANSFORMATION: URBANIZATION

Domestic food markets are now concentrated in cities

The developing world has urbanized rapidly in the past six decades. In 1960, about 22 percent of its population, or 460 million people, lived in cities and towns, and the vast majority – some 1.6 billion people – lived in rural areas. By 2015, the urbanized share of population had reached 49 percent and the urban population had increased to almost 3 billion. Africa’s rate of urbanization is now the world’s fastest, with the urbanized population projected to increase from 470 million in 2015 to 770 million by 2030. Africa’s subregions are urbanizing at different

FIGURE 9
MAIN DRIVERS OF FOOD SYSTEM TRANSFORMATION



SOURCE: FAO.

rates. In East Africa, the urbanized share is 26 percent and projected to reach 44 percent by 2050; in contrast, urbanization is estimated at 45 percent in West Africa. Nigeria's current total population of 170 million includes 88 million urban residents, a figure that is projected to almost double, to 160 million, by 2030 and could reach 300 million by 2050 (UN DESA PD, 2014a).

Demographic patterns in Asia are remarkably similar, although rapid urbanization there began earlier. The region's urban population stood at 48 percent of total population in 2015, the mid-point in a "rush to the cities" that took place over a half century. Asia's urban share of total population is projected to reach 56 percent by 2030, up from 24 percent in 1970. As in Africa, subregions in Asia display different urbanization rates, with shares of 35 percent in South Asia, 48 percent in Southeast Asia and 60 percent in East Asia (UN DESA PD, 2014a). Rather than being starkly different in terms of

urbanization, Africa and Asia are converging toward similar urban shares.

The share of the urban population in total population substantially understates the importance of urban areas in national food consumption and trade, in terms of economic value. As urban areas tend to have higher incomes than rural areas, the individual urban household's food budget is larger. Consequently, city dwellers in Malawi, Uganda, the United Republic of Tanzania, and Zambia consume, on average, 48 percent of food produced and sold, although they make up only 25 percent of total population (Reardon *et al.*, 2015). In studies encompassing Bangladesh, Indonesia, Nepal 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. The urban food market has grown very rapidly in recent decades and, along with it, rural-urban food supply chains (see [Box 4](#) for an

example from Bangladesh). Reardon *et al.* (2015) estimate this growth in East and Southern Africa at 600–800 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, estimates of the population living in smaller urban agglomerations vary, but in general they fall in the range of about 50 percent globally and about 60 percent in Africa and Asia (Berdegué and Proctor, 2014; Christiaensen and Kanbur, 2017). Small cities and towns are closer

BOX 4 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 sector’s total value added – as well as the remaining 40 percent, which is composed mainly of the rural and urban wholesale, retail and logistics segments.

Hernandez *et al.* (forthcoming) estimate that in the past decade the aquaculture 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 along 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 were a major driver of this growth, policy had a facilitating role, particularly through early investments in fish seed production, electricity supply and rural roads.

spatially to rural areas and more economically integrated than larger cities, and are thus more effective in alleviating rural poverty. Their economic integration extends both upstream and downstream in the food system, as 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 destined to feed other local towns or larger cities. This is discussed further below.

Rural markets have also grown substantially

The rural market for food has expanded along with rural population. In less-developed regions as a whole, the rural population grew from 1.6 billion in 1960 to an estimated 3.1 billion in 2015. In that period, Africa’s rural population grew from 230 million to 694 million, and Asia’s from 1.3 billion to 2.3 billion (UN DESA PD, 2014a). Moreover, in economic value terms, the rural market has grown at a faster rate than the rural population, owing to growth in rural incomes. This is very evident in Asia in general and particularly in East and Southeast Asia, which has seen a considerable decline in rural poverty, in both incidence and numbers, over the past two decades (see Chapter 1). This implies higher shares of income being spent on food by households in the low-income range (following Engel’s law)⁶ and a rapid rise in overall food consumption. There is also evidence that, even in the poorest subregions, a rural middle class has emerged; Tschirley *et al.* (2015b) estimate that, on average, 55 percent of the middle class across Ethiopia, Malawi, Mozambique, South Africa, Uganda and the United Republic of Tanzania reside in rural areas.

In addition, the share of purchased food in the total economic value of rural households’ food (which includes a value for home production) is considerable in Africa and Asia. This, along with the growth in rural population and its overall food expenditure, implies a vast increase in the rural food market and

⁶ According to the German statistician and economist Ernst Engel (1821–96), as income rises, the share of income spent on food decreases, even as total food expenditure rises.

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.

Traditionally, farm households in developing countries were either self-sufficient or purchased a small proportion of their food. While some early studies, such as those by Mellor (1976) in India and Reardon, Melton and Delgado (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 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 high shares of purchased food in rural diets in sub-Saharan Africa and Asia. In Malawi, Uganda, the United Republic of Tanzania, and Zambia, rural households buy an average of 45 percent of the food they consume (Reardon *et al.*, 2015); in Bangladesh, Indonesia, Nepal and Viet Nam, rural households purchase on average 73 percent of their food (Reardon *et al.*, 2014). The evidence suggests that very little food is purchased on credit, either from informal or formal sources.⁷ This boom in purchased food in rural households is financed in part by income from the sale of crops and livestock, but more so by income from rural non-farm employment. In fact, the rise of rural non-farm employment as a source of cash is a trend that has accelerated in recent decades (see Kelly *et al.*, 1993, and Reardon and Mercado-Peters, 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, Wang and Qiu, 2012). In Africa and Asia, the non-farm income share averages about 40 percent, and is much greater than income from migrant remittances (Haggblade, Hazell and Reardon, 2007).

⁷ The same conclusion was reached, with regard to the purchase of farm inputs in Africa, by Adjognon, Liverpool-Tasie and Reardon (2017).

Implications of urbanization and rural market growth for inclusive transformation

Changes in levels of urbanization and in rural markets have multiple implications for rural income opportunities and the rural transformation in general. 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 city and countryside is improved. The impacts of urban markets need to be programmed into any 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”. Small cities and towns will be – for reasons of opportunity and challenge – especially important to this 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 (Berdegue and Proctor, 2014).

The proximity of small cities and towns to rural markets is, however, 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 for a steady flow of processed foods, which may represent cost savings for consumers and, consequently, compete with local farmers and existing or the would-be small-scale village enterprises (Reardon and Stamoulis, 1998; Reardon, Stamoulis and Pingali, 2007). Among many examples of this trend are packaged instant noodles sold by an Indonesian food manufacturer 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 more or less fluidly in all directions,

rural producers are essentially “de-protected”, as their traditional markets are opened to competitors from all sides. (However, 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.) As 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 rural producers compete 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. Gender- and age-responsive solutions will also be needed to address the specific challenges that women and young producers face in accessing new market opportunities and participating effectively in longer, more integrated value chains.

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 changes and food system changes, described below. ■

DOWNSTREAM TRANSFORMATION: DIETARY CHANGES

Evidence at the global level strongly suggests that rising household incomes lead to a greater variety in diet. At higher incomes, an increasing share of the household diet comes from non-staple foods, such as animal-source products, vegetable oils, fruit and vegetables, and processed foods that may contain high levels of fat, sugar or salt. Meat, fish and dairy consumption increases strongly with income growth; fruit and vegetable

consumption also increases, but more slowly, and consumption of cereals and pulses declines (Figures 10 and 11).

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

Diets are changing fast in developing regions

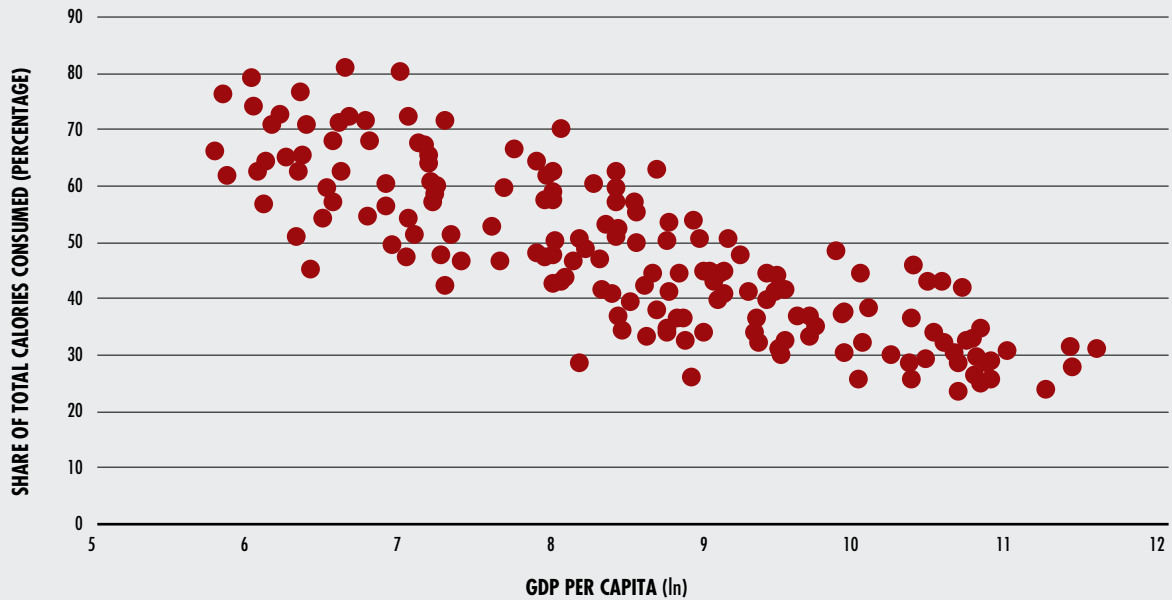
Several trends in diets have been observed in recent decades. First, there has been a steady worldwide reduction in the share of cereals in people’s total food expenditure. In general, the shift happens earlier in urban than in rural areas and, as Bennett’s law predicts, increases as incomes rise (Bennett, 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 (Reardon *et al.*, 2015).

Most research on trends in spending on cereals has been done in Asia. Timmer (2014) and Timmer, Block and Dawe (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 (Table 2) shows that the share of cereals in urban food expenditure 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.

Evidence from India and some countries in South and Southeast Asia suggests that, by 2010, cereals represented from one-quarter to one-third of the economic value 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 for urban households and 37 percent for rural households in Bangladesh, Indonesia, Nepal and Viet Nam.

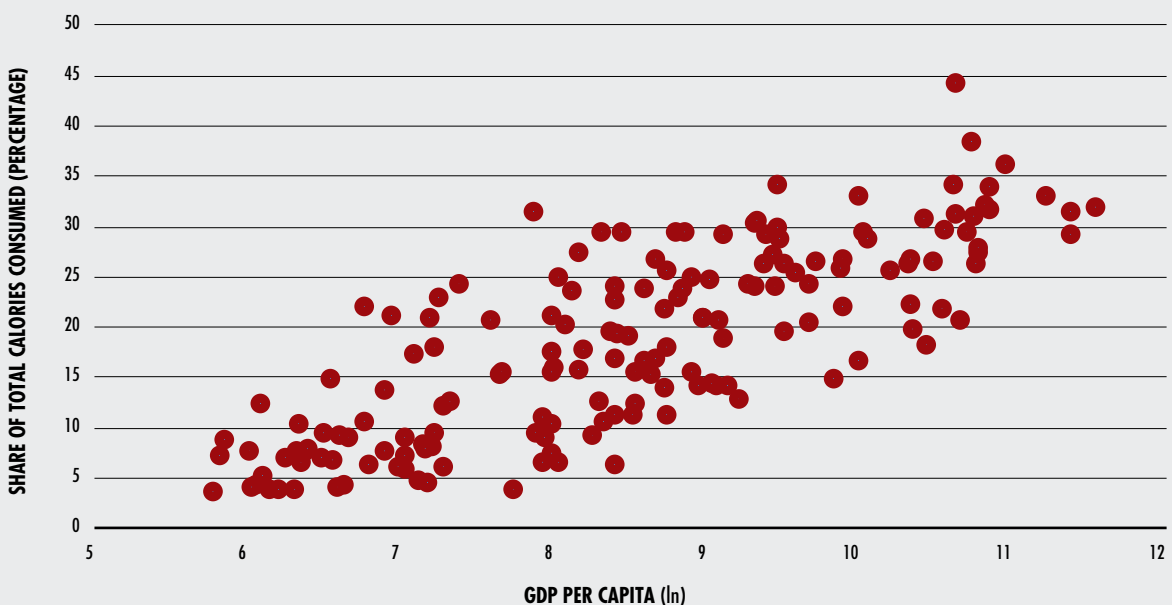


FIGURE 10
CORRELATION BETWEEN CONSUMPTION OF STAPLE FOODS AND GDP PER CAPITA IN SELECTED COUNTRIES IN DEVELOPING REGIONS, 2010



NOTE: Staple foods include cereals, roots and tubers.
SOURCES: FAO (2017c) and World Bank (2016a).

FIGURE 11
CORRELATION BETWEEN CONSUMPTION OF ANIMAL PRODUCTS AND GDP PER CAPITA IN SELECTED COUNTRIES IN DEVELOPING REGIONS, 2010



SOURCES: FAO (2017c) and World Bank (2016a).

TABLE 2
SHARE OF CEREALS IN TOTAL FOOD EXPENDITURE IN INDIA

Year	Urban areas	Rural areas	National
		Percentage	
1972	36	56	52
2006	23	32	29

SOURCES: Datanet India Pvt. Ltd. (various years) and Reardon and Minten (2012).

TABLE 3
SHARES OF STAPLE AND NON-STAPLE FOODS IN TOTAL FOOD EXPENDITURE IN RURAL AND URBAN AREAS AND BY INCOME TERCILES IN SELECTED COUNTRIES OF EAST AND SOUTHERN AFRICA AND ASIA

	Rural terciles			Urban terciles			Rural areas	Urban areas
	First	Second	Third	First	Second	Third		
	Percentage							
East and Southern Africa								
Staples	47.6	39.2	31.9	39.0	35.9	27.0	40.8	30.8
Non-staples	52.3	60.7	68.1	60.9	64.2	72.9	59.2	69.4
Asia								
Staples	47.1	39.0	31.0	37.0	27.2	20.9	36.9	25.9
Non-staples	52.9	60.9	68.9	63.0	72.8	79.1	63.1	74.1

NOTE: Asia data include Bangladesh (2010), Indonesia (2010), Nepal (2010), Viet Nam (2010); East and Southern Africa data include Malawi (2010/2011), Uganda (2009/2010), United Republic of Tanzania (2010/2011), and Zambia (2010).

SOURCES: Reardon *et al.*, 2014, Table 1; Reardon *et al.*, 2015.

TABLE 4
CHANGES IN SHARES OF STAPLE FOODS IN THE FOOD BUDGETS IN URBAN WEST AFRICA

Main staple foods	1990s	2000s
	Percentage	
Cereals only	33	38
Cereals, roots and tubers	41	40
Cereals	27	23
Roots and tubers	14	17

NOTE: "Cereals only" countries are Burkina Faso, Mali and Senegal; "Cereals and roots and tubers" countries are Côte d'Ivoire, Ghana and Nigeria.

SOURCE: Hollinger and Staatz, 2015, Table 6.4.

» Again contradicting conventional wisdom that Africa is sharply different from Asia in food trends, data from East and Southern Africa and from West Africa show that staples represent about 35–40 percent of the economic value of urban diets (Reardon *et al.*, 2015; Hollinger and Staatz, 2015). From LSMS data for urban and rural areas in Malawi, Uganda, the United

Republic of Tanzania, and Zambia, Reardon *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. For selected Asian countries, Reardon *et al.* (2014) estimate that these shares are 26 percent and 37 percent, respectively, which is not greatly different from the reported shares in African

countries (Table 3). 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. As the shares reflect the economic value of the food rather than actual food intake, it is not possible to infer what this means in terms of dietary composition.

There is diversity in food expenditure patterns across different regions in Africa. From an analysis of urban food expenditure in several West African countries in the 1990s and 2000s (Table 4), Hollinger and Staatz (2015) found that where the main staples are cereals alone (Burkina Faso, Mali and Senegal), the budget share of cereals increased slightly, from 33 percent to 38 percent of expenditure. Where cereals plus roots and tubers are the staples (Côte d'Ivoire, Ghana and Nigeria), the budget share of cereals dropped from 27 percent to 23 percent and that of tubers and roots rose from 14 percent to 17 percent.

In addition, there have been changes 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 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, which occurs when the opportunity cost of women's time increases as they enter the away-from-home labour force. In most of Asia outside of China and India, this has led to a partial shift to wheat in traditional rice-consuming areas. Wheat has made inroads mainly thanks to its convenience, in the form of noodles and flatbreads (Reardon, Stamoulis and Pingali, 2007, for Asia overall; Senauer, Sahn and Alderman, 1986, for Sri Lanka; Timmer, 2014, for Southeast Asia). Between 1961 and 2010, Southeast Asia's wheat imports rose from 280 000 tonnes to 15 million tonnes (FAO, 2017c).

In northern China, and most of Africa, where millet and sorghum were the traditional cereals, production and consumption have shifted – to rice and wheat in northern China, and partially to wheat in East and Southern Africa, and to rice and wheat in West Africa. This partial shift to wheat and rice has been driven by convenience, similar to 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 its dependence on imports of rice has been a cause for alarm (Reardon and Mercado-Peters, 1993; Hollinger and Staatz, 2015). Wheat consumption began to rise not only with the adoption of bread in middle-income household diets, but also with increased consumption among the poor of cheap, easily prepared noodles (Liverpool-Tasie *et al.*, 2017).

Maize has also made inroads as a food crop and as a main ingredient in animal feed. Since its introduction in the nineteenth century, 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, in the past decade or two, to intensive production of poultry, fish and livestock. For example, in Nigeria, the maize-based feed industry has grown by 600 percent over the past nine years (Liverpool-Tasie *et al.*, 2017). In China, too, maize production has soared, not for direct human consumption, but as an ingredient in animal feed – output of maize went from half that of rice in 1990 to more than total rice production by 2014 (FAO, 2017c). There has also been an increase in the use of more drought-tolerant and disease-resistant cereal varieties, as well as better-tasting and better-looking varieties. The latter is exemplified by the shift from lower-quality to higher-quality rice varieties in Bangladesh (Minten, Murshid and Reardon, 2013).

Complementing the trend toward a reduction in the share of cereals, there is a shift to non-staple foods – especially meat, fish, dairy products, edible oils, fruit and vegetables – and a marked decrease in the amount of coarse grains, root crops and legumes consumed (FAO, 2017a;

Hawkes and Popkin, 2015).⁸ The daily per-capita consumption of protein from animal sources in low- and middle-income countries rose from 9 g in 1961 to 20 g in 2011, and is projected to reach 22 g by 2030 and 25 g by 2050. Fruit and vegetable consumption is expected to increase in all countries, but at a slower rate in low- and middle-income countries than in high-income countries (FAO, 2017a). Data available for low- and middle-income countries document this trend in all urban areas and increasingly in rural areas (Popkin, Adair and Ng, 2012).

However, there is an important caveat. Data on Malawi, Uganda, the United Republic of Tanzania, and Zambia, especially for the consumption of edible oils and meat, show that the diversification of diets begins well below the threshold of “middle incomes”. For example, the share of animal protein in total food expenditure in rural areas is 12.9 percent in the poorest households and 17.4 percent in middle-income households; in urban areas, the shares are 14.1 percent in low-income households and 16.8 percent in middle-income households. Across all income levels, in rural and urban areas alike, the share of vegetable oils and animal fats is similar (ranging from 2.9 percent to 3.7 percent in rural areas and from 4.6 to 5.1 percent in urban). This suggests that the easier accessibility of these products, thanks to increased production and better transport, combined with food education and lifestyle changes, has induced even relatively poor households to increase sharply their intake of non-cereal food items (Reardon *et al.*, 2015).

Similar patterns are evident in Latin America and the Caribbean. As reported in Anríquez, Foster and Valdés (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; rates of increase have been higher in the poorest countries.

⁸ 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 are often scarce, especially in low-income countries, making it more difficult to do more refined analyses of dietary trends. Efforts are therefore under way to enhance the collection and use of individual dietary data (see www.fao.org/nutrition/assessment/food-consumption-database/en/).

Haiti, Nicaragua and Peru have recorded large increases in calorie consumption since the early 1990s. Anríquez, Foster and Valdés also reported a notable increase in the intake of animal protein, mainly in the form of meat and milk products, but also found that a large proportion of the increase in average daily calorie intake in many countries – and a good proportion for the region as a whole – was due to an increase in the intake of sugar and other sweeteners (Box 5).

Patterns are similar across subregions, and Africa is only slightly behind Asia in dietary diversification. The study by Reardon *et al.* (2015) in East 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 noteworthy that rural consumption of these non-cereal products is so high, in relative terms. The West Africa study by 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 in urban areas held nearly steady in the 1990s to 2000s at 67 percent to 62 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 urban share of non-staples in total food expenditure was steady at 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). East and Southern Africa have higher poverty rates than West Africa, but roughly similar patterns.

The study by 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. The rural and urban patterns are not very different, and the pattern in rural areas is similar to that of urban West Africa. Despite average income differences between the South Asian sample (Bangladesh and Nepal) and the Southeast Asian sample (Indonesia and Viet Nam), the shares of cereals in urban food budgets are similar (29 percent and 23 percent, respectively) – a similarity reminiscent of those

BOX 5 IMPLICATIONS OF DIETARY CHANGES FOR NUTRITION

Recent decades have seen greater diversification of diets worldwide. However, there has been a parallel increase 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 on Agriculture and Food Systems for Nutrition, 2016). In 2010, the cost of all non-communicable diseases (NCDs) related to obesity and overweight was estimated at US\$1.4 trillion (FAO, 2013a). 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, 2017a; Imamura *et al.*, 2015). This “nutrition transition” is seen particularly in low- and middle-income countries, where no general improvements are noted in terms of healthier overall dietary patterns. Of particular concern is the increase in the consumption of highly processed foods with a high

content of added salt, refined carbohydrates or saturated fats (Hawkes and Popkin, 2015). Data from some high-income countries, such as Canada and the United States of America, show that about 60 percent of household calories come from food and beverage groups that are major sources of added sugars, fats and salt (Moubarac *et al.*, 2013; Stern, Ng and Popkin, 2016). In Brazil, China and Mexico, the shares are 26 percent (Monteiro *et al.*, 2013), 30 percent and 58 percent respectively, and they 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, policy-makers 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 of convenience foods that contain less sugar and salt, and education to promote healthy choices. A number of countries are taking 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 United States of America, and the regulation of food marketing and advertising to children in Norway.

across West Africa, as shown by Hollinger and Staats (2015). Meat and fish accounted for an average of 30 percent of the urban budget in South Asia and Southeast Asia, equal to the share of cereals in urban West Africa. Horticulture products averaged 14 percent in urban and rural food expenditures in the Asia sample, similar to the figure in urban West Africa. Together, meat, fish and vegetables account for an average of about 45 percent of total spending across the three subregions, which is more than the share of cereals.

The outcome for the 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. For example,

in three decades, the domestic aquaculture supply chain in Bangladesh (see [Box 4](#)) grew in volume 25 times over, as very little fish is exported (Hernandez *et al.*, forthcoming). Growth in food systems for non-staple products is much larger than growth in the overall rural–urban food supply chain, which is itself in the order of five to ten 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.

TABLE 5
PROPORTION OF FOOD BUDGET SPENT ON PROCESSED FOODS, IN RURAL AND URBAN AREAS AND BY LOWEST- AND HIGHEST-INCOME CLASSES, IN SELECTED COUNTRIES OF EAST AND SOUTHERN AFRICA, 2010

	“Low-processed” food	“High-processed” food	Total processed food
	Percentage		
Region-wide	32.7	37.4	70.1
Lowest-income	34.7	31.2	65.8
Highest-income	24.1	62.0	86.1
Rural	36.7	33.0	69.7
Lowest-income	36.2	29.5	65.8
Highest-income	38.5	52.0	90.6
Urban	28.4	42.1	70.5
Lowest-income	30.3	35.7	66.0
Highest-income	20.4	64.6	85.0

NOTES: Lowest-income is US\$0–2 per day, highest-income is > US\$20 per day. Includes Ethiopia, Malawi, Mozambique, South Africa, Uganda and the United Republic of Tanzania.

SOURCE: Tschirley *et al.*, 2015b, Table 6.

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, the change in Asia is somewhat more advanced than in Africa, and more advanced in urban than rural areas. However, again, there appears to be a process of convergence under way. Substantial purchases of processed food products, accounting for two-thirds of the food budget, were found among the urban and rural poor in East and Southern Africa, as shown in [Table 5](#) (Tschirley *et al.*, 2015b).

In the study of East and Southern Africa, it was found that urban households earmarked 56 percent of food expenditures for processed foods, compared with 29 percent in rural households (Tschirley *et al.*, 2015b). In the Asia study (Reardon *et al.*, 2014), urban households were found to allocate 73 percent of food spending to processed foods, compared with 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.

Implications of dietary changes for inclusive rural transformation

Shifts in the composition of diets, and the increased consumption of value-added food products, have important impacts on demand for services from farm areas and from small towns. The development, maintenance and operation of supply chains have required and driven the expansion of off-farm services in rural areas and towns – to pack 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, which represent important opportunities for employment and inclusive transformation.

The emergence of these activities creates employment multipliers in rural areas and the small towns that service them. 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 jobs and increased rural inclusiveness, at least in the “first round” of the transformation. ■

FOOD SYSTEM TRANSFORMATION

Determinants of pre- and post-farmgate changes

Transformation of the food system is the result of the downstream “pull” factors of urbanization and dietary changes, and the upstream “push” factors of farming intensification and factor market development. Urbanization and dietary changes are the demand-side forces driving the whole set of transformations, while factor market and farm technology changes are the upstream supply-side forces feeding the rest of the changes.

The food system (Box 6) acts as an intermediate link between supply and demand. Thus, the determinants of change at the upstream and downstream ends of the system are themselves determinants of system transformation. They include income increases, technology change, and changes in the employment of consumers, producers and workers, leading to changes in the opportunity costs of time. The demand “pull” of the downstream segments, in addition, rewards investment and transformation in the other 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

BOX 6 VALUE CHAINS: DEFINITIONS AND CONCEPTS

A **food system** encompasses the ecosystems and all of the activities required for the production, processing, transportation and consumption of food, including the inputs needed and outputs generated by each of these activities. Within this system, **value chains** are composed of the full range of farms and enterprises and their value-adding activities, which produce agricultural raw materials and transform them into food products that are sold to final consumers and disposed of after use (FAO, 2014a).

Upstream segments of value chains move inputs to farms and fisheries; produce then moves through midstream segments – wholesalers, logistics agents and processors – to downstream retailers and exporters and on to consumers in the region, the country or abroad. The “off-farm components” include all the segments except the farm segment.

Each product value chain is itself a “cluster of chains” – i.e. 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”, which includes the mining of fertilizer components, manufacture, wholesaling and retailing to a farmer. As a midstream example, the wholesale service to the rice value chain is an “inputs-to-wholesale”

chain, including the manufacture of trucks and warehouses as inputs to wholesaling, through to trading of those inputs to wholesalers.

A product value chain can be of any length – from a very local chain, such as from a farm to its village centre; an intermediate length chain, from a farm to a district town; a long “domestic” chain, from a farm to a distant city; or an international value chain (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 of that chain to a cluster of chains, to a rural territory, to a small city or town, and to a large city or megacity. For example, the mango value chain in Indonesia links: small cities and 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 intermediate and primary cities, which are the main final wholesale and retail markets and outlets for the mangoes. Seen in this way, one can “map”, the distribution over space of the cluster of chains for the mango sector, and discern the roles in the mango system of the rural space and the small city and rural town spaces and their links.

the intersectoral 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 actions related to: the development of infrastructure that affects transport, transaction costs, risk and technology research; and policies, which may begin 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 that favour investments in the food system.

Dietary changes, combined with urbanization, have led to the composition of farm output shifting in relative terms toward non-cereal foods and feedgrains, leading to the 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. Such services tend to be town-based, further raising the profile of the small cities and towns in rural transformation (see [Figure 12](#)).

The development of the off-farm components of the food system has led to further spatial shifts that are important to the 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, and then from village to town or city. These shifts 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 feedgrain supply chains.

These investment and spatial shifts suggest that there are several stages in the transformation of the food system. The first stage occurs in rural areas and is usually focused on cereals with small-scale, fragmented 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 a reduction in off-farm operations except for immediate handling. The practical 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.

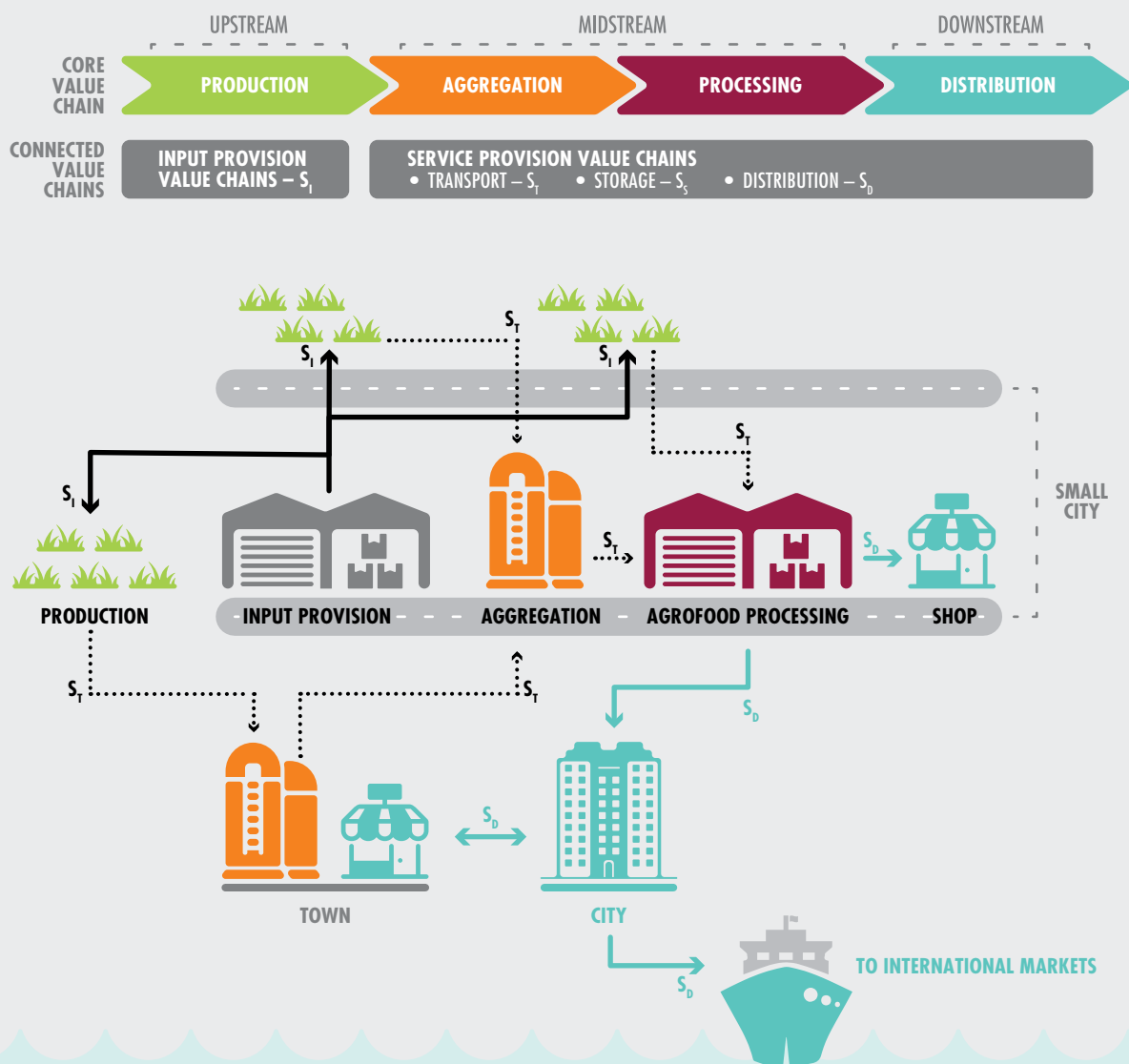
Post-farmgate transformations

Five major transformations now taking place in the post-farm food system have implications for the inclusiveness of rural development. First, there is transformation of the 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 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 cities. This process is correlated with rapid growth not just in larger cities but also in small cities and towns. A further tendency 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 and also for managing income shocks to rural suppliers that will depend more and more on urban sales. The spatial lengthening of value chains differs substantially according to

FIGURE 12
FOOD SYSTEM VALUE CHAINS LINKING RURAL AREAS AND SMALL CITIES



SOURCE: FAO.

product types, perishability and the geography of production zones. For example, vegetables are typically sourced from a “catchment area” within a radius of 3–4 hours’ travel time from a city, while fish is usually sourced from a smaller radius, especially in the case of aquaculture as it develops around large cities. However, with rapid development

of the frozen-fish industry, fish is increasingly transported over longer distances (Bai, Zhang and Reardon, 2017). Poultry and pig production tend to be in similar catchment areas to vegetables because frozen poultry and pork still account for a relatively small share of consumption. As fruit consumption diversifies and longer supply chains

develop, there may be an increase in the mean distance of the fruit source from large urban markets (Qanti, Reardon and Iswariyadi, 2017). Processed products, such as milled rice, edible oil and snacks now appear in national and subregional markets, as they can be shipped and stored.

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 by 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 (Reardon and Timmer, 2014). There are several indicators of growth in the value share of the midstream and downstream segments:

- ▶ The share of home consumption in rural food production has gradually fallen, accompanied by a shift to production of vegetables and animal source foods, which are more profitable. 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 to products and the state of transport infrastructure. This implies growth in the transportation and wholesale segments in order to move food over longer distances. Studies in several countries of Africa and Asia show substantial investments by wholesalers and transport operators in vehicles, warehouses and cold storage for rice, mangoes, potatoes and fish – see [Box 7](#) and [Box 8](#).
- ▶ That the share of processed food in total food consumed has risen over time can be inferred

BOX 7 THE POTATO VALUE CHAIN SUPPLYING DELHI: A CONFLUENCE OF EVENTS

Food supply chains in India have undergone rapid transformation in the past two decades. Modern retail sales have been 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 multifaceted role in the potato value chain in Agra District and from Agra to Delhi. The share of potato farmers using cold storage increased from 40 percent in 2000 to 95 percent in 2009 (Reardon and Minten, 2012). This is significant for the value chain interseasonally: whereas in the early 1990s traditional storage dominated, and allowed storage for only 3 months beyond harvest, cold storage extends storage to about 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. The cold storage operators also provide 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 potatoes as collateral.

Rapid development of cold storage in Agra District appears to have been driven, on the demand side, by the fact that farmers' rewards for cold-storing are 26 percent of the total rewards of the value chain, compared with 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 equal 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 for 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 small cities and improved road links, commercial horticulture areas near Hyderabad, Bangalore, Chennai, Kolkata and Mumbai are also flourishing. The development of this horticultural potential will require continued investment in the power grid, water infrastructure and roads.

from the high share of both minimally and highly processed food in diets. Growth is reflected on the supply side by the expansion of domestic 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: a substantial increase in consumption of food away from home, giving rise on the supply side to the rapid spread of fast food chains and restaurants; and a rapid spread of supermarkets in Asia and Africa (Reardon, Timmer and Minten, 2012).

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 saw segments of traditional small-scale enterprises being gradually, or rapidly, concentrated through domestic or foreign direct investment. Most perishables – poultry, fish, pork, and fruit and vegetables – are examples of this. The recent Asian literature provides similar examples for vegetables (e.g. Gorton, Sauer and Supatpongkul, 2011, for Thailand; Moustier, 2009, and Moustier and Dao, 2003, for Viet Nam).

BOX 8 URBANIZATION, FISHERIES AND AQUACULTURE DEVELOPMENT

Fisheries and aquaculture are an important source of food, nutrition, income and livelihoods for hundreds of millions of people around the world. In 2014, world per capita fish consumption passed the 20 kg per year mark for the first time and is expected to grow further in the coming decade (FAO, 2016a).

Urbanization and higher levels of development will be among the key driving forces behind the projected global increase in the intake of animal proteins, including fish, at the expense of foods of vegetal origin. For this reason, it is expected that emerging economies with growing population and higher incomes will see strong growth in markets for fish and fish products in the next decade (HLPE, 2014). In China, for example, the annual demand for fish is projected to increase from 38 kg per capita in 2013 to 47 kg per capita by 2025 (OECD/FAO, 2016).

Urban and industrial development, tourism and transport can have strong impacts on aquatic ecosystems (e.g. pollution) and livelihoods (e.g. by threatening access to fishing grounds and tenure rights to land). Existing frameworks that address these impacts include the FAO Code of Conduct for Responsible Fisheries (FAO, 1995), and the FAO Voluntary Guidelines for Securing Sustainable Small-Scale Fisheries in the Context of Food Security and Poverty Eradication (FAO, 2015a). Both promote preferential access to fishery resources and land by small-scale fishing communities, including indigenous peoples and ethnic minorities.

Achieving the first of the Sustainable Development Goals, to eradicate extreme poverty, will require more investment in urban areas, as the proportion of the extremely poor residing in the urban population is increasing faster than the population as a whole (Ravallion, Chen and Sangraula, 2007). Although aquaculture is generally seen as a rural activity, aquaculture in peri-urban and urban areas has emerged in recent decades, and plays an important role in the livelihood, food and nutritional security of many urban households, particularly the poorest. However, accelerated urbanization and higher population densities will necessarily induce additional changes.

Rural transformation often brings improved products and enhancements to marketing, distribution, cold chains and infrastructure, and the subsequent availability of and accessibility to a wider choice of food products (FAO, 2016a). The increased demand for fish by growing urban and rural populations can boost investments in, for example, peri-urban and urban aquaculture and fisheries, including recirculating aquaculture systems and aquaponics. Efficient value-chain linkages allow for better management of fish products and of fish losses and wastes through optimized supply and redistribution channels; the processing of fresh products for longer preservation; and the recycling of biowastes for innovative uses. In other cases, where the local demand is low, new markets for the small-scale sector should be promoted (HLPE, 2014).

BOX 9
INCLUSIVE DAIRY VALUE CHAINS
IN AFGHANISTAN

Economic, social and political constraints often prevent rural women from contributing fully to, and benefiting fully from, rural transformation. Rural women face higher barriers than men to participating in dynamic markets, entering high-value 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 profitably in more lucrative markets through a programme for integrated dairy development, implemented in collaboration with the Ministry of Agriculture, Irrigation and Livestock, the International Fund for Agricultural Development (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 households, including 1 540 headed by women, sell their surplus milk directly for processing and benefit daily from “milk money” income.

Women’s increased control over their earnings, and greater access to training, 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: FAO, 2015b.

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 place. This was followed by a consolidation led by the private sector, using large local, regional or international capital, which led to the displacement, acquisition or sometimes merging of the small and medium-sized firms. Most value chains for cereals and pulses are examples of this transformation. 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, increases in processing volume in India led to the diffusion of small enterprises, but it was followed by capital intensification and concentration.

Finally, once the above transformations – in market structure, and in sector composition, scale and technology – have taken place, 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, where they are imposed by large processors, supermarkets and wholesale agents in order to coordinate suppliers, minimize costs and maximize food quality and safety. Large-scale operations do this in order to compete or create symbiosis with one another (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.

The implications of food-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 9**). However, over time, there is gradually capital intensification and, with it, challenges for low-skilled labour in particular. These shifts also have differentiated gender impacts, which need to be carefully assessed and monitored. While the expansion of off-farm services generates employment opportunities for rural women, capital intensification and increased formalization of the chain often exacerbates gender segregation in the labour market.

These shifts tend to put pressure on midstream and upstream segments to comply with requirements that are relatively new to the traditional 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-sized 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 from self-financing, and not from banks, traders or informal credit. Where 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 policy-makers 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. ■

CONCLUSIONS AND POLICY IMPLICATIONS

This chapter has examined the role that urbanization, diets and 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 has highlighted the growing importance of small cities and towns in the 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. The inclusiveness of rural transformation will depend on domestic market opportunities, as most of the food consumed in developing countries comes from domestic production.

However, there are two emerging challenges: (i) small cities and towns are conduits for processed foods, which may benefit consumers at the expense of local small-scale producers; and (ii) vastly expanded, multidirectional 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. As 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 further challenges, especially for low-skilled labour. These challenges will need to be addressed in the design of rural development policies and strategies. Dietary changes tend to put pressure on midstream and upstream segments of the food system to comply with new, unfamiliar requirements, which accelerates structural changes in the off-farm segments of the supply chain. These forces may or may not induce concentration of farmland, an issue examined in Chapter 3. ■

IN FOCUS

INTERNATIONAL TRADE, FOREIGN DIRECT INVESTMENT AND GLOBALIZATION OF THE FOOD SYSTEM

International trade can have positive impacts on rural development through the supply of inputs and machinery, as well as by satisfying demand for agricultural products, which stimulates growth of small urban trade and processing centres. However, with trade liberalization, urban centres can also draw on imports, which benefits consumers but constrains a domestic production response from rural areas.

In recent decades, globalization has gone beyond trade in agricultural inputs and outputs. In this respect, the first half of the 1990s was a watershed because, by then, controls on, and state interventions in, commodity output markets in many developing countries had been reduced or eliminated. That and the subsequent liberalization of capital markets brought deep changes in output markets in the following decade, particularly the restructuring of domestic food markets through foreign direct investment (FDI) (Reardon and Timmer, 2007).

The challenge posed by globalization is that it can weaken the historical ties between agriculture, industrialization and urbanization, which have underpinned past economic transitions (UNRISD, 2010). New links to foreign markets, resulting from the opening up of trade and growth of new global supply chains, may stimulate efforts to become more productive and competitive, but may also limit



DAKAR, SENEGAL

International trade – unloading
Asian rice from an American vessel
in an African port.
©FAO/Marco Longari



local producers' access to the domestic market owing to growing and asymmetric competition from abroad. This has implications for the food supply to urban areas, which may opt for lower-priced imports (Losch *et al.*, 2016).

The import side: inputs and agricultural commodities

One effect of market liberalization is that the price of imported inputs, such as fertilizer and farm machinery, falls as tariffs fall. As noted by Anríquez, Foster and Valdés (2017), exposure to world markets in Latin America, through unilateral border policy reforms and trade agreements, played a significant role in altering incentives for farmers and investors, and in encouraging shifts in the scale and composition of farm production. The consequent changes in farming techniques, cropping patterns and downstream activities have had impacts on the use of inputs. International trade has been a major driver in Latin America's agricultural transformation, and the growth in the value of trade has been a notable outcome.

A more recent development, associated with increased consumption of livestock products, is the growing importance of international trade in animal feed. Imports of animal feed help expand domestic livestock production – and bring down the cost for low-income consumers – while reducing the need for direct imports of livestock products. This is a largely “hidden” side of the dietary transition: increasing global production of maize and soybean is feeding an expanding domestic livestock sector, especially in developing countries (Vorley and Lançon, 2016).

For example, consumption of chicken meat in Peru increased by an annual average of 9.4 percent, and that of eggs by 6.8 percent, between 2005 and 2011. The poultry industry now accounts for 22 percent of agricultural GDP, and it employs 280 000 people directly and more than 1 million indirectly. In 2012, the industry consumed 3.7 million tonnes of maize feed, of which about 40 percent was imported (Del Pozo-Vergnes and Vorley, 2015). Feed imports can have a net positive impact if they free up land for more profitable crops. In China, for example, soybean imports have allowed farmers to specialize in producing maize, which gives higher yields and net returns than soybean (Vorley and Lançon, 2016).

INTERNATIONAL TRADE, FOREIGN DIRECT INVESTMENT AND GLOBALIZATION OF THE FOOD SYSTEM

In this evolving context, import restrictions are being used to encourage a supply response from domestic production, be it for inputs or for outputs, and to insulate producers from extremes of international price volatility. Some interesting large-scale initiatives, such as Nigeria's Agriculture Transformation Agenda, are using border measures along with other instruments to give stimulus to domestic production and manufacturing. Conversely, removing import restrictions through international trade agreements will have a multilayered impact on domestic markets. For example, it will reduce both the costs of imported feed and the price of imported meat such as poultry, which will become more competitive with the output of domestic producers and may displace many local suppliers.

Finding a balance between the requirements of international trade agreements and the need to protect domestic markets is difficult. As food systems evolve rapidly, policy-makers need to weigh gains to producers against losses to consumers. Distinctions between urban and rural areas are blurring, with growing numbers of rural residents being dependent on the market to meet their food needs. Rural net consumers have little to gain, and much to lose, from trade measures designed to stimulate domestic production (Vorley and Lançon, 2016).

Exports: the potential for smallholders

The global food trade is dwarfed by the size of domestic food markets in developing countries. However, this is in the aggregate – some commodities, such as coffee and cocoa, are typically produced for the export market. A number of more recent market developments, such as the case of cut flowers in Kenya, blueberries in Chile, and quinoa in the Andean countries, have also created new opportunities.

International and high-end domestic markets can help smallholders through contracts with large food companies that source from the small farm sector. This strategy has gained political and financial support from many international development agencies and non-governmental organizations (NGOs) in the past decade. It has been argued that the entry of the corporate private sector is a major step towards a solution to shortcomings of traditional strategies to assist small-scale farmers (IFAD, 2016, p. 237). Ion, Beyard and Sedaca (2014) point out that partnerships with the private sector are most effective when used to promote whole sectors or clusters. However, IFAD (2016, p. 240) notes that large corporations interested in these types of partnerships do not “appear capable of involving as direct suppliers even 10 percent or 20 percent of the world's small-scale farmers (50 to 100 million of them), or, at least, not in the next 10 or 20 years.”

Although domestic markets may be the main avenue for smallholders to benefit from rural transformation, owing to large domestic demand, this does not exclude the possibility that, for a subset of smallholders, agricultural exports may be the way to improving their incomes. For example, quinoa, produced mainly in Bolivia (Plurinational State of)

and Peru, has become one of the fastest-growing commodities in world trade in recent years. The quinoa supply is very fragmented, as it is almost entirely produced by subsistence farmers. In Bolivia (Plurinational State of) alone, it is estimated that there are at least 70 000 small producers of quinoa (Furche *et al.*, 2015).

Global production of quinoa increased from 79 000 tonnes in 2010 to 193 000 tonnes in 2014, driven by increasing international demand, which has led to increases in quinoa prices, a portion of which goes to farmers and improves their incomes. Carimentrand *et al.* (2015) report that the farmgate prices increased threefold in Peru between 2007 and 2011. Furche *et al.* (2015) describe the value chain for quinoa on domestic and international markets, emphasizing the role of producer associations in capturing value along the chain.

Although the success of quinoa is encouraging, international markets also expose smallholders to the whims of the market, which can be of unprecedented amplitude. For example, Filipski *et al.* (2015) report on a region in Morocco where saffron production drives the local economy. The global market price for saffron has been highly volatile, producing price shocks that dramatically affect saffron production and labour demand, and particularly wages for women.

The role of foreign direct investment

Infrastructural investment has led to the lengthening of supply chains and the transformation of midstream and downstream segments. Small farmers' access to markets is also conditioned by infrastructure and distance to market. Barrett (2008) found distance is much more important than macroeconomic and trade policies in determining small-scale farmers' participation in markets. Foreign direct investment also played an important role, along with investments made by the public sector.

Before the liberalization of FDI in the 1990s, most FDI in the food system was focused "upstream", in operations such as banana plantations (Reardon and Timmer, 2007). An important recent development with globalization and relatively free entry for FDI is that the amount of investment has increased dramatically and most of it is

"downstream", in processing, retail and food services. Moreover, as countries urbanize, the greater density of consumers and improvements in distribution infrastructure have attracted FDI and domestic investment in livestock production, food processing, services and retail.

Foreign direct investment ultimately facilitates the globalization of food consumption patterns (Hawkes, 2005; Kearney, 2010; Popkin, 1999). As FDI has risen, so has the proportion invested in highly processed foods for sale in host markets. A meta-survey of research on agribusiness FDI in sub-Saharan countries (Dentoni and Mitsopoulos, 2013) found that food processing and beverages dominated in investment projects. Hawkes (2005) viewed FDI as proving more effective than trade in generating sales of highly processed foods.


With better transportation systems and improved access to foreign suppliers, FDI can increase significantly the importance of imports in the overall food supply (Vorley, Fearn and Ray, 2007). However, the domestic private sector, including informal food services, rapidly learns to compete against transnational companies. It is this quick response of national processing and food service sectors to shifts in consumption that may explain why urbanization does not necessarily lead to a rapid growth in food imports.

Domestic food markets are the most important in volume terms in most developing countries. It is this dynamic, which is largely context-specific, that policy-makers should consider in the design of food and trade policies that allow the emergence and the strengthening of a competitive domestic food system. In some countries, including most of those in sub-Saharan Africa, this will require the commercialization and industrialization of agriculture and food systems, and the application of science and technology to realize the highest potential production (Nassirou Ba, 2016). ■



OUANAMINTHE, HAITI
Rehabilitation of rural roads
facilitates food security.
©FAO/Luca Tommasini





CHAPTER 3 WHAT DOES THE FUTURE HOLD FOR FARMING SYSTEMS?

Key messages

- Rural transformation is more likely to be inclusive when the productivity of both agricultural land and labour improve – but trade-offs are emerging where land fragmentation is reducing the average farm size.
- Agricultural mechanization can increase both land and labour productivity, even on small farms, especially if rental markets for machinery or shared use of equipment through farmer cooperatives are well developed.
- Modern information and communication technologies are giving farmers multiple options for buying inputs, selling outputs and improving their access to information.
- In countries with rapid population growth and limited prospects for industrialization, creating jobs for youth will require dynamic growth of decent employment in on-farm and off-farm activities, such as food processing, services and agritourism.

WHAT DOES THE FUTURE HOLD FOR 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, therefore, 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 food system and supply chains change farming systems. They do so directly through their impacts on farm production mixes and technologies, but also indirectly by modifying factor markets, which leads to the re-allocation of labour and capital, as well as land at later stages. In addition, farming system transformations are driven by upstream changes, such as productivity-enhancing technologies and policies that facilitate their adoption. As countries have liberalized their

input markets, larger and more commercialized farms have benefited from the availability of high-yielding inputs, including hybrid crop varieties and quality seed. Often, however, small farmers have been left behind, owing to a lack of policies, infrastructure and institutional arrangements that would enable them to gain scale and improve their access to technologies and markets. With the increasing consolidation of global input markets, agribusiness firms providing inputs and technologies may be less motivated to invest in small farmers in smaller developing countries. This underscores the need for policy interventions that address market failures and respond to small farmers' needs, especially through the provision of public goods such as rural advisory services and support to farmers' collective action.

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 by fostering supply-chain exchange mechanisms that favour the participation of small farms in agricultural supply chains (Barrett, 2008; Poulton, Kydd and Dorward, 2006; Reardon and Timmer, 2012).

This chapter reviews the fourth and fifth major transformations identified in Chapter 2, namely those occurring in rural factor markets and farming technology. It assesses their interactions with agglomeration economies, and their implications for agricultural productivity, rural inclusiveness and environmental sustainability. After analysing major trends in mechanization, farm technologies, farm size and land tenure markets, it discusses the changes affecting farmers' social, institutional

and policy environment and the major challenges to be addressed. The chapter concludes by examining the policy implications of the need to make farming system transformations inclusive and sustainable. ■

MECHANIZATION AND TECHNOLOGY ARE KEY DRIVERS OF FARMING SYSTEM CHANGE

Increasing agricultural output and diversifying products are preconditions for the development of the food processing sector and accompanying increases in rural employment and income. As land shortages are a major factor limiting increased production, achieving higher rates of land productivity is crucial. One response to this challenge is sustainable intensification, which relies on advanced physical inputs, such as high-yielding varieties and improved combinations of fertilizer, along with resource-conserving practices such as mixed cropping and zero tillage. Sustainable increases in productivity have been achieved with alternative approaches. One of these is agroecology, which applies practices that combine scientific and traditional knowledge (FAO, 2016c). In most of the Near East and North Africa, where water is a critically limiting factor, further growth in agricultural productivity will depend on the effective mobilization of water resources and more efficient irrigation, both of which require investments in technologies and infrastructure.

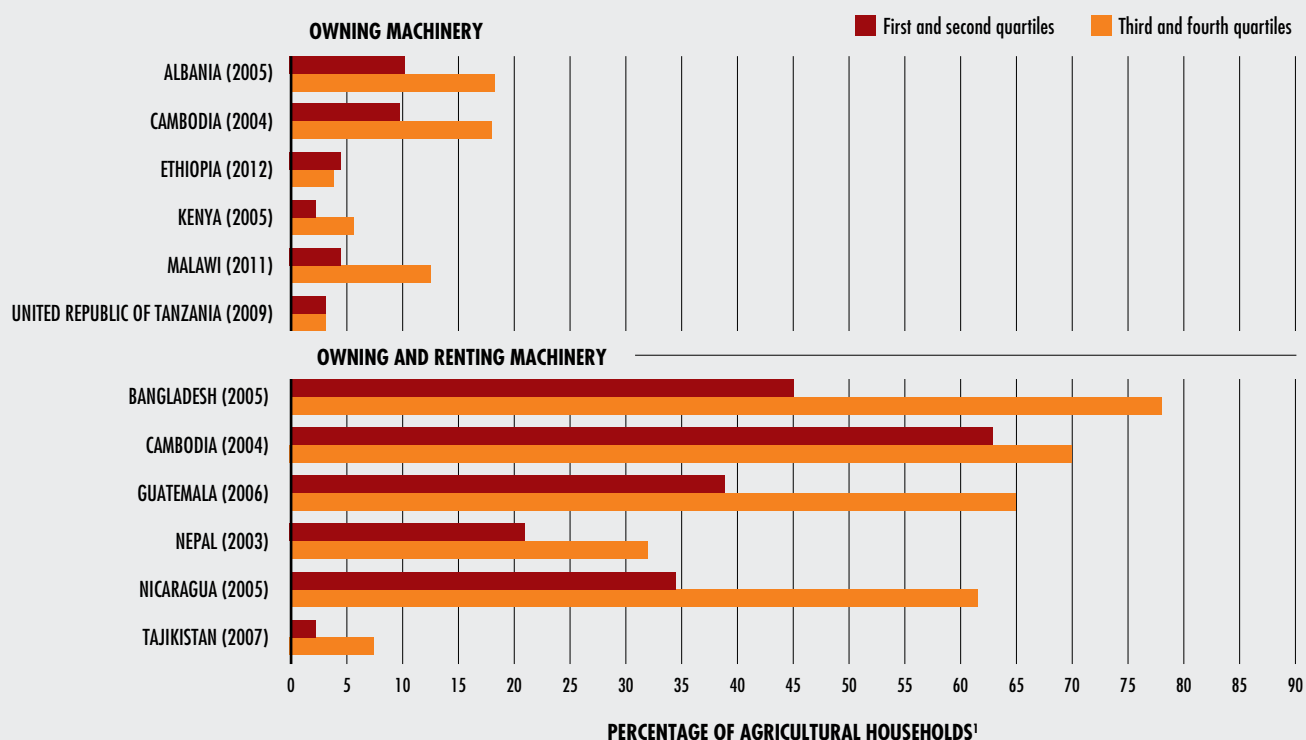
In this context, agricultural mechanization becomes crucial, because it enhances the productivity of other production inputs, such as

seed, fertilizer and water, and can lead to improved productivity of both land and labour. As it is essential for labour exit from agriculture and labour reallocation to the non-farm sector, mechanization has increased substantially worldwide, especially in the countries that have undergone rapid transformations. Available data (Figure 13) show that mechanization is more common among the third and fourth farmland size quartiles (i.e. larger farmers), which 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” and reduce labour and supervision costs per unit of output.

However, mechanization can be profitable even for small-scale farmers. Once a certain level of transformation is reached, agricultural labour costs rise and synergies between machinery and other inputs develop, which together encourage even small farmers to mechanize. This, in turn, creates incentives for the development of a machinery rental market, which has become the key to mechanization among smallholders. Data on Cambodia from 2004 showed that only 20 percent of mechanized farms used their own machinery; the rest relied exclusively on rented machinery (Figure 13). The sharing of machinery through farmer cooperatives is common in many countries and often benefits even the smallest farms. Improved design of farm machinery and equipment, adapted to the specific needs of smallholder farmers, would also do much to increase their use.

Country experiences in mechanization are influenced by context-specific factors, including the stage of rural transformation reached and the role played by public policies, which shape incentives (Box 10). It is noteworthy that the private sector has driven mechanization in Asian

FIGURE 13
LEVELS OF MECHANIZATION BY LAND QUARTILES AND
SOURCE OF MECHANIZATION IN SELECTED COUNTRIES



¹ Agricultural households are those households operating agricultural land.

NOTE: 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 other types of machinery.

SOURCES: FAO 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, 2007; Government of the United Republic of Tanzania, 2009.

countries and that government incentives in India were not for the adoption of a particular technology but rather for mechanization *per se*.

As reported in Poapongsakorn, Pantakua and Wiwatvicha (2017), the level of mechanization also varies across different farming operations and crops. In Thailand, the development of farm mechanization began with energy-intensive machines such as irrigation pumps, power tillers and threshers (Thepent and Chamsing, 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 technical problems in machinery design.

Improvements in agricultural productivity are also driven by the increased use of physical inputs and access to sources of affordable energy. Fertilizer, pesticides, irrigation and improved seed are generally used in concert 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 serve as an indicator of production intensification. Available data indicate that fertilizer use is highest in East Asia, where it

BOX 10 MECHANIZATION PATTERNS VARY BY COUNTRY CONDITIONS

In China, the use of farm machinery, measured in kilowatts, rose sevenfold 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. The adoption of medium-sized and large tractors coincided with a 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 agricultural 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 smallholders. Today, Bangladesh's agriculture is highly mechanized but still labour-intensive, owing to the dominance of small-scale machinery – for example, four-wheeled 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 functioning rental market (Ahmed *et al.*, 2013).

Mechanization in India took yet another pathway. In general, medium-sized tractors (of 20–40 horsepower) are the most common type in India and were first adopted

on medium-sized and large farms. 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 has also sought to ensure that the choice of machinery is driven by demand, not subsidies (Diao *et al.*, 2014).

In Africa, mechanization has received renewed interest. Diao *et al.* (2014) 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 an increasing land-to-labour ratio. These developments, along with increasing wages, have caused farmers to adopt labour-saving technology. Even small-scale farmers now use tractors for operations such as ploughing. Private investors now 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 farmers with 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.

Ghana buys machinery from countries that 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 similar policies of supporting mechanized services through subsidized pricing.

exceeds 300 kg per hectare (ha), and lowest in sub-Saharan Africa, at less than 10 kg/ha, reflecting different levels of transformation and productivity across regions (FAO, 2017c).

Farmers in sub-Saharan Africa generally operate in very difficult conditions on very small farms. Owing to the poor state of rural infrastructure, many lack access to modern agricultural inputs and machinery. 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 (Adjognon, Liverpool-Tasie and Reardon, 2017; Filmer and Fox, 2014). Therefore, increasing agricultural productivity in the region requires investments in roads and other infrastructure in order to improve access to purchased inputs and improved crop varieties, and access to produce markets. However, prioritizing investments in infrastructure should account for factors such as population density, as the aggregate and per capita benefits of

investments will differ between more- and less-populated areas. ■

LAND TRANSFORMATIONS: FRAGMENTATION, CONSOLIDATION AND MARKETS

The ongoing evolution of the food system and agro-industry in developing countries, illustrated in Chapter 2, presents smallholder farmers with the challenge of trading in an increasingly complex business environment with high standards and specific quantity requirements. In this context, farm size matters, as it can bring cost advantages. For example, Collier and Dercon (2014) found that large farmers adopt modern technologies more rapidly than small-scale farmers because they have better access to resources and are, therefore, usually more skilled at managing risks; smallholders rely more on labour inputs and mixed-cropping systems that are appropriate to small farm sizes (Rapsomanikis, 2015).

In all developing regions except Latin America and the Caribbean, most farms are in the smallest cohort – i.e. smaller than 2 ha. In 11 countries of Southeast Asia and the Pacific, 78 percent of farms are smaller than 2 ha, but occupy only 34 percent of farmland.⁹ In South Asia, more than 85 percent are smaller than 2 ha, but occupy only 43 percent of farmland, while in the Near East and North Africa, farms smaller than 2 ha account for 68 percent of total farms, but occupy only 11 percent of farmland (Lowder and Bertini, 2017). This section examines trends in the average farm size and in farmland distribution in developing countries, and analyses the extent to which past transformations are being replicated today and the implications for agricultural productivity and rural livelihoods.

⁹ Data are unavailable on farmland distribution in China. If China is included, the share of small farms (less than 2 ha) in Asia increases. This is because the share of farms smaller than 2 ha in China exceeded 97 percent of total farms in 2006 (Tan *et al.*, 2013).

Trends in the distribution of farm size

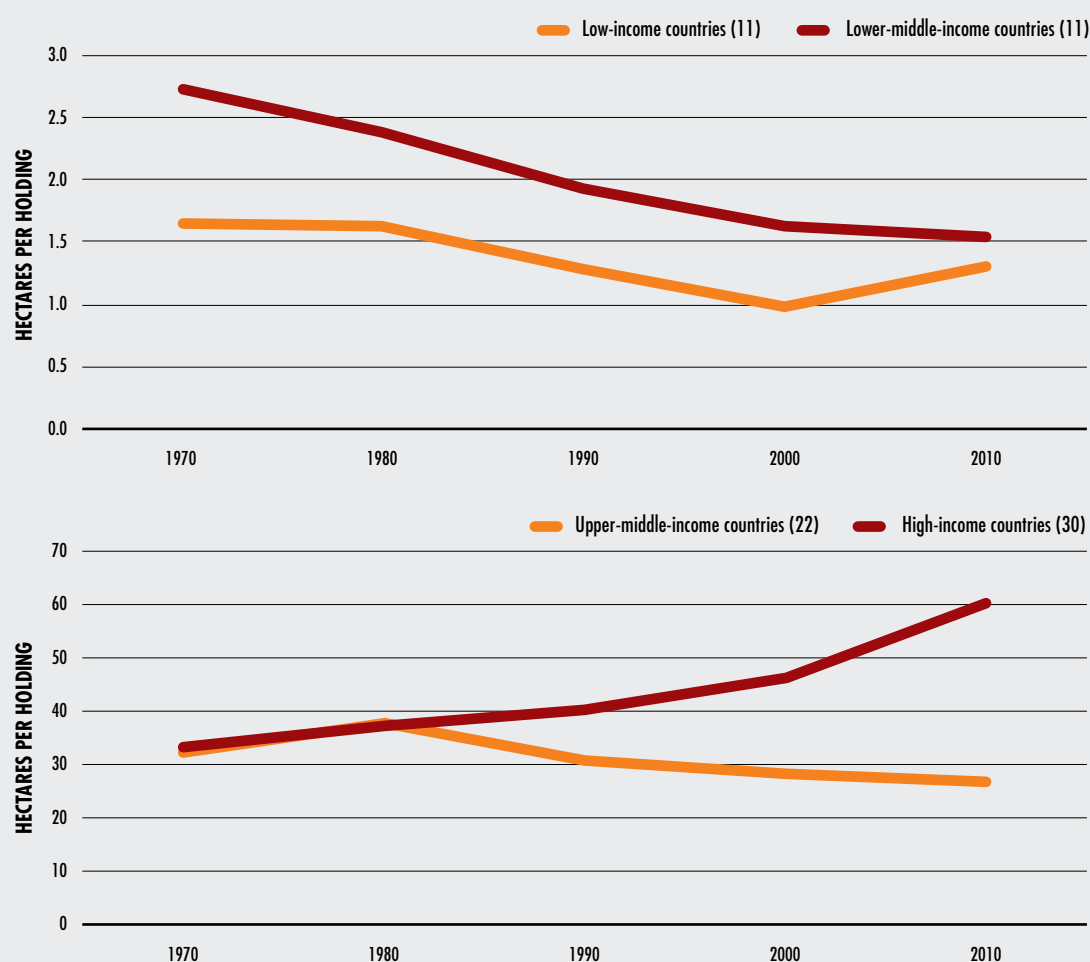
Data from 74 countries with various income levels¹⁰ (Figure 14) show that the average farm size is positively linked to income level – i.e. larger in high-income and upper-middle-income countries (on average 27 ha and 60 ha, respectively, in the 2010s) that have already undergone transformation or are well advanced in the process, and considerably smaller in low-income and lower-middle-income countries (1.3 ha and 1.5 ha, respectively, in the 2010s).

The farmland share of the larger cohorts increases with income level. Farms larger than 5 ha represent 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 larger share of farmland in lower-income countries and regions than in higher-income countries and regions (for details, see FAO, 2014b). This static cross-sectional picture would appear to confirm the standard narrative that, as transformation proceeds, smaller parcels of farmland are consolidated into larger holdings.

The standard narrative is confirmed by the trend in high-income countries, where the average farm size is increasing, but not by the trends in middle- and low-income countries, where it is generally decreasing. However, the average farm size by country income groups hides considerable variations between regions and countries and within countries. While the average farm size is declining in 9 of the 22 upper-middle-income countries for which recent data are available, trends at the country level are mixed. For example, Mexico's average farm size has fallen sharply from 137 ha in the 1970s to 20 ha in the current decade, while increasing from 404 ha to 620 ha in Argentina and from 212 ha and 365 ha in Uruguay, and remaining stable in Brazil at about 60–65 ha. Examples from upper middle-income countries in other regions show similar

¹⁰ Data are available for 30 high-income countries, 22 upper middle-income countries, 11 lower-middle-income countries and 11 low-income countries. World Bank (2016b) is used for the classification of countries by income level.

FIGURE 14
CHANGES IN AVERAGE FARM SIZE IN SELECTED COUNTRIES BY
INCOME GROUP, 1970–2010



SOURCE: Lowder and Bertini, 2017.

mixed trends, but average farm sizes are much smaller, and are comparable with farm sizes in low-income and lower-middle-income countries.

Although the declining trend between 1970 and 2000 was more pronounced in lower-middle-income and low-income countries, it slowed in the former and seems to have reversed in the latter in the period 2000–2010 (Figure 14). However, to understand how farming systems are changing along the transformation pathway, it is also

necessary to examine the distribution of farmland among holdings of different sizes and how it is evolving in recent transformers. Therefore, disaggregation by country provides a more nuanced picture, owing to diversity across countries within the same income group.

The data suggest that, in the last decade, the average farm size in some lower-middle-income and low-income countries, after generally decreasing, has now stabilized or is increasing

slightly. The country-level data show that, in the period 2000–2010, the average farm size increased in 7 of the 12 low-income countries for which data are available – Bangladesh, Ethiopia, Malawi, Mozambique, Myanmar, Togo and the United Republic of Tanzania – but continued to fall in Haiti, Nepal, Niger, Rwanda and Uganda. The average farm size also increased in 4 of the 11 lower-middle-income countries for which recent data are available: Egypt, the Lao People’s Democratic Republic, Paraguay and Tonga.¹¹

At the country level, the evolution of farmland distribution among holdings of different sizes can deepen understanding of trends in the average farm size. This is because, in some contexts, farm consolidation and fragmentation concur, as reported by Filmer and Fox (2014) for Malawi, Uganda and the United Republic of Tanzania. Moreover, Anríquez, Foster and Valdés (2017), using census data from Peru, show that small subsistence farms are becoming more fragmented, while large commercial farms are growing larger.

Figure 15 shows changes in farmland distribution in the last two decades in Ethiopia and India. In both countries, the trend in average farm size is consistent with trends in the distribution of farmland among holdings of different sizes, which indicates that farm consolidation is occurring in Ethiopia, while farmland is becoming more fragmented in India. In Ethiopia, more than 35 percent of farmland was under holdings of less than 1 ha and more than 65 percent was under holdings of less than 2 ha in 1992. This has changed over time, with a noticeable increase in medium-sized farms (2–10 ha) and the emergence of large ones of more than 10 ha. Trends in the numbers of holdings in each category confirm Ethiopia’s farmland consolidation. Small holdings (less than 1 ha) made up 72 percent of the total number of holdings in 1992, but decreased to 63 percent in 2002; holdings of 2–5 ha, which accounted for only 7 percent of the total number of holdings in 1992, accounted for 12 percent in

2002 (Federal Democratic Republic of Ethiopia, Central Statistical Agency, 2012).¹²

The opposite has occurred in India, where farms of less than 1 ha represented only 15 percent of farmland and those of less than 2 ha some 32 percent in 1991. Today, those two categories represent 22 percent and 44 percent, respectively, while the farmland share of medium-sized and large farms has shrunk. In the same period, data from India show that the number of larger farms decreased and that of smaller ones increased. For example, the share of small farms (less than 1 ha) in the total number of holdings rose from 59 percent in 1991 to 67 percent in 2011, while the share of medium-sized farms (2–5 ha) fell from 16 percent to 12 percent and that of large farms (larger than 5 ha) from 6 percent to 3 percent (Government of India, 2012).

In Latin America, Peru provides a striking example of how farmland consolidation is occurring alongside farm fragmentation. Between 2005 and 2014, the number of small subsistence farms increased by 25 percent, and the average farm size for this category dropped from 1 ha to 0.75 ha. In the same period, the number of larger “business farms” almost tripled, while their average size remained constant at about 9 ha (Anríquez, Foster and Valdés, 2017). In general, the land area controlled by larger farms is increasing in Peru, which indicates that, in the long term, farm consolidation will dominate.

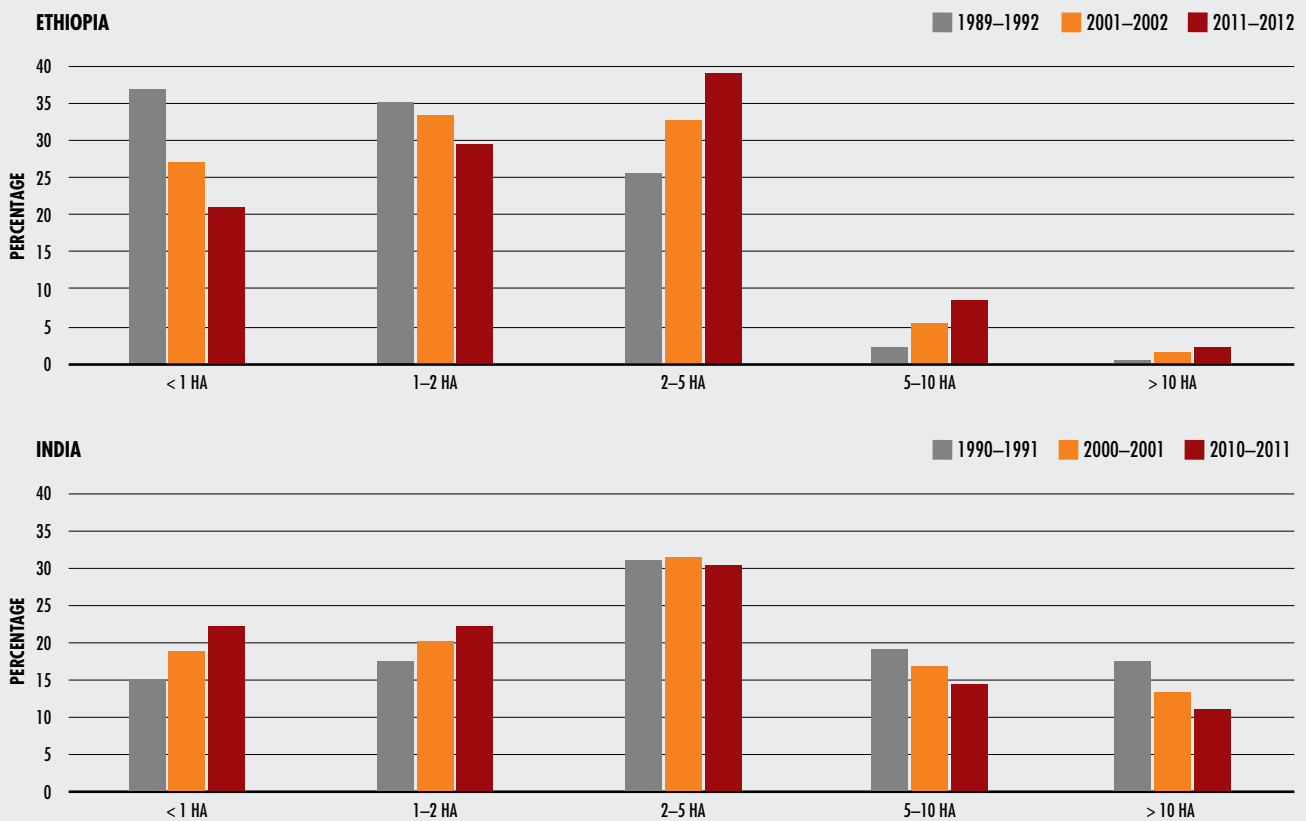
Drivers of farm-size changes and implications for agricultural productivity and rural incomes

Differences in average farm sizes can be attributed, in part, to population dynamics in rural areas, such as population growth and densities. High levels of population density are associated with smaller farm sizes in many Asian countries, such as India and Pakistan. Population dynamics need to be part of any assessment of how farmland distribution will evolve in the future – although other factors play important roles in

¹¹ In the past decade, the average farm size has continued to decrease in the following lower-middle-income countries: El Salvador, Fiji, India, Lesotho, Nicaragua, Pakistan and Samoa.

¹² More recent data on numbers of holdings by farm size category are not available for Ethiopia.

FIGURE 15
CHANGES IN SHARES OF FARMLAND BY LANDHOLDING SIZE
IN ETHIOPIA AND INDIA, 1990s–2010s



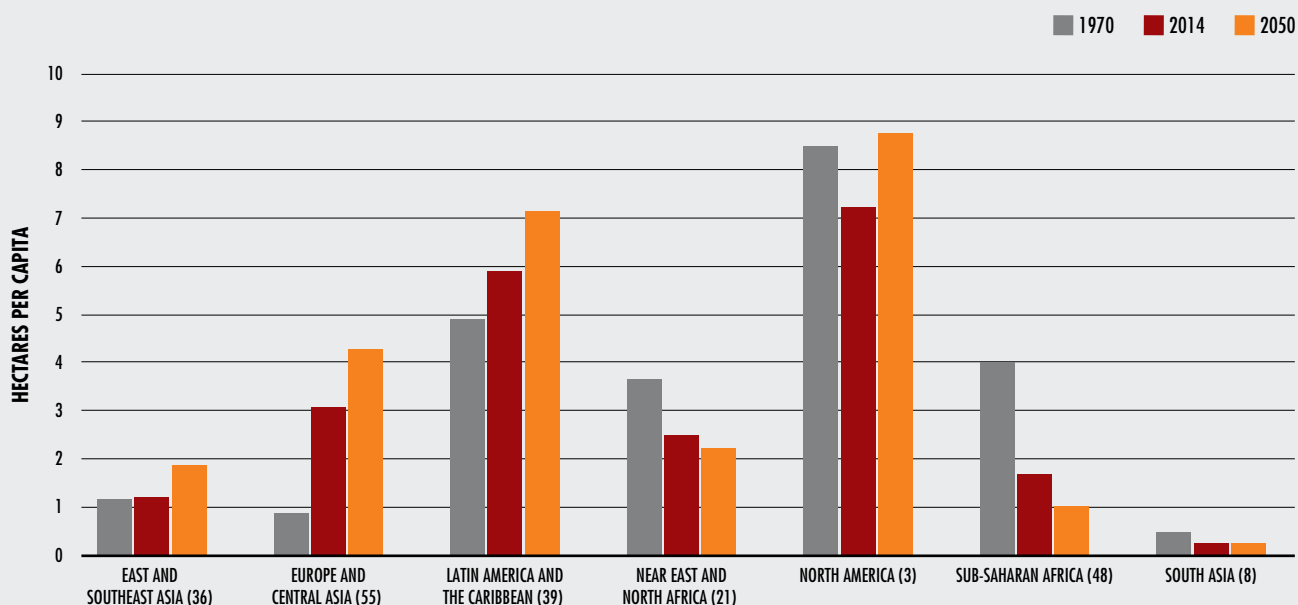
SOURCES: Federal Democratic Republic of Ethiopia, 2012; Government of India, 2012.

the transformation of farmland distribution, how many people will be living in a rural area relative to the amount of available agricultural land is a fundamental consideration. As Figure 16 shows, the Americas had considerably more land available per capita of rural inhabitant in the 1970s than any other region has today or will have by 2050. Given the already extreme land scarcity in most of Asia, and the fact that the most rapid increases in rural population will occur in sub-Saharan Africa in the decades ahead, it is unlikely that average farm sizes in those two regions will increase to those

seen in the United States of America, Argentina or Brazil.

The increase in farm size in some sub-Saharan African countries, especially in the last decade, can be attributed to land acquisitions by wealthy Africans, described as an underappreciated “megatrend” by Jayne and Traub (2016). They note that areas of land acquired by local, often urban, investors are much larger than those purchased by foreign investors. In Ghana, Kenya and Zambia, the area of land controlled by medium-scale farmers now

FIGURE 16
CHANGES IN AGRICULTURAL LAND AREA PER CAPITA OF
RURAL POPULATION, BY REGION, 1970–2050



NOTE: Assumes agricultural area in 2050 remains constant at 2014 levels.
SOURCE: Calculations based on World Bank (2017a).

exceeds that of foreign and domestic large-scale holdings combined (Jayne, 2014). This trend may help explain the dramatic increase seen in land prices in areas with high agro-ecological potentials (AGRA, 2016), which is where medium-sized farms have been mostly concentrated and where factor markets have been functioning better than elsewhere in Africa (Dillon and Barrett, 2017).

The emergence of domestic investors has reduced the amount of land available to rural young people, leading to increased levels of landholding inequality and out-migration (Jayne, Chamberlin and Headey, 2014). When coupled with increasing fragmentation of small farms, this trend would increase barriers to accessing land for younger

generations, as farms become too small and economically non-viable to be divided among heirs. At the same time, investors buying up new lands for farming are bidding up land prices, making them unaffordable to a larger proportion of the rural population. The result may be further out-migration. For example, Bezu and Holden (2014) found that rural youth out-migration in southern Ethiopia has increased significantly in the past six years, partially owing to the serious constraints facing young people in accessing land.

Filmer and Fox (2014) note that farm size in many African countries is also limited by the lack of mechanization. As 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, 2012a). 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 area.

Trends in farm size and farmland distribution have implications for agricultural productivity and rural livelihoods (Box 11). The standard hypothesis of the impact of structural transformation on farming systems is that it leads to land consolidation, which accompanies the move to specialized farming systems and commercialized agriculture and to higher agricultural productivity. However, improvements in productivity are better understood when both land and labour productivities are considered. Mikecz and Vos (2016) find that although the labour productivity of small farms is low, they have the highest land productivity, while the relationship is inverse for the largest farms – their labour productivity is the highest but their land productivity is the lowest. This trade-off between land and labour productivity is important in assessing the impact on overall agricultural productivity of changes in the distribution of farmland during the transformation process.

The trade-off between land and labour productivities and the inverse relation to farm size, described in Box 11, indicate that declining farm size may not hinder productivity, and in some cases it may lead to higher production per unit of land. While the consequences will depend on initial farmland distribution and average size, they also depend on whether small farmers are able to access the production inputs, produce markets and credit necessary for investments and technology adoption, as well as the associated information and knowledge.

When small farms become even smaller, fragmentation will hinder the capacity of

small producers to become more market-oriented and to adopt the technologies needed for sustainable productivity growth, thus increasing the vulnerability of their livelihoods (Rapsomanikis, 2015). At that point, some sort of consolidation will be needed to allow farmers to gain scale and overcome barriers to technology adoption and integration into modern value chains. This underscores the key role played by rural advisory services and the importance of collective action by small farmers to gain scale.

Productivity is also affected by land tenure systems and land markets. Several studies indicate that strengthening property rights leads to higher land productivity (Deininger and Jin, 2008; Dercon and Ayalew, 2007; Holden, Deininger and Ghebru, 2009). This raises issues regarding land tenure systems, the land tenure security of customary holders, the lack of titling of landholdings, and the need for improved partnerships between investors and local farmers. However, the benefits of strengthening property rights are context-specific and depend on other factors. A recent meta-analysis by Lawry *et al.* (2017) found that the titling of land formerly under customary tenure led to investment and productivity gains in Asia and Latin America, but not in sub-Saharan Africa (where most agricultural land is under customary tenure). The study points out that other factors, such as credit, input supply and access to produce markets, are crucial. Therefore, more-secure land tenure is a necessary but not sufficient condition for investments in agricultural land, as concluded by Holden and Ghebru (2016).

Ali *et al.* (2015) found that clarifying land rights remains crucial for the development and efficient functioning of land rental and sales markets (Box 12). Smooth functioning of land markets, in turn, is essential for structural and rural transformations. By helping farmers 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). ■

**BOX 11
RECENT SHIFTS IN PRODUCTIVITY AND LANDHOLDING SIZE IN PERU**

Between 2005 and 2014, per capita GDP in Peru grew at an annual rate of 4.8 percent, and agricultural value added increased by an average of 3.5 percent a year. Peru is coming late to the demographic transition, compared with other Latin American countries, and demography appears to be driving increases in agricultural employment. Indeed, Peru is the only Latin American country to experience higher growth in farm employment than non-farm employment, despite a rapidly growing rural non-farm economy. These trends may be relevant to other “late transformers”.

The table shows the evolution of different farm types between 2005 and 2014. “Subsistence farms” are those declaring that they produce mainly for household consumption and have cropped land of less than 1.5 ha and fewer than 10 livestock units. “Transition” farms use land for cash crops, but their total cropped area is less than 5 ha and they own fewer than 10 livestock units. “Commercial” farms either have more than 5 ha of cropped land or 10 livestock units, or both, or are considered separate from business farms because they are family-operated. “Business” farms are operated by paid managers and, as such, are of commercial scale.

The table also shows that subsistence farms in Peru are, in terms of income per area, more productive than other family farms, but less productive than business farms. This is consistent with the inverse relationship between farm size and farm productivity, a topic that has been extensively discussed in the agricultural economics literature.¹ In general, where most agriculture is small-scale and the commercial sector is not developed, the inverse relationship dominates, with smaller farms being more productive than larger farms. However, in countries where a large commercial sector exists, such as Brazil (Anríquez and Bonomi, 2007), smaller farms are more productive than larger farms, but not more productive than large-scale commercial farms, which are more capital-intensive than smallholder agriculture.

The evidence presented in the table is consistent with the literature – subsistence producers are more productive, in terms of income per unit of agricultural land, than transition and commercial family farms, but not more productive than business farms. Moreover, the average productivity gap between subsistence and transition farms has narrowed, as subsistence farms have become more involved in off-farm productive activities. Overall, these results point to the growing importance of off-farm activities in rural Peru.

EVOLUTION OF FARM TYPES, PERU, 2005–2014

Type of farm		Year	Number of respondents	Total land (ha)	Share of production sold	Livestock units	Farm income per cropped ha (2014 US\$)
Family agriculture	Subsistence	2005	931 633	1.0	0.1	2.9	949
		2014	1 170 016	0.7	0.1	2.5	2 249
	Transition	2005	817 712	2.0	0.6	4.5	742
		2014	787 410	2.0	0.6	3.8	1 950
	Commercial	2005	239 148	12.0	0.5	14.4	234
		2014	212 549	17.0	0.5	17.4	365
	Business	2005	8 726	9.0	0.9	3.9	1 292
		2014	22 020	9.0	0.9	5.4	3 699
	Total	2005	2 002 498	1.5	0.3	5.0	999
		2014	2 191 996	1.0	0.3	4.4	2 556

NOTE: Farm income per cropped ha is converted at the 2014 exchange rate of S/2.84 to US\$1.

SOURCE: Anríquez, Foster and Valdés, 2017, Table 3.

¹ The inverse relationship between productivity and farm size has been observed and confirmed in different contexts since the first household surveys were analysed in India in the 1950s. See Muyanga and Jayne (2016) for an introduction to the subject.

SOURCE: Anríquez, Foster and Valdés, 2017.

BOX 12 RECENT TRENDS IN LAND RENTAL MARKETS

Lowder and Bertini (2017) present evidence from agricultural censuses in 26 countries to show that, in most countries, the majority of landholdings are operated by their owners. The share rented from others is small, ranging from zero in some countries up to 22 percent in Ethiopia. However, 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 (2017) shows that land rental markets are more common than previously thought in six sub-Saharan African countries and that they have potential for advancing 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. In addition, holdings with more than one form of tenure are also found in some countries. For example, in Bangladesh and Togo, 40 percent of holdings are categorized as rented, owned or operated under other tenure systems (Lowder and Bertini, 2017).

WHAT IS CHANGING FOR FARMERS?

New intermediaries as entry points

Farmers' relationships with intermediaries are changing rapidly. The example of the potato value chain that supplies Delhi from the city of Agra (see [Box 7](#), p. 40) shows how cold storage has only recently emerged thanks to a confluence of factors, and has become more than a simple storage mechanism. Reardon and Minten (2012) found that farmers around Agra now sell only 10 percent of their potatoes to rural brokers at the farmgate, and only 20 percent to local brokers while their produce is in cold storage. Almost 60 percent of production goes directly to wholesale markets in Agra and Delhi, bypassing local brokers. 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 several countries, including China (Huang *et al.*, 2007), Indonesia (Natawidjaja *et al.*, 2007) and Mexico (Berdegue *et al.*, 2006). 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 the potato supply to Delhi, the cold-storage facilities are also providing financial services, with 60 percent of farmers, large and small alike, receiving credit.

Other important changes for farmers in transforming countries include new avenues for accessing finance and investments, and the increasing role of non-farm income 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, as they are typically better informed, use their own savings to buy inputs, and have the collateral banks need to grant loans for investments. Private-sector banks usually lend little to farmers owing to the high transaction costs and farmers' lack of collateral. Small-scale farmers, in particular, face serious difficulties accessing formal credit sources, and typically depend on local moneylenders, often with onerous conditions and high interest rates. Adjognon, Liverpool-Tasie and Reardon (2017) 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 in areas 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 agricultural credit schemes, which played an important role in developing countries for several decades. The informal financing arrangements

BOX 13
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, the share of farmers' maize sales to LSTs has quadrupled, rising from 3 percent to 12 percent of total maize sales by 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 with traditional commercial channels, LSTs 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 kilogram.

Large-scale traders are attracted to an area by medium-sized 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 credit for inputs.

The role of LSTs in East Africa is evolving with other important transformations in the demand and production segments of regional 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 low-income farmers. 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.

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 being at different stages in the transition towards greater access to financial resources and markets. Because interlocking factor markets¹³ 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

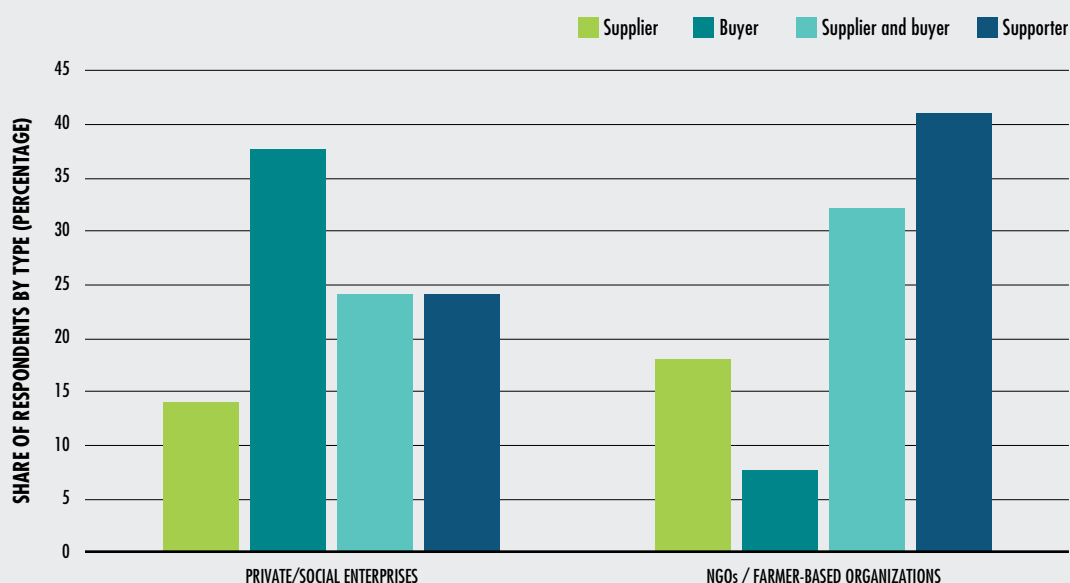
superhighway altered bargaining power between landlords and the rural poor, in favour of the latter. Smallholder participation in social networks can serve the same function, as reported by Abay, Kahsay and Berhane (2014) in the case of Ethiopia. In Kenya and Zambia, the entry of large-scale traders into maize markets is bringing small-scale producers generally higher prices and better access to inputs (see **Box 13**).

Agricultural extension and rural advisory services

The roles of agricultural extension and rural advisory services (RAS) in developing countries have changed significantly since the 1980s, the result of cuts in public funding, the increased complexity of farming systems and rural

¹³ Interlocking factor markets exist where access to one factor of production (e.g. credit) is conditional on providing another factor. The best-known example is sharecropping, in which a tenant offers labour to a landlord in exchange for accessing land and credit, and shares the output with the landlord, usually on exploitative terms.

FIGURE 17
 TYPES OF VALUE CHAIN ADVISORY SERVICES PROVIDED BY PRIVATE/
 SOCIAL ENTERPRISES AND NGOs / FARMER-BASED ORGANIZATIONS



NOTE: Based on data from 42 developing countries.

SOURCE: Gómez, Mueller and Wheeler, 2016, Figure 19.

landscapes, and the ongoing commercialization of agriculture. Traditional, top-down, mainly public-sector extension systems that 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 issues such as food security, climate change adaptation, nutrition, gender and health.

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 ten 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, 2014b). Therefore, most farmers are relying largely on other sources of information, such as other farmers, input dealers, radio, television, the Internet and mobile phones (Bitzer *et al.*, 2016).

Gómez, Mueller and Wheeler (2016) surveyed more than 100 organizations providing advisory services to small farmers in 42 countries.¹⁴ 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 17). Of the sampled organizations, 84 percent reported that their clientele included farmers with less than 2 ha.

¹⁴ The Gómez, Mueller and Wheeler (2016) study is likely to be more representative of Africa as 72 percent of respondents were in Africa, 17 percent in Latin America, and only 9 percent in Asia.

The 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.

Gómez, Mueller and Wheeler (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 information and communications technology (ICT) and arrangements 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, as the private sector may not meet those needs. Therefore, public support to the formation of producer organizations will play a central role in providing services and giving voice to farmers' concerns. In this way, advisory services become more demand-driven (FAO, 2014b).

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, the plurality 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 need external support.

The potential of information and communications technology

Direct, face-to-face extension services and relationships with buyers are increasingly being complemented – and sometimes replaced – by information channelled through modern ICT. In India, for example, a private food conglomerate has provided Internet access in rural areas so that farmers can negotiate prices for their produce (Box 14).

While infrastructure investments remain low in many developing countries, one area in which there has been a dramatic improvement in 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). In developing countries as a whole, penetration stood at 59 percent in 2016 and should reach 70 percent by 2020 (GSMA, 2016).

Mobile phones effectively shorten the distance between isolated smallholders and other actors involved in processing, transporting, marketing and regulating farm produce (Conway, 2016). As third-generation (3G) broadband coverage extends to the countryside, rural people are

moving increasingly from basic mobile phones, with voice and text-message capabilities, to feature phones, which support media formats such as images and video and can connect to the Internet (FAO, 2013b). Between 2011 and 2015, the proportion of the world's population with 3G coverage jumped from 45 percent to 69 percent, although broadband penetration lags behind in Africa, where coverage is below 20 percent (FAO and ITU, 2016). As mobile phone use increases, 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 government launched the M-Kisan Portal, an online service with location-specific information for farmers (FAO and ITU, 2016).

Whether "basic" or "feature", mobile phones allow farmers to seek solutions from peers or the expanding range of other information sources. In Sri Lanka, a virtual trading floor, FarmerNet, connects produce buyers and farmers via text messaging (FAO and ITU, 2016). Mobile phones 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 that delivers seed and fertilizer vouchers directly to farmers through their mobile phones. The platform was recently 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 and ITU, 2016). In the near future, such systems could provide a platform for connecting millions of once-inaccessible smallholders in sub-Saharan Africa. Local access to credit can also be made more timely and efficient through ICT.

Urban agglomeration and its impact on agriculture

As urbanization accelerates and, with it, the growth of small cities and towns, many farmers will find themselves living closer to urban areas. The economic changes facing farmers 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 also provides 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 is available during peak periods (Jordan, 1989).

BOX 14 PRIVATE-SECTOR ADVISORY SERVICES IN INDIA

Developed by an Indian 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 farmers to better align output with market demand and consumer segments. This has helped farmers to raise their quality standards and find the best price for their produce. The system helps facilitate access to higher-quality inputs at a lower cost to the farmer. It also creates a direct marketing channel, which, by eliminating wasteful intermediation and 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: Goyal, 2010; Singh, Shahi and Singh, 2016.

For further information, see APAARI, 2014.

In addition, proximity to urban centres expands off-farm employment opportunities, which helps farming households supplement income from their farming operation. In many developed countries, the proximity of farms to urban centres has allowed a transition to part-time farming by urban dwellers, which is a growing phenomenon also in parts of Africa (Yeboah and Jayne, 2016). Proximity also increases competition for land for non-agricultural commercial use or urban development, which increases the value of farmland, especially around large cities. This may be good news for small farmers willing to sell their land and switch to non-farm activities, but it may hinder farmland consolidation as larger farmers willing to expand their operations will face higher costs.

Urbanization also brings increased demand for locally grown, perishable and high-value crops, such as vegetables, which can offer farmers returns commensurate with those of urban uses. As the urban agglomeration size increases, the area devoted to peri-urban horticulture and urban agriculture may increase (De Bon, Parrot and Moustier, 2010). As vegetable production is typically labour-intensive, it contributes to employment creation (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 intensification of farming systems in many parts of the world, especially in proximity to urban centres, is already an observed phenomenon and poses challenges to environmental sustainability (see [In focus: Environmental and natural-resource challenges](#), p. 72).

The dynamic forces of urbanization create a city-region system in which a variety of farm types co-exist, reflecting different pathways that farms have taken in adapting to urban pressures. The system is shaped primarily by changes in the input and produce markets, where 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 with 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). ■

CHALLENGES AND OPPORTUNITIES FOR FARMERS IN TRANSFORMING FOOD SYSTEMS

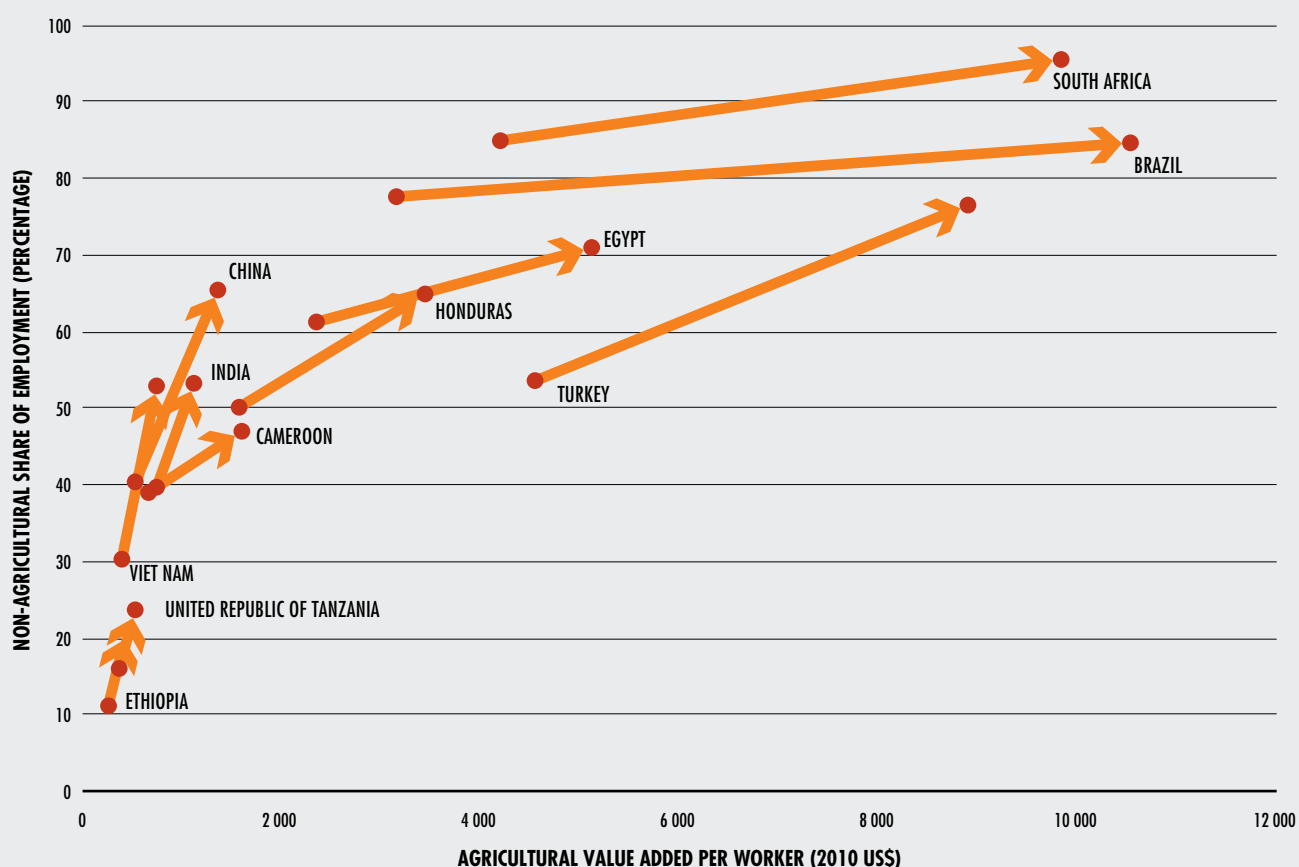
The employment challenge

One trend in low-income countries that does not appear to be diverging from those of past transformations is the exit of labour 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 share of labour employed in agriculture. This is shown in [Figure 18](#) 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, however, labour exit from agriculture slows considerably even as increases in productivity continue, as seen in the cases of Brazil, South Africa and Turkey.

These trends do not necessarily mean that the absolute number of people employed in agriculture is decreasing. That will be determined also by population growth in addition to the pace of transformation. In the United Republic of Tanzania, for example, the total number of people employed in agriculture increased by about 2.5 million between 2000 and 2015, while the share of agricultural employment in total employment fell from 79 percent to 68 percent. However, in countries that have undergone rapid transformations, such as China and Viet Nam, the pace of transformation has exceeded that of population growth, leading to a sharp decline even in the absolute number of people employed in agriculture – by 131 million in China and 2 million in Viet Nam (FAO calculations from FAO, 2017c).

In countries in more advanced phases of transformation, the pace of labour exit from

FIGURE 18
CHANGES IN SHARE OF NON-AGRICULTURAL EMPLOYMENT AND
INCREASES IN AGRICULTURAL PRODUCTIVITY, 1990s–2010s



SOURCE: FAO calculations from World Bank and IFAD (2016).

agriculture is slower. In Latin America and the Caribbean, the absolute number of people employed in agriculture increased, between 1984 and 2012, in 14 of 22 countries for which data are available; they include Chile, Ecuador, Mexico and Peru (Anríquez, Foster and Valdés, 2017). However, the share of agricultural employment decreased in all countries. For example, between 2000 and 2015, the share declined from 14 percent to 9.6 percent in Chile and from 18 percent to 14 percent in Mexico, although the absolute number of people employed in agriculture increased by 27 000 in Chile and 379 000 in Mexico.

Two types of factors explain these trends. First, push factors, driven by population growth in rural areas (relative to a land availability) and 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 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, prompting farmers to invest further in farm

machinery. Thus, while labour exit from agriculture continues, it does so at a slower pace, as in the cases of Brazil and Turkey.

In the past 15 years, the share of the workforce employed in agriculture has fallen in most countries, despite a modest rise in the absolute number of hours worked in agriculture. This change is taking place in all regions, but it 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 subregions. 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 owing to the sharp rise in agricultural employment in Ethiopia (23 percent). Even in Asia, the rates of change are uneven – it is highest in East Asia (–18 percent), but averages about –12 percent in Central, South and West Asia (FAO calculations from FAO, 2017c).

The drop in the share of 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 Africa is employed in family farming. Fine *et al.* (2012) estimate that some 122 million young people will enter the labour force in sub-Saharan Africa between 2010 and 2020; of these, only 72 million are expected to find employment in the non-farm sector.

Growth in agriculture will need to be sustained by parallel growth in off-farm agriculture-related activities, such as food processing and trading. Although agriculture may still have the potential to create new jobs – as observed in many countries where the number of those employed in agriculture has increased – the pace of labour absorption is slow compared with other sectors, and in many countries is slower than population

growth, especially in rural areas. Thus, agriculture’s role in job creation needs to go “beyond the farm”, by boosting the non-farm economy through the development of agroprocessing, trading and related activities.

The crucial role of producer organizations

Globally, the number of farms smaller than 2 ha has been estimated at 475 million (Lowder, Scoet and Raney, 2016). These smallholdings provide livelihoods for almost 2 billion people and, in Asia and sub-Saharan Africa, produce about 80 percent of food consumed (HLPE, 2013). Yet the access of small farmers to the land, innovations, technology, knowledge and information that are needed to enhance productivity and incomes remains limited. Female farmers’ access to knowledge of agriculture and nutrition is essential for achieving the SDG of eradicating hunger and achieving food security and sustainable agriculture. Well-equipped and professional rural institutions and organizations can play key roles in bridging these gaps while contributing to sustainable agricultural growth and development (GFRAS, 2015).

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, which affect their access not only to input and output markets, but also to a number of rural services, such as extension and credit (Poole and de Frece, 2010). Producer organizations, such as farmers associations and cooperatives, allow small farmers to pool their resources and reduce transaction costs, thereby gaining scale, and to increase 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 adapted to farmers’ needs and financial capacities. Producer organizations also facilitate access to credit, directly by managing microcredit systems and indirectly through innovative arrangements such as warehouse-receipt systems, in which stored produce is used as a collateral guarantee to obtain short-term loans (Herbel *et al.*, 2012).

Meeting smallholder farmers' financial needs, especially those related to liquidity constraints, is a strong incentive for farmer participation in organizations (Berdegué, Biénabe and Peppelenbos, 2011).

Through producer organizations, small farmers can engage in collective marketing, which reduces their transaction costs, allows them to share risks and improves their bargaining power. When their organizations are linked to other private and public actors, farmers can participate in multistakeholder coordination along value chains and make effective use of contract farming and fair-trade schemes (Prowse, 2008). For example, in Kenya, small-scale producers of leafy vegetables use groups to respond to modern market requirements. Being organized in associations, farmers are able to comply with the food quantity, quality and delivery requirements set out in contracts with supermarkets (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 and implementation of public policies. In the Gambia, for example, the National Fisheries Post-Harvest Operator Platform helps the government, NGOs, microfinance institutions and other partners to learn about small producers' needs and helps producers to express their concerns and preferences.

As trust is a precondition for the design and implementation of inclusive development policies, transparent dialogue is essential for the emergence of shared views and values (Crowley *et al.*, 2007). 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 to innovate, improve their skills, access and make use of appropriate information and knowledge, and adapt to changing markets (Chirwa *et al.*, 2005; Herbel *et al.*, 2012).

Producer organizations have an important role to play in the sustainable management of natural

resources. Mediation committees for conflict resolution of land issues or for securing land-use rights, water users associations, women's groups for reclaiming land, and community-based forestry enterprises are examples of collective action that provide incentives for small producers to manage natural resources in a sustainable way, while creating benefits for rural communities as a whole. Herbel *et al.* (2012) show how such organizations have helped ensure natural-resource use and management in a way that is both inclusive and sustainable in a range of countries, including Benin, Egypt, the Gambia and India.

The reform and strengthening of extension and rural advisory services will need to continue because these service providers are best positioned to provide the support farmers need in shifting to sustainable production systems. Many remain under-resourced after many years of neglect and have significant needs for capacity development. Extension and rural advisory services can assist farmers and other actors in rural settings in developing the technical, organizational and management skills and practices needed to improve their livelihoods and well-being. They provide critical services that improve the productivity and livelihoods of smallholder farmers and enable them to maximize their contributions to national and global development (Box 15).

Producer organizations require institutional arrangements to ensure that they are sustainable and effective in dealing with market actors and policy-makers. These arrangements consist of three interdependent relationships: among small-scale producers within organizations; between small-scale producer organizations, in order to create apex bodies; and between small producer organizations and other market actors and policy-makers (Herbel *et al.*, 2012).

As small farmers are characterized by great diversity in their production orientations and locations, many of them have different and even conflicting interests and priorities (Chirwa *et al.*, 2005). Therefore, building trust within local-level organizations is essential. Through bonding, small-scale 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 organization. Farmer field schools and business schools can also help small farmers and other rural groups improve their understanding of the complexity of territorial development through trial-and-error experimentation (Herbel *et al.*, 2012). The ability of small farmers to innovate and implement new management models in line with mainstream marketing techniques is one of the key factors contributing to their successful participation in dynamic markets (Berdegué, Biénabe and Peppelenbos, 2011).

Above all, producer organizations should aim at facilitating members' engagement in profitable

BOX 15 RURAL ADVISORY SERVICES SHARE EXPERIENCES

Country rural advisory service fora are arrangements through which stakeholders in rural advisory services (RAS) work together to influence reforms, and share experiences with other countries through wider regional networks. They provide a mechanism that helps diverse actors – including farmers and their organizations – to share knowledge, innovations, lessons learned, priorities and demands, and foster new approaches to increasing their effectiveness. They also serve as an entry point for regional and international initiatives aimed at improving RAS and rural livelihoods in general.

Country fora are currently active in 24 countries in sub-Saharan Africa, in 6 in Latin America, and in 3 Asia. Experience has shown that local and national RAS actors brought together in country fora, coordinated in regional RAS networks, and connected through the Global Forum for Rural Advisory Services, provide a coherent framework for knowledge generation, sharing and capacity strengthening at the levels of individuals, organizations and the enabling environment.

SOURCES: FAO, 2010a; GFRAS, 2015.

commercial activities, which is an important condition for the long-term success of collective action (Chirwa *et al.*, 2005). Another important condition is good internal governance, which is reflected in accountability, transparency and equity, responsible leadership and member participation (Agrawal and Perrin, 2009). In addition, to be able to influence policy-making, similar organizations need to connect with one another to form larger unions, federations and networks (Herbel *et al.*, 2012).

Successful farmers associations enable producers to pool their assets and skills to overcome market barriers, enlarge their market shares, obtain access to better-quality information, and gain greater political power. When linked to external economic and policy actors, such as private businesses and governments, they can gain access to national and international markets, and can engage in discussions of their needs, such as those for agroterritorial investments, with national and local policy-makers. ■

CONCLUSIONS AND POLICY IMPLICATIONS

As farming systems transform, and land shortages affect increases in smallholder production, technological improvements become essential for productivity and sustainability. Mechanization, which has increased worldwide, has proved profitable even for small-scale farmers owing to its synergies with other production inputs. With demand for machinery increasing, rental markets have become the key to successful mechanization. Productivity will also need to be improved through a shift in farming systems to practices such as sustainable intensification and agroecology.

The average farm size is declining in most developing countries, although medium-sized farms are emerging in high-potential areas, especially in sub-Saharan Africa. Declining farm size may not hinder productivity, as small farms have the highest land productivity despite their low labour productivity. However, to access markets and adopt new technologies, small farmers must acquire the necessary economies of scale. This can be achieved by facilitating

farmers' links to downstream actors along food value chains, strengthening their property rights, supporting producer organizations and enhancing rural advisory services.

In the 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 physical inputs, machinery, information and finance, with better terms for farmers. Mobile phones are playing an increasingly important role in connecting farmers to markets. However, to make use of these resources, small farmers also need access to the advice and assistance that rural extension services once provided. This chapter has shown how public-sector extension systems reach a very small proportion of the farming community, especially in low-income developing countries. Consequently, better targeting of resources and greater coordination with private rural advisory services would help extensionists improve their effectiveness, as they are expected to help farmers respond to a range of new challenges, such as climate change, and to advise on new farming approaches, such as nutrition-sensitive agriculture and sustainable intensification.

The emergence of pluralistic rural advisory systems has raised the question of coordination between different entities so that the outreach to farmers is maximized. The answers are mostly context-specific and depend on farmers' needs and priorities. As transformation proceeds, new questions arise about the appropriate mix of advice providers, and methods of outreach and interaction with small farmers. Exploring answers to such questions would move the focus of attention from the assertion that "all farmers need advisory services" to a more nuanced understanding of specific farmers' 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 equipped to cope with the increasingly rapid transformation of the developing world's rural areas. For example, issues related to land tenure, landholding fragmentation and consolidation can be better addressed through collective action. The same applies to the benefits brought by mechanization in terms of increased productivity. Where these organizations are sensitive to age and gender issues, they will be effective tools for including marginalized and vulnerable groups, such as rural youth and women, in rural transformation.

Efforts to raise agricultural productivity to meet the growing demand for food are also increasing the pressure on natural resources and agricultural systems, posing a threat to their sustainability. Rural transformations need to be made not only socially inclusive but also compatible with sustainability, through innovations that reduce resource use without compromising yields and optimally manage sources of greenhouse gas emissions. This underscores the importance of rural advisory services in promoting environmental sustainability and addressing the complex interactions of factors driving rural transformation, such as urbanization, population growth and dietary diversification.

Urbanization will continue to modify people's diets and drive increased demand for higher-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. If not, urbanization will open the doors to increasing dependence on food imports.

As employment in agriculture continues to decline, growth in the rural non-farm economy becomes crucial as a means of absorbing excess labour as it leaves the farm workforce. Diversification into off-farm rural activities is increasingly seen as a key strategy for helping small-scale farmers and the rural landless to raise their income and manage risks. Policies to support development of the non-farm economy are discussed in Chapter 4. ■

IN FOCUS

ENVIRONMENTAL AND NATURAL-RESOURCE CHALLENGES

ISMALIYA GOVERNORATE, EGYPT

Irrigating cypress seedlings destined for afforestation around peri-urban areas.

©FAO/Rosetta Messori

Food systems use natural resources and energy to produce, process and deliver agricultural products to consumers. The resource-intensive systems that characterized “green revolution” agriculture relied on high levels of inputs and have had severe consequences for the environment, including soil depletion, massive greenhouse gas emissions and accompanying climate change, and increases in water scarcities (FAO, 2011a).

Agriculture uses 11 percent of the world’s land surface for crop production, and accounts for 70 percent of all freshwater withdrawals (FAO, 2011a). The sector is responsible for about 80 percent of deforestation worldwide (FAO, 2017a). 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 demand for food, feed and biofuel in 2050 is expected to be 50 percent higher than it was in 2012, which will intensify pressures on the natural-resource base (FAO, 2017a).

Past transformations in today’s developed countries took place in an environment of relative abundance of natural capital (UNESCAP, 2016). Future transformations will be carried out within unprecedented environmental limits and require that



countries act to mitigate and adapt to climate change and natural-resource scarcities. Intensive systems cannot guarantee food security in the long run if they compromise the natural resources needed for sustainable food production. 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 gas emissions from agriculture.

Strategies for reducing energy use

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, about 225 petajoules of energy – equal to about 4 percent of Australia’s total energy supply in 2014 (UN, 2016) – are used annually to power the pumps that irrigate some 300 million ha of land (Smil, 2008). The use of fossil fuels can be reduced with more efficient pumps and machinery – for example, tractor fuel consumption can be reduced by matching tractor size to field requirements, and combining operations such as tilling, seeding and fertilizing.

Irrigated land is more productive than rainfed land because it permits double or triple cropping (FAO, 2011b). However, excessive pumping of groundwater can lead to a permanent lowering of the water table. Therefore, irrigation systems need to be designed to optimize energy and water use. In parts of the world where water resources are already stressed, systems such as drip irrigation are needed. Although these systems may consume more energy than gravity irrigation systems, combining them with renewable energy, such as solar-powered pumps, can help minimize environmental externalities. In Zimbabwe, for example, funding from the European Union (Member Organization) and Oxfam helped to install solar-powered pumps that provide water to a 250 ha irrigation scheme (Oxfam, 2012).

Energy is also used indirectly in the manufacture of fertilizer, insecticides, herbicides and other chemical inputs. Nitrogen fertilizer accounts for about half of the fossil fuel used in primary

production, and contributes a significant share of the nitrous oxide emissions from farmland (GOS, 2011). Farmers can save on indirect energy inputs by using techniques such as “precision placement” of fertilizer, which also lowers greenhouse gas emissions per unit of output and help reduce nitrate pollution of aquifers and surface waters. The use of geolocation-guided systems (e.g. the Global Positioning System) to optimize applications of agrochemicals is another example of the broad range of sustainable farming practices that have not yet been widely adopted, but are both economically viable and environmentally friendly (FAO and USAID, 2015).

Using renewable energy as a source of heating, electricity and transport fuel reduces both dependence on fossil fuels and levels of greenhouse gas emissions. Currently, biomass is the most widely used source of renewable energy worldwide. In Turkey, where strong economic growth and urbanization has led to a steady increase in electricity consumption and deepening dependence on imported fossil fuel, 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 agriculture sector produces large amounts of residues that could be used to produce energy and offset fossil fuel use. FAO’s bioenergy and food security 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 wastes 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. The FAO assessment suggests that, if only 20 percent of cotton stalk residues were used to make briquettes and pellets, an additional 1 million tonnes of oil equivalent could be produced annually (FAO, 2016b).

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).

IN FOCUS ENVIRONMENTAL AND NATURAL-RESOURCE CHALLENGES

Livestock manure is a major source of methane emissions. As countries develop, consumption of dairy and meat products is increasing, which will contribute to further methane emissions and climate change. The production of biogas from livestock manure provides an 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 processing wastes, or any other biodegradable feedstock.

Sustainable farming systems¹

FAO has developed a range of approaches to assist small-scale farmers in increasing productivity while adapting to climate change, conserving natural resources. A core principle is to create synergies with the natural habitat, instead of depleting natural resources, in order to improve yields and resource-use efficiency and strengthen resilience. The sustainability of many small-scale food production systems will also depend on the ability of smallholders to adopt “climate-smart” agricultural practices and technologies.

“**Save and Grow**”. The FAO model for sustainable crop production intensification, known as “Save and Grow”, draws on nature’s contribution to crop growth, such as soil organic matter, water flow regulation, pollination and natural predation of pests. It applies external inputs, such as mineral fertilizer, at the right time and in the right amount to improved crop varieties that are resilient to climate change and use nutrients, water and external inputs more efficiently. Increasing resource-use efficiency, cutting the use of fossil fuels and reducing direct

environmental degradation are key components of the approach. It saves money for farmers while avoiding the negative effects of overusing external inputs. This approach has been extended to other agriculture sectors.

Agroecology. Going beyond input use efficiency and input substitution, agroecology seeks to harness key ecological processes, such as the recycling of nutrients and synergies among the components of agrobiodiversity. An important feature of the approach is to draw on farmers’ traditional knowledge to create solutions that respond to their needs. For example, farmers in China who grew different mixtures of traditional rice varieties suffered 44 percent less blast incidence and achieved 89 percent higher yields, when compared with single-variety fields, and did so without the need to use fungicides. Agroecology also promotes the use of polycultures, which have greater yield stability and suffer fewer productivity declines during a drought than monocultures.

Climate-smart agriculture. FAO’s climate-smart agriculture (CSA) approach aims at sustainably increasing agricultural productivity, increasing adaptive capacity and resilience to climate shocks, and reducing greenhouse gas emissions and increasing carbon sequestration where possible. The point of departure for CSA is the technologies and practices that countries have already prioritized in their agriculture policy and planning. It assesses the food-security and adaptation potential of these technologies and practices under site-specific conditions, seeking to determine what adjustments are needed. Such adjustments include: adopting varieties resistant to heat and drought; diversifying farm portfolio; improving soil and water management; and promoting non-farm employment (FAO, 2016c). Often, practices with strong adaptation and food-security benefits can also reduce greenhouse gas emissions and increase carbon sequestration.

¹ Source: FAO, 2016b.

Land tenure governance for sustainable farming and forestry²

Food production, coupled with weak land governance, contributes to the conversion of land use from forests to cropping. Between 2000 and 2010, tropical countries suffered a net forest loss of 7 million hectares a year and a net gain in agricultural land of 6 million hectares a year. The greatest net loss of forests and net gain in agricultural land in the period was in the low-income group of countries, where rural populations are growing. While large-scale commercial farming accounts for about 40 percent of deforestation in the tropics and subtropics, and local subsistence farming for 33 percent, there are large differences by region. For example, commercial agriculture is responsible for almost 70 percent of deforestation in Latin America, but only one-third of that in sub-Saharan Africa, where small-scale agriculture is a more significant driver of forest loss.

Case studies on Chile, Costa Rica, the Gambia, Georgia, Ghana, Tunisia and Viet Nam highlight the need to use the right policy instruments to enhance agriculture while promoting sustainable forest management. They show the importance, at the national, landscape and local levels, of integrated land-use approaches, such as land-use master plans, watershed management, agroforestry systems, and collaboration between agricultural and forestry research institutes and extension services.

Also needed are legal and institutional frameworks that provide predictable and secure land tenure and measures to regulate land-use change, such as requirements for environmental impact assessments

and special protection for designated areas. These are particularly necessary in the light of recent international agreements, such as the 2030 Agenda for Sustainable Development and the Paris Agreement on climate change. Recognition of customary rights will be very important for vulnerable forest-dependent people, who lack secure land tenure and depend on the common-property resources provided by forests for their livelihoods. In the absence of mechanisms that recognize tenure rights, including customary rights, there is greater likelihood of land disputes caused by overlapping land titles.

Within farming communities, customary law guides the inheritance of rights to land and local-level land-tenure agreements, although these are rarely documented. The tenure security of farmers and forest-dependent communities will help to prevent land conflicts, strengthen local livelihoods, facilitate efficient land use by allowing secure land lease markets, and facilitate partnerships between farmers and forest dependent communities, on one side, and commercial entities on the other.

The Voluntary Guidelines on the Responsible Governance of Tenure of Land, Fisheries and Forests in the Context of Food Security (FAO, 2012a), which member countries of the Committee on World Food Security adopted in 2012, provide clear guidance to ensuring that governance frameworks “recognize and respect, in accordance with national laws, legitimate tenure rights including legitimate customary tenure rights that are not currently protected by law; and facilitate, promote and protect the exercise of tenure rights”. Such frameworks should be non-discriminatory, and should promote social equity and gender equality. ■

² Source: FAO, 2016d.

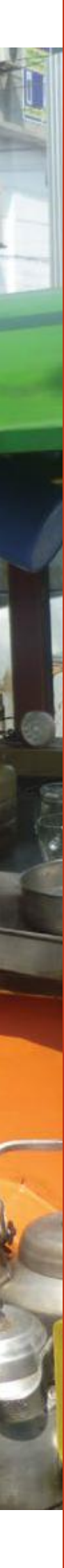


BANGLADESH

FAO promotes safe street-food vending and enhances food-safety monitoring in cities.

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CHAPTER 4 THE NON-FARM SECTOR: HOUSEHOLD INCOME, EMPLOYMENT AND WELFARE

Key messages

- Unless countervailing measures are adopted now, current trends in population growth and in urban and rural development patterns could lead over time to huge migratory flows.
- The diversification of rural households' income is important for poverty reduction and growth of non-farm economic activities.
- In low-income countries, agriculture can generate new employment opportunities, especially where strong backward and forward linkages are created between primary production and non-farm activities and between rural areas and small cities and towns.
- Social protection facilitates inclusive transformation, helps promote more efficient use of resources, and increases the productive capacity of poor households.

THE NON-FARM SECTOR: HOUSEHOLD INCOME, EMPLOYMENT AND WELFARE

Only about 3 percent of the total workforce in high-income countries is employed in agriculture. If agriculture's share of employment in the developing world were to fall to that level, some 1.7 billion male and female farmers would leave the farm sector over the next few decades. The challenge of job creation could become insurmountable, resulting in high levels of poverty and exclusion with considerable social, economic and geopolitical repercussions (d'Orfeuill, 2012).

As their economies transform, many low-income countries are beginning to see a decline in the size of the labour force engaged in agriculture, and an increase in the number of rural households complementing their incomes with non-farm activities. However, in many countries, including most of those in sub-Saharan Africa, a decline in agriculture's share in GDP has not been matched by comparable growth of formal employment in the industrial and service sectors, which was a feature of structural transformations in the past (see, for example, McMillan and Harttgen, 2014). Those leaving agriculture are moving instead to informal activities, in both urban and rural areas, which are generally concentrated in small-scale trading and services and characterized by low productivity (World Bank, 2007). Therefore, fostering inclusive transformation will often require action to promote development of the rural non-farm economy, and especially of the agro-industrial sector (IFAD, 2016).

Rural labour markets in many developing countries are characterized by high levels of informality, a prevalence of people holding more than one job, casual work arrangements, labour force fragmentation, gender- and age-based inequalities, and the uncertainties of agricultural production. Labour legislation is often not

enforced, rural workers are the least organized and least protected by legislation, and social dialogue is generally weak (FAO, 2012b). In most of sub-Saharan Africa, for example, a budding service sector and the growth of household enterprises are changing rural non-farm economies, but creating formal non-agricultural wage employment is proving extremely difficult, even in rapidly growing economies. It is unlikely that formal employment will account for a large share of the region's jobs market in the foreseeable future (Fox and Sohnesen, 2012).

Furthermore, the size of the young labour force continues to grow in many low-income countries. The International Labour Organization (ILO) estimated that, in South Asia and sub-Saharan Africa, an average of 1 million and 2.2 million young people, respectively, entered the job market every year between 2010 and 2015 (ILO, 2010). Asia will be home to more young people than any other region until about 2080, and Africa's youth population is expected to continue growing throughout the twenty-first century (ILO, 2015). Increases in the working-age population represent significant growth potential owing to the higher availability of labour and to changes in consumption patterns associated with younger populations. However, creating jobs for youth is becoming a serious challenge for most low-income and lower-middle-income economies.

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 subsector 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 subsector 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 ten years of significantly higher private investment in labour-intensive medium-sized 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.

Household enterprises are often seen as a solution to unemployment among sub-Saharan Africa’s bulging youth population. However, most of those under 25 years of age have a very low probability of success in household enterprises, as they lack the 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 trading (Thurlow *et al.*, 2016).

Efforts to promote more and better jobs for rapidly expanding youth populations should pay particular attention to rural areas. In addition to the lack of employment opportunities, available jobs in rural areas are often characterized by very low returns and often exploitative arrangements (FAO, 2012b). 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. ■

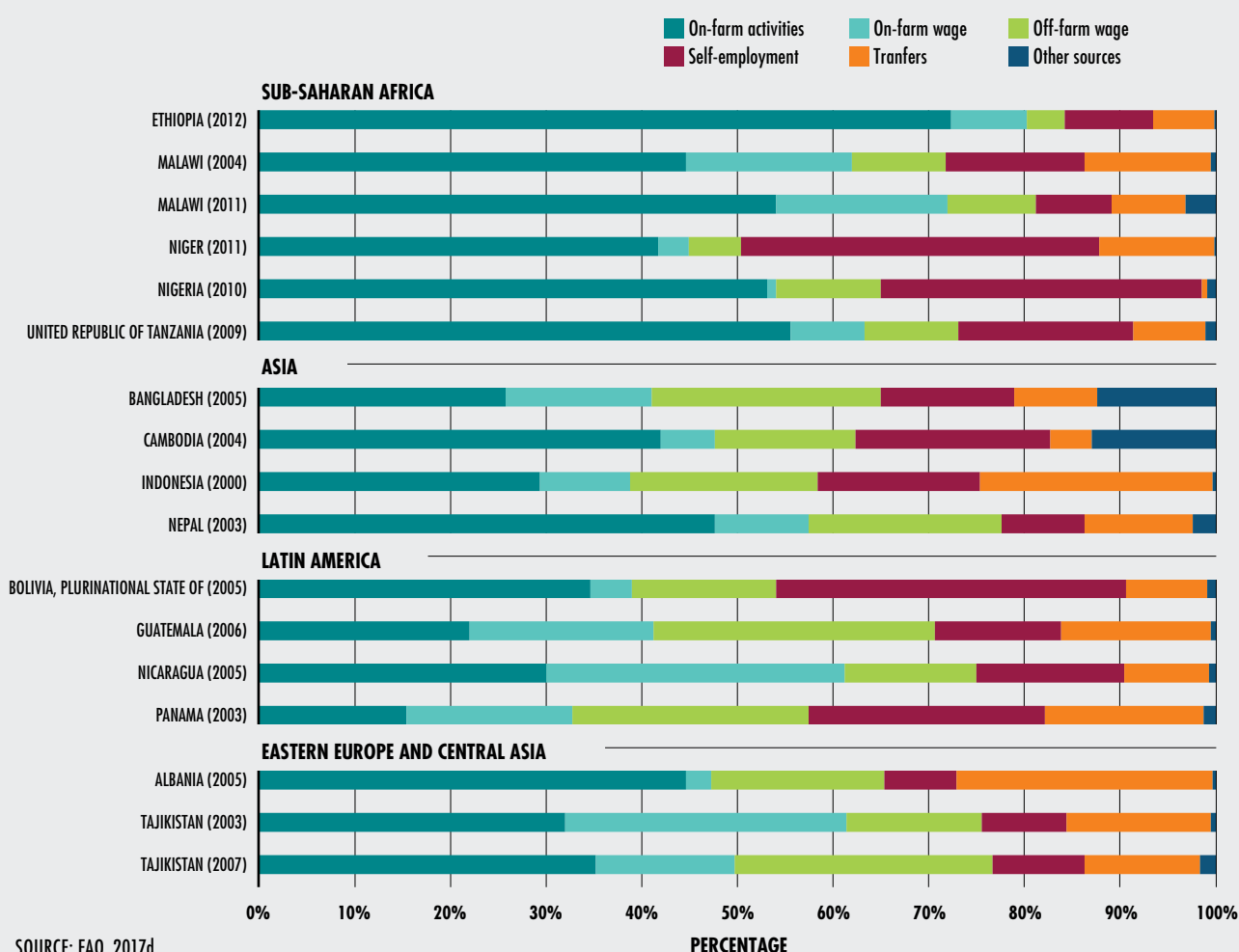
DIVERSIFICATION STRATEGIES AND HOUSEHOLD WEALTH

The rural non-farm economy has grown rapidly since the 1970s, when it typically contributed to less than 20 percent of rural household incomes. Using 54 rural income surveys from the 1990s and the 2000s, Reardon, Stamoulis and Pingali (2007) estimated the contribution of non-farm earnings at about 35 percent in Africa and about 50 percent in Asia and Latin America.

Analysis of FAO’s Smallholder Farmers’ Dataportrait¹⁵ data set (FAO, 2017d) shows the shares of rural income generated by different economic activities in 17 countries of 4 developing regions (Figure 19). Sources of income include: on-farm activities; wages received for agricultural and off-farm non-agricultural work; non-farm self-employment; and income and consumption transfers through, for example, social protection programmes and migrants’ remittances. 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 four Asian countries, where it ranges from 26 percent to 48 percent, and smaller still in the four Latin American countries. Compared with the African countries, the share of income from non-agricultural wages in total income is higher in the countries of Asia and Latin America, while the share from self-employment is lower.

¹⁵ Dataportrait data are based on the Rural Income Generating Activities (RIGA) database (FAO, 2017e), which covers 19 countries in Africa, Asia, Eastern Europe and Latin America.

FIGURE 19
SHARES OF INCOME FROM DIFFERENT SOURCES IN RURAL AREAS OF
SELECTED DEVELOPING COUNTRIES



SOURCE: FAO, 2017d.

The disaggregation of data for each country by household type shows that the share of non-farm income in total rural household earnings varies widely, with wealthier rural households – which typically have higher education levels – relying more on non-farm income. In a sample of nine African countries for which data are disaggregated by quintiles, the non-farm income share was highest for the fifth quintile (i.e. the wealthiest) rural households, exceeding 50 percent of total income in all countries except Ethiopia (FAO, 2017e). 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 seen in data from six Asian and four Latin American countries (FAO, 2017e).¹⁶

¹⁶ Only in Viet Nam was the level of wealth associated with greater reliance on farm income.

BOX 16 RECENT SHIFTS IN WELFARE BY FARM TYPE IN PERU

The table shows the evolution of welfare and productivity indicators of the different economic farm types in Peru between 2005 and 2014. "Subsistence farms" are those declaring that they produce mainly for household consumption and have cropped land of less than 1.5 ha and fewer than 10 livestock units. "Transition" farms use land for cash crops, but their total cropped area is less than 5 ha and they own fewer than 10 livestock units. "Commercial" farms either have more than 5 ha of cropped land or 10 livestock units, or both, or are considered separate from business farms because they are family-operated. "Business" farms are operated by paid managers and, as such, are of commercial scale.

The table provides details of the considerable improvement in welfare levels for Peruvian farmers

over the decade. The large reductions in consumption poverty across farm types was accompanied by improvements in household access to sanitary services, computers and the Internet, ownership of assets such as cars and trucks, and a significant increase in per capita incomes. There was also an important increase in the share of household income that is obtained off-farm, across family farm types – but not for business farms. This result highlights the growing role that off-farm income plays in improving welfare and reducing poverty, especially among small family farmers. It also indicates that labour has been moving to off-farm activities. As of 2014, only one-third of household incomes on subsistence farms was derived from farming activities.

SOURCE: Anríquez, Foster and Valdés, 2017.

	Type of farm	Year	Poverty rate (%)	Per capita income (2014 US\$)	Farm income/ total income (%)	With sanitary services (%)	With computer (%)	With car or truck (%)
Family agriculture	Subsistence	2005	84.2	556	40.0	48.6	1.3	0.5
		2014	45.7	1 377	33.8	78.7	5.8	2.0
	Transition	2005	71.3	792	51.0	58.8	2.5	1.8
		2014	31.7	1 887	44.4	81.4	11.4	5.6
	Commercial	2005	66.3	914	61.3	59.0	3.3	5.7
		2014	25.8	2 236	50.6	78.1	13.6	8.1
	Business	2005	9.7	3 418	74.4	91.8	17.2	9.0
		2014	6.2	9 210	81.0	94.6	30.6	34.5
	Total	2005	76.3	711	49.6	54.3	2.1	1.8
		2014	38.4	1 721	42.8	79.7	8.8	4.2

NOTE: Per capita income is converted at the 2014 exchange rate of S/2.84 to US\$1.

SOURCE: Anríquez, Foster and Valdés, 2017, Table 4.

For example, using national household surveys for Chile, Nicaragua and Peru, Anríquez, Foster and Valdés (2017) found, between 2005 and 2014, a very clear increase in rural areas of

non-farming households and of households dependent on agricultural wages, while households that depended mostly on "own-farm" income declined (Box 16). »

BOX 17 DIVERSIFICATION, SPECIALIZATION AND NON-FARM INCOME

Both 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 socio-economic characteristics and level of wealth, including its human capital. Although there is no straightforward relationship between wealth and diversification or specialization, wealthier households usually have access to more lucrative non-farm employment, whereas agricultural wage labour or self-employment are poorer households' main means of diversifying their activities (Davis *et al.*, 2010; Davis, Di Giuseppe and Zezza, 2017).

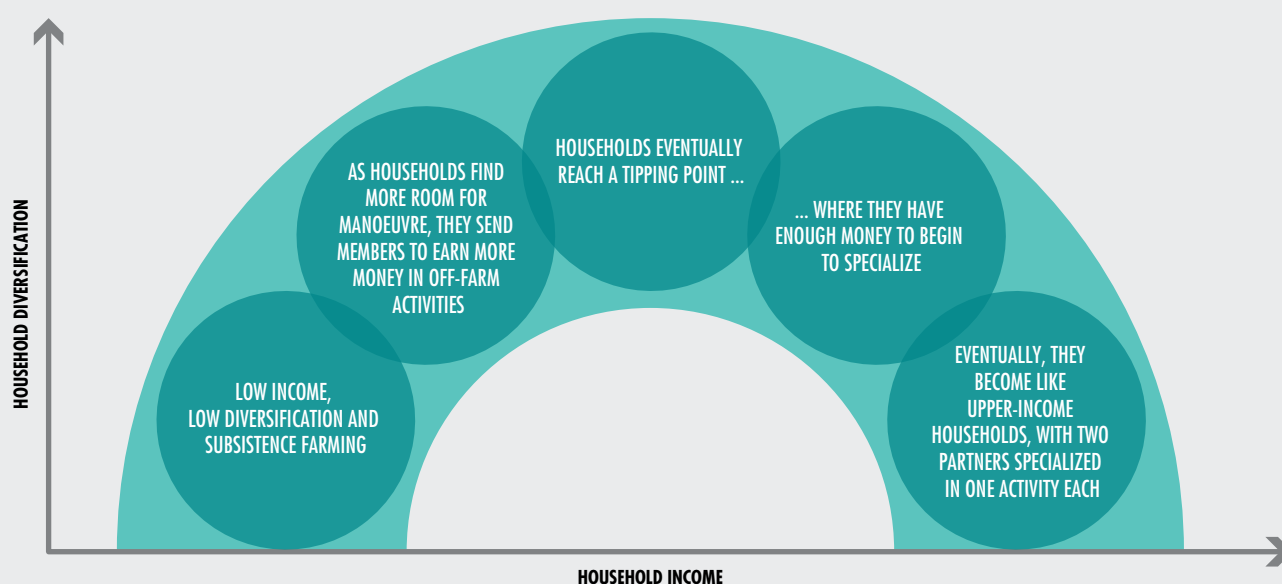
Specialization is often more efficient because it allows individuals to accumulate experience and gain scale; this is what wealthier people choose to do. However, for poor households, specialization is not a viable option owing to the risks inherent in relying on one source of income. Hence, they choose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

Losch, Fréguin-Gresh and White (2012) point out that, in order to understand diversification and specialization choices, it is necessary to consider the patterns of change both within and among households. At early stages of transformation, subsistence farming dominates the economy, with very little diversification at both the country and household levels, and most of the farming community is underemployed. When transformation begins, it accelerates the growth of agricultural productivity, leading to a reduction in the agricultural labour force. However, because subsistence farmers are reluctant to 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 occurs when an underemployed farmer begins to work additional hours in the non-farm sector (Davis, Di Giuseppe and Zezza, 2017).

As transformation continues, markets grow and become more reliable, creating a new institutional environment in which people can specialize and trade. Many part-time farmers or diversifying farming households now cease farming and move to other sectors, while other farmers become more specialized in agricultural production. At this point, within-household diversification begins to decline. 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.

The figure is a stylized representation of the diversification/specialization process along the transformation pathway. The process is much more complicated in reality and involves many other factors – such as the nature of growth (whether led by manufacturing or services), urbanization patterns, and the strengths of rural-urban linkages – which determine 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 (Davis, Di Giuseppe and Zezza, 2017; IFAD, 2016; World Bank, 2007).



SOURCE: Losch, Fréguin-Gresh and White, 2012, Figure 6.3.

» These general trends confirm the findings of other studies. First, higher welfare levels are usually associated with lower reliance on agriculture (Davis, Di Giuseppe and Zezza, 2017). Second, while non-farm income is essential for rural-landless and near-landless households, other agricultural households rely on it to a lesser extent, using it to diversifying risk, to mitigate seasonal income swings, and to buy agricultural inputs (Adjognon, Liverpool-Tasie and Reardon, 2017; Kangasniemi, Knowles and Karfakis, 2017).

Disaggregation of on-farm and non-farm income data show that, across countries and regions, the lower the level of household wealth, the higher the contribution to total income of agricultural wages and transfers, and the lower the contribution of non-farm activities (i.e. non-farm wage labour and self-employment). This disparity can be explained by the wide variation in levels of productivity found in non-farm activities – as the activities of wealthier households usually require skilled labour, they are usually more remunerative than those of poor households (Davis, Di Giuseppe and Zezza, 2017; Kangasniemi, Knowles and Karfakis, 2017).

The impact on agricultural productivity of the diversification to non-farm activities depends on whether they complement or substitute on-farm activities. They can lead to higher productivity if they support on-farm production (Kangasniemi, Knowles and Karfakis, 2017), but those not related to farming can also be used to manage risks to income and to smooth consumption expenditure (Davis, Di Giuseppe and Zezza, 2017). When non-farm diversification activities are a substitute for farming, they may represent a specialization within households, as members engage in activities in which they have a comparative advantage (Losch, Fréguin-Gresh and White, 2012). In this case, diversification is probably a transitional step towards completely exiting agriculture, and is usually carried out by young household members. In Viet Nam, 20 percent of the decrease in the relative share of agriculture in total employment has been attributed to young rural people finding work directly in higher-productivity sectors, such as manufacturing (McCaig and Pavcnik, 2013).

Despite historical trends showing a strong and positive correlation between wealth and non-farm jobs (Box 17), the relationship between diversification and welfare is not straightforward and depends on the socio-economic status of the household before it began to diversify. Wealthier households tend to specialize to accumulate experience and gain scale, but they may diversify as part of 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 meet immediate cash needs or to spread risk; they may face serious barriers to entry to a second activity, which limits their ability to diversify further. ■

AGRO-INDUSTRY PRESENTS OPPORTUNITIES FOR LATE TRANSFORMERS

The importance of agriculture in the non-farm economy

The rural non-farm economy consists of a wide variety of trading, agroprocessing, manufacturing, commercial and service activities, carried out by entities ranging from small part-time artisanal workshops to large-scale transnational companies. It is composed largely of businesses, industries and services linked to agriculture. As agriculture usually accounts for the largest share of employment, value addition and the supply of raw materials in rural areas, it has a direct influence on the size and structure of the rural non-farm economy.

Within the manufacturing sector, agro-industry develops, transforms and distributes inputs to and outputs from agriculture, fisheries and forestry. It includes agroprocessing, a subset of manufacturing that processes raw materials and intermediate products derived from agriculture, including food, beverages, tobacco products, textiles and clothing, wood products and furniture, paper products and rubber products (UN, 2008). In most developing countries,

agroprocessing plays a prominent role in value added within the manufacturing sector.¹⁷

In the last three decades, agro-industry has grown very rapidly in the developing world. FAO (2007) estimates that, in the period 1980–2005, the share of developing countries' value addition in global manufacturing of food, beverages, tobacco and textiles almost doubled. Analysis of available data from 2010 onwards (UNIDO, 2017) indicates that, for a total of 40 developed and 53 developing countries, the food and beverages subsector accounts for an average of 13 percent of total manufacturing value added. The highest average share, of 40 percent, was in low-income countries. Countries where the processing of food and beverages provides more than 40 percent of manufacturing value added include Algeria, Bolivia (Plurinational State of), Burundi, Malawi, Mongolia, Namibia, Swaziland and the United Republic of Tanzania.

In developing countries, enterprises in the food and beverages subsector are often scattered, numerous, small to very small, family-based, and lacking economies of scale. Using ILO data, Wilkinson and Rocha (2009) found that, on average, 60 percent of those working in the subsector in developing countries are employed with little or no social protection by small-scale informal firms. Despite that, the subsector accounts for more than 50 percent of the formal agroprocessing sector's value added in 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 processing represents 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.

Recent data from the United Nations Industrial Development Organization (UNIDO) indicate that the contribution of food and beverages processing in overall manufacturing value addition is important in most developing regions,

¹⁷ The gross value added of a manufacturing industry is the value of that industry's output less the value of intermediate consumption. Net value added is the value of output less the values of both intermediate consumption and consumption of fixed capital (OECD, 2007).

with shares ranging from 20 percent to 30 percent in countries of Latin America and from 10 percent to 25 percent in most Asian and North African countries. One common trend across these three regions is that the food and beverage subsector's share seems to have changed little in the last decade, except in Egypt and Tunisia where it has declined. The lowest shares are in Asia, and 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 subsectors, which has led to a sharp increase in the sector's total value added since the 1990s (UNIDO, 2017).¹⁸ Figure 20 shows the trend in Indonesia, where the absolute value of manufacturing is increasing and the share of the food and beverages subsector within manufacturing is also increasing.

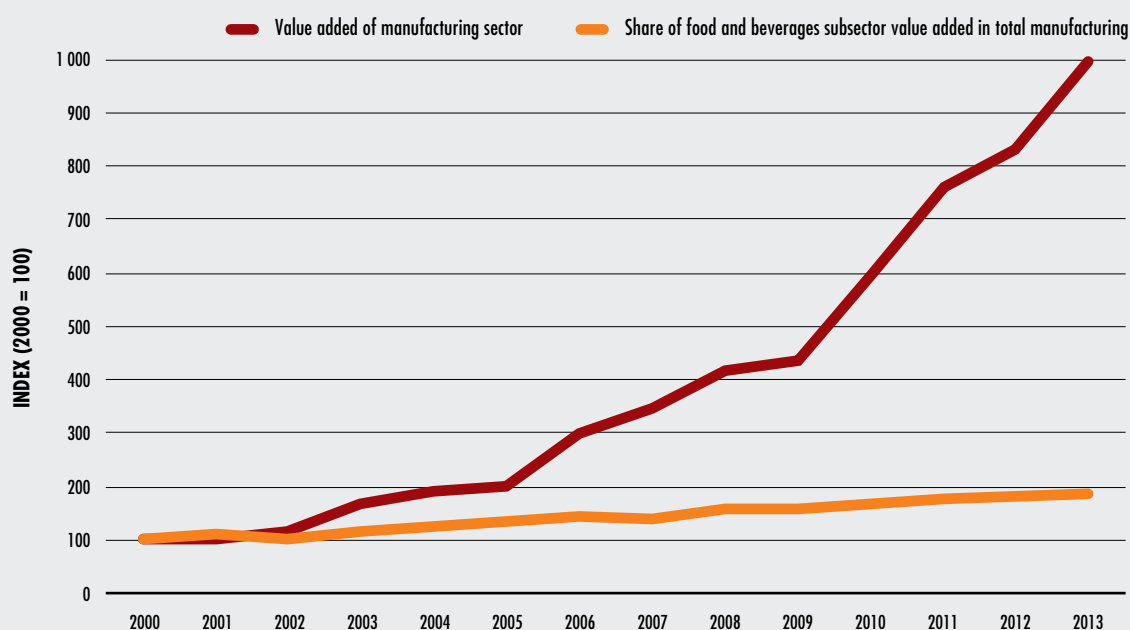
The relative importance of the food and beverages subsector is highest in sub-Saharan Africa, where it represents 30–50 percent of total manufacturing value added in most countries, and more than 80 percent in Burundi and Swaziland.¹⁹ Although its share is declining in countries such as Cameroon, Ethiopia, Malawi and Senegal, it is increasing in Kenya and the United Republic of Tanzania, which saw 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). This increase 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 (Wilkinson and Rocha, 2009), the food and

¹⁸ Since the 1990s, manufacturing value added has increased in Bangladesh by 1 100 percent, in China by 1 340 percent, in India by 640 percent, in Indonesia by 930 percent, in Malaysia by 670 percent and in the Philippines by 200 percent (FAO calculations from UNIDO, 2017).

¹⁹ Recent and complete data are available only for the following countries: Cameroon, Ethiopia, Kenya, Malawi, Senegal, South Africa and the United Republic of Tanzania in sub-Saharan Africa; Bangladesh, China, India, Indonesia, Malaysia, the Philippines and Thailand in Asia; Brazil, Colombia, Mexico and Peru in Latin America; Egypt, Morocco and Tunisia in North Africa; and Turkey in West Asia.

FIGURE 20
CHANGES IN FOOD AND BEVERAGES SUBSECTOR VALUE ADDED IN
INDONESIA, 1990–2013



SOURCE: UNIDO, 2017.

beverages subsector is a promising source of employment for those leaving agriculture. In the last two decades, employment in the manufacturing sector has been a key driver of poverty reduction, especially in East and Southeast Asia. In China, the number of workers employed in manufacturing has increased by more than 60 percent, of which the share of agro-industry has been about 8 percent. In Malaysia and Indonesia, the agro-industry accounts for higher shares of manufacturing employment, reaching 12 percent and 16 percent, respectively in 2012.

However, in sub-Saharan Africa, there has been no sizeable increase in the number of people employed in manufacturing, even in Kenya and the United Republic of Tanzania, whose manufacturing sectors have grown significantly since the 1990s. Another feature of African economies is that the share of

agro-industry in total manufacturing employment is noticeably higher than in other regions – it ranges from 35 percent to 50 percent, compared with no more than 25 percent in Latin America and North Africa.

These trends indicate that, despite the importance of agroprocessing in general, the food and beverages subsector in sub-Saharan Africa seems to have stagnated. This is perhaps due to the structural flaws of an industry based on numerous small-scale family-based enterprises. Although such enterprises offer employment opportunities for a large proportion of rural households, they are fragile, lack scale and often provide only seasonal employment. Although a few large-scale transnational firms also operate in the region, they have only a minor impact on employment, owing to their high capital intensity.

BOX 18
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 the 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 a comparative disadvantage for agriculture (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 as the Nile, Euphrates and Tigris (FAO, 2016e).

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 and Sadiddin, 2016). This is due to policies that have historically favoured cereals and which were reinforced in some countries, such as Egypt, following the food price inflation of 2007–08. Even so, production is insufficient to significantly reduce the region’s high dependence on cereal imports (Breisinger *et al.*, 2017; Elbehri and Sadiddin, 2016).

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

Development of market opportunities along the value chain through agroprocessing would motivate farmers to exploit these comparative advantages. Although agroprocessing is a fairly small subsector in Egypt, in terms of its contribution to 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.

In order to harness the opportunities offered by the 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. Agroprocessing 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 18).

Growth in agroprocessing: the challenge of inclusiveness

The composition of non-farm opportunities varies by location. Home-based processors and

small retailers predominate in rural areas, while manufacturing, services and wholesaling, including agroprocessing and its supplementary non-farm activities, are concentrated in small cities and towns (Haggblade, Hazell and 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 that increasing numbers and shares of women are employed in the food industry. Although trends vary substantially across regions and countries, there have generally been considerable increases in

female participation in many low-income countries. For example, between 1990 and 2011, the number of female workers in Bangladesh's food and beverages subsector increased 10 times over, while the share of females employed grew from 6 percent to 23 percent. In Ethiopia and Kenya, in 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, respectively.

Some sources have found variations in the extent of female participation in the food industry. In the Dominican Republic, women comprise roughly 50 percent of the labour force in horticultural processing; in Mexico, about 90 percent of employees in horticultural packaging are women (Barrón, 1999; Reynolds, 1998); and in Kenya and Zambia, more than 65 percent of workers in horticulture (both farms and pack-houses) are women (Barrientos, Dolan and Tallontire, 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 and 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 and especially in countries with a strong agricultural base, such as Ethiopia, Malawi and the United Republic of Tanzania (FAO, 2017e). The low capital requirements of engaging in small-scale agroprocessing businesses make them feasible for poor households. However, the low productivity of many of these businesses indicates that they may represent "distress diversification", which the poor are pushed to adopt in the absence of more profitable alternatives.

Data from World Bank and IFAD (2016) indicate that inequality in rural areas has increased across the world in the last two decades. The increase has been greatest in rapidly transforming

countries that have also been successful in reducing rural poverty. For example, in China and Viet Nam the rural Gini index rose from 30 to 40, and from 26 to 32, respectively, between the 1990s and the 2010s. In sub-Saharan 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 is highly urbanized compared with other developing regions. ■

MORE INCLUSIVE GROWTH OF 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. As they are used mostly as a risk management tool, these activities are not reliable sources of sustained employment growth (Nagler and Naudé, 2014). However, Jin and Deininger (2009) 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 17–27 percent of the working population. With a value added per person comparable with 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 Shimeles (2014) found that sub-Saharan Africa does not have a severe unemployment problem. The authors argue that, as economic growth in recent years has created little wage employment outside of Botswana, Nigeria and South Africa, unemployment in the region was kept low by growth of the informal sector. The formal employment market is unlikely to improve in the near future. It is estimated that of the 220 million young people who will enter sub-Saharan 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 the region, this growth will not absorb the new entrants, as it is starting from a very small base (Filmer and Fox, 2014).

Given sub-Saharan Africa's high population growth rate, higher levels of investment in industry are needed in order to achieve the same levels of employment as countries with lower rates of population increase (Fox, Thomas and Haines, 2017). 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 in the past decade just to raise the share of employment in industry to that of Viet Nam's in 2008 (Filmer and Fox, 2014). This highlights the important interaction between population growth and investment strategies.

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 remain on the farm or move out much more slowly. Their responsibilities in agriculture may actually increase. The "feminization of agriculture" is evident in many countries, but it is hard to assess accurately owing to difficulties in capturing all of women's employment activities, including secondary and seasonal work.

Figure 21 shows that the share of women in agricultural employment is growing in all developing regions except East Asia and Southeast Asia, where the lack of an upward trend reflects the fact that women already make up about 50 percent of the agricultural workforce. Women have traditionally been heavily engaged in farming in sub-Saharan Africa, where they make up 47 percent of the region's agricultural workforce, and well over 50 percent in many countries. While women's employment rates in sub-Saharan Africa's farming sector have not changed significantly in the past few decades,

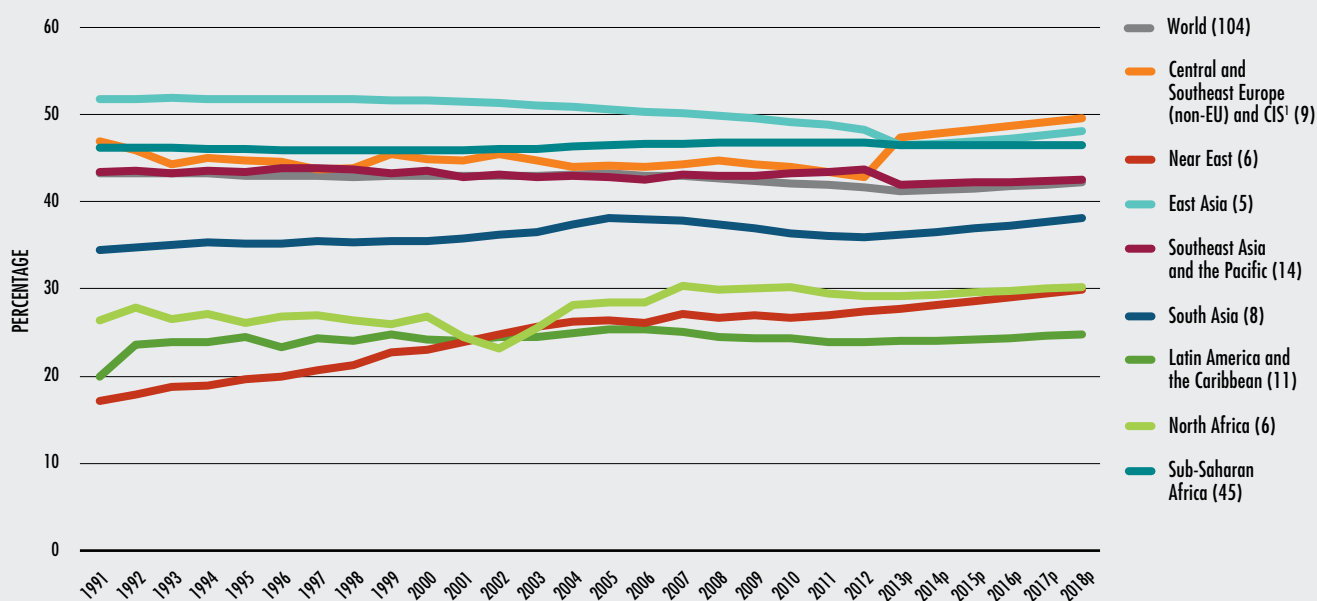
their roles and responsibilities may be changing – for example, from subsistence farming to wage employment, and from contributing household members to primary producers. However, these changes are hard to detect at the national level using the data currently available.

In other developing regions, women's employment in agriculture relative to that of men is on the rise. The change in women's roles is most dramatic in the 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 agricultural employment is also rising in South Asia and in non-European Union countries of Central and Eastern Europe and the Commonwealth of the Independent States. More striking than these regional averages are the trends in some countries. For example, since 1990, the share of women in the agricultural workforce has risen from 50 percent to 66 percent in Bangladesh, from slightly more than half to 60 percent in Nepal; and from 15 percent to 21 percent and 36 percent, respectively, in Afghanistan and Pakistan.

Even in Latin America, where farming has traditionally been a male occupation, the share of women in agricultural employment is increasing. For example, in 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 Peru, the increase has been from about one-third to almost 40 percent.

Male out-migration is among the key factors driving women's increasing employment in agriculture. Data from sub-Saharan Africa show that migrants are mostly young men and that women migrate less. More research is needed to understand whether women's expanding roles in agriculture lead to welfare improvements or merely perpetuate existing gender inequalities in access to resources and human capital. For an

FIGURE 21
FEMALE SHARE IN AGRICULTURAL EMPLOYMENT, GLOBALLY AND BY SUBREGION



¹ Commonwealth of Independent States.

NOTES: From 2013 onwards, data are projected values calculated by ILO.

SOURCE: ILO, 2014.

analysis of the role of migration flows in rural transformation, see [In focus: Drivers and impacts of rural out-migration](#), p. 92.

Decent employment, labour skills and the role of social protection

Creating new jobs and upgrading the quality of existing ones in rural areas should be a core pillar of any strategy to address poverty and food insecurity. This implies that employment in the non-farm sector should empower the poor and the marginalized by providing equal opportunities to all regardless of gender, age or ethnicity. Only decent employment that ensures adequate levels of income can become a powerful driver for long-term food security, poverty reduction and sustainable development (FAO, 2012b).

The growth of rural non-farm activities is an opportunity for poor rural households only if they have, or can acquire, the skills needed to take advantage of the opportunities. However, decent non-farm employment remains largely associated with education levels (Lanjouw and Murgai, 2009). Jin and Deininger (2009) found that the most common perceived constraints facing small rural family enterprises were a lack of finance and infrastructure, followed by electricity shortages, insecurity and lack of access to market information.

In a study of youth employment in sub-Saharan Africa, virtually all household enterprises reported using their own funds or loans from friends and relatives, not formal credit, to start their business. The study notes that borrowers must be able to save regularly and that having a saving mechanism is essential. Mobile banking,

pioneered in Kenya, where 50 percent of the adult population use it, could help connect to savers in remote areas and also reduce the transaction costs of serving small savers (Filmer and Fox, 2014).

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. Patterns of growth will differ substantially in speed and in composition between countries where agriculture is transforming rapidly and those where the sector is stagnant. Stifel (2014) found that in Ethiopia, a country that has recorded strong agricultural productivity growth, 51 percent of households started a non-farm activity using income from farming. Moreover, recent research in Bangladesh indicates that non-farm employment growth and transformation – often prompted by adverse shocks to agricultural productivity, such as floods and drought – have 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. The development of a sustainable agro-industry will depend largely on policies that look beyond the farmgate and seek to add value through agroprocessing. Therefore, agro-industrial policies should occupy a central position in government strategies, and should be integrated into a social policy framework aimed at enhancing food and nutrition security and reducing poverty. There needs to be greater emphasis on supporting small and medium-sized food enterprises with capacity-building, clustering and modern technologies in order to enable them to reach scale and improve competitiveness. Policies need to recognize the limitations of the informal sector and facilitate the inclusion of small food processors in supply chains under formal contracts.

Social protection also has a very important role to play in helping the poor to access high-productivity employment and income-generating opportunities. Social protection programmes can 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 constraints, including a lack of liquidity, credit or insurance, may hinder individuals, households or enterprises 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 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 in order to increase the productivity of agriculture and also for the growth of high-productivity services and industrial sectors. Skills are complementary to technology²⁰ and necessary for accessing better-paid jobs.²¹ Policies supporting education at all levels are thus key to inclusive rural transformation, although their impacts will be felt in the long term. In the short term, social protection programmes can contribute to achieving the same objective through cash transfers, conditional or unconditional, which lead to increased school attendance among children in beneficiary households (Barrientos, 2012; Bastagli *et al.*, 2016). ■

CONCLUSIONS AND POLICY IMPLICATIONS

Creating sufficient employment opportunities for the developing world's rural population in the years ahead is a huge challenge. Efforts to promote more and better jobs, especially for the rapidly expanding youth populations, should pay particular attention to rural areas and focus on

²⁰ There is ample literature on skill-biased technological change. See, for example, Acemoglu (2002), who argues that technical change has been skill-biased for at least the last 60 years.

²¹ A misconception is that job creation is a process separate from the availability of labour. Although mismatches can occur, production and technology choices typically reflect the amount and type of labour available.

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. Such an approach is very relevant for many countries in 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. While these interventions should continue to aim at increasing agricultural production and productivity, 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, enhance human capital, and capitalize on potential territorial comparative advantages. Facilitated access to affordable sources of credit and energy, and improvements in 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 land, water and other natural resources and infrastructure largely govern how population is distributed across rural areas in any country. In many rural areas, the economic base includes other natural resources – such as minerals, forests or tourist attractions – which could sustain income-generating activities. 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

support in overcoming 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. 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 policy and planning approach that supersedes the narrow sectoral focus currently dominant in policy-making by taking into account the rural–urban continuum and the major role that small cities and towns are playing in rural economic development. This approach would also take account of the rapid changes in territorial dimensions, such as those introduced by modern telecommunication technologies, which are connecting more farmers and rural households than ever to markets and sources of knowledge and information.

Overall, the economy of any rural area is based on the activities in which the area has a comparative advantage and remains competitive when exposed to external market forces. However, competitiveness also depends on the size of the economic base and the demand it generates locally. As 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, a case can be made for explicitly incorporating spatial issues into policy design through a “territorial approach” that can help counter territorial distortions in development patterns. This approach is the focus of Chapter 5. ■

IN FOCUS

DRIVERS AND IMPACTS OF RURAL OUT-MIGRATION

Major rural–urban migration flows have been a feature of past structural and rural transformations. Migration flows are complex phenomena that defy simple analysis. For example, while there is growing attention today to international migration towards Europe and North America, these South–North migratory flows are one part of a bigger picture that includes migration both between and within developing countries. Migration can originate in rural or urban areas and can also take different forms depending on its duration. It may be permanent or temporary, as in seasonal movements of farm workers. Migration may also be driven by very different factors and often by a combination of them. It may depend on differences in economic – and other types of – opportunities in the areas of origin and destination. Major flows of migration are also associated with protracted crises resulting from conflicts and disasters.

While migration may take different forms and have different drivers, rural out-migration is bound to be part of any process of structural and rural transformation. However, its precise magnitude and characteristics will depend on contexts and are often difficult to assess. This is because the processes driving migration decisions are not well understood. While people migrate in search of opportunities, it is not easy to predict who will migrate, where they will migrate to and why. While migration is extremely important in determining a country's development pathway, how it unfolds and its impacts depend on national policies and planning and on how resources are allocated between rural areas and cities of different sizes. A better understanding of the decisions behind



IDOMENI, GREECE

Migrants and refugees attempting to reach Northern Europe.
©FAO/Giuseppe Carotenuto



migration can help in shaping national policies and strategies aimed at achieving inclusive growth of the rural non-farm economy.

Town and village enterprises offer non-farm jobs

If rural out-migration is driven by a lack of jobs locally, providing non-farm employment opportunities is a way of meeting the needs of potential migrants before they leave. Where out-migration is driven by the attraction of more prosperous conditions in destination regions, usually urban centres, a different strategy may be effective – 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 large-scale rural–urban migration. 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 and Reardon, 2017). By 2010, the total number of migrants leaving rural areas was estimated at up to 180 million (Fan, 2009). In parallel, the Chinese government fostered the development of town-and-village enterprises, which promoted the industrialization of rural areas by giving farmers who exited agriculture the option of jobs in manufacturing. 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 and create jobs.

Song, Thisse and Zhu (2012) observe that patterns of migration will depend on factors such as the agglomeration effects of cities, transportation costs, the cost of migrating, spatial differences in the technological efficiency of businesses, 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.

IN FOCUS DRIVERS AND IMPACTS OF RURAL OUT-MIGRATION

Developing an economically viable source of rural non-farm income was a key element in China's rural-urban strategy. It has generated widespread rural-urban commuting, which has also become significant in densely populated areas of Asia and Latin America.

Most African migrants “benefited from decision to migrate”

Migration is the common response of people seeking to mitigate or cope with adverse conditions. However, individuals also migrate to take advantage of new opportunities. Lucas (2015) 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).

Data on migration in Ethiopia, Kenya, Nigeria, Senegal, South Africa and Uganda indicate that the proportion of migrants moving from rural to urban areas ranged from 40 percent of total migrants in Nigeria to 55 percent in South Africa (World Bank, 2013b, 2017b). Migrants were mostly male and young, with 60–70 percent aged 15–34 years. In all the countries considered, women migrated less and when they did, it was mostly for family reasons, while men migrated in search of employment.

The same data showed 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, reflecting the lack of decent employment opportunities in rural areas (Figure A). Education and family reasons were also important drivers of rural out-migration, but their ranking varied by country. Although poverty is a key driver of migration, the poorest often lack the resources needed to migrate. Thus, while stimulating local economic development and job opportunities can offer alternatives that reduce the desire to

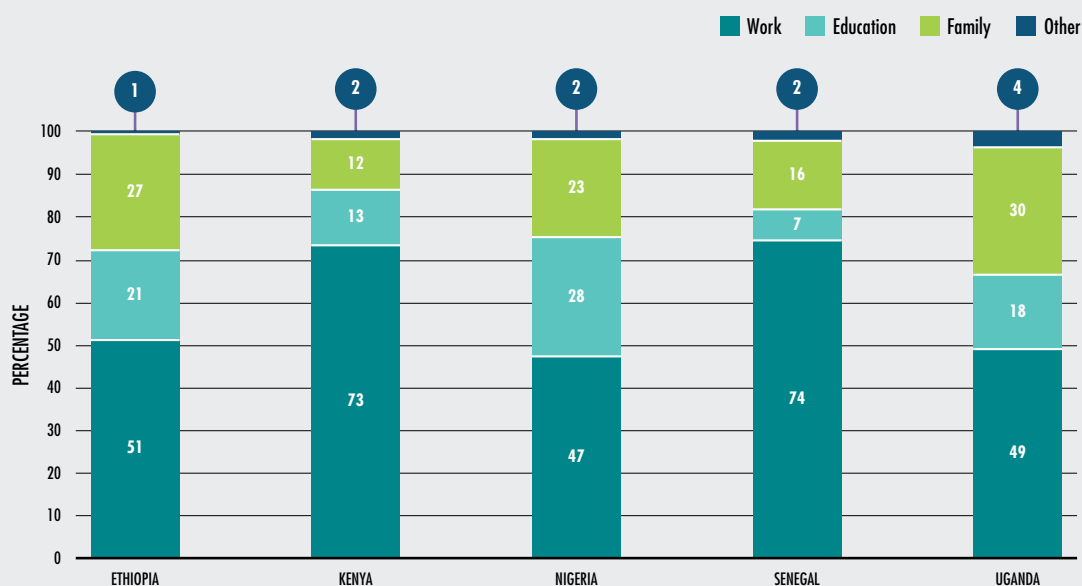
leave, they can also stimulate migration by providing the resources needed to do so.

A comparison of migrants' employment status before and after migration in Kenya, Nigeria, South Africa and Uganda shows that most individuals who moved away from rural areas have found better employment opportunities (Figure B). In all four countries, the shares of both the employed and of self-employed increased with migration. In all countries, unemployment rates declined significantly with migration, as did the share of students. However, the proportion of housewives increased.

While data are scarce, several studies show that migration produces welfare benefits. For example, Beegle, De Weerd and Dercon (2011) analysed the impact of migration on poverty in Kagera Region in the United Republic of Tanzania. They found that between 1991 and 2004 the consumption levels of migrants increased by 36 percent compared with the levels of those who stayed behind. Among migrants who moved to urban areas, the difference was 66 percentage points.

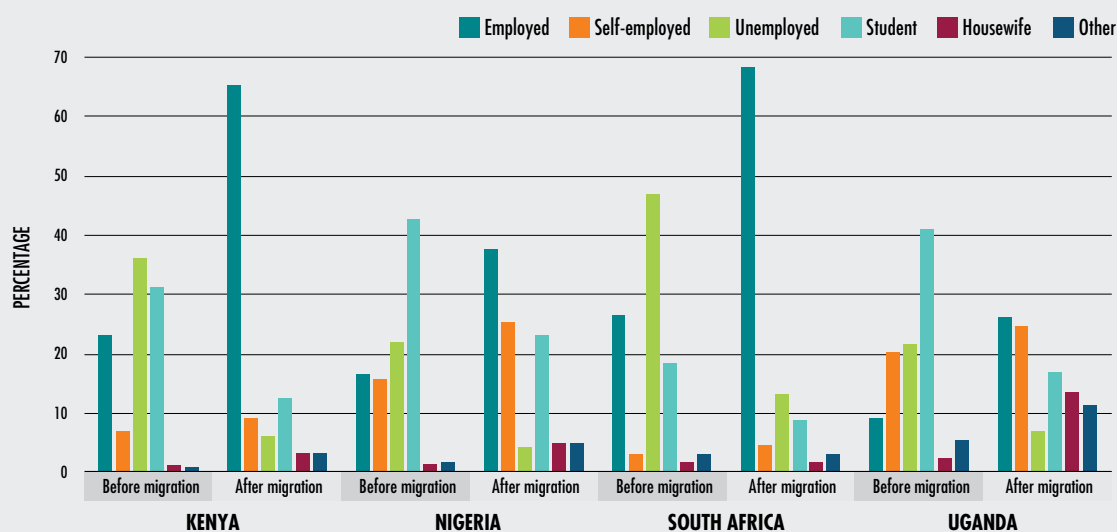
Migration has both positive and negative effects on rural areas and rural households. However, the exact impact of migration and associated remittances on rural household welfare is highly context-specific, varying both across space and time. Migrant remittances can be one of a rural household's main sources of finance for investment, schooling, house construction and agricultural inputs. However, remittances can also have negative consequences, by increasing inequality. In addition, male out-migration is one of the key drivers of the feminization of agriculture, which is now under way in many low-income countries. When migrants have difficulty finding decent jobs at their final destination, or in sending remittances to their families, the 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, 2017b). ■

FIGURE A
DRIVERS OF RURAL OUT-MIGRATION IN SELECTED AFRICAN COUNTRIES



SOURCES: World Bank (2013b) for Ethiopia; and World Bank (2017b) for Kenya, Nigeria, Senegal and Uganda.

FIGURE B
EMPLOYMENT STATUS BEFORE AND AFTER MIGRATION FROM RURAL AREAS
IN SELECTED AFRICAN COUNTRIES



SOURCE: World Bank, 2017b.



SAGANA, KENYA
Fish farmers benefit from
FAO's innovative Africa
Solidarity Trust Fund.
©FAO/Tony Karumba





CHAPTER 5 A TERRITORIAL APPROACH TO INCLUSIVE RURAL TRANSFORMATION

Key messages

- Combining sectoral and territorial development approaches is essential for the effective strengthening of rural–urban linkages.
- Interconnected functional rural–urban territories are key to creating on-farm and off-farm jobs, eradicating poverty, ensuring food and nutrition security, providing alternatives to rural out-migration, and achieving sustainable management of natural resources.
- Institutional frameworks and policies that guide development of food systems should mitigate the risks associated with increased market concentration and minimize the adverse impacts on smallholders and the rural poor.

A TERRITORIAL APPROACH TO INCLUSIVE RURAL TRANSFORMATION

One of the defining themes of this report is urbanization and the rapid evolution of food systems in developing countries, and the opportunities and challenges those trends create in domestic food markets. Another is the role of small cities and towns and how they contribute to inclusive transformation through their close links to rural areas and the food system. As pointed out in Chapter 2, half of the global population now lives in or within the “sphere of influence” of small cities and towns. This polycentric pattern of urbanization is found in all country income categories, and persists as transformation unfolds. Therefore, a key strategy for reducing rural poverty is to foster access to economic assets, and enable the poor to invest in on-farm and off-farm income-generating activities, in proximity to these smaller urban areas.

Inclusiveness is not a natural outcome of rural transformation. It requires political will, legal and institutional reforms that strengthen transparency and accountability, and empower local communities – especially the most vulnerable groups, such as women, youth and indigenous peoples – to participate in policy and planning processes. Necessary conditions and actions to ensure that transformations result in improved rural livelihoods and poverty reduction are: decentralization; strengthening small-scale farmers’ organizational capacities; promoting community mobilization to facilitate rural people’s access to information; inclusion of the most vulnerable in community life; and supporting collective action so that rural people take ownership of their own development.

During structural transformation, social protection is a key measure for promoting inclusion. Social protection programmes strengthen human capital, allow the poor to invest in more risky but potentially more

profitable activities, and complement agricultural interventions that improve technical skills and access to new technologies. However, to be successful, social protection needs to be flexible enough to allow geographical and sectoral mobility, which enables households to take advantage of the emerging opportunities. Therefore, the design and targeting mechanisms of programmes need to provide portable benefits or establish social protection floors that address poverty in all circumstances (Kangasniemi, Knowles and Karfakis, 2017).

Recognition of the importance of small cities and towns in rural economic development is prompting renewed interest in a territorial development approach that recognizes the diversity of development potentials and performances of geographic areas at the subnational level (Box 19).

Under a territorial development approach, “territories” cease to be passive entities characterized by locational advantages and become dynamic entities in which economic and social agents offer products and services, and concur in efforts to boost the competitiveness of their space. By placing the focus on intangible factors – human capital and knowledge – and on relational and network factors, such as cooperation, partnerships, local culture, local vocations and communications, the territorial approach stresses the importance of negotiation, consensus building and conflict resolution. As such, it can facilitate more inclusive decision-making and empower local populations through their formal and informal organizations and networks (Cistulli, Heikkilä and Vos, 2016).

A territorial approach inherently takes a spatial, integrated, process-oriented, multistakeholder and multidimensional perspective. With growing

BOX 19 TERRITORIAL APPROACH FOCUSES ON “PLACES”, NOT “SECTORS”

The territorial approach to inclusive rural transformation has its origins in a paradigm shift in rural development policy, beginning in the early 1990s, which acknowledged that farm employment had declined notably in most middle- and higher-income countries, and that rural areas were generating a wider range of economic activities. As policies moved away from an emphasis on agricultural subsidies towards incentives for investments of all types, new governance and policy models became more important. In the European Union (Member Organization), the LEADER¹ programme involved local partners in steering the development of rural areas. Moreover, in the European Union (Member Organization), the Common Agricultural Policy has been shifting gradually away from production support to direct payments, and recently focused on rural development, acknowledging the multifunctionality of agriculture as a provider of not only food, but also landscape and other environmental services.

The New Rural Paradigm put forward by the Organisation for Economic Co-operation and

Development (OECD) in 2006 asserts that promoting integrated rural development requires “stronger coordination across sectors, across levels of government, and between public and private actors. It also requires a new focus on *places* rather than *sectors* and an emphasis on *investments* rather than *subsidies*.” In a recent revisiting of the theme, adapted to the reality of developing countries today, the OECD offers a framework, along with a number of case studies, for rural development strategies that are multisectoral, build on rural–urban linkages, and focus on different levels of government, rural communities, the private sector, non-governmental organizations and international donors (OECD, 2016).

The interest in territorial approaches has also extended to aspects of food and nutrition security, as rural poverty and food insecurity usually go hand in hand and tend to occur in geographical clusters within countries (OECD/FAO/UNCDF, 2016).

¹ *Liaison entre actions de développement de l'économie rurale.*

awareness of its potentials, an increasing number of countries are putting in place mechanisms to pursue intersectoral territorial approaches to rural development (see [Box 20](#)). However, implementation of a territorial approach is a complex task that requires a fundamental change in policy-making and institutional cultures. Conventional government-led policy approaches to food value chains need to be rebalanced with an approach that promotes dialogue between government and non-government actors at various levels, considering interdependences across different parts of food systems, and taking into account possible trade-offs between the growth, inclusiveness and environmental sustainability of food systems across different territories. The complexity and uncertainty about outcomes pose challenges that should be considered before the adoption of territorial approaches in practice (Karlsen and Larrea, 2016). ■

AGROTERRITORIAL OPTIONS: LIMITED SCOPE, MORE MOMENTUM?

A fully fledged territorial development approach is intersectoral. Apart from extensive consultations with stakeholders, it requires a long-term commitment to coordination across many ministries. This may be difficult to achieve, given the relatively short time frames of many governments and development partners. This underscores the importance of political will and strong leadership in setting appropriate policies, governance mechanisms and investments, and harmonizing local needs and priorities with those at the national, regional and global levels. The territorial approach's broad, intersectoral coordination process is a strength »

BOX 20 TERRITORIAL DEVELOPMENT EXPERIENCES IN LATIN AMERICA

Among developing regions, Latin America has possibly the longest experience in the application of the territorial development approach. National programmes for rural territorial development, aimed at alleviating poverty, improving education levels and reducing regional disparities, are under way in Argentina, Brazil, Colombia, Costa Rica, Honduras, Mexico and Nicaragua.

Mexico has the most extensive territorial planning approach, with a national strategy for microregions and an integrated territorial perspective. The aim is to foster a place-based policy by identifying functional regions, and facilitating mechanisms to induce endogenous development through the creation of “micropoles of development”. These poles are identified with spatial, social and economic criteria, based on connectivity and relation to surrounding localities. Chile is also developing a territorial development scheme along the lines of the New Rural Paradigm (OECD, 2016).

More than a decade ago, Costa Rica began moving from sectoral to rural territorial development, with an emphasis on tourism, the environment, artisanal production and agro-industry. Brazil’s National Plan for Rural Development aims at improving market access and diversifying the rural economy. Argentina has created a Rural Development Commission for northern, economically lagging provinces, with a focus on diversification and alternatives to farming.

Of all the developing regions, Latin America is the one where the relationships between urban centres and rural areas, and their impacts on poverty and income inequality, have been studied most in-depth. In a study of Chile, Colombia and Mexico, Berdegué *et al.* (2015) found that poverty reduction was greater in rural areas with a nearby urban centre than in remote rural hinterlands, and that the largest poverty reductions were observed in territories around large metropolises. However, the authors also point out the importance of small- and medium-sized cities as facilitators of rural development – the presence of such cities in a territory correlates with a far smaller gap between the poor and non-poor in access to basic services, such as education health, and housing, compared with hinterlands.

Summarizing a number of territorial studies, Berdegué, Escobal and Bebbington (2015) highlight the role of resource endowments and access to these resources in shaping territorial dynamics. This emerged in case studies of tourism in Brazil, in market-oriented smallholder agriculture in Guatemala and Peru, and in

diversified rural economies in Mexico. They also point out that linking dynamic markets to more-diversified economic structures opens up more opportunities to participate in and benefit from the dynamics of growth. Comparing case studies on Ecuador and Nicaragua, they highlight the fact that economic growth opportunities are more inclusive when links to dynamic markets are reinforced with more equitable structures of access to land and resources.

The role of public investment in rural infrastructure, and its unintended consequences, are highlighted in Ramírez and Ruben (2015) and Ravnborg and Gómez (2015). In the first case, which focused on the salmon aquaculture industry in southern Chile, public investment in rural roads, services and improved access to resources led to large private investments, which accelerated poverty reduction mainly by incorporating rural women in jobs in the agro-industrial sector. In the second case, focusing on a milk-producing area of central Nicaragua, investments in rural roads, cold storage and milk processing stimulated economic growth in the period 1998–2005, but this growth came at the expense of poor peasants. A key point made by both papers is that outcomes depend on how local actors and institutional arrangements relate to investment decisions made outside the territory, as well as to implementation.

In a study of six territories in Latin America, Fernández *et al.* (2012) emphasize the importance of territorial social coalitions, defined as “a group of different actors that carry out convergent actions around a territorial development dynamic.” This is a central theme in territorial development, which is grounded in the fact that agrarian structures, institutions, markets and public investments all influence the social actors in a territory and their capacities and capabilities.

The experiences in Latin America are very diverse. Some territories are managing economic growth, reducing poverty and improving income distribution, while others are failing in one or more of these dimensions. From a review of case studies from 9 countries, Modrego and Berdegué (2015) found that territorial development approaches led to economic growth and poverty reduction or improved income distribution in only one-third of the cases. Although conditions in Latin America may be different from those of late transformers in sub-Saharan Africa and Asia, understanding the Latin American experience, its successes and failures, may hold some valuable lessons.

BOX 21 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 CRFS, 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/km² and increasing. To meet the needs of this growing population, food is sourced from many parts of the country. However, owing to inefficiencies in 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.

SOURCE: FAO, 2017f.

The Sri Lankan government has set up a dedicated ministry to implement Megapolis, a large-scale, multibillion-dollar urban development initiative in Western Province, where Colombo is located. The results of the Colombo CRFS assessment are being scaled up 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 improve the sustainability of local food systems, generate employment, create new opportunities for urban and peri-urban farming, and develop shorter value chains linked to peri-urban and urban production areas. It will safeguard the territory’s natural environment through better use and management of land, water and waste, integrate climate change adaptation and risk reduction strategies into urban planning, and prioritize protective mechanisms to control the use and expansion of agriculture in urban and peri-urban areas, as well as the rural hinterland. Other important objectives are to guarantee food safety and product quality in order to ensure the health and well-being of the population, and to provide social protection for low-income marginalized communities, children and other vulnerable groups.

» where properly implemented, but a weakness where policy-makers and stakeholders are unable to maintain commitment and momentum.

Focusing the territorial approach on the food system and its links to the territory simplifies coordination, making it easier to build momentum around a territorial initiative. This “agroterritorial” approach is intersectoral, to the extent that the food system encompasses agriculture, agro-industry, agroprocessing and associated services. Nonetheless, it is narrower than the approach typically taken in territorial development, and may miss broader intersectoral opportunities such as tourism or other manufacturing and services. Even so, some of the investments aimed at developing economic opportunities in the food sector may also benefit other sectors indirectly. Coordination with local institutions may provide a stimulus for broader discussions and the inclusion of other, relevant economic activities.

The benefit of an agroterritorial approach is that, while simplifying the territorial development process, it reconciles the sectoral economic aspects of the food sector with its spatial, social and cultural dimensions, which are at the core of agriculture and food systems. It addresses the challenge of supplying food to urban consumers by linking urban centres more effectively with their “catchment areas”, while at the same time creating rural income opportunities and using agro-ecological zoning and landscape approaches to ensure sustainable development (see [Box 21](#)). It also builds sustainable rural–urban linkages that bring together the “two middles” of the food system – the small cities and rural towns that facilitate downstream links of the food value chain; and the farmers, agro-industries, traders and ancillary players that provide non-agricultural services across the rural–urban continuum.

As analysed in Chapter 3, the decline in agriculture's share of employment – coupled with the non-farm sector's often limited capacity to generate sufficient jobs to absorb new entrants to the rural labour force – may lead to higher levels of unemployment and underemployment in rural areas, resulting in higher rates of out-migration. Agroterritorial interventions aim at generating new jobs, in urban as well as rural areas, by creating or capturing employment opportunities in the food system in labour-intensive manufacturing jobs, on-farm activities, and ancillary services that develop around agribusiness and agro-industrial production. In this way, the food sector plays an important role in economic development and inclusive rural transformation.

Unless done in a coordinated and consultative manner, an approach focused on the food system could lead to the marginalization of many smaller-scale producers and agro-enterprises. This may occur, for example, with the development of capital-intensive, vertically integrated value chains in geographical areas where they are not appropriate. Therefore, governments have an indispensable role to play by formulating policies, making institutional reforms and providing public goods that facilitate agribusiness and agro-industrial development, while at the same time ensuring that small-scale producers are included and that other non-farm job opportunities are created and developed in fragile and remote areas.

In view of the challenges associated with ongoing transformations (identified in previous chapters), the purpose of an agroterritorial development approach is to address: the potential exclusion of small-scale producers and other vulnerable groups from the food system; the expected increase in rural unemployment and underemployment in the years ahead; and the need to close the infrastructure deficit in rural areas and to increase rural–urban connectivity.

This chapter explores how food systems can contribute to inclusive rural transformation through an agroterritorial approach. It highlights first the importance of collective action by smallholders as a means of reaching economies of scale and ensuring they have a voice in the territorial development

process. It then describes agroterritorial investment options, which are based on a combination of public-good provision and investments in infrastructure, and a multistakeholder territorial planning process. Before the final conclusions, the chapter reviews the agroterritorial approach within the broader policy context, which will influence its outcomes. ■

PRODUCER ORGANIZATIONS ARE ROOTED IN TERRITORIES

For rural transformation to be inclusive, rural producers – particularly smallholders, rural women, youth and vulnerable groups – need access to rural services. At the local, national and regional levels, their access is mediated by institutions, which must have the necessary capacities and resources to respond to producers' demands. To promote wider access to appropriate innovations, there is a need for effective, responsive, demand-driven and inclusive public and private institutions and actors that provide relevant services to rural people.

Key objectives of the agroterritorial development approach are to ensure the inclusion of smallholder farmers, especially youth and women, by brokering collaborative arrangements between producer organizations and agro-enterprises in the targeted location, and to foster small and medium-sized food enterprises by helping them achieve economies of scale through co-location and dedicated services, as described later on in this chapter. However, to benefit fully from such arrangements, small farmers and vulnerable groups will need to be well connected to sources of knowledge, inputs and finance, and to profitable value chains.

As explained in Chapter 3, because smallholder farmers are often isolated and scattered over a territory, they may be excluded from services such as extension and input supply and from markets. For example, small-scale producers in many developing countries were unable to benefit from higher food prices in 2007–2008 (Herbel *et al.*, 2012). However, when organized in associations, smallholders are able to manage

their resources efficiently, improve their access input and output markets, information and knowledge effectively, and have greater influence in the policy-making process.

Strong rural organizations are fundamental to territorial planning for rural development. Issues such as insecure land tenure and land fragmentation, which may hinder effective territorial development, can be better addressed through collective action. Through their organizations, small farmers can also reach the economies of scale needed to adopt farm mechanization. In addition, because rural transformation must be compatible with environmental sustainability, through innovations that enable higher output using fewer resources, an important role of farmer organizations is to facilitate the adoption and diffusion of knowledge on best available practices that are locally adapted and economically viable. An interesting application of collective action in a territorial context is provided by food products with “geographical indications”, such as Pinggu peaches in China, and Parmesan cheese in Italy (Box 22). ■

INVESTMENT OPTIONS FOR AGROTERRITORIAL DEVELOPMENT²²

As well as encouraging collective action, an agroterritorial development approach often requires major investments in rural infrastructure. In this case, several options for investment in agroterritorial development are available 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** – territories connected by lines of transportation, such as highways, railways, ports or canals, in which an economic development programme fosters agriculture and other

economic sectors. Agro-corridor programmes enhance the so-called “three Cs”: connectivity, competitiveness and community. Examples include Mozambique’s Beira Agricultural Growth Corridor, which aims at promoting investment in commercial agriculture and agribusiness across three provinces.

- **Agroclusters** – geographic concentrations of interconnected producers, agribusinesses and institutions that are engaged in the same agricultural or agro-industrial subsector, and build value networks to address common challenges and pursue common opportunities. In Maharashtra State, India, clusters have been created to boost grape production through farm-machinery hiring services.

BOX 22 GEOGRAPHICAL INDICATIONS CREATE AND PRESERVE VALUE

Geographical indications identify a product as originating in the territory of a particular country or region, where its quality, reputation or other characteristics are linked to its geographical origin (WIPO, 2003). Typically, a geographical indication reflects local conditions, natural resources and traditional practices, often with small-scale producers being the main guardians of tradition. Geographical indications have been initiated by producer-based groups that organized themselves specifically for the purpose of establishing and protecting the originality and authenticity of a particular product.

The development of geographical indications involves a public–private approach that values 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 “origin-linked quality virtuous 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, 2010b).

²² This and the following section draw on FAO’s recent work in the field of territorial tools for agro-industrial development. See Gálvez Nogales, 2010, 2011, 2014; Gálvez Nogales *et al.*, 2014; and Gálvez Nogales and Webber, 2017.

- ▶ **Agro-industrial parks** – centrally managed platforms that offer 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. With funding from Japan, the 60 ha Jericho Agro Industrial Park in The West Bank processes frozen foods and dried fruits using the produce of local farmers.
- ▶ **Agro-based special economic zones (SEZs)** – demarcated geographic areas 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. The Philippine Economic Zone Authority manages and operates several export zones, whose products include foods processed from domestic raw materials.
- ▶ **Agribusiness incubators** – enterprises that provide a common environment for nascent agriculturally based companies, in which there is access to shared infrastructure, networking, coaching, and business and financial services. For example, the Technological Centre for Regional Development of Viçosa (CENTEV), at Brazil's Federal University of Viçosa, has fostered a biotechnology business specializing in fungi that control crop parasites.

Promoting the employment multipliers associated with the food sector, discussed in Chapter 2, is an integral part of the agroterritorial approach. Gálvez Nogales and Webber (2017) report several initiatives that have been successful in generating jobs, often on a large scale – for example, from an investment of only US\$28 million, the corridors supported by Peru's poverty reduction and alleviation programme created more than 100 000 new jobs between 2000 and 2014. Some initiatives, particularly agribusiness incubators, are very effective in generating youth employment. They spawn start-ups that shift the focus from necessity-driven, informal entrepreneurship to high-impact new ventures with a greater capacity for employment creation. For example, in Cairo, the "Flat6Labs" incubator created more than 400 jobs over three years from an investment of US\$1.2 million.

Determinants of agribusiness location decisions

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

Businesses look for ease of access to markets, to raw materials and to infrastructure such as water, railways, roads and energy. Food companies are attracted to cities with nearby agricultural areas because being nearer to consumer markets is more profitable. Companies are also pulled towards urban locations because they offer productive assets, such as efficient labour markets, input providers and support services. Political, institutional and macroeconomic stability also matter, as do a deregulated environment and an enabling investment policy.

Food companies locate where the supply of agricultural products is regular, 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 production areas. This is the case, for example, with almost all zones producing sugar cane, as the sugar content of the cut cane begins to fall dramatically with each passing hour. When agricultural raw materials are much larger or heavier than their final product, for example, coconuts and coconut water, transportation costs can be reduced by carrying out processing near the source of production, especially where ship or rail transport is not available.

Another major determinant of food business location is the state of infrastructure and logistics. Good access to road and rail networks reduces the cost and travel time of agricultural raw materials moving from farm to factory for processing. Infrastructure for waterborne transport also offers advantages. Access to

TABLE 6
PROMINENT FEATURES OF AGROTERRITORIAL INVESTMENT OPTIONS

Option	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 kilometres linking several urban centres	Couples infrastructure investments with trade and regulatory policy reforms and sectoral development plans
Agrocluster	Network linkages	Regional or provincial agglomeration around a production area; from hundreds to thousands of hectares	Benefits of agglomeration economies and promotion of collective action
Agro-industrial park	Value addition through processing and innovation	Urban; a few hectares	Common infrastructure, logistical facilities and dedicated services
Agro-based special economic zone	Provision of a favourable regulatory, business and fiscal environment	Urban; a few hectares	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, Table 25.

electrical power plays a critical role in location decisions – the operating costs of rural agro-industries can be up to 30 percent higher than those of a plant connected to the national grid. Reliable access to energy provided the cold chain facilities that were key to the rise of meat, dairy and horticulture value chains in newly competitive regions of Argentina, and it has been critical to the rapid development of cold chains in China and Viet Nam.

To create those attractive conditions for food system investment, governments should engage with local stakeholders in zoning exercises to identify the vocation of various areas and target them for agricultural, commercial or residential uses. This process may include setting aside zones to attract agro-industry, thereby adding value to the territory's agricultural base. Zoning would need to be accompanied by infrastructure development that helps to maximize the potential of economic activity, including agro-industry.

Governments should also recognize that food system links may extend far beyond a specific territory. Interventions need to take into account just how globalized many domestic food systems

have become. They are typically populated by overwhelmingly transnational supermarkets and processors, which may be driven by business and investment strategies different from those of their domestic competitors (Reardon *et al.*, 2003). Similarly, trade in highly processed food products that travel long distances from the field to the consumer may not necessarily benefit from the territorial development approach discussed here. Other essential means that facilitate the outward flow of food products, such as coastal areas and cross-border regions, will need attention as well.

Characteristics of agroterritorial investment options

Options for investments in agroterritorial development vary in terms of their overall purpose, geographic range and defining features, as summarized in [Table 6](#). All five options analysed here 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

FIGURE 22
GEOGRAPHIC RANGE OF AGROTERRITORIAL INVESTMENTS
AND TYPE OF GOVERNANCE RESPONSIBILITY



SOURCE: Gálvez Nogaes and Webber, 2017, Figure 23.

food system 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.

In addition to their shared objectives, each agroterritorial investment option pursues different specific goals, as illustrated in Table 6. 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.

Geographic range

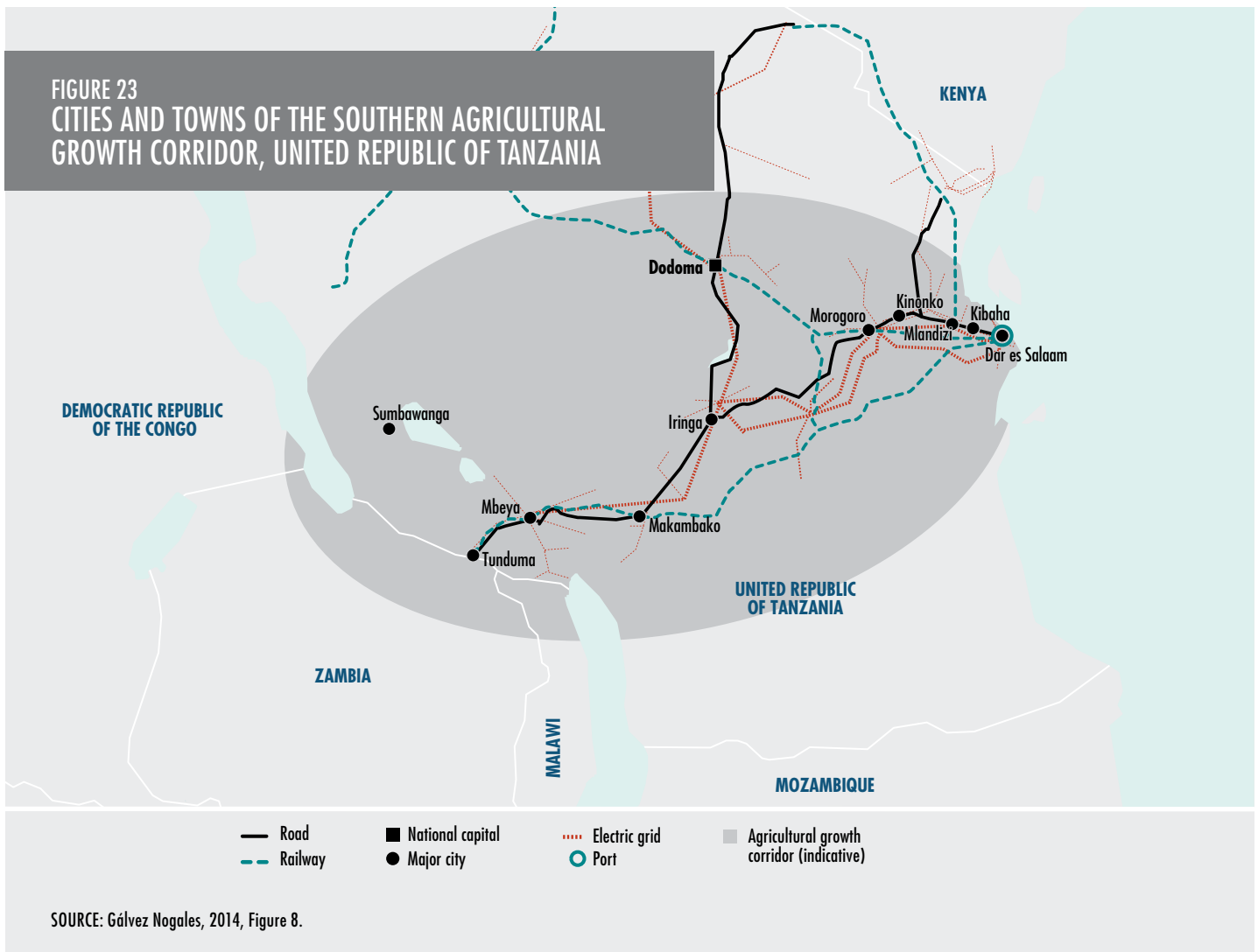
Agroterritorial investment options have fairly distinct geographic ranges, which results in different governance models, as shown in Figure 22. The broadest instrument, in terms of geographic range, is the agro-corridor, which

can spread over a very large space. The Tarapoto corridor in northeast Peru stretches for 500 km, the Southern Agricultural Growth Corridor of Tanzania for 1 000 km, and the 10-nation Central Asia Regional Economic Cooperation (CAREC) Program foresees 6 corridors extending over 4 000 km in Central Asia and linking the west of China to the Caspian Sea.

An agro-corridor may include one or several cities, often including smaller cities or towns, which act as hubs for goods entering or leaving the corridor, and as a home to businesses that constitute the proximate point of demand for food system services. Typically, the transport axis of the corridor connects rural areas to small cities and towns, and links these intermediate cities, in turn, to broader domestic and international markets. For example, the growth corridor in the United Republic of Tanzania connects two secondary towns and several small cities to Tanzania's largest city, Dar es Salaam, and its 4.3 million inhabitants (see Figure 23). Similarly, the Tarapoto corridor in Peru links the city of Tarapoto (population: 120 000) to three secondary towns.

An agrocluster typically extends over a province or a department, which often gives the agrocluster its name, for example, Mexico's Colima lemon cluster, Brazil's Santa Catarina

FIGURE 23
CITIES AND TOWNS OF THE SOUTHERN AGRICULTURAL
GROWTH CORRIDOR, UNITED REPUBLIC OF TANZANIA



apple cluster, and the Maharashtra grape clusters 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 an 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. In Denmark, the Agro Food Park on the outskirts of Aarhus, a city with a population of 320 000, is planned to cover 32.5 ha, while the Bizerta food technopark in Tunisia includes a 150 ha industrial estate and a 45 ha area dedicated to innovation and knowledge. Most agrofood 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, and the Baguio special economic zone in the Philippines, Agri-food City in Tudela, Spain, and the Jericho agro-industrial park. Agribusiness incubators require only a few hundred square metres – Brazil's CENTEV Technology Incubator occupies a 1 000 m² building, and incubator sizes in the United States of America average 3 700 m².

Given their diverse geographical ranges, all of these agroterritorial development instruments can often be combined in useful ways. For example, incubators can operate within agro-parks and clusters. Clusters, SEZs and agro-parks are incorporated in corridor initiatives.

In other words, instruments that are delimited in geographic range can be effective components when combined in broader programmes for food system development.

The larger the geographic range, the more complex the intervention becomes, in terms of participants, levels and sectors, and the higher the budget tends to be. This results in a gradation in governance requirements, as noted in **Figure 22** – greater public support and leadership is needed for larger interventions, owing in part to the connective infrastructure investments required, while private participation is a feature of smaller-scale agribusiness incubators and agro-parks.

Defining features and commonalities of agroterritorial investment options

The applicability of the various agroterritorial investment options will depend on the level of economic development in the area where they are to be located. For countries with substantial civil and political stability, which can afford to invest in infrastructure and education, the agroterritorial approach can be highly effective in building agricultural value chains 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, with complexities that call for strong collaboration among sectors, central and decentralized levels of government, and public and private partners. For middle-income countries and advanced agro-industrial economies, more sophisticated forms of regional agrocluster development will be applicable. Clusters can be the tool of choice when participants in a 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.

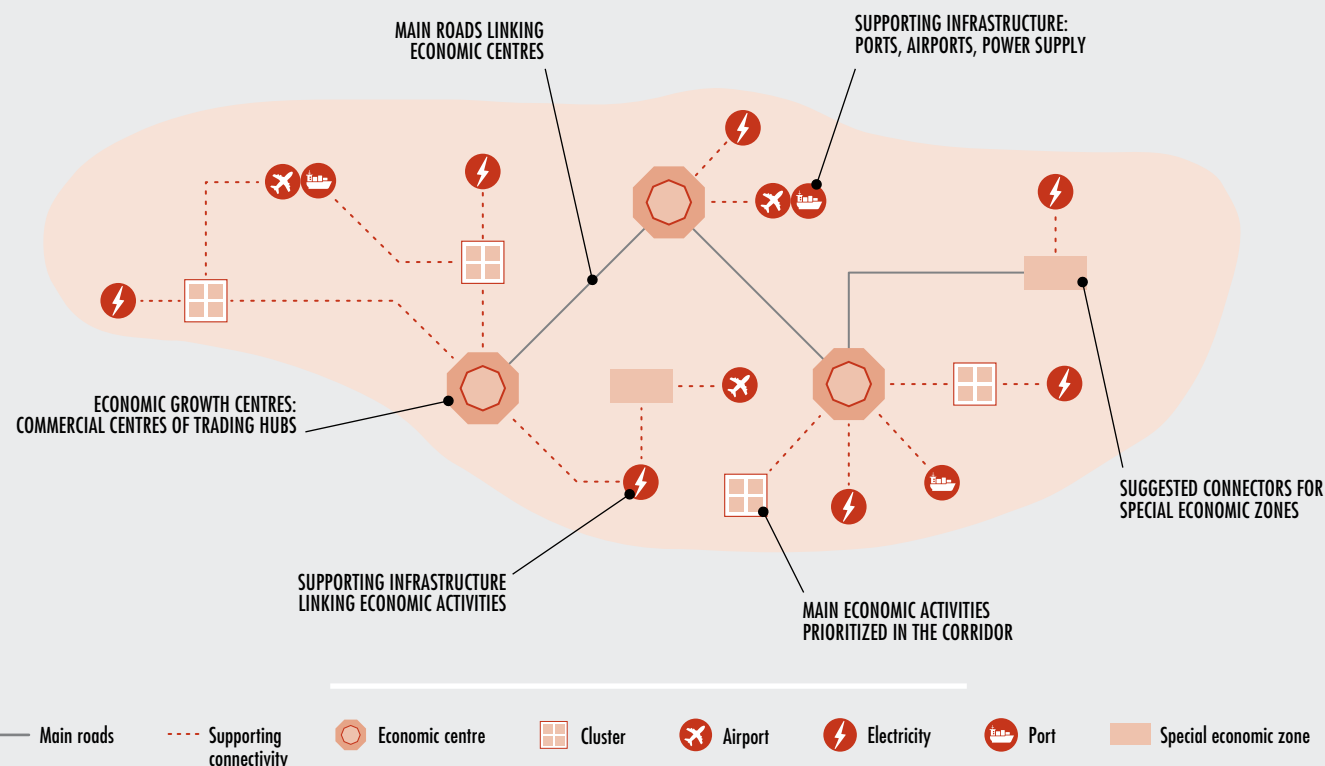
Policy-makers may adopt the agro-park model when their specific goal is to generate or capture opportunities for agro-industry, which generates labour-intensive manufacturing jobs in urban and peri-urban areas and helps to move the food system towards higher-value activities. This option is indicated for adding value through processing, which means increasing the efficiency and capacity of park tenants and their suppliers of raw materials to create value while reducing transaction costs. Agro-parks can also support a multiplicity of food value 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.

When the regulatory environment is a constraint on food system development, agro-based SEZs can offer a haven for food enterprises, as well as a testing ground for innovative policies in a controlled environment before going sector- or country-wide. Finally, agribusiness incubators are the right tool to use to overcome market failures that are hindering entrepreneurship and the development of a healthy entrepreneurial ecosystem in a specific location. Regardless of these differences, when designing agroterritorial interventions, policy-makers need to bear in mind that the key to success lies in achieving a balanced mix of infrastructure development and “soft” enabling policy measures across the whole rural–urban spectrum.

What type of rural infrastructure is needed and where?

Agribusinesses are acutely aware of the impact of ease or difficulty in moving products on their costs and competitiveness, and look for infrastructure investments that lower transportation costs (Carciofi, 2012). The agroterritorial investment options combine, in different ways, interventions in infrastructure with specific actions aimed at strengthening and expanding the food system. Infrastructure investments include those that create, expand or rehabilitate transport infrastructure and related logistics services, urban and regional infrastructure networks, “last-mile” and food-specific infrastructure, and common, centrally managed infrastructure and facilities for agrofood parks, SEZs and incubators (**Figure 24**).

FIGURE 24
INFRASTRUCTURE INVESTMENTS IN AGROTERRITORIAL INITIATIVES



SOURCE: Gálvez Nogales, 2014, Figure 20.

In developing countries, the development of large connective infrastructure 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 leading role in the regional corridor initiatives in Central Asia and in the Greater Mekong Subregion of Southeast Asia. Conversely, lighter infrastructure investments are usually funded from a mix of public and private resources.

It is the responsibility of the public sector to ensure the efficient movement of food products. Agroterritorial investments can help address bottlenecks created where key connective infrastructure and facilities are not in place, or

require upgrading or upscaling. By providing more efficient transport services – in terms of time, and economic and environmental costs – they facilitate integration of rural–urban areas within the country and onward links to global markets. Improvements in transport infrastructure along agro-corridors reduce average travel time by 40–50 percent and transport costs by up to 80 percent. Failure to improve critical connective infrastructure blocks access to input, output and labour markets, and all other investments risk becoming ineffective.

Also important is the extension of connective, “last-mile” infrastructure to the rural hinterland, which is crucial for rural transformation and territorial development (Box 23), and infrastructure

BOX 23
"LAST MILE" INFRASTRUCTURE IN JAMAICA

Last-mile infrastructure integrates rural 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 connects isolated rural areas to urban centres, creating conditions that foster agribusiness development.

Jamaica's Ministry of Agriculture and Fisheries is fostering tripartite investments – by government, farmer organizations and buyers – in selected territories and value chains for higher-value crops, such as ginger and turmeric, using a three-pronged approach that

combines the establishment of agrofood parks, the development of irrigation systems, farm roads and packing houses, and the promotion of supply agreements between irrigated farms and consortia of agro-park tenants.

One planned initiative is the Yallahs Park (near Kingston) for processing onions and other vegetables. The park investment is complemented by a US\$4 million investment in irrigation facilities, farm roads and a packing house, funded by 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.

improvements that serve the needs of small-scale producers (Box 24). Developing gateways, such as ports and airports, may also be needed to move agricultural products to domestic and international markets.

The private sector, and particularly firms specialized in logistics, can play an important role in reducing costs and increasing the intermodal exchange of food products and services across the rural–urban continuum. In addition to expanding road networks, finalizing incomplete infrastructural linkages and funding multimodal transport initiatives that benefit the targeted area, public authorities should collaborate with the private sector to address concerns about transport and logistics, and encourage 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 impose taxes or levies on movements of goods.

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 major budget item in the corridor programmes analysed, ranging from 60 percent to 80 percent of total allocations. For example, 80 percent of the budget of the CAREC programme in Central Asia is allocated to the infrastructure pillar, including some 3 600 km of road building and improvements, 2 000 km of railway tracks and the upgrading of ports and border crossings (ADB, 2011). To meet these costs, the participation of both public and private sectors is needed. Should the infrastructure gap be considerable, incentives and other support measures may be provided for *ex novo* "greenfield" developments, as in some agroterritorial initiatives in sub-Saharan Africa.

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

BOX 24 INFRASTRUCTURE THAT BUILDS “NESTED MARKETS” FOR SMALLHOLDERS

Investments in infrastructure to enhance food security and nutrition are more effective when they support models of production and marketing that are appropriate to smallholders and when investments are also made in securing tenure rights (HLPE, 2013). Many farmers practising agroecology have undertaken initiatives to develop new products and services that add value per unit and market those products in novel ways. The construction of new infrastructure, along with new institutional arrangements that link producers and consumers, stimulates the development of new market segments that are nested in general market infrastructure (van der Ploeg, 2008).

A comparative analysis in Europe, Brazil and China found that emerging nested markets have similar infrastructure features, which focus on local and regional markets, and build on common pooled

resources, which might include water, fishing grounds, common land and jointly exploited forests (van der Ploeg *et al.*, 2012). In Brazil, for example, the transport time and costs for individual farmers and drivers have been reduced through infrastructure that provides nodes for self-organized transportation of products (Ecovida, 2007). Research on the infrastructure needs of smallholders has shown the importance of local abattoirs (European Innovation Partnership AGRI Focus Group, 2015), farmers' markets (Kirwan, 2004), and Internet ordering systems (Milone, 2009).

In 2016, the Committee on World Food Security made important recommendations for connecting smallholders to markets, underscoring the importance of public investments to develop or improve smallholder-targeted infrastructure specifically targeted at smallholders (CFS, 2016).

Investments in connective infrastructure reduce transportation costs and travel time, while telecommunications and energy infrastructure reduce business costs for agroprocessors and for food marketing and logistics firms.

Agroterritorial initiatives 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 food-system supply chains.

Infrastructure specific to food systems includes warehousing, cold storage, fresh primary and wholesale markets, collection points, dry ports, logistics platforms and retail operations. Providing this infrastructure is the basis for a diversified service industry and a critical step towards more efficient management of the food supply chains. For farmers, such investments help smooth income shocks from seasonality, market volatility and weather variability (Graziano da Silva and Fan, 2017). For example, in India, cold storage is playing a crucial role in

reducing the seasonality of the potato supply in Delhi by offering farmers of Agra District choices that counterbalance the marketing power of traditional wholesalers. The streamlining of warehousing, shipping, certification and inventory control generates savings and increases efficiency, and may be targeted to specific food supply chains. For example, Indonesia dedicates US\$2.36 billion from 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 food system can be financed from a mix of private and public sources. Some investments, for example, rural or feeder roads, will be in purely public goods, and as such will be provided by governments and their development partners. Others with potential to generate financial returns will probably come from the private sector. Partnership arrangements that pool public and private resources are essential. ■

BEYOND AGRIBUSINESS AS USUAL: THE NEED FOR PUBLIC GOODS

Infrastructure development is an “essential enabler” that makes possible the efficient functioning of markets and agro-enterprises. However, it needs to be part of a broader, multistakeholder territorial planning process. Along with improvements in infrastructure, policy-makers should recognize the need for public goods and services that facilitate the development of inclusive economic activities in a targeted territory. These public goods are described below.

Spatially bound value chain interventions. The five territorial instruments in [Table 6](#) (p. 105) incorporate, in their planning and implementation, supply chain and value chain interventions that reduce the cost of services, increase competition in the provision of services, and improve service quality. Focusing on strategically important value chains helps avoid the dispersal of limited resources. Initiatives should 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 and to improve chain performance at all levels. These interventions include improving supply chain management, establishing value-chain finance schemes, creating a database of input and service providers, and launching value chain partnerships. Successful value chain interventions are those that promote active links between farmers and markets, and support farmer aggregation and broad-based access to finance. Agro-corridors, agro-parks, SEZs and agribusiness incubators typically cover multiple value chains and promote spatial synergies across them.

Integrating value chain interventions in a broader territorial strategy. The above interventions are often part of broader area development plans that integrate interrelated 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 agriculture, social and tax policies, including compensating for the potential negative impact of productivity improvements with social protection.

Policy and regulatory frameworks that foster an enabling business environment and improved governance. These frameworks aim at reducing transaction costs that impede smooth market functioning and prevent farmers from adopting new technologies and exploiting sales opportunities (Calderon, 2009; Gollin and Rogerson, 2010; Jacoby and Minten, 2009; Stifel and Minten, 2008). Ensuring an enabling environment is critical during rapid structural transformation. Using data on 11 sub-Saharan African countries, Carraro and Karfakis (2017) found a positive and significant relationship between 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, food security and public-private collaboration. In particular, land tenure security has been found to be essential. Barrett *et al.* (2017) point out that insecurity of land rights is a major obstacle to agricultural transformation in Africa. Some territorial interventions seek to overcome this barrier by creating land banks, which allocate land to investors following consultation with local governments and communities.²³ This type of intervention is the cornerstone of agro-SEZs, which embody streamlined regulatory environments, including rapid customs approvals.

Brokerage of inclusive collaborative arrangements that benefit smallholder farmers. Contract farming and outgrower schemes are at the heart of most cluster, agro-park and SEZ initiatives. For example, legal, regulatory and policy frameworks have enabled contract farming in the Greater Mekong Subregion corridor programme, which covers Cambodia, China, the Lao People’s Democratic Republic, Myanmar, Thailand and Viet Nam. Another approach is to

²³ Stakeholders should refer to the Principles for Responsible Investment in Agriculture and Food Systems (CFS, 2014) and the Voluntary Guidelines on the Responsible Governance of Tenure of Land, Fisheries and Forests in the Context of Food Security (FAO, 2012a).

incorporate 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. Mozambique's Beira Agricultural Growth Corridor initiative provides favourable funding options for companies that invest in agroclusters with high agricultural potential, provided they adopt inclusive business models that ensure a "win-win" relationship with smallholder producers. A fund created for the Southern Agricultural Growth Corridor of Tanzania includes a facility for large-scale agribusiness companies that develop supply chains with smallholder farmers, as well as a social venture-capital fund that supports youth agro-enterprises.

Improving and expanding business development services.

In transforming economies, food systems usually undergo a transition from segmented markets, in which small and medium-sized enterprises play an important role, to increasing concentration and integration, leading to a loss of SME competitiveness and, eventually, their disappearance. Agro-parks can help to reverse or mitigate this trend. In China, industrial parks have helped small-scale park tenants to grow into medium-sized and large enterprises (Dinh *et al.*, 2012). India has promoted food parks that improve the access of SMEs to cold storage, quality control laboratories and warehouses. Parks also create scope for joint purchasing that reduces the cost of inputs, allowing participating SMEs to scale up within a short time. The Bahamas Agricultural and Industrial Corporation, a parastatal, operates industrial parks and incubators supporting SMEs, notably in the food sector. Many governments promote a mix of firms of various sizes and encourage them to collaborate and support one another (Gálvez Nogales and Webber, 2017; Murray, 2009). For example, China fosters business models that stimulate the relocation of different-sized businesses to industrial parks and nurture linkages among all tenants. In India, cohesion among park users is seen as essential for resilience (Saleman and Jordan, 2014).

Adoption of improved vehicles for financial inclusion and investment. The lack of insurance and credit availability in many rural areas traps farming households in low-risk, low-return activities,

perpetuating their low productivity and poverty (Barrett and Carter, 2013; Carter and Barrett, 2006; Dercon and Christiaensen, 2011). Financial market failures are directly associated with relatively low rates of uptake of more sustainable and productive practices and technologies, in particular irrigation and farm machinery. To correct these failures, dedicated financial facilities and investment vehicles are increasingly being used, as part of agroterritorial development, to support farmers and agribusiness. For example, the Beira Agricultural Growth Corridor initiative in Mozambique 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.

Green practices in agroterritorial interventions.

Environmental concerns need to be identified and integrated into a "greenprint" of the territorial intervention, i.e. an investment framework for sustainable "green growth" of the economy 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 intensifying both smallholder and commercial agriculture while protecting the natural-resource base. As part of the corridor's investment greenprint, several agribusiness firms collaborated with the Norwegian University of Life Sciences and the Sokoine University of Agriculture in the United Republic of Tanzania on a research project that examined the effects of best practices in sustainable farming. They demonstrated the potential of some value chains to double yields and farmers' incomes without expanding the farmed area or increasing greenhouse gas emissions. Green growth agro-parks, such as Suiker Unie in the Netherlands, have a strong focus on the environment and on value-added food products. The scope of these agro-parks is to optimize the use of natural resources – especially through more efficient and sustainable water use – in food production, processing and distribution. Commonly adopted techniques include the use of bioreactors to process biomass into a fuel that is efficient and environmentally friendly.

Innovation programmes. Innovation is particularly important in “food technopoles”, which are agrofood parks that place a special emphasis on technology and innovation, and in 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 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-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.

Skills development programmes. All five agroterritorial investment options presented here can help build the productive and agribusiness skills of smallholders and SMEs, as well as ensure that agribusinesses find personnel with the up-to-date skills needed in competitive food systems. This can be achieved through, for example, public programmes of technical assistance to build enterprise capacities and the use of payroll taxes to finance training. Producer organizations and farmer field schools can be integrated into these programmes to help farmers acquire the knowledge needed for technology adoption and compliance with quality standards and certification procedures. Social protection programmes (see Chapter 4) can also be integrated into public training programmes in order to guarantee smallholders access to training that may broaden their income-generating opportunities.

Strengthening relevant public and private organizations. The success of the agroterritorial development 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 the Indian Grape

Processing Board, which promote collective action within agro-parks and beyond. Similarly, support provided to a federation of cooperatives in Mendoza, Argentina, was instrumental in enhancing farmers’ collective bargaining power and forging alliances with domestic and international distributors, which eventually contributed to the success of the Mendoza wine and grape cluster. ■

INSTITUTIONAL ARRANGEMENTS IN SUPPORT OF AGROTERRITORIAL INTERVENTIONS

Establishing policy coordination in planning and regulating the use of land, water and other resources critical to food production in urban, peri-urban and rural areas is also important for efficiency and win-win outcomes. Political will and the effective allocation of financial resources and decision-making power are required in order to secure better horizontal and vertical coordination across central and local governments and policy domains (Graziano da Silva and Fan, 2017). As well as ensuring public goods and services, governments should put in place in the public sector the multilevel, multistakeholder institutional arrangements and institutional reforms needed to support agroterritorial development and 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 20, p. 100).

Streamlining public governance is paramount. Establishing enabling institutional and regulatory processes will make agroterritorial initiatives more likely to succeed, as will complying with good governance principles on inclusiveness, transparency, leadership and the engagement of all stakeholders. Good governance requires clarification of the roles of public and private organizations working in the design and

implementation of agroterritorial plans. The governance of these processes and planning instruments requires balancing 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, need to find ways to work together and reconcile interests and policies that do not necessarily fit seamlessly (Gálvez Nogales and Webber, 2017).

In 2013, FAO conducted a scoping survey in 71 developing countries and an 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 food system (see FAO, 2014c and 2014d). The study found that agribusiness and food systems usually fell under the mandate of multiple agencies and that the work of these agencies was poorly coordinated. To improve coordination, several countries were creating interministerial committees or similar mechanisms to manage decentralization processes and implement agroterritorial initiatives. This decentralization trend is reflected in the evolution of India's food park programme, which has devolved to state governments the responsibility for creating, supporting and monitoring agrofood parks.

Another option is to establish dedicated authorities responsible for developing and managing agroterritorial initiatives. For example, Mozambique's Beira corridor initiative has 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 agribusinesses. Many agrofood 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.

Involving the private sector, including SMEs, in the design and implementation of agroterritorial

initiatives is often important to their success. Where initiatives seek to attract both public and private investment in functional territories, public-private partnerships are important vehicles for financing, governance and implementation. Because government leadership and involvement are generally reduced, private leadership is especially important in the case of agro-parks, clusters and incubators. For example, in Honduras, a new law allowing the private development of SEZs helped to revive a government-run initiative; the government focused instead on providing an improved regulatory framework and the necessary infrastructure and services for investors (Farole and Akinci, 2011). ■

BROADER POLICY COHERENCE FOR AGROTERRITORIAL DEVELOPMENT

Building an enabling business environment may also require trade facilitation and careful implementation of border measures, such as import tariffs and export restrictions, as well as domestic agricultural support measures, such as input and output subsidies. All of these measures can affect market incentives in the agriculture sector (see also in Chapter 2, *In Focus: International trade, foreign direct investment and globalization of the food system*, p. 44). The stage of agricultural transformation already reached is often a key determinant of the objectives of policy interventions, and ultimately, of the mix of policy measures being implemented (FAO, 2015c).

Key considerations in the framing of trade and related policies include (FAO, 2015c, 2015d and 2015e):

- ▶ The effectiveness of policies depends not only on their type and sequencing, but also on their design, enforcement and implementation.
- ▶ Ensuring stability, transparency and consistency in policy interventions – rather than introducing ad hoc changes driven by short-term concerns – is important for managing expectations and building trust between all actors.

- ▶ Policy design needs to be country-specific, as policies that work in one country might fail in other countries owing to different initial conditions and objectives.
- ▶ The effectiveness of domestic support and trade policy will depend on the extent of competition throughout a specific supply chain. As market power increases, the firms dominating the supply chain will benefit, while producer and consumer gains are reduced. Ignoring competition issues will probably lead to overstating the potential benefits of policy reform for farmers and consumers.
- ▶ Trade policies should not be used as the main instrument for correcting unrelated market failures that are preventing productivity increases. ■

CONCLUSIONS AND POLICY IMPLICATIONS

Chapter 1 presented evidence that transformations taking place in rural and urban areas since the 1990s have led to an increase in the number of people living above the moderate poverty line of more than 1.6 billion people, including 750 million in rural areas. These figures indicate that rural economic activities 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 changes in the 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 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 food system that are location-specific. Therefore, a food systems perspective alone risks overlooking territorial dimensions that are essential to observed outcomes.

Territorial dimensions have become particularly relevant with the growing recognition of the important role of smaller cities and towns in urbanization and rural–urban economic development. An analysis prepared 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. One-third of the world’s total population resides in cities with fewer than 500 000 inhabitants, and another 16 percent live in rural areas surrounding them. Therefore, about half of the global population today is connected through small cities and towns, many of which 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 out-migration is driven by a lack of decent employment and income-generating opportunities in rural areas, creating jobs in the non-farm economy around small cities and towns is a way of meeting the needs of potential migrants before they leave. When out-migration is driven by the “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. Therefore, it is important to view the food system and its development with a territorial perspective.

Without farmers, herders, fishers and forest communities, there is no food system. Thus, the centrepiece of any strategy for rural development and food security is creating the enabling conditions that allow production units to become economically viable, providing adequate incomes and decent living conditions for farmers, workers and households. To take advantage of new opportunities, farmers need productivity-enhancing technologies and improved access to transport, information, investment loans and skills training. This report also reiterates the importance of non-farm income to farming households and their investment strategies.

A strategy that combines the strengthening of economic viability of farming units with the generation of rural non-farm income is also essential for food security and adequate nutrition. As food insecurity often arises from a lack of sufficient income to purchase food or of the means to produce it, a territorial development approach that promotes food security must include rural and agricultural development that generates jobs and income. In addition, it must also include social protection and social policies that act as safeguards against poverty and marginalization. Otherwise, agricultural development could lead to perverse and unacceptable economic, social and food-security outcomes.

On the farming side, the opportunities that come with expanding demand are often accompanied by capital-intensive consolidation of value chains, stricter quality and safety standards, and contractual obligations that create high barriers to small farmer participation. While the development of supply and value chains has employment multipliers that contribute to non-farm incomes, capital intensification will, over time, 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 multidirectional supply chains provide new opportunities, but also leave rural areas exposed to outside competition. Agroterritorial strategies and initiatives will be key in helping small farmers overcome barriers and benefit from the ongoing transformations.

The implication here is that the farm efficiency and food security agenda needs to be extended to a territorial scale, and incorporated as another important tool for risk management and enhanced resilience. To ensure that rural livelihoods are sustainable, policy-makers will need to ensure that the drive for greater efficiency and competitiveness in the food system dovetails with the 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 to generate non-farm employment in rural areas, whether in the agro-industrial sector or other manufacturing.

Another major challenge in today's rapidly evolving food systems is to bridge the gap created by the decline of public-sector extension services. Improved targeting of resources and greater coordination with private advisory services are needed so that farmers can adapt to 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 huge potential of ICT. Through stronger organizations, smallholders can address issues inherent to transformation, such as the consolidation of value chain and landholdings. Rural transformation also needs to be made environmentally sustainable through incentives along the value chain that promote sustainable use of natural resources and investments in research and technology transfer.

Food system and territorial approaches are no panacea. They are proposed here as a means of analysing the confluence of events that drive rural transformation, its impacts and outcomes. The successful outcome of agroterritorial initiatives will depend on stakeholder involvement, on how the initiatives 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, the effective planning and implementation of an agroterritorial development approach require sound choices by stakeholders.

Major infrastructural investments are needed in rural areas, and funds are limited. The World Bank (2012b) estimates the infrastructure gap in low-income and middle-income countries – including roads, ports, airports, access to networked electricity, improved water supply and sanitation, telecommunication and Internet services, irrigation, cold storage and warehousing facilities – at US\$1 trillion. Agroterritorial 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

evaluations 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 for the implementation of agroterritorial initiatives. For example, infrastructure development is most effective when planned in a comprehensive manner and implemented within an appropriate regulatory framework. This requires an understanding of how road, power and telecommunications networks interact with one another and affect populations, and of the economic potential of value chains present in a territory. If infrastructure is to be built, stakeholders need to select carefully the governance model most suited to the implementation and maintenance of the required investments. Emphasis should be given to integrating interrelated policy initiatives, acknowledging the potential synergies and trade-offs among them.

Based on the analysis presented in this report, and the territorial perspective taken in this chapter, a number of policy implications can be drawn.

Possible pathways for policy interventions from an agroterritorial perspective. The huge challenge of eradicating poverty and hunger by 2030 has no easy solutions. A long list of potentially helpful policy measures aimed at poverty alleviation and rural economic growth has emerged from the past two decades of rural development practice. The main recommendations are: improve imperfect markets by lowering transaction costs; develop “missing markets” for credit, technical support and insurance; provide public goods, such as infrastructure, research, information and capacity building; and introduce risk-mitigation mechanisms. However, the recurring questions concerning policy recommendations are: what to do, how to do it, and when to do it? The agroterritorial approach presented here provides an entry point for analysing the constraints facing a specific food system initiative in a given territory.

Reassessing the role of agriculture and rural development in national development strategies. As a result of state withdrawal and excessive segmentation in sectoral policy-making, overall strategy design has been neglected in recent decades. The

weakening of public information and statistical systems has constrained understanding of the dynamics at work in agriculture and rural economies. This is a major handicap for policy-makers, and reinvesting in knowledge creation is an urgent priority. In particular, regional diagnoses will be indispensable for prioritizing objectives, targeting interventions and sequencing actions. Re-engaging in development strategies at both the national and subnational levels implies reinvesting in processes. Consultation is a requirement to secure ownership, which is the foundation of shared vision and commitment. It takes time, adequate planning and a significant effort in capacity building to manage information systems, analyse results and monitor processes.

Enabling institutional and regulatory processes to make agroterritorial initiatives more likely to succeed. The experience of collective action – from geographical indication labelling that enhances product value to small agro-incubators and large-scale agro-corridors – has generated recommended good practices in governance and institutional arrangements. These good practices can be summarized as:

- ▶ Coordinate policy measures in targeted territories, and 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 through the use of partnerships for infrastructure and agribusiness development (Rankin *et al.*, 2016a, 2016b).
- ▶ Build synergies also between education and innovation institutions and actors in the food system in order to give the agroterritorial approach a competitive edge.
- ▶ Prioritize interventions according to value-for-money principles, where value should include social value such as the value of employment generation in rural areas.

Supporting smallholder farms in changing farm systems. The case for supporting smallholder family farms and the reassessment of optimal farm size is often characterized by a false dualism.

It sets smallholder agriculture against large-scale and commercial agriculture, when the reality is a continuum in which family farming is nearly always the dominant mode of production, and transitions occur between one type and another, as shown in Chapters 3 and 4 in the case of Peru. A large body of empirical evidence shows that small farms can be competitive in terms of production costs compared with large-scale commercial farms, but they are often disadvantaged owing to factors unrelated to their size, such as the institutional environment. A territorial approach, with its emphasis on multistakeholder consultation, can facilitate the identification and resolution of challenges facing different stakeholders.

Skills development to foster rural entrepreneurship and employment diversification, especially for youth and women.

Strengthening the instruments and institutions for territorial development – including promotion of local value chains and rural–urban linkages, labour-intensive infrastructure works and support for SMEs – can support labour demand in the food system, both on-farm and non-farm. Dedicated spaces for multistakeholder coordination and policy dialogue could be established on topics such as youth unemployment, violence and migration. Participatory diagnostic studies would help assess the opportunities offered to rural youth in the food system, including the employment potential of stronger rural–urban linkages. Measures that facilitate youth employability in rural areas include strengthening vocational training and education, establishing mechanisms for the recognition of labour experience in the informal sector, and creating greater awareness of job opportunities and labour rights to ensure that migration is an informed choice. Several successful examples of youth employment programmes and policy initiatives could be incorporated in territorial development initiatives.

Social protection for risk management and resilient rural livelihoods.

Risk-coping mechanisms are needed to support poor rural households emerging from the poverty trap. A recent trend is the design of social protection programmes that link social benefits to direct promotion of rural employment and agricultural production. In Mexico, for example, the Oportunidades social protection programme has made this shift. Other innovations now widely applied include the linking of public food-purchase schemes and school feeding programmes to smallholder family farmer suppliers, as pioneered in Brazil. Social protection and other risk management tools for poor rural and agricultural households promote inclusive rural transformations through asset protection, facilitating labour mobility to the non-farm sector, and investments in non-farm activities.

Improvements in education, health, communication, leisure and other basic services in smaller cities and towns.

Such improvements are also fundamental to inclusive rural transformation. In addition to promoting increased production and productivity in food systems, regional development planning should make every effort to ensure that the living conditions in smaller cities and towns are attractive, above all to rural youth, who are those most likely to join out-migration to larger cities.

To conclude, the options proposed in this report should involve all stakeholders in developing and implementing agroterritorial initiatives. The design of any intervention will need to take their interests into account. In a rapidly transforming world, the food sector, rooted in territorial experiences, is an asset for 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 building prosperous and sustainable rural economies. ■

STATISTICAL ANNEX

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 A1

Share of population residing in the urban, peri-urban and nearby rural areas of larger cities, small cities and towns, and in the rural hinterland

Source: FAO elaboration based on GRUMP and LandScan datasets, 2000.

Larger cities, urban and peri-urban: share of total population that resides within one hour's travelling time from the centre of a larger city (population greater than 500 000).

Larger cities, proximate rural: share of total population residing between one to three hours' travelling time from the centre of a larger city (population greater than 500 000).

Small cities and towns, urban and peri-urban: share of total population residing within one hour's travelling time from the centre of a small city or town (population between 50 000 and 500 000).

Small cities and towns, proximate rural: share of total population residing between one to three hours' travelling time from the centre of a small

city or secondary town (population between 50 000 and 500 000).

Rural hinterland: rural population residing more than three hours' travelling time from any city centre with a population greater than 50 000, or residing in countries with no cities larger than 50 000 residents.

Towns of fewer than 50 000 people that are distributed throughout a country's territory are not captured here as urban or peri-urban.

METHODOLOGY USED TO CALCULATE TABLE DATA

The 2009 *World Development Report* (World Bank, 2008) proposed an agglomeration index based on a uniform definition of what constitutes an "urban" or agglomerated area, using the technique outlined in Chomitz, Buys and Thomas (2005) and elaborated in Uchida and Nelson (2010). This approach permits international comparisons. Whereas the 2009 *World Development Report* focused exclusively on agglomeration aspects, this report is 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 shares of the 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: (i) minimum population size used to define a sizeable settlement; and (ii) maximum travel time to the settlement’s centre by motor, animal or foot transport across road, rail, navigable waters, paths and off-road terrain. Three categories are distinguished: cities with more than 500 000 people, those with 100 000–500 000, and towns with 50 000–100 000. There is an assumption of one hour of travel time to the centre of the nearest urban settlement 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 1–3 hours of travel time to reach the centre of a specific urban area. Start with categorizing populations in this travel time range from agglomerations of 500 000 people or more, then 100 000–500 000 people, and finally 50 000–100 000 people.
- ▶ **Calculate population in more remote rural areas (hinterland).** These are populations that face travel time greater than 3 hours to the centre of an urban settlement 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-density areas (i.e. more 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 fewer than 50 000 people. To try and accurately capture this component of the population, in each category developed in the above procedure, a distinction is then made between population in high-density areas and in low-density areas. This is done by creating 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 1 000 people/km².

TABLE A2

Non-agricultural share of GDP and agriculture value added per worker in the 1990s and 2010s

Source: World Bank and IFAD, 2016.

Non-agricultural share in GDP in baseline year represents the share of total GDP that is not agricultural, as defined in International Standard Industrial Classification (ISIC) divisions 1–5. Agriculture includes forestry, hunting and fishing, as well as cultivation of crops and livestock production. Value added is the net output of a sector after adding up all outputs and subtracting intermediate inputs. It is calculated without making deductions for depreciation of fabricated assets or depletion and degradation of natural resources. The origin of value added is determined by ISIC revision 3.

Non-agricultural share in GDP in end year represents the share of total GDP that is not agricultural value added, as defined above, in the end year.

Agricultural value added per worker in baseline year is a measure of agricultural productivity. Value added in agriculture measures the output of the agriculture sector (ISIC divisions 1–5) less the value of intermediate inputs. Agriculture comprises value added from forestry, hunting, and fishing as well as cultivation of crops and livestock production in the base year. Data are in constant 2010 US dollars.

Agricultural value added per worker in end year is the amount of value added divided by the number of workers in the agriculture sector in the end year.

TABLE A3

Moderate poverty and levels of inequality in rural and urban areas in the 1990s and 2010s

Source: World Bank and IFAD, 2016.

Regional averages are based on the most recent information and do not necessarily correspond to **Figure 2**, which includes only countries for which at least three observations at three different points of time were available.

Rural poor is the share of total population living in rural areas living on less than US\$3.10 per capita per day.

Rural non-poor is the share of total population living in rural areas living on more than US\$3.10 per capita per day.

Urban poor is the share of poor population living in urban areas living on less than US\$3.10 per capita per day.

Urban non-poor is the share of total population living in urban areas living on more than US\$3.10 per capita per day.

Rural Gini measures the extent to which the distribution of income (or, in some cases, consumption expenditure) among individuals or households within an economy deviates from a perfectly equal distribution. This refers to baseline year in rural areas.

Urban Gini measures the extent to which the distribution of income (or, in some cases, consumption expenditure) among individuals or households within an economy deviates from a perfectly equal distribution. This refers to baseline year in urban areas.

Weighted averages for world, country groups, regions and subregions are calculated using country data available from 2010 onwards.

TABLE A4

The contribution of the food and beverages subsector to value added and employment

Source: UNIDO, 2017.

Share of the subsector’s value added in total value added of the manufacturing sector: the percentage of the value added from the food and beverages subsector in the total manufacturing sector in the most recent year. The term “value added” is consistent with the definition used in the System of National Accounts 2008 for a given price basis, factor costs or basic prices (European Commission, International Monetary Fund, Organisation for Economic Co-operation and Development, United Nations and World Bank, 2009). However, not all countries are able to provide estimates on this basis. Typically, for these countries, the estimates are based on production minus the intermediate consumption of goods and industrial services

only. This differs from the above definition, which excludes the intermediate consumption of all services.

Share of employees in the subsector: the percentage of employees in the food and beverages subsector in the total number of employees in the manufacturing sector in the most recent year.

Share of female employees in the manufacturing sector: the percentage of female employees in the manufacturing sector in the most recent year.

Share of female employees in the subsector: the percentage of female employees in the food and beverages subsector in the most recent year.

Weighted averages for world, country groups, regions and subregions are calculated using country data available from 2010 onwards.

COUNTRY GROUPS AND REGIONAL AGGREGATES

Country and 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: China, Hong Kong SAR, and China, Macao SAR. All country group and regional averages are weighted averages; they are presented where available data allow such calculations to be made.

TABLE A1
SHARE OF POPULATION RESIDING IN THE URBAN, PERI-URBAN AND NEARBY RURAL AREAS OF LARGER CITIES, SMALL CITIES AND TOWNS, AND IN THE RURAL HINTERLAND

	Larger cities, urban and peri-urban	Larger cities, rural	Small cities and towns, urban and peri-urban	Small cities and towns, rural	Rural hinterland
	Percentage				
WORLD	24.8	9.8	33.9	15.9	15.6
COUNTRIES AND TERRITORIES IN DEVELOPING REGIONS	21.2	10.8	31.5	18.0	18.5
AFRICA	16.7	7.9	24.7	19.8	30.9
Sub-Saharan Africa	14.4	8.4	19.0	22.1	36.0
Eastern Africa	9.7	7.4	16.1	24.4	42.4
Burundi	0.0	0.0	38.2	38.6	23.1
Comoros	0.0	0.0	0.0	0.0	100.0
Djibouti	0.0	0.0	58.7	25.3	16.0
Eritrea	24.4	24.9	1.9	6.2	42.5
Ethiopia	4.7	5.1	10.0	20.1	60.0
Kenya	13.0	5.8	14.4	27.8	38.9
Madagascar	12.7	12.7	12.4	27.2	34.9
Malawi	21.2	36.1	5.5	8.3	28.9
Mauritius	0.0	0.0	95.9	1.0	3.0
Mozambique	9.5	1.7	17.8	30.1	40.9
Réunion	0.0	0.0	97.7	1.9	0.3
Rwanda	0.0	0.0	18.6	49.2	32.2
Seychelles	0.0	0.0	0.0	0.0	100.0
Somalia	11.7	7.2	13.3	8.0	59.8
Uganda	11.2	12.4	22.0	29.9	24.5
United Republic of Tanzania	6.8	1.8	22.8	32.7	36.0
Zambia	12.8	4.0	20.6	12.1	50.6
Zimbabwe	24.7	13.1	11.1	15.8	35.4
Middle Africa	18.1	5.3	13.0	17.6	46.0
Angola	18.4	9.1	4.7	3.2	64.6
Cameroon	18.4	6.3	26.5	25.2	23.6
Central African Republic	15.6	7.2	7.3	13.4	56.5
Chad	8.5	3.0	7.8	21.6	59.2
Congo	50.3	6.1	7.8	6.3	29.6
Democratic Republic of the Congo	17.4	4.3	12.6	19.8	45.8
Equatorial Guinea	0.0	0.0	27.7	30.3	42.0
Gabon	37.5	4.2	3.7	0.0	54.6
Sao Tome and Principe	0.0	0.0	55.5	39.5	5.1
North Africa	25.0	5.7	45.7	11.4	12.2
Algeria	4.5	1.3	67.5	18.0	8.7
Egypt	36.7	5.1	55.0	2.5	0.7
Libya	46.2	2.5	39.7	6.2	5.4
Morocco	31.3	15.6	31.9	8.7	12.5
Sudan	13.4	1.7	26.0	23.9	35.1
Tunisia	24.5	11.5	35.1	21.6	7.3

**TABLE A1
(CONTINUED)**

	Larger cities, urban and peri-urban	Larger cities, rural	Small cities and towns, urban and peri-urban	Small cities and towns, rural	Rural hinterland
	Percentage				
Southern Africa	32.0	3.6	18.4	19.0	27.1
Botswana	0.0	0.0	32.2	26.4	41.4
Lesotho	0.0	0.0	32.5	28.8	38.7
Namibia	0.0	0.0	13.3	3.4	83.3
South Africa	36.6	4.1	17.3	18.4	23.6
Swaziland	0.0	0.1	25.9	42.5	31.5
Western Africa	14.3	11.9	24.7	22.1	27.1
Benin	22.0	17.0	19.4	19.0	22.6
Burkina Faso	6.9	14.3	9.5	20.1	49.2
Cabo Verde	0.0	0.0	45.9	24.9	29.2
Côte d'Ivoire	18.4	10.7	21.3	26.0	23.5
Gambia	0.0	0.0	47.4	8.8	43.8
Ghana	22.9	15.6	16.2	22.3	22.9
Guinea	13.2	22.7	7.8	18.1	38.2
Guinea-Bissau	0.0	0.0	21.8	21.7	56.5
Liberia	9.1	12.6	8.5	13.5	56.3
Mali	13.4	4.8	10.4	20.9	50.5
Mauritania	23.9	0.5	8.5	8.4	58.7
Niger	10.2	5.2	11.7	28.6	44.4
Nigeria	12.2	12.9	32.7	21.7	20.6
Saint Helena	0.0	0.0	0.0	0.0	100.0
Senegal	22.9	4.0	24.0	24.4	24.8
Sierra Leone	21.5	6.2	14.1	32.6	25.5
Togo	21.2	8.4	21.6	22.1	26.8
AMERICAS, EXCLUDING NORTH AMERICA					
LATIN AMERICA AND THE CARIBBEAN	40.8	6.8	30.8	11.4	10.2
Caribbean	23.2	6.5	48.7	13.9	7.6
Antigua and Barbuda	0.0	0.0	0.0	0.0	100.0
Bahamas	0.0	0.0	65.1	6.1	28.8
Barbados	0.0	0.0	96.4	3.6	0.0
Cuba	21.8	2.1	51.4	20.7	4.0
Dominica	0.0	0.0	0.0	0.0	100.0
Dominican Republic	32.0	3.5	53.8	8.0	2.6
Grenada	0.0	0.0	0.0	0.0	100.0
Haiti	25.9	18.6	15.8	21.6	18.2
Jamaica	49.8	13.1	30.3	4.1	2.7
Martinique	0.0	0.0	97.2	2.8	0.0
Puerto Rico	0.0	0.0	96.9	2.7	0.4
Saint Kitts and Nevis	0.0	0.0	0.0	0.0	100.0
Saint Lucia	0.0	0.0	89.5	10.4	0.1
Saint Vincent and the Grenadines	0.0	0.0	0.0	0.0	100.0
Trinidad and Tobago	0.0	0.0	84.9	9.9	5.2

**TABLE A1
(CONTINUED)**

	Larger cities, urban and peri-urban	Larger cities, rural	Small cities and towns, urban and peri-urban	Small cities and towns, rural	Rural hinterland
	Percentage				
Central America	45.1	9.1	27.4	8.5	9.8
Belize	0.0	0.0	4.3	31.5	64.2
Costa Rica	0.0	0.0	59.6	19.0	21.5
El Salvador	54.6	10.6	27.7	4.3	2.8
Guatemala	28.1	24.0	11.2	13.9	22.8
Honduras	15.7	16.7	32.4	18.5	16.7
Mexico	52.0	7.4	27.1	6.6	6.8
Nicaragua	34.4	11.4	21.6	14.2	18.3
Panama	0.0	0.0	59.3	14.3	26.4
South America	41.0	6.0	30.2	12.3	10.6
Argentina	48.3	4.9	28.7	11.6	6.6
Bolivia (Plurinational State of)	46.8	7.2	13.0	6.8	26.2
Brazil	40.6	6.1	31.7	13.4	8.2
Chile	40.2	2.1	41.7	10.8	5.2
Colombia	44.0	7.2	22.4	12.1	14.3
Ecuador	23.1	17.8	35.0	9.6	14.6
Falkland Islands (Malvinas)	0.0	0.0	0.0	0.0	100.0
French Guyana	0.0	0.0	45.3	21.2	33.4
Guyana	0.0	0.0	41.7	20.3	38.0
Paraguay	0.0	0.0	47.2	15.4	37.4
Peru	33.7	3.1	26.8	14.7	21.7
Suriname	0.0	0.0	73.7	8.1	18.2
Uruguay	55.1	9.8	12.6	13.0	9.4
Venezuela (Bolivarian Republic of)	51.9	4.7	32.3	6.5	4.6
ASIA, EXCLUDING JAPAN	23.1	10.9	35.4	16.6	13.9
Central Asia	13.3	3.3	44.6	20.4	18.3
Kazakhstan	9.4	1.9	40.8	13.2	34.7
Kyrgyzstan	20.6	6.1	24.8	23.7	24.8
Tajikistan	19.4	12.5	31.1	21.3	15.7
Turkmenistan	14.8	3.2	40.9	18.6	22.5
Uzbekistan	12.5	1.4	54.9	24.2	7.0
East and Southeast Asia	15.8	12.0	30.6	21.1	20.5
Eastern Asia	13.7	14.0	29.4	21.8	21.2
China	11.9	14.1	30.0	22.2	21.7
Democratic People's Republic of Korea	27.6	13.5	32.3	17.5	9.2
Mongolia	30.3	3.1	2.9	2.2	61.4
Republic of Korea	76.4	4.9	14.8	2.1	1.8

**TABLE A1
(CONTINUED)**

	Larger cities, urban and peri-urban	Larger cities, rural	Small cities and towns, urban and peri-urban	Small cities and towns, rural	Rural hinterland
	Percentage				
Southeast Asia	21.1	7.0	33.8	19.5	18.6
Brunei Darussalam	0.0	0.0	73.6	10.6	15.8
Cambodia	16.5	31.6	11.6	11.3	29.0
Indonesia	25.1	8.0	33.9	13.6	19.5
Lao People's Democratic Republic	0.0	0.0	19.8	34.1	46.0
Malaysia	25.8	5.4	49.4	8.7	10.8
Myanmar	11.6	6.2	27.6	27.7	27.0
Philippines	28.0	3.1	36.3	18.1	14.6
Singapore	97.5	2.5	0.0	0.0	0.0
Thailand	15.2	3.9	27.9	34.8	18.3
Timor-Leste	0.0	0.0	0.0	0.0	100.0
Viet Nam	11.4	8.2	41.1	25.1	14.1
South Asia	22.4	12.8	36.2	16.0	12.6
Afghanistan	12.6	5.9	18.7	21.1	41.7
Bangladesh	13.9	8.7	37.9	25.1	14.4
Bhutan	0.0	0.0	7.1	15.2	77.7
India	22.8	14.6	36.7	14.6	11.3
Iran (Islamic Republic of)	34.2	4.5	38.6	14.4	8.3
Maldives	0.0	0.0	0.0	0.0	100.0
Nepal	9.0	7.1	22.9	26.4	34.6
Pakistan	27.4	9.3	36.9	14.5	12.0
Sri Lanka	23.5	10.6	20.8	28.3	16.8
Western Asia	34.0	7.5	34.2	13.4	10.9
Armenia	51.6	10.1	23.9	4.5	9.9
Azerbaijan	25.0	2.4	26.4	29.6	16.6
Bahrain	0.0	0.0	97.4	2.4	0.3
Cyprus	0.0	0.0	72.2	27.1	0.8
Georgia	29.9	8.3	24.6	27.5	9.7
Israel	6.0	1.9	86.3	4.5	1.3
Iraq	47.0	12.3	28.0	7.3	5.4
Jordan	62.1	9.2	20.6	3.8	4.4
Kuwait	0.0	0.0	98.2	1.7	0.2
Lebanon	48.7	12.8	32.1	4.4	1.9
Oman	0.0	0.0	76.0	17.3	6.7
Qatar	0.0	0.0	94.7	5.1	0.1
Saudi Arabia	54.5	1.6	29.2	6.7	8.1
Syrian Arab Republic	44.9	11.6	25.1	12.0	6.4
Turkey	30.1	8.3	38.4	18.2	5.0
United Arab Emirates	39.9	9.0	40.6	7.3	3.2
Yemen	9.7	5.4	16.0	12.8	56.1

**TABLE A1
(CONTINUED)**

	Larger cities, urban and peri-urban	Larger cities, rural	Small cities and towns, urban and peri-urban	Small cities and towns, rural	Rural hinterland
	Percentage				
OCEANIA	0.0	0.0	5.5	10.1	84.4
Melanesia	0.0	0.0	6.3	11.5	82.3
Fiji	0.0	0.0	22.5	44.0	33.5
Papua New Guinea	0.0	0.0	4.6	8.0	87.4
Solomon Islands	0.0	0.0	0.7	1.7	97.6
Vanuatu	0.0	0.0	0.0	0.0	100.0
Micronesia	0.0	0.0	0.0	0.0	100.0
Kiribati	0.0	0.0	0.0	0.0	100.0
Micronesia (Federated States of)	0.0	0.0	0.0	0.0	100.0
Marshall Islands	0.0	0.0	0.0	0.0	100.0
Nauru	0.0	0.0	0.0	0.0	100.0
Palau	0.0	0.0	0.0	0.0	100.0
Polynesia	0.0	0.0	0.0	0.0	100.0
Samoa	0.0	0.0	0.0	0.0	100.0
Tonga	0.0	0.0	0.0	0.0	100.0
Tuvalu	0.0	0.0	0.0	0.0	100.0
COUNTRIES AND TERRITORIES IN DEVELOPED REGIONS	38.8	6.2	43.5	7.6	4.0
NORTH AMERICA	36.7	6.4	44.7	8.1	4.2
Canada	54.8	6.6	22.4	5.9	10.3
United States of America	34.8	6.3	47.1	8.3	3.5
EUROPE	35.2	6.9	45.3	8.3	4.3
Eastern Europe	31.2	6.6	47.9	8.8	5.5
Belarus	19.6	7.2	51.6	17.2	4.4
Bulgaria	19.2	4.9	60.7	13.2	2.1
Czechia	23.2	7.7	63.2	4.0	1.9
Hungary	29.2	6.5	56.7	6.0	1.6
Poland	25.4	7.1	60.4	6.0	1.1
Republic of Moldova	28.4	22.2	34.9	10.1	4.5
Romania	14.5	2.9	67.9	12.5	2.2
Russian Federation	35.3	7.8	36.4	10.6	9.9
Slovakia	0.1	5.3	73.7	18.2	2.7
Ukraine	29.1	10.3	45.9	12.0	2.7
Northern Europe	26.1	10.2	43.2	14.9	5.6
Denmark	24.1	17.3	32.6	18.1	7.9
Estonia	0.0	0.0	57.6	36.0	6.4
Finland	24.5	4.5	41.8	18.9	10.4
Iceland	0.0	0.0	60.4	9.5	30.1
Ireland	35.5	22.1	16.0	18.5	7.9
Isle of Man	0.0	0.0	0.0	0.0	100.0

**TABLE A1
(CONTINUED)**

	Larger cities, urban and peri-urban	Larger cities, rural	Small cities and towns, urban and peri-urban	Small cities and towns, rural	Rural hinterland
	Percentage				
Latvia	46.2	16.8	11.6	19.0	6.4
Lithuania	21.3	13.4	44.9	17.6	2.7
Norway	27.7	7.8	28.9	13.5	22.1
Sweden	8.5	3.3	60.5	20.1	7.6
United Kingdom	39.4	3.7	52.7	3.2	0.9
Southern Europe	33.7	5.4	47.0	9.9	4.1
Albania	0.0	0.0	71.6	22.1	6.3
Andorra	0.0	0.0	99.8	0.0	0.2
Bosnia and Herzegovina	0.0	2.8	50.0	36.2	11.0
Croatia	30.8	17.1	27.5	15.6	9.0
Gibraltar	0.0	0.0	6.6	93.4	0.0
Greece	33.9	5.7	30.1	20.4	9.9
Italy	38.7	4.3	49.6	5.9	1.5
Malta	0.0	0.0	92.0	8.0	0.0
Montenegro	0.0	0.0	45.0	42.2	12.8
Portugal	22.4	8.1	45.3	16.2	7.9
San Marino	0.0	0.0	73.5	26.5	0.0
Serbia	26.4	7.9	52.5	10.3	3.0
Slovenia	0.1	14.6	56.5	18.5	10.3
Spain	41.4	4.8	44.4	5.7	3.7
The former Yugoslav Republic of Macedonia	0.0	0.0	77.7	19.3	3.0
Western Europe	47.3	7.1	40.5	3.3	1.9
Austria	32.4	13.1	48.0	3.8	2.7
Belgium	10.5	2.5	83.7	2.8	0.5
France	50.6	8.0	35.3	3.7	2.4
Germany	56.0	7.6	32.3	2.4	1.7
Liechtenstein	0.0	0.0	99.3	0.0	0.7
Luxembourg	0.0	0.0	89.1	7.6	3.3
Monaco	0.0	0.0	100.0	0.0	0.0
Netherlands	44.2	2.2	49.3	2.9	1.3
Switzerland	0.1	4.9	84.1	10.0	1.0
ASIA, AUSTRALIA AND NEW ZEALAND	61.1	2.6	31.8	2.7	1.8
Australia	61.4	7.1	17.4	6.3	7.8
Japan	62.9	2.0	32.8	1.7	0.6
New Zealand	0.0	0.0	72.3	19.0	8.7

TABLE A2
NON-AGRICULTURAL SHARE OF GDP AND AGRICULTURAL VALUE ADDED PER WORKER IN THE 1990s AND 2010s

	Baseline year	End year	Non-agricultural share in GDP in baseline year	Non-agricultural share in GDP in end year	Agricultural value added per worker in baseline year	Agricultural value added per worker in end year
			Percentage		Constant 2010 US\$	
COUNTRIES AND TERRITORIES IN DEVELOPING REGIONS			83	90	897	1 620
AFRICA			79	84	931	1 355
Sub-Saharan Africa			79	84	744	1 107
Angola	1990	2014	67	91	..	..
Benin	1990	2014	65	64	581	1 112
Botswana	1990	2014	95	98	1 065	881
Burkina Faso	1990	2014	71	78	248	405
Burundi	1990	2014	44	61	388	219
Cameroon	1990	2014	75	77	699	1 646
Cabo Verde	1990	2014	86	92	1 101	4 968
Central African Republic	1990	2014	51	42	559	432
Chad	1990	2014	71	47	..	1 923
Comoros	1990	2014	59	65	914	982
Congo	1990	2014	87	95	695	1 159
Côte d'Ivoire	1990	2014	68	78	..	2 697
Democratic Republic of the Congo	1990	2014	69	79	397	340
Ethiopia	1993	2014	48	58	300	463
Gabon	1990	2014	93	96	2 149	3 670
Ghana	1990	2014	55	79	1 386	1 531
Guinea	1990	2014	76	80	186	274
Guinea-Bissau	2000	2013	39	56	758	911
Kenya	1990	2014	70	70	830	794
Lesotho	1990	2013	75	94	426	414
Madagascar	1990	2013	71	74	378	271
Malawi	1990	2014	55	67	260	435
Mali	1990	2012	54	58	782	1 193
Mauritania	1990	2014	70	77	1 271	1 174
Mozambique	1990	2014	63	71	194	329
Namibia	1990	2014	90	94	2 684	3 322
Niger	1990	2014	65	63	493	585
Nigeria	1990	2014	68	80	1 809	8 249
Rwanda	1990	2014	67	67	292	461
Senegal	1990	2014	80	83	503	446
Seychelles	1990	2014	95	97	1 152	866
Sierra Leone	1990	2014	53	38	890	1 124
South Africa	1990	2014	95	98	4 233	9 746
Swaziland	1990	2011	90	93	2 166	2 397
Togo	1990	2014	66	58	818	953
Uganda	1990	2009	43	72	442	470
United Republic of Tanzania	1990	2014	54	69	410	568
Zambia	1990	2013	79	90	823	577
Zimbabwe	1990	2014	84	86	659	454

**TABLE A2
(CONTINUED)**

	Baseline year	End year	Non-agricultural share in GDP in baseline year	Non-agricultural share in GDP in end year	Agricultural value added per worker in baseline year	Agricultural value added per worker in end year
			Percentage		Constant 2010 US\$	
North Africa			78	84	2 033	3 934
Egypt	1990	2014	81	86	2 387	5 049
Morocco	1990	2014	81	84	2 059	4 778
Sudan	1990	2014	59	71	1 427	2 561
Tunisia	1990	2013	82	91	3 170	4 793
LATIN AMERICA AND THE CARIBBEAN			91	95	3 494	6 779
Belize	1990	2013	80	85	3 557	5 390
Bolivia (Plurinational State of)	1990	2013	83	87	987	1 114
Brazil	1990	2014	92	94	3 184	10 458
Chile	1990	2014	91	97	3 979	7 763
Colombia	1990	2014	83	93	5 709	6 262
Costa Rica	1990	2013	88	94	3 974	8 415
Cuba	1990	2011	86	95	4 557	4 851
Dominican Republic	1990	2014	85	94	2 754	9 041
Ecuador	1990	2014	79	91	2 978	6 793
El Salvador	1990	2013	83	89	2 665	4 464
Guatemala	2001	2014	85	89	1 788	2 422
Guyana	1990	2014	62	82	4 064	8 623
Honduras	1990	2014	78	86	1 599	3 465
Jamaica	1993	2013	92	93	2 659	3 781
Mexico	1990	2014	92	97	3 109	5 128
Nicaragua	1994	2014	79	79	1 963	4 657
Panama	1990	2012	90	97	2 819	5 237
Paraguay	1991	2014	83	79	2 959	5 765
Peru	1991	2012	91	93	1 616	2 995
Saint Lucia	1990	2014	85	97	7 019	1 702
Suriname	1990	2013	91	93	10 391	13 730
Trinidad and Tobago	1990	2013	97	99	2 900	2 200
Uruguay	1990	2014	91	91	10 639	18 211
Venezuela (Bolivarian Republic of)	1990	2012	95	95	16 357	29 892
ASIA AND OCEANIA			76	89	779	1 489
Central Asia			72	91	2 532	3 845
Kazakhstan	1992	2014	73	95	5 598	6 907
Kyrgyzstan	1990	2014	66	83	993	1 775
Uzbekistan	1990	2014	67	81	1 344	3 500
Tajikistan	1990	2013	67	73	855	1 878

**TABLE A2
(CONTINUED)**

	Baseline year	End year	Non-agricultural share in GDP in baseline year	Non-agricultural share in GDP in end year	Agricultural value added per worker in baseline year	Agricultural value added per worker in end year
			Percentage		Constant 2010 US\$	
East and Southeast Asia and Oceania			77	90	684	1 532
Cambodia	1993	2014	53	70	536	803
China	1990	2014	73	91	561	1 398
Fiji	1990	2013	80	88	2 690	2 634
Indonesia	1990	2014	81	86	1 413	2 521
Lao People's Democratic Republic	1990	2014	39	72	639	966
Malaysia	1990	2014	85	91	9 146	19 259
Mongolia	1990	2014	87	84	3 714	6 536
Papua New Guinea	1990	2004	69	62	..	..
Philippines	1990	2014	78	89	1 400	1 949
Thailand	1990	2014	88	88	1 106	2 162
Timor-Leste	2000	2012	72	82	671	489
Viet Nam	1990	2014	61	82	441	791
South Asia			73	84	797	1 216
Bangladesh	1990	2014	67	84	314	715
Bhutan	1990	2014	65	83	1 104	845
India	1990	2014	71	83	767	1 157
Iran (Islamic Republic of)	1990	2007	81	90	3 650	5 479
Maldives	2000	2014	89	96	4 063	4 670
Nepal	1990	2014	48	66	454	457
Pakistan	1990	2014	74	75	1 377	1 744
Sri Lanka	1990	2014	74	90	857	1 406
Western Asia			81	92	4 353	8 346
Armenia	1990	2014	83	78	3 623	16 375
Azerbaijan	1990	2014	71	94	2 203	3 112
Jordan	1990	2014	92	96	3 852	7 354
Palestine	1994	2013	87	95	3 460	3 912
Syrian Arab Republic	1990	2007	70	82	..	..
Turkey	1990	2014	82	92	4 574	8 960
Yemen	1990	2006	76	90	..	..

TABLE A3
MODERATE POVERTY AND LEVELS OF INEQUALITY IN RURAL AND URBAN AREAS, 1990s–2010s

	Years	Rural poor	Rural non-poor	Urban poor	Urban non-poor	Rural Gini	Urban Gini
	Percentage of total population						
COUNTRIES AND TERRITORIES IN DEVELOPING REGIONS	2010s	27.8	27.5	9.7	35.0	..	..
AFRICA	2010s	48.0	16.0	18.4	17.6	..	..
Sub-Saharan Africa	2010s	48.8	15.7	18.7	16.8	..	..
Angola	..	..	..	..	..	..	..
	2009	50.3	9.7	22.6	17.5	37.8	38.9
Benin	2003	48.6	12.1	25.4	13.9	32.2	41.6
	2012	44.1	14.1	27.8	14.1	32.5	44.0
Botswana	1994	18.9	27.8	22.2	31.0	47.8	62.6
	2010	13.8	29.9	13.0	43.3	56.8	60.7
Burkina Faso	1998	78.0	5.5	10.2	6.3	39.0	54.0
	2009	56.3	18.0	14.4	11.3	34.9	43.2
Burundi	1998	90.1	2.2	4.0	3.6	36.1	43.8
	2006	84.9	4.5	6.7	4.0	29.6	39.0
Cabo Verde	2002	26.4	18.5	21.2	34.0	42.1	52.4
	2008	19.8	18.4	14.4	47.4	38.2	45.3
Cameroon	1996	47.4	9.5	21.2	21.9	33.5	45.1
	2007	33.3	15.2	11.2	40.3	34.9	37.7
Central African Republic	2003	51.7	10.4	25.2	12.7	43.9	42.3
	2008	52.8	8.3	27.4	11.4	54.0	54.9
Chad	2003	66.5	11.7	12.9	8.8	37.8	38.5
	2011	51.8	26.2	8.0	14.0	42.4	37.1
Comoros	..	..	..	..	..	..	..
	2004	26.4	45.6	7.3	20.6	58.3	48.7
Democratic Republic of the Congo	2005	61.3	1.7	33.1	3.9	39.3	41.8
	2011	45.1	14.9	18.6	21.4	35.7	39.4
Congo	1998	33.1	5.9	48.3	12.7	41.3	46.6
	2008	34.6	2.2	44.1	19.1	34.7	35.8
Côte d'Ivoire	2006	36.3	20.2	19.9	23.6	35.6	37.9
	2012	34.0	15.4	22.6	28.0	41.0	40.4
Ethiopia	2000	72.3	12.0	12.3	3.4	26.3	39.6
	2011	56.3	26.4	9.7	7.6	27.7	39.1
Gabon	..	..	..	..	..	..	..
	2005	4.1	10.2	14.4	71.3	40.4	41.7
Gambia	1998	50.4	3.5	32.2	13.9	40.2	42.1
	2003	25.8	17.9	23.2	33.1	45.7	44.8
Ghana	1999	41.3	15.6	19.2	24.0	36.9	36.2
	2006	29.5	19.8	15.4	35.3	38.2	39.2
Guinea	1994	61.7	9.1	13.4	15.8	36.3	40.5
	2012	52.2	12.9	19.2	15.7	29.0	32.3
Guinea-Bissau	..	..	..	..	..	..	..
	2002	42.7	12.1	31.4	13.8	33.3	37.2

**TABLE A3
(CONTINUED)**

	Years	Rural poor	Rural non-poor	Urban poor	Urban non-poor	Rural Gini	Urban Gini
		Percentage of total population					
Kenya	1997	48.7	32.1	3.7	15.5	39.3	45.4
	2006	56.8	19.6	7.8	15.8	38.9	48.4
Lesotho	1995	46.1	35.9	3.6	14.5	57.4	54.5
	2010	57.4	17.8	13.7	11.0	53.7	51.1
Liberia	..	..	..	..	..	..	..
	2007	51.0	1.2	42.6	5.2	32.5	34.5
Madagascar	2005	71.3	2.9	21.4	4.4	34.8	42.2
	2010	66.3	1.7	27.5	4.5	36.8	42.6
Malawi	1998	87.2	0.6	7.3	4.9	63.7	54.8
	2011	78.4	6.0	9.3	6.2	37.4	49.3
Mali	1994	72.4	2.6	19.3	5.7	43.2	43.4
	2009	53.9	10.1	19.0	17.0	27.8	29.5
Mauritania	1996	30.8	23.1	13.4	32.7	33.1	34.3
	2008	17.5	25.8	9.0	47.6	33.0	32.9
Mozambique	1997	67.0	4.1	23.8	5.1	37.5	49.6
	2009	58.0	11.0	23.2	7.7	37.6	50.6
Namibia	2004	43.3	25.4	8.0	23.4	54.1	59.4
	2010	30.5	27.9	8.9	32.7	50.4	58.9
Niger	1995	78.8	5.1	12.3	3.8	37.8	42.3
	2011	67.7	14.8	6.7	10.8	24.3	33.7
Nigeria	1996	57.7	9.6	27.1	5.6	47.9	56.1
	2010	48.0	8.6	32.2	11.3	42.1	41.1
Rwanda	2000	82.1	4.6	5.4	7.8	37.0	47.2
	2011	63.7	12.3	11.7	12.3	40.1	59.5
Sao Tome and Principe	2001	32.0	13.7	39.3	15.1	32.5	31.8
	2010	29.1	9.0	49.1	12.8	30.1	31.5
Senegal	2001	47.9	11.6	23.0	17.5	29.7	38.3
	2011	40.1	17.7	18.6	23.6	30.2	35.3
Seychelles	..	..	..	..	..	..	..
	2007	0.3	47.4	0.2	52.1	44.4	38.2
Sierra Leone	2003	58.6	5.0	22.8	13.6	31.8	39.9
	2011	56.9	4.8	24.7	13.5	28.7	31.6
South Africa	1995	28.1	17.4	15.7	38.8	55.7	56.9
	2011	10.1	27.7	5.2	57.0	50.3	61.9
Swaziland	2001	59.5	18.4	6.9	15.2	43.1	51.5
	2010	54.8	23.7	5.5	16.0	46.8	46.8
Togo	2006	55.7	8.6	19.2	16.5	32.5	37.5
	2011	53.6	8.9	19.1	18.4	36.2	39.5
Uganda	1999	71.4	17.0	3.8	7.8	35.7	43.0
	2013	56.8	28.7	5.1	9.4	37.1	44.2
United Republic of Tanzania	1992	69.3	8.0	16.8	5.8	33.3	34.0
Zambia	1998	57.7	7.5	17.9	16.9	41.8	44.4
	2010	58.8	2.5	25.0	13.7	44.0	50.1

**TABLE A3
(CONTINUED)**

	Years	Rural poor	Rural non-poor	Urban poor	Urban non-poor	Rural Gini	Urban Gini
		Percentage of total population					
North Africa							
Egypt	2000	12.6	44.6	4.9	37.9	24.9	38.3
	2009	13.9	43.1	7.5	35.5	22.4	33.7
Morocco	2001	14.2	32.2	6.7	46.9	32.0	39.2
	2007	7.3	35.0	4.5	53.2	33.1	41.1
Sudan	..	..	..	..	..	..	..
	2009	33.4	33.5	10.2	22.8	33.3	32.8
Tunisia	1995	8.4	30.1	7.3	54.1	35.3	38.8
	2011	1.8	32.3	1.1	64.8	31.9	33.2
ASIA AND OCEANIA	2010s	27.6	30.6	8.9	32.8	..	..
Central Asia	2010s	18.1	38.7	5.7	37.5	..	..
Kazakhstan	1996	8.8	35.3	7.3	48.6	37.2	32.8
	2010	0.4	45.8	0.3	53.5	25.5	28.6
Kyrgyzstan	1998	32.8	31.7	15.9	19.6	46.6	45.2
	2011	23.7	41.0	6.5	28.8	32.8	31.7
Tajikistan	1999	65.1	8.1	22.4	4.4	28.6	31.5
	2012	51.9	21.5	17.0	9.5	29.1	32.1
East and Southeast Asia and Oceania	2010s	17.1	35.3	3.9	43.7	..	..
Cambodia	1994	68.6	14.5	8.3	8.6	26.7	44.7
	2011	33.6	46.6	3.7	16.1	23.9	32.6
China	1990	68.4	5.1	16.5	10.0	30.6	25.6
	2012	16.2	34.6	0.8	48.4	39.5	35.4
Fiji	2003	28.9	22.0	15.5	33.6	46.7	46.1
	2009	11.1	37.1	6.4	45.4	33.7	43.1
Indonesia	1990	61.0	8.4	23.5	7.0	26.5	34.7
	2012	21.8	28.2	20.3	29.7	33.0	42.5
Lao People's Democratic Republic	1998	69.4	10.5	15.1	4.9	32.1	39.7
	2012	45.0	21.9	14.7	18.4	32.9	38.3
Malaysia	2004	6.6	28.6	6.7	58.1	40.9	44.0
	2009	0.9	28.2	1.0	70.0	42.6	43.9
Papua New Guinea	..	..	..	..	..	..	..
	2010	41.1	45.8	2.9	10.1	41.1	42.2
Philippines	1997	33.3	18.5	12.6	35.6	36.1	44.5
	2012	30.8	23.9	11.0	34.3	39.1	41.1
Thailand	1999	13.6	55.4	1.9	29.1	35.8	40.5
	2012	0.8	55.1	0.5	43.6	36.2	38.0
Timor-Leste	2001	49.2	26.1	12.6	12.0	32.2	40.1
	2007	51.0	19.5	18.2	11.3	26.2	34.8
Viet Nam	1999	58.5	17.7	8.2	15.6	26.4	34.2
	2012	9.7	59.9	1.1	29.3	32.3	36.6



**TABLE A3
(CONTINUED)**

	Years	Rural poor	Rural non-poor	Urban poor	Urban non-poor	Rural Gini	Urban Gini
		Percentage of total population					
South Asia	2010s	41.3	25.6	15.0	18.1	..	..
Bangladesh	1996	68.6	9.4	11.5	10.6	37.1	26.8
	2010	57.8	11.7	17.3	13.1	27.5	33.7
Bhutan	2003	65.1	6.2	20.4	8.3	64.0	71.7
	2012	8.9	56.3	1.4	33.4	35.4	35.8
India	1994	62.6	11.0	19.0	7.4	28.6	34.3
	2012	43.7	25.4	15.5	15.4	31.1	39.1
Iran (Islamic Republic of)	1998	4.7	32.7	1.8	60.7	41.5	41.5
	2013	0.2	29.2	0.1	70.6	33.1	35.9
Maldives	1998	34.0	38.9	0.4	26.8	59.4	44.7
	2004	5.9	54.1	2.1	37.9	33.4	35.4
Nepal	1996	78.1	10.5	8.0	3.4	31.3	45.5
	2011	42.7	40.5	10.0	6.8	31.1	35.2
Pakistan	1997	43.7	24.0	19.9	12.5	24.5	32.0
	2011	30.0	33.4	16.8	19.8	24.5	33.4
Sri Lanka	1996	37.5	44.0	6.8	11.7	33.1	38.4
	2013	15.2	66.5	3.3	15.0	37.4	39.9
Western Asia	2010s	3.7	25.6	3.8	67.0	..	..
Armenia	1999	14.0	21.0	34.5	30.4	33.0	38.1
	2012	5.5	30.9	10.1	53.4	27.3	31.9
Azerbaijan	2002	0.3	48.0	0.6	51.2	15.9	18.6
Iraq	2007	11.2	20.1	11.0	57.7	25.5	28.0
	2012	9.4	21.6	11.3	57.7	27.8	28.9
Jordan	2003	1.3	18.1	5.7	75.0	33.4	37.1
	2010	0.3	17.2	1.5	81.0	27.1	34.4
Palestine	..	..	..	..	..	..	..
	2009	0.2	26.9	0.1	72.8	32.0	36.6
Syrian Arab Republic	..	..	..	..	..	..	..
	2004	9.5	34.8	4.9	50.8	36.4	32.9
Turkey	2002	3.0	31.1	3.9	62.1	39.8	40.9
	2012	1.5	27.8	0.5	70.3	39.7	38.5
Yemen	1998	24.2	50.1	7.5	18.3	31.9	35.2
	2005	25.7	42.5	8.2	23.5	30.6	39.7
	2005	0.0	46.6	0.2	53.2	14.7	18.2
LATIN AMERICA AND THE CARIBBEAN	2010s	4.4	18.7	4.9	72.0	..	..
Belize	1999	13.7	41.3	6.4	38.6	54.5	48.9

Bolivia (Plurinational State of)	1999	23.6	15.0	8.3	53.1	64.0	49.2
	2012	9.1	24.5	3.5	62.9	54.3	41.8
Brazil	1999	4.6	14.9	13.3	67.2	54.7	57.8
	2012	1.7	14.0	4.6	79.7	49.5	52.1
Chile	1998	0.6	13.9	4.8	80.7	49.5	55.2
	2011	0.2	11.2	1.6	87.0	47.2	51.0

**TABLE A3
(CONTINUED)**

	Years	Rural poor	Rural non-poor	Urban poor	Urban non-poor	Rural Gini	Urban Gini
		Percentage of total population					
Colombia	2001	11.0	16.6	17.9	54.5	50.6	57.1
	2012	6.0	19.0	6.3	68.7	47.1	51.7
Costa Rica	1999	4.3	37.5	3.9	54.2	46.2	46.8
	2012	1.1	27.2	1.7	70.1	46.8	47.4
Dominican Republic	1997	5.9	34.8	3.8	55.4	48.0	48.0
	2012	3.3	22.9	5.4	68.3	39.2	47.1
Ecuador	1999	15.3	24.9	12.2	47.6	62.7	54.1
	2012	5.6	31.8	3.3	59.4	45.2	44.6
El Salvador	1999	12.5	29.2	6.1	52.2	48.9	46.6
	2012	2.6	33.1	2.2	62.1	37.6	40.6
Guatemala	2000	16.3	38.6	6.1	39.0	47.9	55.0
	2011	23.2	27.5	9.0	40.3	44.6	51.7
Guyana	1998	14.7	57.0	4.0	24.3	43.6	43.6

Haiti	2001	46.9	15.9	24.1	13.1	49.9	63.3
	2012	35.5	12.5	28.9	23.1	62.6	63.3
Honduras	1999	25.6	29.4	10.8	34.1	54.2	50.2
	2012	20.4	27.9	12.5	39.2	57.8	53.2
Jamaica	1996	7.4	41.7	2.3	48.6	38.0	39.8
	2004	4.3	41.9	1.1	52.6	41.7	45.5
Mexico	1998	8.0	17.8	8.4	65.8	50.2	50.6
	2012	2.0	20.2	4.1	73.7	47.5	48.1
Nicaragua	1998	19.1	26.7	17.2	37.0	51.4	53.4
	2009	13.2	29.5	7.2	50.1	44.7	42.9
Panama	1999	12.0	26.5	4.5	56.9	57.2	50.9
	2012	6.4	28.5	1.7	63.4	50.1	48.2
Paraguay	1999	10.4	34.9	3.4	51.3	56.0	49.3
	2012	5.8	35.7	1.4	57.1	53.2	42.2
Peru	1999	11.7	15.6	6.7	65.9	45.0	51.6
	2012	4.9	18.2	1.4	75.5	42.8	40.5
Trinidad and Tobago	1992	9.5	81.4	1.9	7.2	37.5	40.4

Uruguay	2006	0.1	7.9	3.8	88.2	43.1	47.4
	2012	0.0	5.6	1.5	93.0	36.9	41.5
Venezuela (Bolivarian Republic of)	1999	2.2	10.2	7.4	80.2	45.0	46.5
	2003	3.8	7.5	28.1	60.6	46.4	49.2

TABLE A4
THE CONTRIBUTION OF THE FOOD AND BEVERAGES SUBSECTOR TO VALUE ADDED AND EMPLOYMENT

	Years	Share of the subsector's value added in total value added of the manufacturing sector	Share of employees in the subsector	Share of female employees in the manufacturing sector	Share of female employees in the subsector
WORLD	2010s	13.4	12.5	..	..
COUNTRIES IN DEVELOPING REGIONS	2010s	12.8	11.5	..	..
AFRICA	2010s	21.9	23.6	..	..
Sub-Saharan Africa	2010s	28.0	23.9	..	..
Botswana	2013	29.9	18.6	14.0	32.5
Burundi	2012	88.5	51.0	..	..
Cameroon	2002	34.7	27.7	29.1	21.8
Congo	2009	74.5	..	..	..
Eritrea	2012	26.8	24.1	19.2	41.7
Ethiopia	2014	35.3	18.9	24.7	19.4
Gambia	2004	32.5	..	..	..
Ghana	2003	32.5	19.9	..	..
Kenya	2013	38.5	36.9	..	..
Malawi	2012	46.9	49.4	56.8	20.9
Mauritius	2012	45.5	18.8	4.6	16.0
Namibia	2013	40.5	..	..	..
Niger	2002	32.2	54.2	24.6	2.6
Senegal	2012	33.2	43.4	..	..
South Africa	2010	21.9	17.7	..	..
Swaziland	2011	85.9	41.1	..	..
Uganda	2000	59.9	27.9	..	..
United Republic of Tanzania	2010	48.5	43.9	36.8	25.6
North Africa	2010s	15.8	23.2	..	..
Algeria	2010	45.7	..	..	..
Egypt	2012	9.7	22.8	7.9	4.2
Morocco	2013	23.2	31.8	37.3	54.8
Sudan	2001	64.8	56.6	..	..
Tunisia	2011	8.7	12.8	..	..
ASIA, EXCLUDING JAPAN	2010s	9.9	10.0	..	..
Central Asia	2010s	21.7	20.4	..	..
Kazakhstan	2013	21.8	20.3	31.3	49.7
Kyrgyzstan	2012	20.4	26.6	33.4	39.8
Tajikistan	2013	..	15.6	..	..
East and Southeast Asia	2010s	9.6	9.3	..	..
Brunei Darussalam	2010	..	25.3	..	..
Cambodia	2000	5.8	3.8	1.5	28.0
China	2014	8.8	8.1	..	..
Indonesia	2013	21.1	18.2	19.0	45.4
Lao People's Democratic Republic	1999	..	..	..	..
Malaysia	2012	12.4	13.0	11.9	32.0

**TABLE A4
(CONTINUED)**

	Years	Share of the subsector's value added in total value added of the manufacturing sector	Share of employees in the subsector	Share of female employees in the manufacturing sector	Share of female employees in the subsector
Mongolia	2011	41.1	32.0	16.8	27.0
Philippines	2012	23.5	20.1	15.6	36.7
Republic of Korea	2014	5.4	6.5	12.1	47.9
Singapore	2014	4.7	6.8	..	..
Thailand	2011	19.1	19.6	16.5	42.1
Viet Nam	2013	21.1	10.8	9.0	50.0
South Asia	2010s	9.7	12.0	..	..
Afghanistan	2014	..	13.1	7.8	23.1
Bangladesh	2011	12.0	5.9	3.0	22.6
India	2014	8.6	13.6	21.4	15.3
Iran (Islamic Republic of)	2014	10.6	15.8	24.1	15.2
Nepal	2011	29.3	22.0	16.2	16.9
Pakistan	2006	17.8	14.6	9.8	2.6
Sri Lanka	2012	28.9	19.6	15.1	42.6
Western Asia	2010s	10.8	16.1	..	..
Armenia	2013	..	38.3	..	..
Bahrain	2013	13.2	6.5	..	..
Cyprus	2014	42.2	42.2	57.1	47.5
Georgia	2013	43.6	34.7	46.4	41.7
Iraq	2011	15.2	18.1	..	..
Israel	2014	11.2	17.2	..	..
Jordan	2013	21.0	23.0	14.3	9.7
Kuwait	2013	5.4	20.3	32.5	7.0
Lebanon	2009	27.4	2.6	0.8	22.8
Oman	2014	5.7	25.2	32.4	6.3
Qatar	2013	0.9	8.9	22.8	5.2
Saudi Arabia	2006	19.5	20.4	..	..
Syrian Arab Republic	2005	27.7	23.3	..	..
Turkey	2014	13.0	13.2	15.4	23.4
Yemen	2012	46.8	36.9	..	..
OCEANIA	2010s	..	..	..	..
Fiji	2011	50.6	39.7	23.4	19.6
LATIN AMERICA AND THE CARIBBEAN	2010s	22.2	22.2	..	..
Argentina	2002	30.2	29.5	..	..
Bolivia	2010	48.2	36.8	..	..
Brazil	2013	20.8	21.5	..	..
Chile	2013	36.7	34.3	43.7	30.8
Colombia	2012	30.3	24.1	21.8	33.0
Costa Rica	2013	50.1	33.2	..	..
Ecuador	2008	35.5	45.7	50.0	29.3
Mexico	2013	22.2	21.9	19.7	30.8

**TABLE A4
(CONTINUED)**

	Years	Share of the subsector's value added in total value added of the manufacturing sector	Share of employees in the subsector	Percentage	
				Share of female employees in the manufacturing sector	Share of female employees in the subsector
Panama	2001	56.6	56.4	60.3	25.0
Paraguay	2010	39.7	28.0	..	..
Peru	2011	32.5	20.5	..	..
Puerto Rico	2006	8.1	9.3	6.2	33.1
Trinidad and Tobago	2006	9.1	38.4	..	..
Uruguay	2011	38.0	47.0	..	..
COUNTRIES IN DEVELOPED REGIONS	2010s	13.5	14.9	..	..
EUROPE	2010s	13.5	15.5	..	..
Albania	2013	15.7	14.3	16.4	57.5
Austria	2014	10.6	12.9	20.7	45.9
Azerbaijan	2013	27.3	24.0	32.4	36.5
Belarus	2014	22.2	16.6	23.6	52.1
Belgium	2014	15.1	18.3	..	..
Bosnia and Herzegovina	2011	22.0	16.1	..	..
Bulgaria	2014	18.0	17.7	17.4	47.9
Czech Republic	2013	8.3	9.6	..	..
Denmark	2014	22.6	17.6	..	..
Estonia	2014	13.3	13.8	..	..
Finland	2014	11.0	11.7	..	..
France	2014	18.1	20.6	..	..
Germany	2014	7.3	11.9	..	..
Greece	2013	29.6	30.6	..	..
Hungary	2013	10.0	15.4	..	..
Iceland	2005	31.4	..	..	..
Ireland	2012	21.7	24.7	..	..
Italy	2014	11.3	10.7	..	..
Latvia	2013	19.1	21.4	34.1	17.3
Liechtenstein	2013	..	16.5	17.9	30.4
Lithuania	2014	21.9	21.7	27.8	60.1
Luxembourg	2014	10.8	16.2	..	..
Malta	2009	16.8	17.2	12.2	32.6
Netherlands	2013	18.9	18.9	..	..
Norway	2014	18.7	21.6	..	..
Poland	2013	16.9	18.1	..	..
Portugal	2014	15.9	16.1	..	..
Republic of Moldova	2012	39.6	..	32.7	..
Romania	2013	15.0	15.8	..	..
Russian Federation	2014	16.1	16.0	..	..
Serbia	2014	26.3	..	..	..
Slovakia	2013	7.0	9.1	..	..
Slovenia	2013	7.0	8.3	..	..

**TABLE A4
(CONTINUED)**

	Years	Share of the subsector's value added in total value added of the manufacturing sector	Share of employees in the subsector	Share of female employees in the manufacturing sector	Share of female employees in the subsector
Spain	2014	20.4	20.5	..	..
Sweden	2014	8.0	9.7	..	..
Switzerland	2013	8.7	12.8	..	..
The former Yugoslav Republic of Macedonia	2011	22.1	16.3	..	..
Ukraine	2014	27.9	21.3	..	..
United Kingdom	2013	18.3	14.9	17.2	53.8
OTHER ASIAN COUNTRIES, AUSTRALIA AND NEW ZEALAND	2010s	13.8	14.4	..	..
Australia	2013	26.4	26.9	20.2	23.2
Japan	2012	12.3	16.5	29.7	53.3
New Zealand	2012	35.9	4.2	..	..
NORTH AMERICA	2010s	13.9	13.5
Canada	2014	15.4	15.4
United States of America	2011	13.7	13.3

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SPECIAL THEMES OF THE THE STATE OF FOOD AND AGRICULTURE

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METHODOLOGY

The preparation of *The State of Food and Agriculture 2017* began with an inception workshop held at FAO headquarters in Rome on 21 September 2016 and attended by members of a panel of external experts and FAO specialists. Following the workshop, an advisory group, representing all relevant FAO technical units and chaired by the Director of FAO's Agricultural Development Economics Division, was formed to assist in the drafting process. At two seminars, held in November 2016 and January 2017, the research and writing team and the advisory group prepared the report outline and discussed the drafts of Chapters 1 and 2. The team used comments received from the advisory group to revise the outline and produce the first full draft of the report at the end of February 2017. The draft was then discussed at a second workshop held on 16–17 March with the advisory group and

panel of external experts. With inputs from that workshop, the report was revised and presented to the FAO Economic and Social Development Department management team. The revised draft was sent for comments to other FAO departments and to the FAO regional offices for Africa, Asia and the Pacific, Europe and Central Asia, Latin America and the Caribbean, and the Near East and North Africa, as well as to external reviewers. Comments were incorporated in the final draft, which was submitted to the Office of the FAO Director-General on 31 May 2017. In drafting the report, the research and writing team drew on background papers prepared by FAO and external experts and on four regional papers commissioned for the FAO Conference on Rural Transformation, Agricultural and Food System Transition, held in Rome on 19–20 September 2016. ■

2017

THE STATE OF FOOD AND AGRICULTURE

LEVERAGING FOOD SYSTEMS FOR INCLUSIVE RURAL TRANSFORMATION

One of the greatest challenges today is to end hunger and poverty while making agriculture and food systems sustainable. The challenge is daunting because of continued population growth, profound changes in food demand, and the threat of mass migration of rural youth in search of a better life. This report presents strategies that can leverage the potential of food systems to become the engine of inclusive economic development and rural prosperity in low-income countries. It analyses the structural and rural transformations now under way, and examines the opportunities and challenges they present to millions of small-scale food producers. It shows how an “agroterritorial” planning approach, focused on connecting cities and towns and their surrounding rural areas, combined with agro-industrial and infrastructure development can generate income opportunities throughout the food sector and underpin sustainable and inclusive rural transformation.



ISBN 978-92-5-109873-8 ISSN 0081-4539



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I7658EN/1/10.17