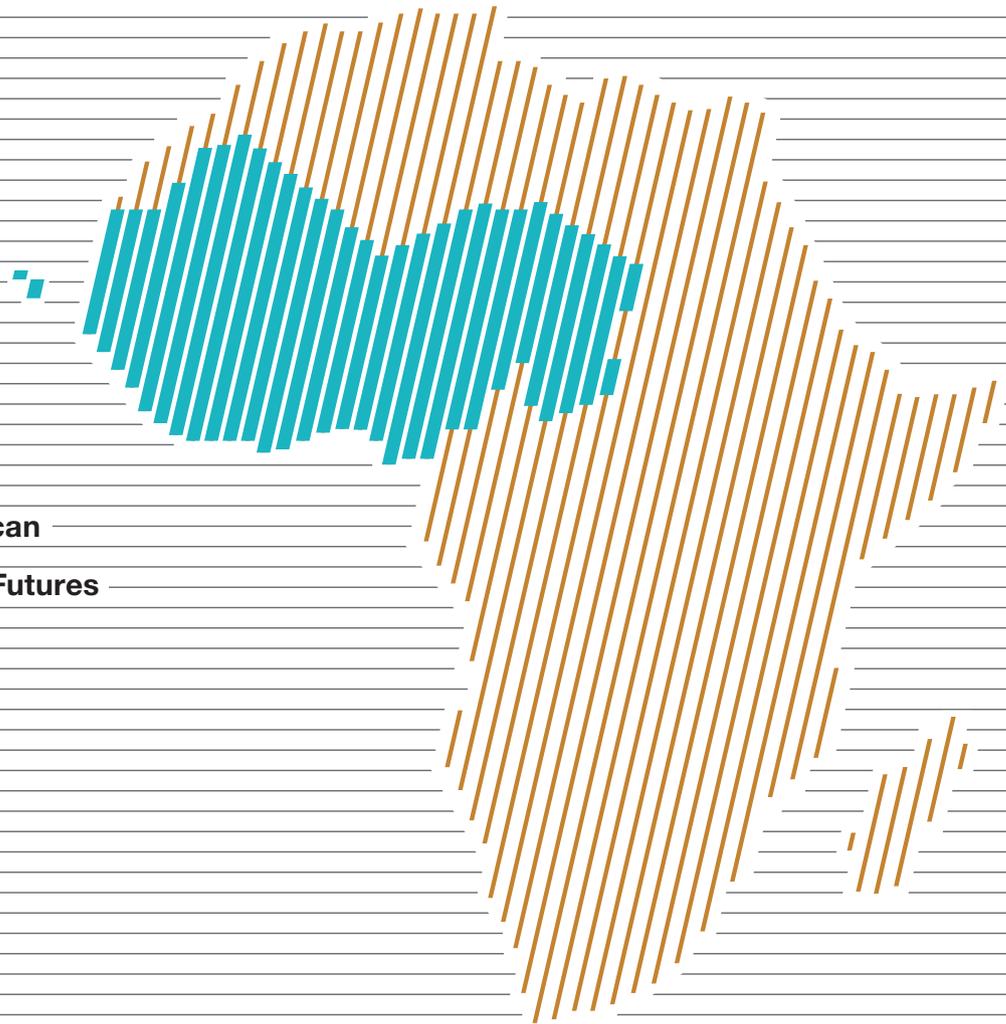




West African Studies

Settlement, Market and Food Security



West African

Futures

Settlement, Market and Food Security

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The Club

Working together for regional integration

The Sahel and West Africa Club is a group of West African regional organisations, countries and international organisations that work together towards the development and integration of the West African region.

The Club's mission is to pool together Members' experiences, ideas and perspectives to help build more effective regional policies. Drawing on factual studies and independent analyses, the Club devises strategic guidelines and policy tools for Members and other stakeholders.

The Club is also a space for policy dialogue. As a member of the OECD Development Cluster, the SWAC Secretariat contributes to the work of the Organisation and ensures that West African concerns and initiatives are taken into account in global debates, particularly those on food, energy and security issues.

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Belgium: Ministry of Foreign Affairs, Foreign Trade and Development Co-operation; **CILSS:** Secretariat of the Permanent Inter-State Committee for Drought Control in the Sahel; **ECOWAS:** Commission of the Economic Community of West African States; **France:** Ministry of Foreign and European Affairs; **Germany:** Federal Ministry for Economic Co-operation and Development (until 2011); **Luxembourg:** Ministry of Foreign Affairs; **Netherlands (The):** Ministry of Foreign Affairs; **Switzerland:** Federal Department of Foreign Affairs; **UEMOA:** Commission of the West African Economic and Monetary Union; **United States:** U.S. Agency for International Development.

The Austrian Development Agency joined the SWAC in 2013. The European Commission's accession process to the SWAC is under way.

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Abbreviations and acronyms

AFD	Agence française de développement / French Development Agency	IIASA	International Institute for Applied Systems Analysis
ACF	Action contre la faim / Action Against Hunger	IITA	International Institute of Tropical Agriculture
AfDB	African Development Bank	ILC	International Land Coalition
AFRISTAT	Observatoire économique et statistique d'Afrique Subsaharienne / Economic and Statistical Observatory for sub-Saharan Africa	ILO	International Labour Organization
AGRHYMET	Centre régional Agro-Hydro-Météorologique (CILSS)	INRA	Institut national de la recherche agronomique
AGRI	Agricultural Information System	INSAH	Institut du Sahel (CILSS)
AMIS	Agricultural Market Information System	INSD	Institut national de la statistique et de la démographie
AP	Agricultural population	IPAR	Initiative prospective agricole et rurale
APr	Agricultural population in rural areas	IPPF	International Planned Parenthood Federation
APU	Agricultural Policy of UEMOA	IPUs	Informal production units
ATP	Agribusiness and Trade Promotion	KCAL	Kilocalories
BUCREP	Bureau Central de Recensement et d'Étude de la population au Cameroun	MDG	Millennium Development Goals
CAADP	Comprehensive Africa Agriculture Development Programme	Mi	Index of macrocephaly
CEPED	Centre Population et Développement / Population and Development Research Centre	MISTOWA	Market Information Systems and Traders Organizations in West Africa
CEPS	Centre for Population, Poverty and Public Policy Studies	NAP	Non-agricultural population
CIDCM	Center for International Development and Conflict Management	NAPr	Non-agricultural rural populations
CIGEM	Migration Information and Management Centre	NAPu	Non-agricultural urban populations
CILSS	Comité permanent Inter-États de Lutte contre la Sécheresse dans le Sahel / Permanent Inter-State Committee for the Prevention of Drought in the Sahel	NEPAD	New Partnership for Africa's Development
CIRAD	Centre de coopération internationale en recherche agronomique pour le développement / Agricultural Research Centre for Development	NESMUWA	Network of Surveys on Migration and Urbanization in West Africa
CNRS	Centre national de la recherche scientifique	NGOs	Non-governmental organisations
CRED	Centre for Research on the Epidemiology of Disasters	OAU	Organization of African Unity
DAADER	Délégation d'Arrondissement de l'Agriculture et du Développement Rural	OECD	Organisation for Economic Co-operation and Development
DNPGCA	Dispositif National de Prévention et Gestion des Crises Alimentaires	OFDA	Office of Foreign Disaster Assistance
ECOLOC	Programme sur les économies locales en Afrique de l'Ouest / Managing local economies in West Africa	PARSTAT	Regional Statistical Support Programme
ECOWAP	Agricultural Policy of ECOWAS	Pi	Index of primacy
ECOWAS	Economic Community of West African States	PNIA	National Agricultural Investment Programme
EU	European Union	PRIA	Regional Agricultural Investment Programme
FAO	Food and Agriculture Organization of the United Nations	PRIO	Peace Research Institute Oslo
FAO/GIEWS	FAO Global Information and Early Warning System	REMUAO	Réseau migrations et urbanisation en Afrique de l'Ouest
FARM	Fondation pour l'agriculture et la ruralité dans le monde	ROPPA	Réseau des organisations paysannes et de producteurs de l'Afrique de l'Ouest / Network of Farmers' and Agricultural Producers' Organisations of West Africa
FCFA	Franc de la Communauté financière africaine	SAGE	Center for Sustainability and the Global Environment
FEWS NET	Famine Early Warning Systems Network	SAM	Social Accounting Matrix
GAEZ	Global Agro-Ecological Zones system	SAPs	Structural adjustment programmes
GDP	Gross domestic product	SDC	Swiss Agency for Development and Co-operation
GHI	Global Hunger Index	SEDET	Sociétés en développement, Études transdisciplinaires
GHS	Ghana Health Service	SIAR	Regional Agricultural Information System
GSM	Global System for Mobile Communications	SMART	Statistical, Mapping and Regional Analysis Tool
GSS	Ghana Statistical Service	SNA	System of National Accounts
IFPRI	International Food Policy Research Institute	SOFI	State of Food Insecurity in the World
		SONAGESS	Société Nationale de Gestion des Stocks de Sécurité Alimentaire / National Food Security Reserve Management Company
		SRAI	Strengthening Regional Agricultural Integration in West Africa programme
		SWAC	Sahel and West Africa Club
		TMS	Tropical Manioc Selection
		U/P	Level of urbanisation

U/R	Urban population to rural population ratio	USAID	United States Agency for International Development
UCDP	Uppsala University Conflict Data Programme	WAF	West African Futures
UEMOA	Union économique et monétaire ouest-africaine / West African Economic and Monetary Union	WALTPS	West Africa Long-Term Perspective Study
UN	United Nations	WB	World Bank
UNDP	United Nations Development Programme	WDR	World Development Report
UNECA	United Nations Economic Commission for Africa	WFP	World Food Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization	WPP	World Population Prospects
UNFPA	United Nations Population Fund		
UNHCR	United Nations High Commissioner for Refugees		

Editorial

Looking at the world from a different viewpoint is always helpful. Not because that viewpoint might reveal a hitherto unknown reality or hidden truths, but because it can provide both points of contention and inspiration from which policies should be drawn. The Members of the Sahel and West Africa Club have given their Secretariat the task of facilitating this type of thinking on the basis of factual and independent analysis. In 2010, they requested that a regional study be conducted which would be both retrospective and prospective and which would focus on two determinants of food security: settlement and the regional market.

The work presented here is the result of the lengthy assimilation of a very extensive body of research, combined with in-depth discussions and debates within an ad hoc working group. On certain points, it is also the result of original research.

In the following paragraphs, readers will find an analytical summary that has no other aim but to encourage them to read the entire book. If the judgments put forward here seem somewhat blunt, that is because we believe that being so is necessary to stimulate debate – which is, after all, the Club’s mission.

Regional policies flying blind

The objective of all West African agriculture and food security policies is to feed a fast-growing and increasingly urban population. But are these policies truly capable of integrating these dynamics and their implications? Our general answer to this question is no. Not because policy makers lack lucidity – in fact, they are fully aware of the demographic challenge – but because they face two major constraints.

« Deprived of essential information about the dynamics at work, West African agriculture and food security policies are to some extent flying blind.

First, the dynamics at work are so fast-moving that problems change much more quickly than do the solutions to them. ECOWAS defined its agricultural policy about 10 years ago; since then, the population has grown by a third, adding another 67 million people to the total. The divisions between rural and urban, agricultural and non-agricultural, formal and informal have shifted. The international environment has also changed significantly. This highlights the importance of developing

permanent mechanisms for monitoring and policy adjustment. Among other things, this entails a complete overhaul of statistical indicators, which today are partly “blind”, incapable of capturing the realities crucial to managing realistic and hence effective food security strategies. The absence of harmonised and hence comparable data at the level of West African countries and regional organisations on an aspect as important as population – whether total, urban or rural, agricultural or non-agricultural, or formal or informal – is astonishing. Likewise, the lack of data relating to household food consumption or regional trade, on which policies have to be based, is unacceptable. Throughout this study, readers will find robust arguments and surprising examples that demonstrate the widening gap

Despite being one of the world’s top agricultural performers, West Africa nonetheless suffers from unacceptable levels of chronic food and nutritional insecurity.



between the reality and the prism through which we currently try to observe this reality. As a temporary alternative, a coherent, retrospective and prospective database, together with methods that may be helpful to hands-on professionals, is proposed by the authors, at least until the shortcomings of existing statistical systems are addressed.

Second, although agricultural policies stress the importance of demographic variables, their actual formulation is not based on a comprehensive analysis of the challenges of the latter. We therefore looked at population (i.e. the number of people) and settlement (i.e. the geographical distribution of people) no longer as two elements among others, but as the starting points for analysis. To do so, we have to place our analyses within a broad vision of development based on a human geography approach in which settlement recomposition is the key element of development. Settlement dynamics generate the economic concentration that is necessary for growth, but such dynamics also create risks and inequalities, notably strong spatial and social disparities. The aim should therefore be to benefit from economic concentration, which is manifest in a high intensity of production and trade, by assuring, through appropriate policies, that

individual well-being is not only a function of location. This conceptual approach is not a panacea; it underestimates, for example, the part of economic geography that is still directly dependent on natural endowments. However, it sheds new light on a phenomenon hitherto little documented in Sub-Saharan Africa, opens up new prospects, and paves the way for new means of analysis and action.

Growth and exclusion

The number of people living in West Africa has increased fourfold over the last 60 years. When a population grows quickly, it “reacts” by a settling differently across space. Geographical mobility goes hand-in-hand with the high population growth phases of a demographic transition. No counter-example exists in history.

This phenomenon explains why regional migrations are not only very large in scale, but also very “smart”. Regional migrations constantly adapt to economic opportunities, policies and instabilities. It also explains why the number of people living in cities has risen by a factor of twenty over the same period, whereas the rural population has increased by a factor of only two-and-a-half. The implications for agricultural geography, market dynamics, income distribution, social attitudes, and food consumption habits are considerable. Few places in the world have changed so much within such a short time.

West African agriculture has risen to the challenge of population growth, taking off in the mid-1980s after two decades of stagnation or regression. Over the past 30 years, agricultural production has risen much more quickly than population, resulting in an increase in food supply in the area from 1 700 to 2 400 kilocalories per person per day. Food dependence on the rest of the world has not increased: it was 20% in 1980 and remains about the same today (in kcal/capita/day). Rice imports have increased by only 3.5 kg per capita in 30 years, and have actually decreased when measured per capita of the urban population.

These achievements, which could have been even greater if Liberia, Sierra Leone, Chad, Côte d’Ivoire and other countries were not enduring extended periods of conflict or instability, should be credited to West Africa’s farmers, traders, transporters and processors. They have

shown themselves capable of responding to a sharp and steady rise in demand from growing numbers of non-food producing consumers. In 1950, nine households out of ten consisted of farmers. In 2010, this ratio fell to five out of ten. A decreasing proportion of the population therefore had to feed the other (the fast-growing part of the population). This achievement was based on a steady improvement in farm labour productivity that, having declined for many years, has risen by an impressive 2.6% annually since 1980. Yields also increased, although not as vigorously. This increase in productivity is an unsurprising feature, for as long as land is easily accessible and hence inexpensive, farmers prefer to increase their production by extending land under cultivation.

Also as a result of these trends, the prevalence of undernourishment has fallen by 45% in 20 years. The countries that have made the greatest progress share common features, including growing agricultural productivity, rising incomes, little vulnerability to natural disasters, an improved human development index, declining debt levels, and social and political stability.

However, many West Africans have been left behind. Ten percent of the population, 30 million people, still suffers from chronic undernourishment or malnutrition. These people can most commonly be found in the households of farmers excluded from the market, of agro-pastoralists and pastoralists over-dependent on livestock under threat from recurrent drought, and of poor workers in the popular economy. Structurally vulnerable, these people, who are often women and children, are incapable of withstanding repeated shocks caused by drought, floods, crop-destroying pests, economic crises and conflicts.

Tackling the causes of the marginalisation of the most vulnerable involves understanding the dynamics that are profoundly changing West Africa's economic and social geography.

Spatial integration and social diversification

Urbanisation is the most important of these dynamics. Having risen very rapidly, urban growth slowed in the 1980s as a result of the economic crisis and the structural adjustment programmes that followed. It then continued at

a slower but still steady pace. Urban growth is not limited to large agglomerations. A network of small and medium-sized towns has emerged. Between 1950 and 2000, the average distance between cities of over 10 000 inhabitants has been divided by three, from 111 to 33 km. The urban network thus provides the framework for the spatial organisation of the West African



Agricultural and food policies must target the entire informal sector, both rural and urban.

economy. It is transforming rural areas, with which it constructs integrated trading and market spaces. The changes are striking.

Eighty percent of the rural population now lives within a 90 km radius of an urban centre of at least 50 000 inhabitants. Urbanisation creates an expanding outlet for agricultural production. The up-stream activities (inputs and services) and down-stream activities (marketing and processing) of agricultural production have further sustained the development of networks of small and medium-sized towns and big cities alike.

The rural economy is changing, although available statistics do not give an accurate sense of the scale of this change. Due to a lack of data, all rural households are often likened to agricultural producers and all urban households to consumers. This leads to diagnostic errors in which the number of producers is substantially overestimated and their productivity significantly underestimated. Based on our estimates, the total population of West Africa in 2010 was evenly divided between agricultural producers and non-agricultural producers, while parity between urban and rural dwellers had not yet been reached. The majority of agricultural producers remain in the countryside, but non-agricultural producers now account for 25% of the rural population, and urban areas comprise a significant number of food producers. Looking at the picture in terms of the urban versus rural divide is no longer relevant. Doing so divides the real.

It is surprising to find in the same analysis the need to “work on value chains”, which include all actors regardless of the environment in which they operate, and to “focus policies on agricultural production and rural markets”; you cannot do one thing and its opposite at the

same time. These value chains irrigate integrated social and economic spaces where, from producer to consumer, a multiplicity of urban and rural actors interacts according to the same logic: that of the “informal sector”. The vast majority of farmers, stockbreeders, fishermen, traders, transporters and craftsmen, both rural and urban, work in the “popular economy” (another term, more appropriate in our opinion, for the informal sector). They constitute the “social fabric” on which agricultural and food policies should focus without discrimination.

Food policies must therefore be taken out of the sole sphere of rural or agricultural development. The proportion of urban dwellers in the population suffering from chronic food inse-

The market provides two-thirds of food supplies. Improving its functioning should be the priority of food and nutritional security policies.



curity is likely to increase in the future simply because they comprise a growing share of the total population. Planning and developing towns and cities to foster the popular economy and increase the income it generates, as well as facilitating commercial activities and informal food processing (fewer roadblocks, less red tape, more appropriate legal forms, etc.), must be prioritised in policies enhancing resilience to food insecurity.

Market access

If everyone produces what he or she consumes, little or no trade exists. The market emerges and grows with the division of labour, which is possible only if the population agglomerates. By concentrating, people specialise, and sell other people what they do not produce themselves. The dynamics of urban and rural concentration in West Africa illustrate this and explain why markets have become the main source of households’ food supplies – providing between 60% and 80% of food, depending on the country. Although this process is broadly virtuous, it also causes inequalities that explain many of the problems of access to food, both in rural and urban areas.

Sixteen percent of West Africans live in low-density areas more than 90 km from an urban centre of 50 000 inhabitants or more. However,

remoteness is not measured by distance alone. A farm may be situated a few dozen kilometres from a town, but five or ten kilometres from the road that leads to it, without a track to get to the road. In such areas, a programme to develop income-generating activities, whether agriculture, craftwork or trade, has little chance of success. In 2000, the World Bank estimated that fewer than 40% of the rural population had access to a road or track. Politicians thus have to be encouraged to continue and step up their efforts in developing the required communication and marketing infrastructure.

Connection to roads and the market is obviously not enough to allow people to escape poverty. These are, however, important elements. Variations in the degree of poverty across farming and rural households are more closely linked to proximity and ease of access to markets than to agro-ecological factors.

For the rest, a farmers’ decision to invest in selling a planned surplus of production depends on the level and stability of income. These decisions are also closely correlated to the risks incurred. These risks are linked to production conditions (drought, pests, etc.), inter- and intra-annual price variability, and to the lack of social safety nets and insurance mechanisms. The always difficult trade-off between risk and opportunity explains why the investment needed to develop market-oriented production develops only gradually.

Making the market more efficient must therefore be a primary concern. It is a feature of all current policies. However, too often this objective is limited to a notion of market in the sense of a physical location and its actors, who are the traders. This limited interpretation influences the analysis and restricts the scope of policies. It fails to take into account the interactions among many variables and players. The market should be understood as all interlinked activities from the producer to the consumer, including planting, harvesting, transporting, storing, processing and distributing. All too often, policies still tend to divide the reality into producers who produce, traders who trade, processors who process and so on, thereby ignoring the value chain that links them and has considerable influence in determining how effective they are. Understanding that it may be much more important for a producer to be able to sell than to know how to produce

is essential. Many unsuccessful agricultural projects can be attributed to the failure to take such aspects into account.

Better access to information by all actors is an important component of more efficient markets. A producer who knows what prices are can sell for 20% more. The widespread use of mobile phones has significantly improved this situation. Producers wanting to invest in the production of a planned surplus certainly need to know what products the market wants, in what quantity and what quality, where, when, and at what price.

The regional market and consumption overlooked in food security strategies

Mostly informal, regional trade in agricultural produce is reflected only marginally in statistics. As a result, this trade is officially very small or even non-existent.

The study's analysis of the West African maize market shows the outlines of a very different reality, although it is difficult to quantify regional flows precisely. Five million tons were marketed in 2007, eight times more than that marketed 25 years earlier. The quantity marketed is, unsurprisingly, increasing more rapidly than the quantity produced. Substantial volumes flow towards the coastal conurbation of Nigeria, Benin, Togo, and Ghana, which alone consumes 2.5 million tonnes. The share of interstate trade cannot be evaluated at this stage, although it is undoubtedly significant.

The lack of data on regional trade combines with the lack of information on consumption to produce food crisis prevention and management tools of relative reliability. The FAO estimates the food supply available for human consumption for each country, which, in the absence of regular and consistent surveys, is treated (by default) as consumption. The food supply available for human consumption is calculated as production minus a set of variables, including postharvest losses, animal feed, stock variations, imports/exports, seeds, etc.

As emphasised by the FAO itself, these shortcomings result in inaccurate evaluations of the food situation. For instance, a survey in 2003 in Burkina Faso shows that the official figure for food supply per person per year was overestimated by 20% for sorghum and 15% for maize, and underestimated by 25% for

rice. Many other examples show that the food balance sheets used to prevent food shortages are, both conceptually and statistically, disconnected from reality.

Imagining the introduction of comprehensive and permanent systems to capture all regional trade is unrealistic. Aside from their high costs, such systems could turn into another opportunity to set up roadblocks and collect additional informal taxes. Also conducting household food consumption surveys each year in all the countries and across all existing social and economic situations is unimaginable. Any such ambition would also run into a major obstacle: national definitions of urban and rural and agricultural and non-agricultural populations vary. Yet these categories are essential to calibrate the surveys and ensure comparable results.

The data collected and produced in this study (regarding spatialisation of different population groups on a regionally harmonised basis) have opened some new prospects. Combined with spatial information on production systems, agro-ecological zones and distances to markets, the data could help generate a representative sample of households for the entire region. Based on such information, consumption surveys could be conducted at regular intervals. The selection of relevant information to be collected, which must necessarily be executed on a small scale and in a transferable format, must be considered with

« The food balance sheets used to forestall food shortages are both conceptually and statistically at odds with the reality.

respect to the information already available, especially regarding prices, to contribute to the setting up of a multidimensional information system on food security.

The consumption data thus collected will help give a fairer approximation of regional trade in food balance sheets.

Incorporate population policies into long-term food security strategies

The region currently has 300 million inhabitants. Population growth is slowing. How many West Africans will there be in 20 or 40 years' time? The United Nations' low variant projection

indicates that the answer is 435 and 600 million respectively. However, this is a low hypothesis, which implies a proactive population policy and assumes a very rapid decrease in fertility, more rapid than an extrapolation of the current trend indicates. Demographic growth could, in fact, be much greater, with the population reaching 470 million by 2030 (30 million more than the low variant) and 700 million by 2050 (100 million more).

These figures are merely indicative. However, they show that depending on which path the region takes, its prospects are significantly different. Any lag in the decrease in fertility will slow the development process and raise uncertainty on the future of food and nutritional security.

To accompany the rapid demographic transition it needs, the region will have to commit more resources to population policies and, in some cases, take a more ambitious stance. It will have to draw on short- and long-term solutions, ranging from the spread of modern contraception methods to encouraging the use of traditional methods to using the media to inform people about the advantages of lower birth rates, etc. The region will also have to tap into education significantly. These measures

Any lag in the decrease in fertility will raise uncertainty on the future of food and nutritional security.



will allow as prompt as possible a benefit from the demographic dividend, which contributes to development in general and to food security in particular.

Although the slowdown phase of the demographic transition has begun everywhere, the study underlines that coastal countries are more advanced in the transition than Sahelian countries, urban centres more than rural areas, and densely populated areas more than remote ones. Urban populations lead rural populations by more than a decade in terms of fertility decline. The emergence and development of urban centres of all sizes helps to spread new attitudes towards family size in all settings by reducing the distance from urban households to households in the countryside. Economic concentration and the densification of population settlement also accelerate social and cultural change.

Consequently, long-term strategies to end chronic food and nutritional insecurity must take a constructive attitude toward a greater concentration of the rural population and toward urbanisation. The promotion of resilient food systems, today centred on rural areas, must henceforth explicitly include urban centres. Managing them more efficiently and encouraging commercial activities, crafts, the agri-food industry, and urban and peri-urban agriculture is crucial. The latter may particularly provide families with greater food security as well as an extra source of income, and shorten the chain between producers and consumers.

The future of farming

The agricultural population is likely to level out at around 130 million between 2010 and 2050. In contrast, the total population will double, and the non-agricultural population will triple. The agricultural population will predominantly be in rural areas and, to a lesser extent, in and around urban centres. From a technical perspective, the coming decades could see a genuine agrarian revolution.

Family farms, which account for 80% of all farms, have until now ensured a large part of agricultural production by adapting to changes in demand. In the medium term, the general production system is unlikely to be very different from one based on family farms of varying sizes. In the long-term, however, the transformation process of production systems is likely to follow patterns observed elsewhere, as in Asia, Latin America, or Europe. These patterns are characterised by an increase in the average size of holdings and the simultaneous concentration of food production.

Based on past trends, the study gives a picture of the use of agricultural land in 2050, with an average farm size of 9 hectares. The largest 10% of holdings will have an average size of 33 hectares and cover 38% of the total land area. At the other end of the distribution, 10 million holdings will be of fewer than 5 hectares. Such a distribution is not incompatible with a family-farming based system, as long as it is not regarded as equivalent to manual agriculture. On the contrary, farming systems will specialise, mechanise and gradually intensify.

Most small farms will be located in areas well-connected to markets. They will specialise in high-value crops or activities (fruit and vegetables, poultry, etc.). Their yields will have to increase very significantly, partly to offset the high cost of land in areas close to urban centres. Small and remote farms, however, will have few incentives and face more constraints in integrating the process of specialisation, intensification and income creation.

Average-sized holdings will sustain the trend toward more specialisation and intensification of production systems. Using credit and accumulated assets, they will follow a logic of expansion by increasing land areas and capturing new markets, including the regional market.

A new feature will be the emergence of a small number of very large farms. Extensive agricultural production of this type, often on farms of several thousand hectares, will focus on food staples, especially cereals, aimed at processing industries (brewing, flour-milling, etc.) and large distributors.

Anticipating and supporting changes in agricultural systems

The take-off of agricultural production from the mid-1980s onward should be credited to the dynamism and creativity of all actors in the value chain, including producers. They have benefited from the opening up of the market economy, but at the same time they have had to contend with an institutional and regulatory environment that is not geared to the entrepreneurial modernisation of family farming. This environment needs to be adapted and simplified to prepare for the necessary changes, in particular increased specialisation, wide adoption of soil fertility management techniques, intensification in terms of input use, and mechanisation. In a nutshell, agricultural entrepreneurs must be enabled to invest and prosper.

However, today farmers are mostly governed by laws and regulations devised for businesses in the modern sector. Flexible legal frameworks that no longer act as a disincentive are needed for ultra-streamlined administrative procedures and participatory anti-corruption measures (administrative streamlining being in itself one way of combating corruption). Equally important are policies that stimulate

lending and access to credit. In many countries, especially French-speaking ones, competition between lenders is weak or non-existent in some areas. The sector needs to be opened to more players to improve banking services for

« Larger and more specialised farms are not incompatible with continued family farming.

the private sector (including the “informal” sector), reduce interest rates, and enhance the range of financial services offered. The creation of information offices would bring greater transparency to lending. West African governments must get down to the job of designing and implementing integrated frameworks for agricultural investment.

Investment is also linked to land security. Regardless of the modalities, land security substantially determines farmers’ capacity to respond to market signals by investing. This is a complex and highly political issue, and an area in which states are particularly jealous of their sovereignty. However, regional action can help them exchange best practices and frame appropriate policies. Regional action of this nature must also ensure that land laws comply with community texts and principles, especially freedom of movement and establishment.

Because of the varied pace at which the considerable agrarian changes noted above will occur, they will give rise in the future more than in the past to new opportunities and significant migration flows within the region. At the macro-regional level and in the long-term, and subject to necessary investments

« Agricultural investment ought to be a regional great cause. Otherwise, growth will be less strong, less equitable and less sustainable.

(infrastructure, equipment and training), it is reasonable to suppose that neither labour nor natural resources (land and water) will be limiting factors in production and food security, as long as the necessary adjustments are able to take place and migration within the region is not obstructed.

This highlights why regional dialogue on the rights and obligations of West African farmers in their community areas must be a priority, especially in terms of access to land. At

stake is the pursuit of agricultural growth and the prevention of conflict. In 2004, the principle of a regional land charter was adopted at the highest level. The project, which aims to apply to the domain of land tenure the principles of freedom of movement and establishment of people, is currently at a standstill. It is vital to return it to the agenda for discussion as soon as possible, given that the process will inevitably be long.

Promoting entrepreneurship and agricultural investment ought to be a “regional great

cause”. Otherwise, even if the West African agricultural community takes up the food challenges of the 21st century, it will do so less-vigorously and less-sustainably, with land degradation posing a constant threat, and in a less-egalitarian fashion, with the persistence of an unacceptable fraction of poor farmers.

Laurent Bossard

**Director, Sahel and West Africa Club
Secretariat**

Executive summary

The West African population is projected to double by 2050, during which time agricultural production systems will profoundly change. The WAF report highlights the main features of settlement (from a homogenised base), agriculture and food security. It also provides an analytical framework and tools to allow policies to anticipate and incorporate the coming changes. The analysis particularly focuses on population concentration and on its corollary, market development, so as to shed light on some of the regional issues ahead.

- West Africa is one of the last regions that has not completed its demographic transition. Between 1950 and 2010, its population increased from 72 to 290 million inhabitants. In these 60 years, the urban population multiplied by nearly 20 times – from 6 to 118 million inhabitants. In 1950, no country in the region had a level of urbanisation higher than 20%, while in 2010, eight countries had a level close to or higher than 50%.
- West African agricultural producers have increased production to meet growing demand. Between 1980 and 2010, agricultural production growth averaged 3.7% making it the fastest growing region of the world. Over the same period, the total production tripled and per-capita food production increased by 1.8% per year.

- Since 1990, the prevalence of undernourishment has decreased by 44% at the regional level, although unevenly across countries. Despite these advances, the food situation remains critical. According to the FAO, 33 million people (12% of the total population) remained undernourished in 2006–08.

These evolutions have led to profound changes in the human and economic geography of West Africa. Urban growth has manifested in the growth of the largest cities and the development of a network of small and medium-sized towns, which act as nodes for the spatial organisation of trade and markets. As a result of these dynamics, agriculture is transforming and the rural economy is diversifying. The share of agricultural producers in the total population decreased from 90% in 1950 to 50% in 2010. In rural areas, 25% of the population is no longer engaged in agricultural activities. More than two-thirds of household food consumption is bought on the market, and the food value chain is based primarily on informal dynamics.

Impressive gains have been realised in terms of productivity per agricultural producer, which has increased by 2.6% per year since 1980. Over the same period, yields have grown an average of 1.4% annually. These developments reflect the gradual integration of West African agriculture into the market economy,

which has brought about new incentives for producers, and which poses a variety of challenges for policy makers.

The balancing between food demand and agricultural supply is taking place in a space structured by transportation and communication networks, with transaction costs depending on location. City-countryside relations are part of a continuum in which the role of markets is essential. The growing importance of the market and of the concentration of food consumption and production has created stronger interdependencies between geographical areas and actors. The rural/urban transition accentuates the heterogeneity in the levels of development of rural areas. It underscores that the more farms are connected to markets, the more they evolve and the more diversified their supply becomes.

These trends should continue until 2050, when there will be 400 million urban dwellers in the region, with two urban dwellers for each rural inhabitant. By that time, agricultural producers will represent no more than 22% of the total population. A number of policy levers have been identified for responding to these changes. For example, an active demographic policy will allow the region to take advantage of the demographic dividend; urban and agricultural policies linked by the common challenge of combating food insecurity are indispensable.

The main challenge identified by our analyses, however, is that of the future of agricultural

systems. The growth of the non-agricultural population is an accelerator for the division of labour between agriculture and other sectors of the economy. Two major trends are emerging: the specialisation of small- and medium-scale farms in market-oriented production and the establishment of very large farms. This will translate into farms using more capital and more agricultural inputs. The future of West African agriculture depends in part on its capacity to develop an integrated agro-food complex.

The changes described in this report have taken place within the context of an intensification of agricultural land use. Between 1980 and 2000, cropping intensity increased steadily. Beyond the expansion of cultivated areas, yield gains now account for 40% of growth in production. Due to a lack of data and homogeneous definitions, the amount of actual agricultural land is difficult to assess. In addition, there are still challenges related to the regulation of land investments through legal mechanisms that respect the interests of all stakeholders.

At the macro-regional level and in the long-term, subject to the necessary adjustments and policies, and if internal and intra-regional migration are not impeded, neither labour nor natural resources appear to be factors limiting agricultural production and food security in West Africa.

Part I
Integrating Spatial Dynamics and Food Security Issues

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Chapter 1

A review of past trends on settlement, agriculture and food insecurity

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Key messages

- The demographic transition in West Africa is advancing, and it is accompanied by a spatial redistribution of populations. These settlement dynamics are shaping the economic, social and political trajectories of the region;
- Urbanisation, a manifestation of these dynamics, has reached 41% at the regional level. The urban population increased by a factor of 20 between 1950 and 2010, from 6 million to 118 million, compared to a fourfold increase in the total population. The number of people born in cities has exceeded the number of people arriving from rural areas since the early 1980s. The continuing growth of urbanisation contributes to the integration of rural areas into the market economy;
- Agricultural performance over the past 30 years puts the region's countries among the world's top performers. Per capita food production has grown by 1.9%. Import dependence remains low at the regional level;
- Undernourishment and hunger have been declining since the 1990s. However, crises remain frequent, there are vulnerable groups and resilience is fragile.

1.1 THE MAJOR SETTLEMENT DYNAMICS

Demographic growth and transition

Between 1950 and 2010, West Africa's population grew from 72 million to 290 million (Figure 1.1). West Africa accounts for 28% of the continent's total population. In 2012, the total population of West Africa exceeded 300 million. If taken as a single country, it would be the fourth largest country in the world after China, India and the USA (seventh in 1950). In looking at current projections, West Africa will have more inhabitants than the USA before 2020. Its population growth averaged 2.3%, with a peak of 2.7% in the early 1980s. The population of West Africa continues to grow at 2.2%.

West Africa is one of the last regions in the world to complete its demographic transition. Its high growth rates in the last few decades correspond to the start of a phase character-

These settlement dynamics shape the economic, social and political trajectories of the region.



ised by a reduction in mortality and continued high birth rates (Figure 1.2). Fertility rates in the region have declined (-1.3 in 50 years), although these remain very uneven across countries. Niger, Mali, Chad, Burkina Faso, Liberia, Guinea Bissau and Sierra Leone are still in phase 2 of the demographic transition, which is characterised by very high population growth.

Other countries, such as Togo, Côte d'Ivoire, Ghana, Mauritania and Cape Verde, are nearing the final phase of the transition, characterised by a stable population growth resulting from low birth and mortality rates.

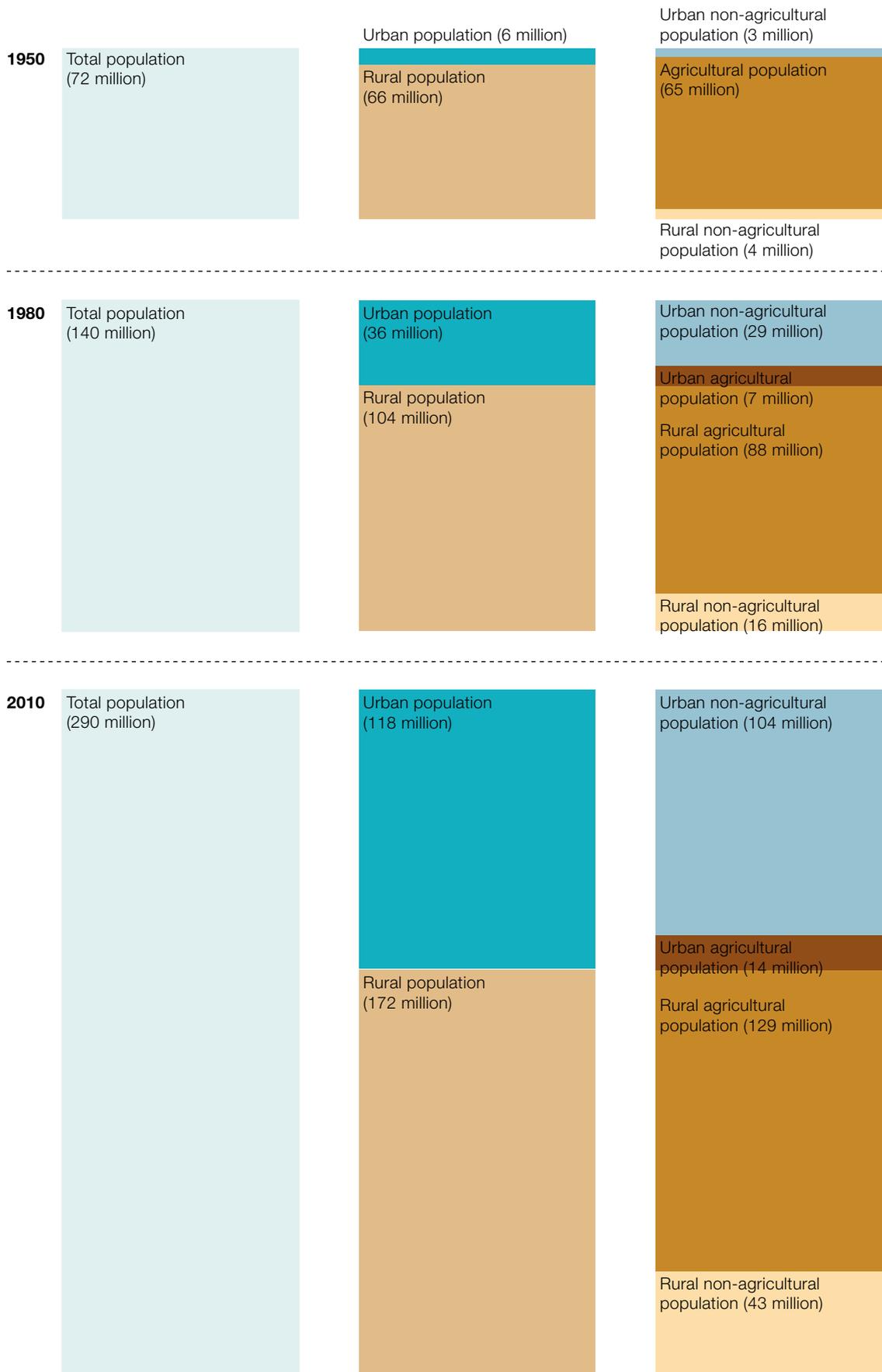
Historically, phases two and three of the demographic transition are always accompanied by a spatial redistribution of populations. These settlement dynamics' shape the economic, social and political trajectories of the region.

Urbanisation

Urbanisation is one of the most impressive manifestations of settlement dynamics. The urban population in the region increased by a factor of 20 between 1950 and 2010, from 6 million to 118 million, as compared to a fourfold increase in the total population (Figure 1.1). The corollary is a completely reshaped economic and social geography (World Bank, 2009). Whereas West Africa was a sparsely populated and predominantly rural region, with six urban centres of more than 100 000 inhabitants and an urbanisation level of 8% in 1950, the region today boasts 122 cities with more than 100 000 inhabitants, and the level of urbanisation is 41%. The traditional perception of West Africa as a mostly rural region no longer reflects the reality. The cities and their inhabitants are increasingly shaping the region's economic, political and social landscape.

Figure 1.1

Illustration of settlement dynamics, 1950–2010



Source: SWAC/OECD 2012

The pace of urbanisation in West Africa between 1950 and 1980 was astonishing. The urban population, which grew at an annual rate of more than 6%, doubled every 11 years. This growth slowed to 4% between 1980 and 2010. None of the countries in the region had a level of urbanisation more than 20% in 1950, while eight countries were close to or above

The number of people born in cities has exceeded the number of people arriving from rural areas since the early 1980s.



50% by 2010. The three landlocked countries, Mali, Niger and Chad, were the only countries in 2010 to have a level of urbanisation below 25%. However, the urban population growth rates are above average in all three countries (Figure 1.3).

Between 2000 and 2010, the urban population grew by 34 million, of which 23 million were born in cities. The number of people born

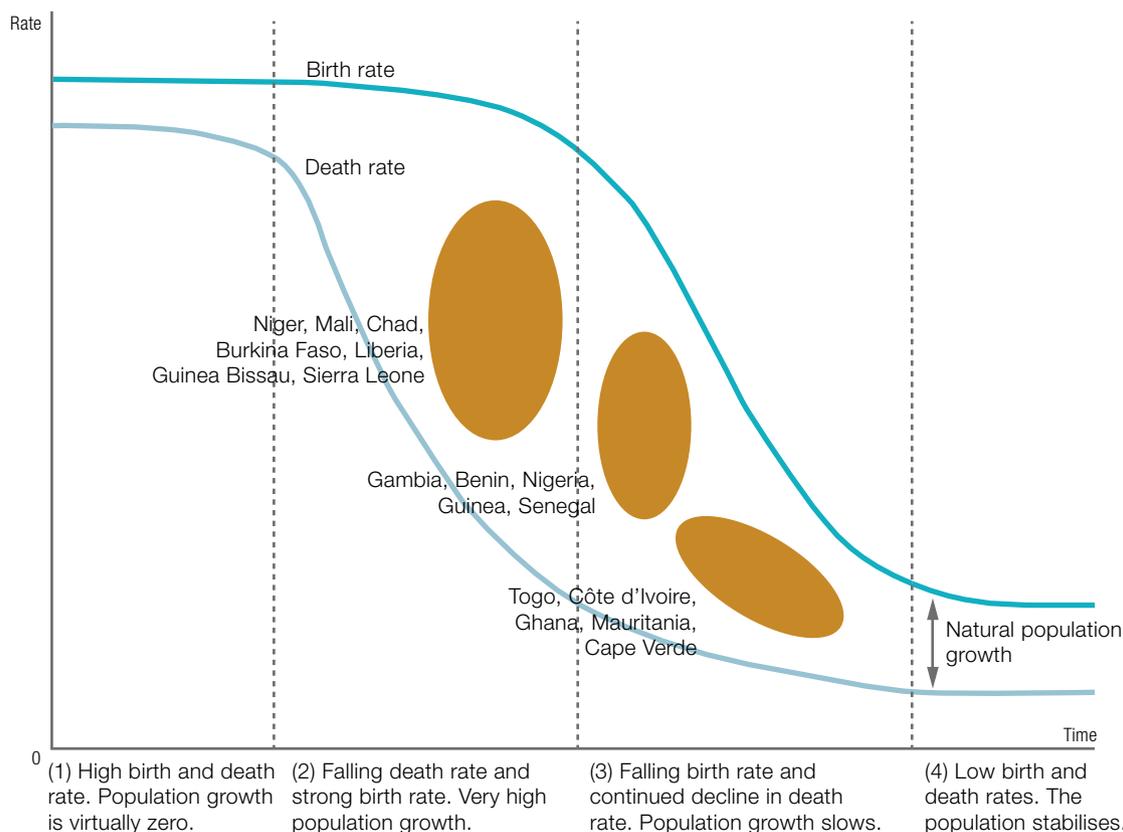
in cities has exceeded the number of people arriving from rural areas since the early 1980s (Figure 1.4).

Cities have also grown in size and number. Whereas the region had 64 agglomerations with more than 20000 inhabitants in 1950, it now has 712, 18 of which have over a million inhabitants. Lagos (Nigeria), with 10 million inhabitants, is the largest city in sub-Saharan Africa.

Six of the ten largest cities (Lagos, Abidjan, Accra, Dakar, Conakry and Lomé) are coastal cities, and the other four are the ancient cities of Ibadan (Nigeria), Kano (Nigeria), Kumasi (Ghana) and Bamako (Mali). The Sahelian capitals of Ouagadougou (Burkina Faso), Niamey (Niger) and N'Djamena (Chad), the 11th, 18th and 20th largest cities, respectively, have grown at rates similar to their coastal counterparts, or faster in the case of Ouagadougou.

Out of the 712 agglomerations with more than 20000 inhabitants, almost half (298) are in Nigeria (Figure 1.5). However, the number of

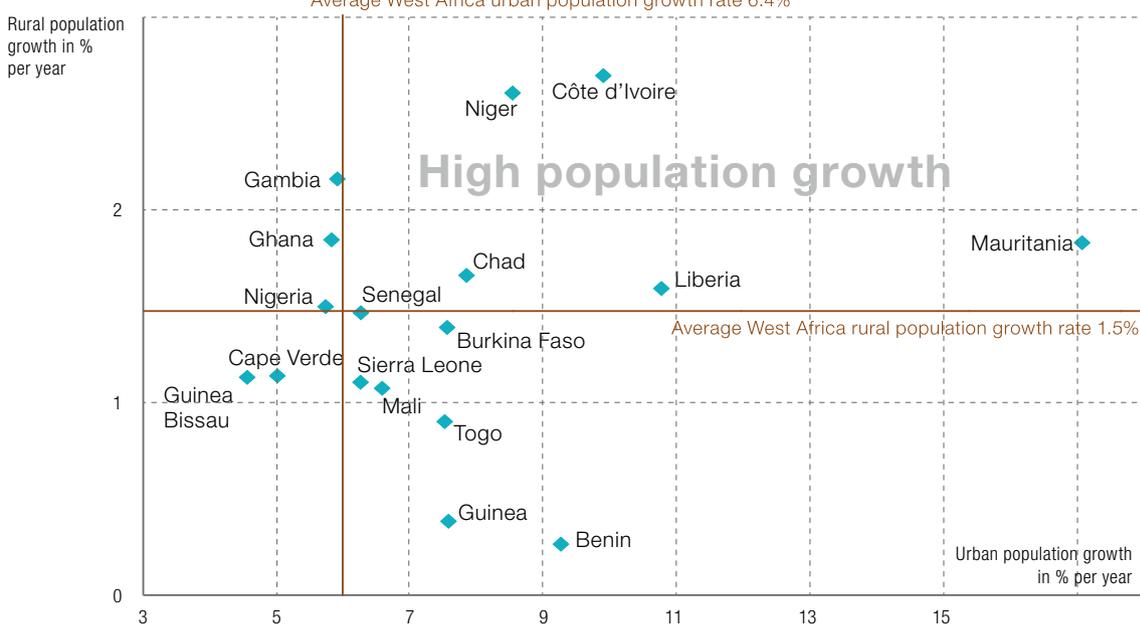
Figure 1.2 Demographic transition and West Africa countries, 2009



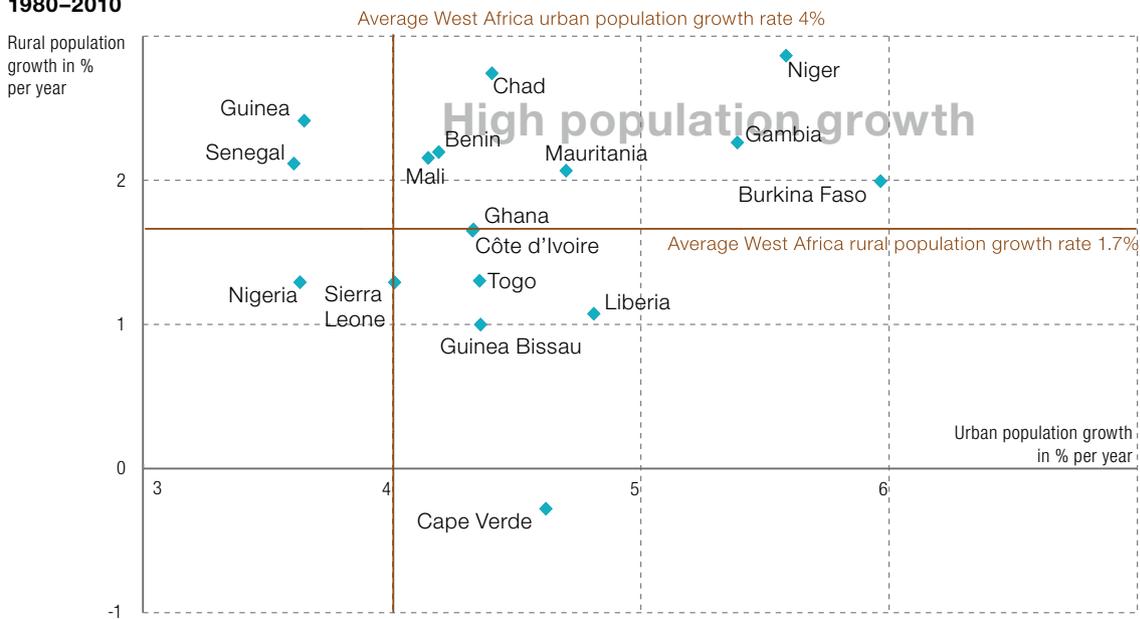
Sources: SWAC/OECD 2009; World Bank 2012

Figure 1.3
Urban and rural population growth rates

1950–1980

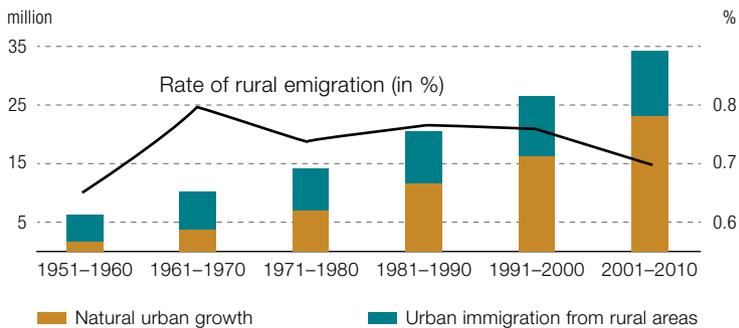


1980–2010



Sources: Africapolis 2008; UN and authors' calculations

Figure 1.4
Composition of urban growth



Source: SWAC/OECD 2012

urban agglomerations increased most in Côte d'Ivoire, from 2 in 1950, to 25 in 1980, and 64 in 2010. Benin, Togo, Burkina Faso and Chad are the only other countries in which the number of cities has increased more than twenty-fold, although most of the increase took place between 1980 and 2010.

Urbanisation has been the main feature of settlement dynamics in all countries, but the density of urban networks varies across the region. A network of cities has emerged

The average distance between agglomerations fell from 111 km to 33 km between 1950 and 2000.



in some countries, whereas urbanisation has been more concentrated in others; this reflects their different historical, political and economic circumstances (UN Habitat, 2010). The average distance between agglomerations has been divided by three, falling from 111 km to 33 km between 1950 and 2000. This trend has both driven and considerably improved the integration of rural areas into the market economy.

Rural settlement

Urbanisation has not led to an emptying of rural areas. The rural population increased from 66 million in 1950 to 172 million in 2010. Rural densities have increased almost everywhere, although to different degrees. Rural settlement dynamics have been influenced by

two trends. One is rural-rural movements of farmers in search of available and productive farmland (or paid employment on commercial farms). These movements occur both within countries, from north to south, especially in Sahelian countries, and also across borders, towards major cash-crop production basins (cocoa, coffee, etc.) in coastal countries, notably Côte d'Ivoire, Ghana and Nigeria. These patterns are a characteristic of the post-independence period (1960–1980). The second long-term trend is the growing concentration of rural populations near urban centres as a result of market opportunities arising from food demand in cities.

Both trends have resulted in strong heterogeneity in rural settlements. A few hundred kilometres can separate high-density rural areas from areas where the rural density is less than 2 inhabitants/km². These differences exist both within countries and across borders. In 1960, 50% of the rural population was concentrated in less than 11% of the land area (excluding desert areas) (WALTPS, 1998).² Today, 15% of the rural population live in high-density areas (>150 inhabitants/km²), covering just 2% of non-desert land area. All these high-density areas are in the urban catchment areas of cities with more than 50 000 inhabitants.

Rural density has also increased insofar as rural farmers are now closer to urban centres than they used to be. A spatial relationship between urban and rural populations has emerged and developed ([Map 1.1](#)).

1.2 AGRICULTURAL PERFORMANCE AND SETTLEMENT DYNAMICS

Food production increases

Over the past 30 years, West Africa has been the world's fastest-growing region in terms of agricultural production. Gross agricultural production, which increased at an average

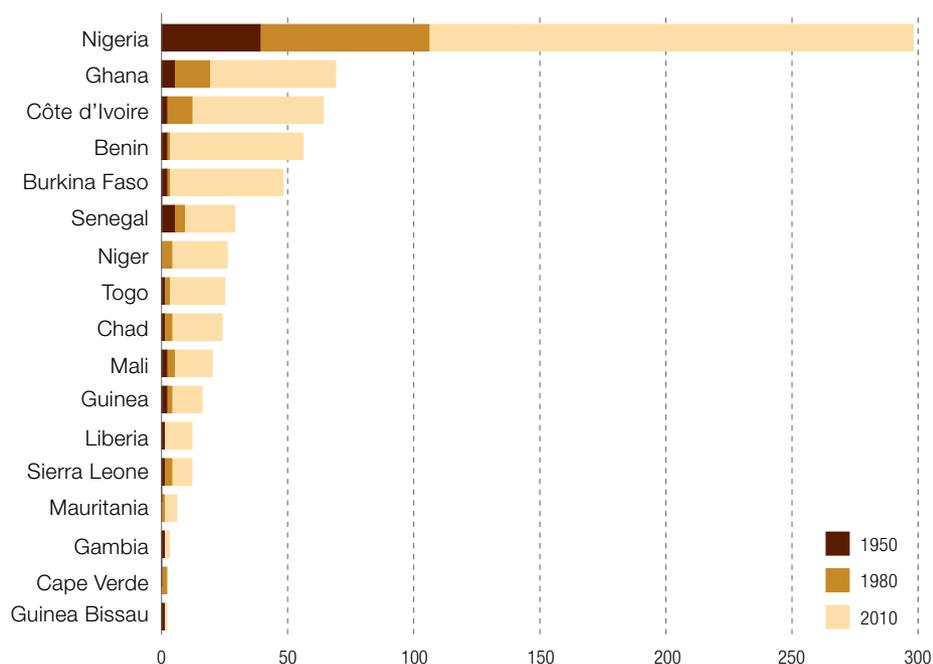
The region's average annual growth rate of 3.8% exceeds that of Brazil and China.



annual rate of 3.7% (as compared with the global average of 2.2%), tripled between 1980 and 2010. Burkina Faso and Ghana respectively rank fifth and sixth in terms of gross agricultural

production among 136 countries, and Benin, Niger, Mali and Nigeria also feature among the top 25 ([Figure 1.6](#)). Production of cereals, the largest component of food consumption in the region, has grown even faster. Nine West African countries are in the world's top 20, and the region's average annual growth rate of 3.8% easily exceeds that of Brazil (2.4%) and China (1.7%) ([Figure 1.6](#)). This regional performance masks differences between countries, but the overall performance has been broadly similar. The worst performers are countries that have been affected by conflict and political instability: Liberia, Mauritania, Sierra Leone,

Figure 1.5
Number of urban agglomerations with more than 20 000 inhabitants



Sources: Africapolis 2008; SWAC/OECD 2012

Map 1.1
Rural density, 2000

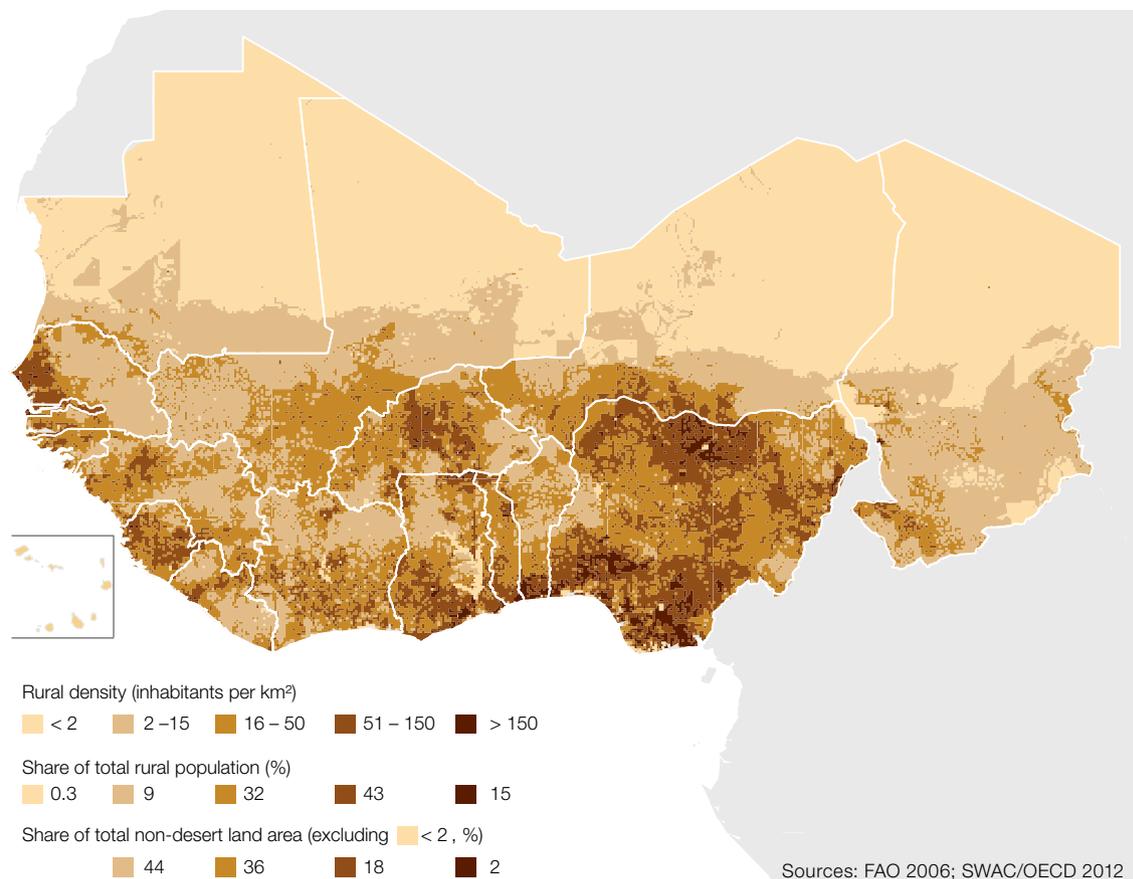
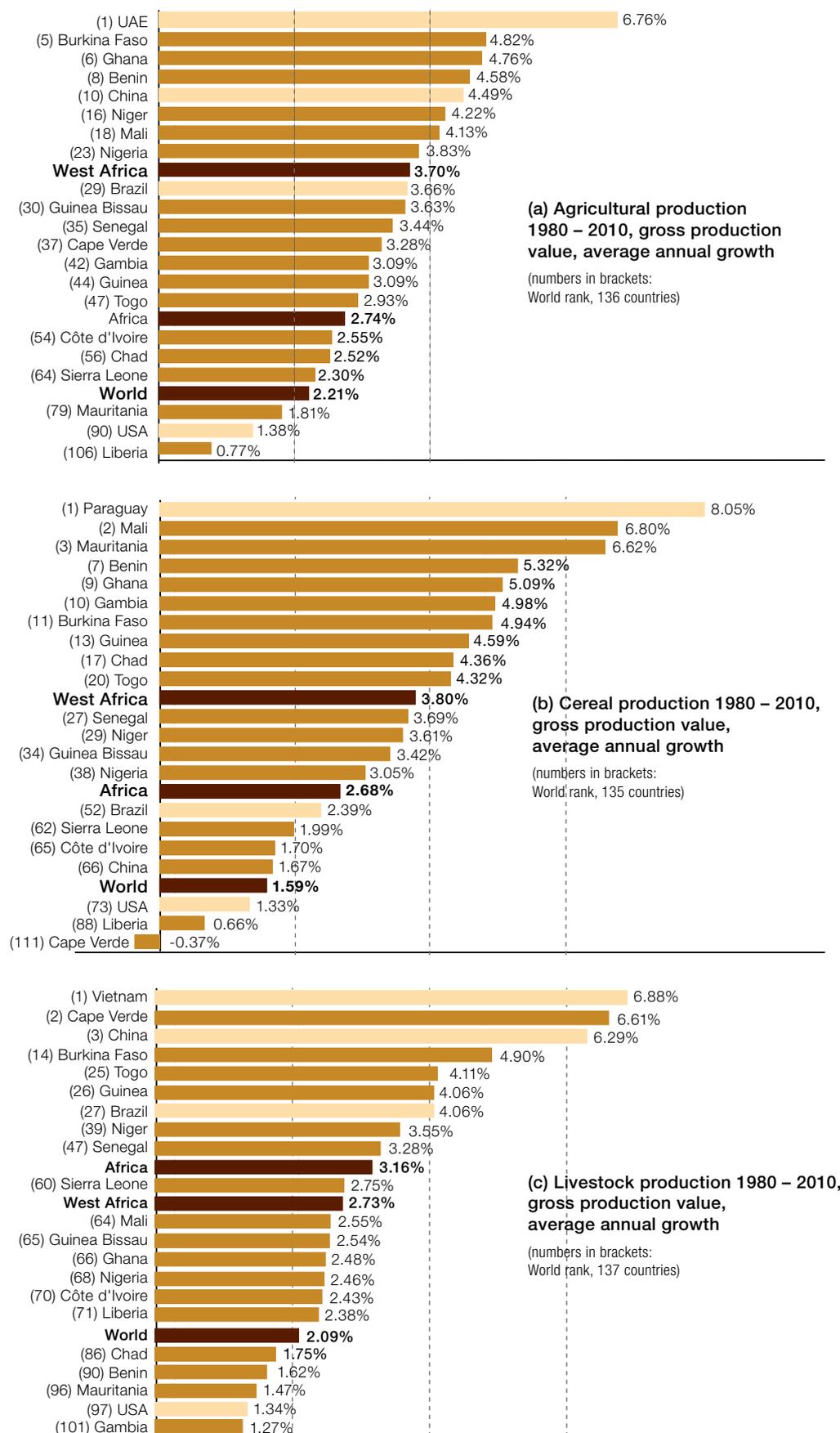


Figure 1.6

Agricultural performance, 1980–2010



Sources: FAO 2012 and authors' calculations

Chad and Côte d'Ivoire. However, Mauritania, Chad and Sierra Leone have recently recorded faster growth rates than the regional average (e.g. Sierra Leone averaged 8.1%) from 2000–2010.

The food produced in the region that is available for consumption³ (net of imports) increased from 1 661 kcal per person per day in 1980 to 2 397 kcal/person/day in 2007, which represents an annual increase of 1.4% (Figure 1.7). The FAO defines the average minimum energy requirement per person as 1 800 kcal/day.⁴ In 2007, 10 of the 17 countries in West Africa, accounting for 90% of the total regional population, produced more than what was necessary to meet this minimum energy requirement. However, this figure is different from the actual food supply. In some countries' imports contribute significantly to food

energy supply, notably Cape Verde, Senegal and Mauritania. The total food energy available, including net imports, reached 2 628 kcal/person/day in 2007.

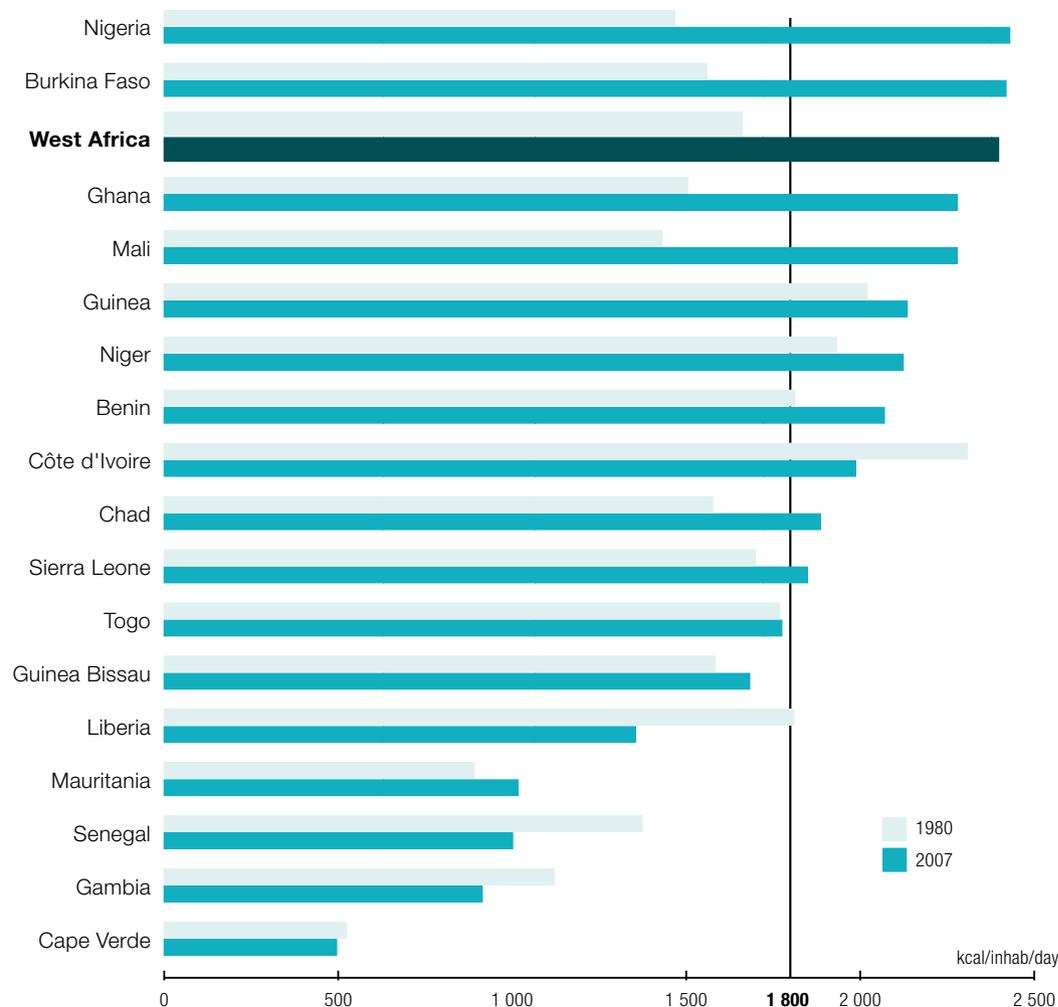
In summary, agricultural production has taken off since the 1980s. The liberalisation of agricultural markets that began in the mid-1980s, the devaluation of the FCFA in 1994, the improvements to the infrastructure and the expanding market – essentially the result of the growing urban population – have encouraged this transformation (Box 1.1).

No rise in the level of imports

The value of total food imports increased by 7.4% annually in the period from 1961–2009, from USD 280 million to USD 8.8 billion (Figure 1.8). However, the data show two

Figure 1.7

Food supply from domestic production



Sources: FAO 2012; SWAC/OECD 2012

Box 1.1

Agricultural transformations identified by ECOWAS

Although agriculture is still based on very large numbers of family farms, far-reaching transformations have taken place in West African agriculture over the last 20 years.

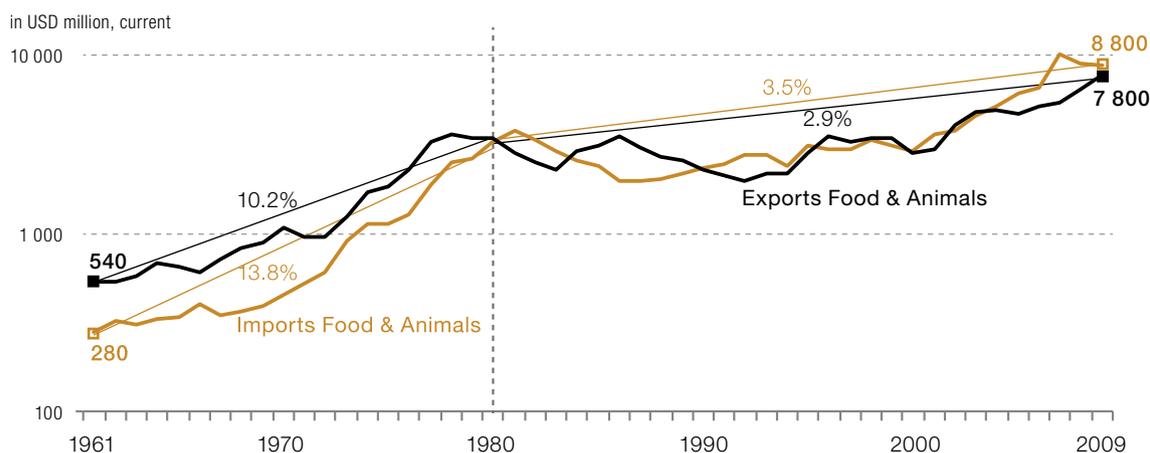
- Production volume has risen sharply, generally faster than the rate of population growth in the region. Output in almost all products, with

the exception of cattle, more than doubled between 1980 and 2000;

- Production is intended for local and regional markets. Recent years have seen a significant rise in production, driven by urban demand, especially for market gardening and poultry.

Source: Regional action plan 2005–2010 for the implementation of the Agricultural Policy of ECOWAS (ECOWAP) and CAADP/NEPAD in West Africa

Figure 1.8
Imports and exports of food and animals



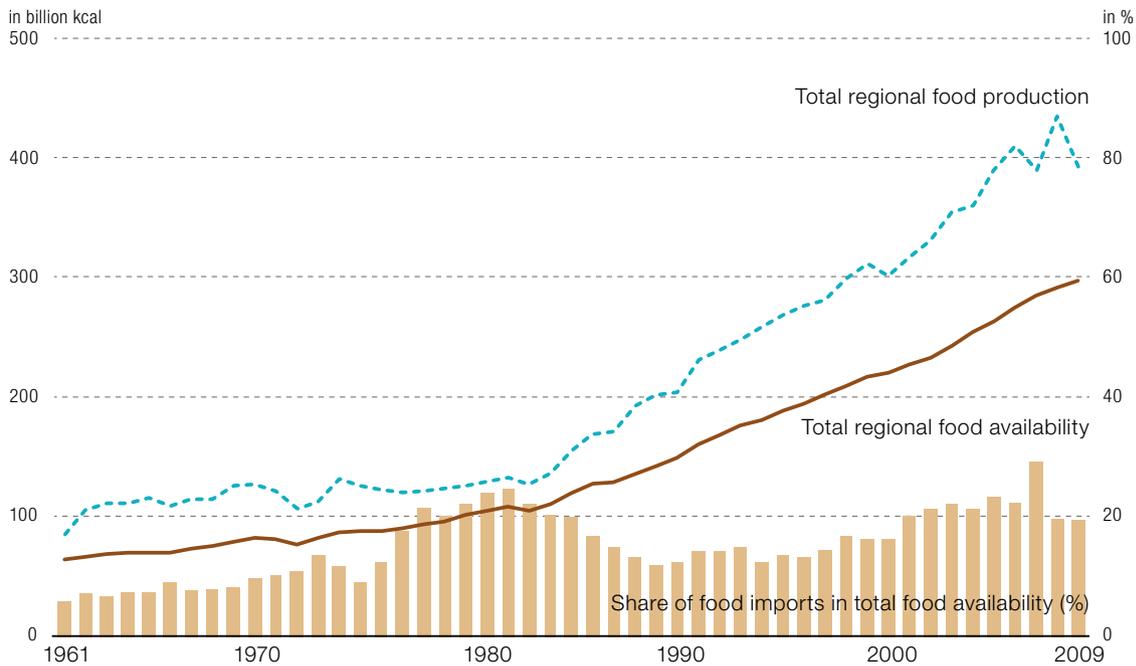
Sources: FAO 2012 and authors' calculations

distinct phases: 1961–1980 and 1980–2009. From 1961–1980, imports grew by 13.8% annually but dropped to 3.5% annually in the period from 1980–2009. This decline corresponds to the trend in agricultural production, which accelerated quickly after 1980. Exports of food and animals followed a similar trend, as they grew 10.2% annually between 1961 and 1980 and 2.9% thereafter. The trade balance deteriorated gradually from a USD 260 million surplus in 1961 to a balanced trade balance in 1980. Since, the trade balance fluctuated between surplus and balance. Only recently (2005–2009), marked by a peak in international cereal prices and several below-average harvests in the region, has a significant trade deficit emerged.

However, dependence on food imports has not increased. Imports represented 20% of the total food availability (in kcal) in 2009 (Figure 1.9), a figure that has barely changed since the early 1980s. This shows that at the regional level, West African farmers have been able to increase production to meet growing demand, in particular from the urban population. Again, significant variations can be found at the sub-regional and national levels in terms of import share. The lowest share of imports in total energy supply is in the four landlocked countries, where imports account for only 12%, whereas the import share is 60% in Senegal.

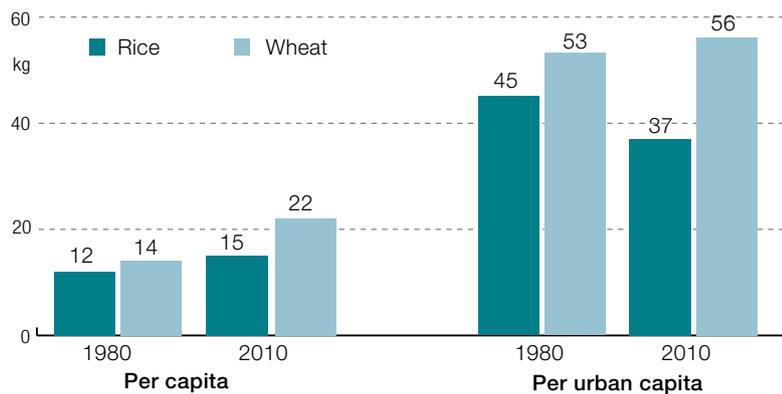
A close look at rice and wheat imports confirms that dependence on imports at the regional level has not increased in relative

Figure 1.9
Share of imports in total food availability



Sources: FAO 2012; SWAC/OECD 2012

Figure 1.10
Imports of rice and wheat
(in kg per capita)



Sources: FAO 2012; SWAC/OECD 2012

terms. Cereals account for the largest share of food imports, representing 42% of the total in 2009 (USD 3.6 billion). Rice and wheat account for 97% of all cereal imports, at USD 1.9 billion and 1.6 billion, respectively. In 2009, the region imported 15 kg of rice and 22.4 kg of wheat per capita. For rice, this represents an annual increase of 0.9%, or 3.5 kg in relation to the quantity in 1980 (11.5 kg). Wheat imports per inhabitant grew 1.7% annually, or 8.9 kg, over the entire period. Calculated in terms of kilograms per urban capita, the growth rates for the period from 1980–2010 were negative for

rice (-0.7%) and close to zero for wheat (0.2%). Hence, for these two cereals, the hypothesis that urbanisation is synonymous with increasing dependence on imports is not confirmed. The results show that either the consumption basket of urban households has not increased demand for imported cereals or the changes have been met by the local supply (Figure 1.10).

Understanding productivity gains

Food production per capita increased 0.5% annually between 1961 and 2007, whereas the

population increased by 2.4% over the same period. Again, a pronounced change in the trend can be seen after 1980. Between 1980 and 2007, production per capita increased 1.8% annually, compared with -1.3% between 1961 and 1980. However, significant variations by country can again be found in the production trends, either keeping up with or lagging behind population growth. For example, agricultural production per capita in Senegal (-2.2%) and Niger (-0.1%) has fallen, while it has increased above average in Nigeria (3%) and Ghana (2.1%).

The share of agricultural producers in the total population declined from 83% in 1960 to 50% in 2010.



Marketed surplus production⁵ has increased 5.5% annually.⁶ The strong growth in marketed surplus production, and hence commercial agriculture, is linked to the rural-urban transition and the emergence of a dynamic regional food market. The share of agricultural producers in the total population declined from 83% in 1960 to 50% in 2010. This, in combination with the observed increase in production, translates to impressive gains in agricultural labour productivity,⁷ which increased by 2.6% annually after 1980 after having declined in the period from 1961–1980.

Yields (land productivity) have increased less than labour productivity. Over the same

period, from 1980–2010, the yields increased an average of 1.4% annually. Yields therefore accounted for one-third of the increase in production, while the remaining two-thirds were accounted for by the increase in the area harvested, which grew 2.9% annually. The extensive nature of production growth is often interpreted as undermining past performance, as well as questioning future potential. However, this interpretation omits the fact that land availability and land tenure systems have generally favoured extensive farming practices and that the priority of producers is to increase labour productivity. As long as land is easily available, and hence serves as an inexpensive factor of production, the strategy will be to increase production by increasing the area under cultivation. This type of farming requires very small inputs in labour, and hence it implies high labour productivity. When land becomes scarce, labour productivity will tend to decline, thus encouraging greater intensification of agriculture.

Since 1990, the data show an acceleration in yield growth, but reduced growth in terms of the area being harvested (Figure 1.11). Over the last decade, the growth in yields (2.3%) has actually exceeded the growth of the area harvested (1.4%), a trend possibly marking a structural shift in response to rural densification and reduced land availability.

1.3 FOOD INSECURITY AND RESILIENCE

Undernourishment in the region is declining unevenly

The prevalence of undernourishment, which corresponds to the percentage of the population whose dietary energy consumption is lower than the dietary energy requirements, has fallen by 44%, albeit very unevenly, since the early 1990s. West Africa has performed better than other sub-Saharan regions (East, Central and Southern Africa⁸) (Figure 1.12).

This indicator, published by the FAO on the basis of food balances and household surveys,⁹ measures chronic hunger and the long-term determining factors of households' nutritional status. It does not reflect short-term influences

such as seasonal shortages or food price fluctuations; it also does not take into account temporary food crises (Gennari, 2011). However, it provides a basis for comparing countries and regions over a long period. Undernourishment is higher than the sub-Saharan average in only four West African countries: Chad, Sierra Leone, Liberia and Togo. These countries have all been afflicted by conflict or post-conflict situations, while Togo started from a high level in 1990–1992.

Ghana, Nigeria, Mali, Mauritania and Burkina Faso combine a rapid improvement in nutrition with a low prevalence of undernourishment (Figure 1.13). Gambia and Liberia are the only countries where the situation has

Figure 1.11

Harvested area, yields and labour productivity (%)

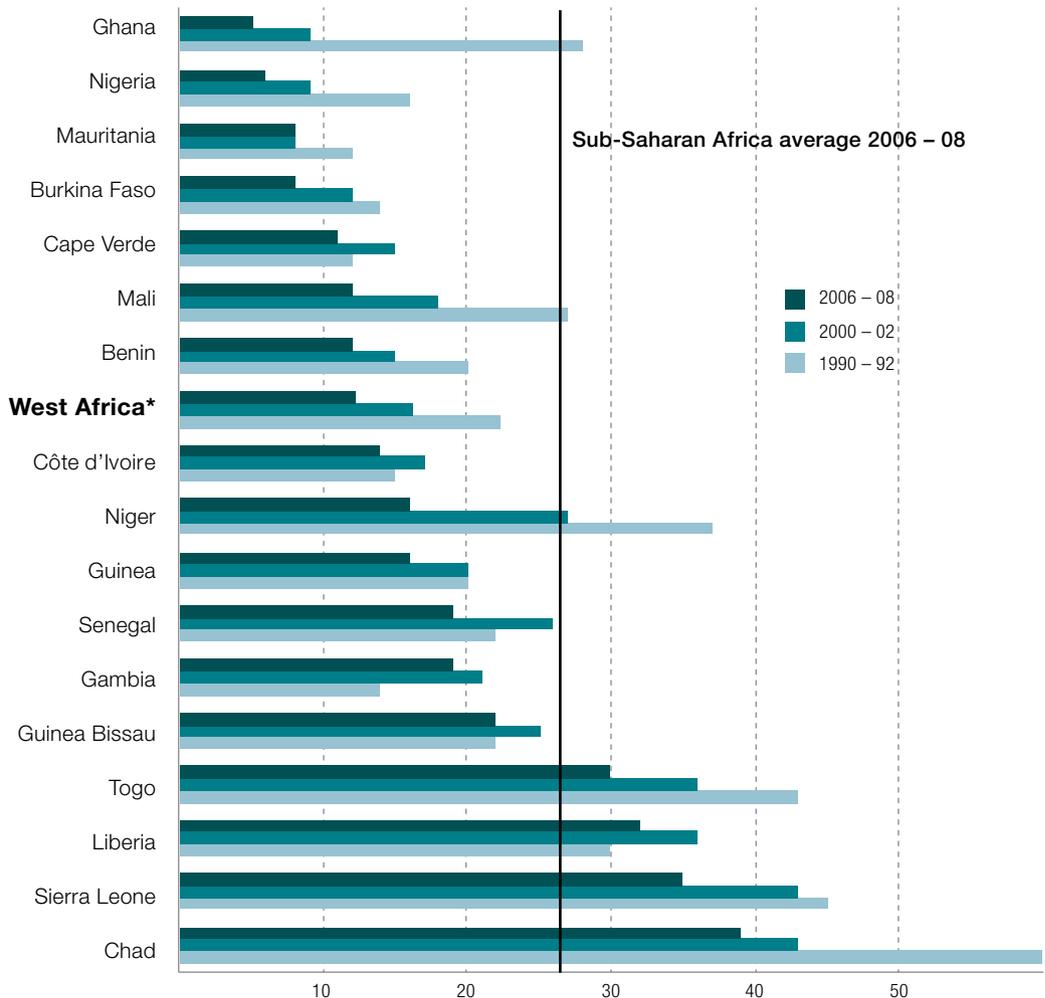


Sources: FAO 2012; SWAC/OECD 2012

*calculated in kcal

Figure 1.12

Prevalence of undernourishment

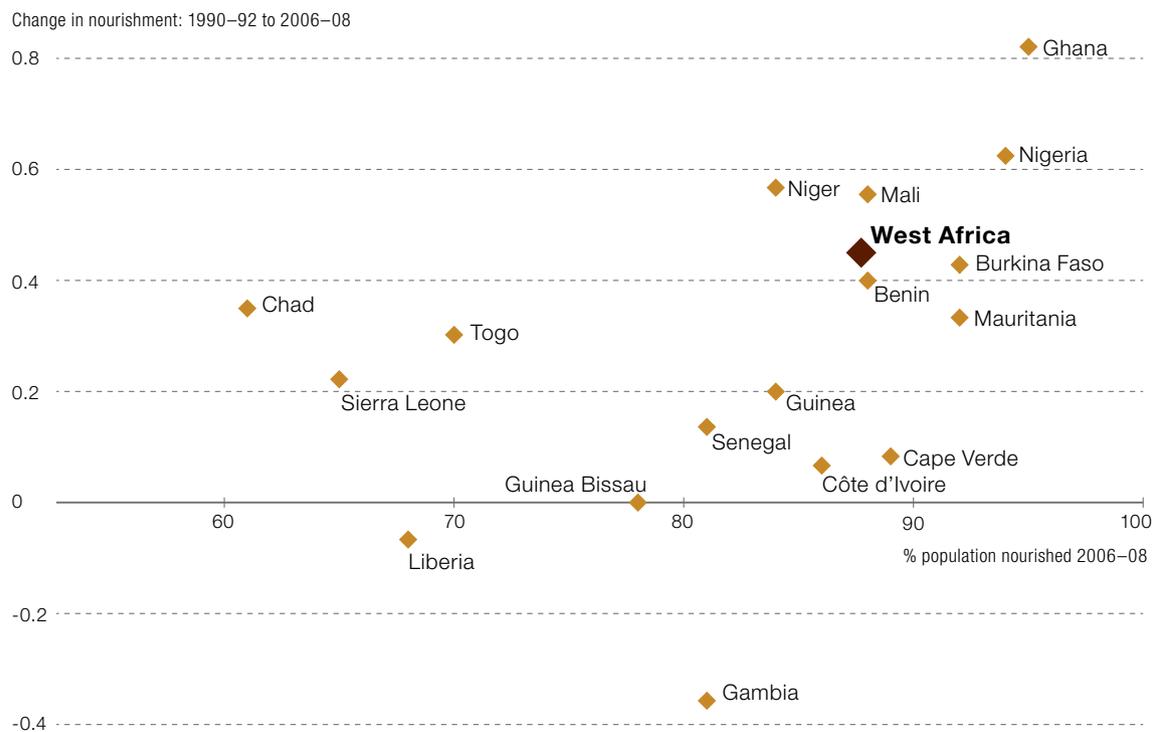


Sources: FAO 2012 and authors' calculations

*Population weighted average

Figure 1.13

Status and progress in undernourishment: 1990–92 to 2006–08



worsened over the 16-year period from 1990–92 to 2006–08. Guinea Bissau, where undernourishment had initially risen, has fallen back to its 1990–92 level.

The countries that have reduced the prevalence of undernourishment share some general features, including a growth in agricultural productivity, higher incomes, less vulnerability to natural disasters, improvements in the human development index and reduced debt. Countries with high and rising levels of undernourishment have small “peace dividends”, with poorer outcomes in terms of social policies and equality, and higher population growth.

Countries that have reduced the prevalence of undernourishment share a notable growth in agricultural productivity.



Niger’s recent performance is attributed to the improved detection of malnourishment and better co-ordination between treatment centres (the provision of information and improved co-ordination between NGOs, the UN and authorities). In Ghana, where income distribution seems to have remained constant,

the improvement is attributable to better access to food (investments in road and market infrastructure). Production in Ghana has also been increasing as a result of improvements in the economic environment (growth in incomes), the strong demand for food products, the improved market access for farmers and agronomic research.

Significant progress and the remaining vulnerabilities

Trends in undernourishment are confirmed by the Global Hunger Index (GHI). Published by the International Food Policy Research Institute (IFPRI), the GHI is a combination of three indicators: undernourishment, prevalence of underweight children and infant mortality. The index thus provides additional information about a particularly vulnerable group, children under five, with a classification ranging from “low” to “extremely alarming”. For the region as a whole, its GHI has fallen by 25% over the past 20 years, from 24.6 to 18.3¹⁰ (18% for sub-Saharan Africa). The improvement has been particularly marked over the last decade

(2001–2011). The GHI improved in 11 of the 17 countries between 1990 and 2001, and in 16 countries between 2001 and 2011 (Figure 1.14). Côte d’Ivoire is the only country to experience deterioration between 1990 and 2011, with its score rising from 16.6 to 18.

Ghana has been the top performer, both at the regional and continental level, as it improved from “alarming” (21) to “moderate” (8.7) (Box 1.2). Besides Ghana, the countries with the best relative progress are Mauritania (-44%), Niger (-37%), Nigeria (-36%) and Benin (-32%).

Despite the remarkable improvement in undernourishment and GHI scores, especially since 2000, the food situation remains critical. The FAO indicates that 33 million people were undernourished in 2006–08 (12% of the total population), as compared with 41 million in 1990–92. Of this figure, 14 million (42%) live in

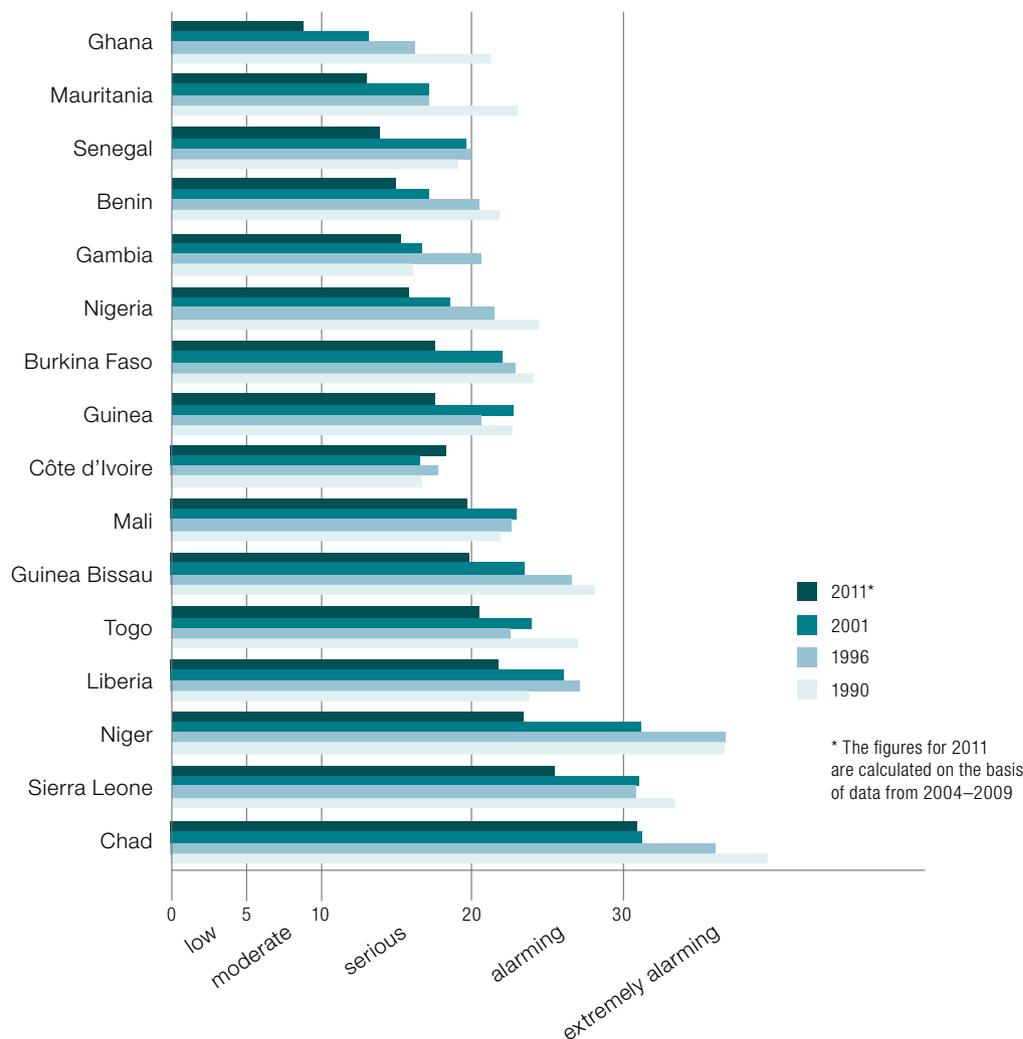
Box 1.2

Agricultural transformation and food security in Ghana

“One of the top ten performers in tackling hunger has been Ghana, which reduced its GHI score by 59% from the 1990 GHI to the 2011 GHI. Ghana’s success resulted from a combination of investments in agriculture, rural development, education and health, including strong increases in the rate of immunisation against common childhood diseases (GSS, GHS and ICF Macro 2009). The government provided farmers with information, agricultural inputs such as pesticides and fertiliser, and infrastructure such as roads and storage facilities”.

Source: IFPRI 2011, p. 14

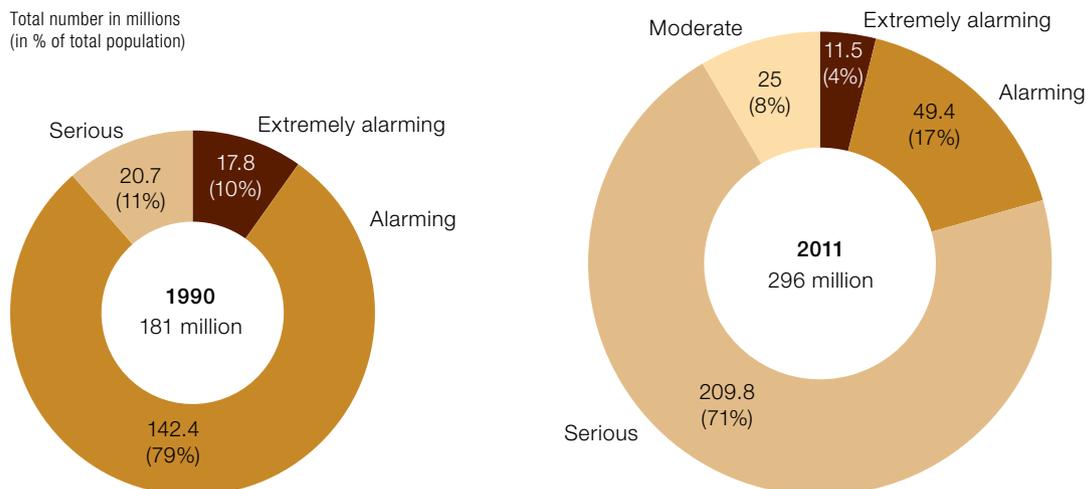
Figure 1.14
Global Hunger Index



Source: IFPRI 2011

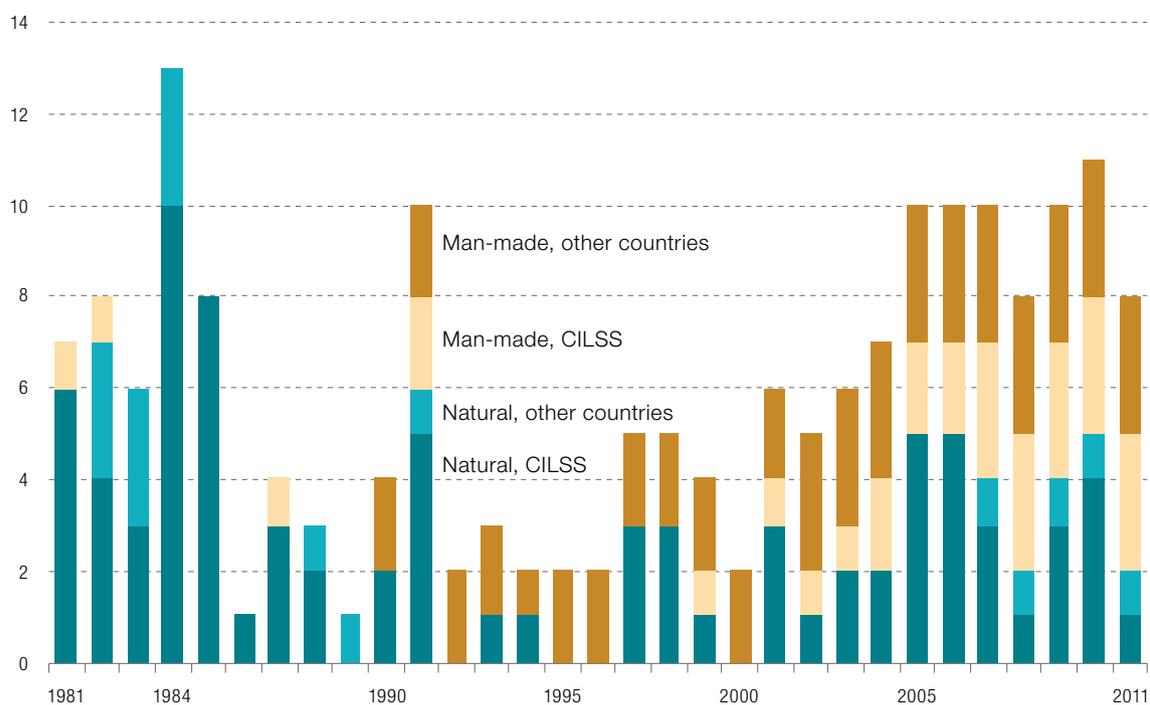
Figure 1.15
Hunger situation in West Africa

Total number in millions
(in % of total population)



Sources: IFPRI 2011, SWAC/OECD 2012

Figure 1.16
Number and causes of food crises – CILSS and West Africa



Source: FAO/GIEWS 2011

Sahelian countries and 9 million live in Nigeria. The absolute number of undernourished people has fallen in four countries, notably in Nigeria, by 6.9 million, and in Ghana, by 3.2 million. The GHI indicates that the situation is “alarming” for 17% of the West African population and “extremely alarming” for 4% (Figure 1.15). The countries’ resilience remains fragile, vulnerable to shocks and food crises.

Frequent but different crises¹¹

In terms of food crises and emergencies, Rukandema and Gürkan (2003) stress that “[a] shortfall may be caused by a natural or man-made disaster, or a combination of both. [...] Natural disasters are caused by events (or natural hazards) such as earthquakes, volcanic activity, drought, floods, landslides, tropical cyclones, pest and disease infestations, etc. [...] Man-made disasters are caused mainly by wars and financial/economic crises.”¹²

The number of countries in the world that are in food security-related crisis situations has been increasing, with a rising proportion of man-made disasters. This case is also true in West Africa, even if almost all crises are due to a combination of factors. Natural causes were relatively more prevalent until 1990. CILSS countries were more affected than others by natural disasters between 1981 and 2011 (Figure 1.16).

Map 1.2 shows the number of consecutive years during which African countries have been affected by food emergencies. West Africa has done relatively well compared with other sub-regions in terms of the number of food emergencies. The countries with the highest frequency of crises are also the ones most affected by conflict and face the highest risk of natural disasters.

Natural disasters are categorised into two types: slow onset, such as droughts, and sudden onset, such as floods, earthquakes, cyclones/hurricanes and landslides. Emergencies following slow-onset natural disasters can be contained or prevented by early warning systems and readiness, which reduce the potential negative effects. The great variation in the production volume of rain-fed crops in sub-Saharan Africa and the frequency of droughts represent a threat to economic and social development and may affect long-term food security. Short-term shocks may have long-term effects on vulnerable livelihoods by destroying basic means of existence that cannot be readily reconstituted (e.g. loss of cattle).

The region is mostly hit by slow-onset disasters. Overall, the number of natural disasters in West Africa has fallen since the 1980s, although the number of disasters in the decade

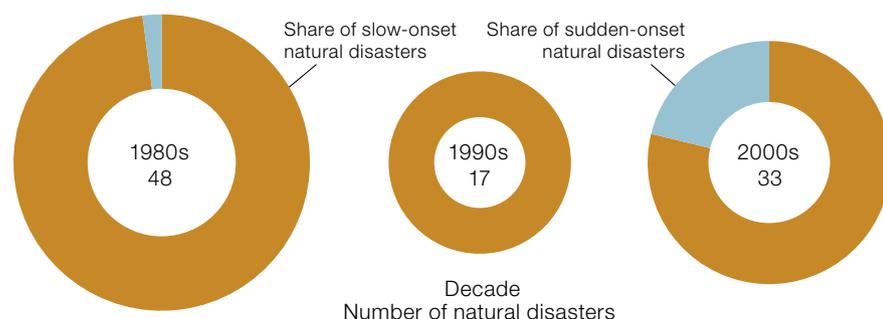
« Globally, the number of countries in food security-related crisis situations has been increasing.

after 2000 was higher than the number in the 1990s (Figure 1.17). Sudden-onset natural disasters have increased, both in number and as a proportion of the disasters, over the last decade.

The two major causes of man-made disasters are economic crises and civil wars. Internationally, the proportion of socio-economic shocks, opposed to open conflict, rose from 2% in the 1980s to 11% in the 1990s, with an increase to 27% after 2000. This has also been true in West Africa since the early 1980s.

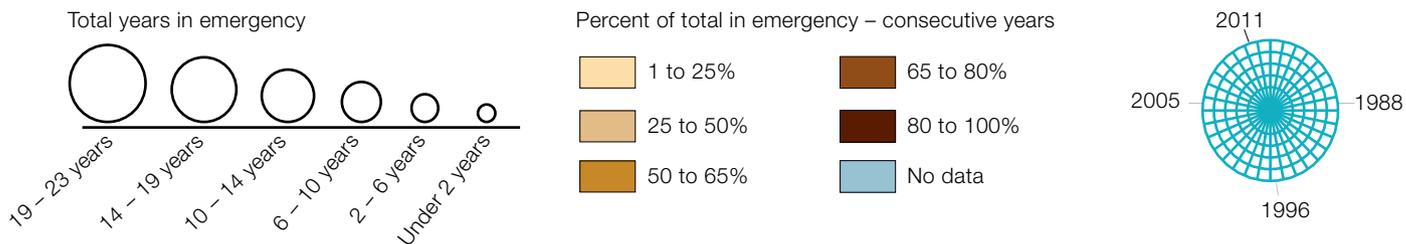
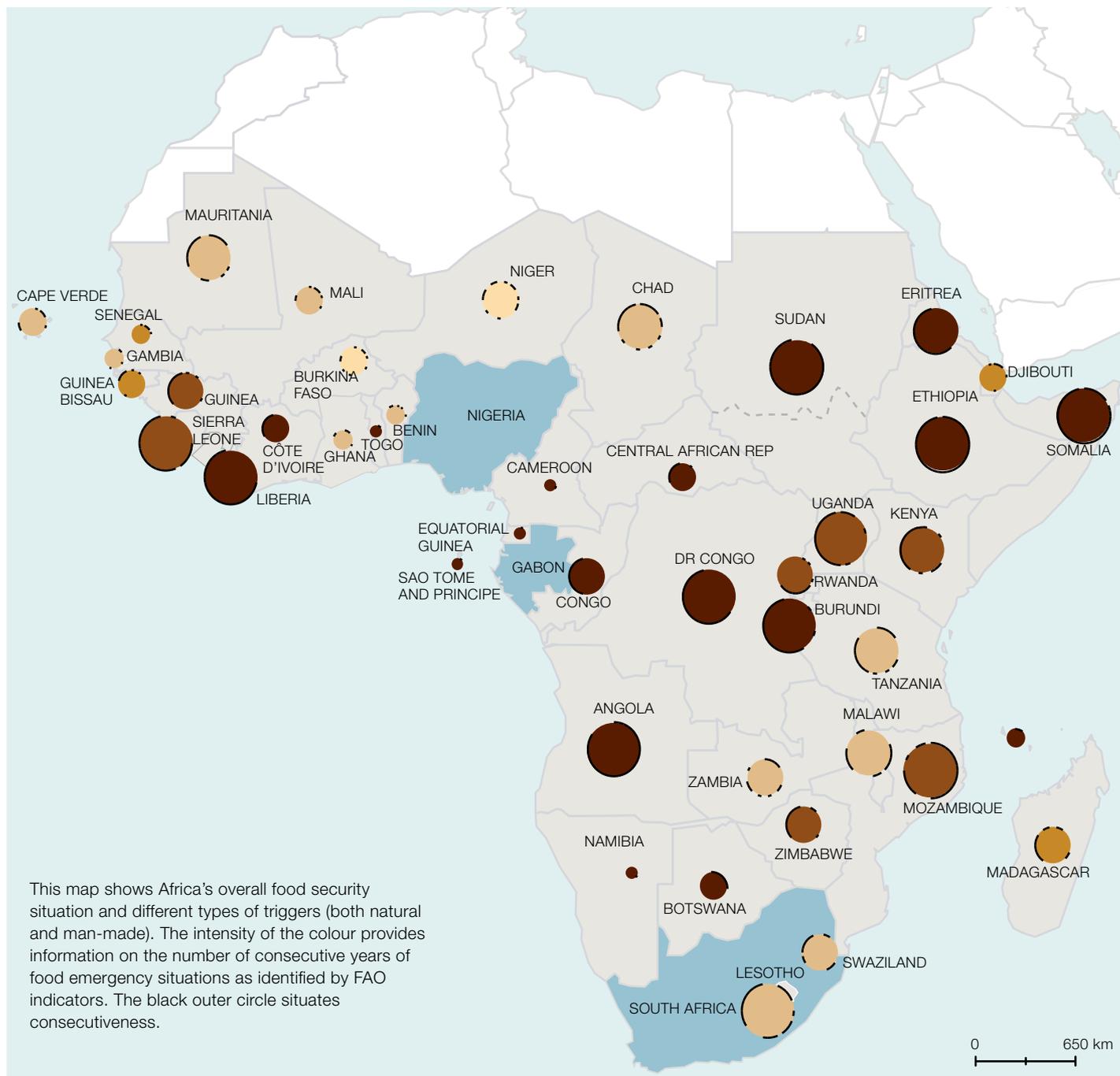
Over the last 50 years, the region has witnessed a range of internal and cross-border conflicts. The UCDP/PRIO conflict database¹³ indicates that since the end of World War II, all the countries in the region, with the exception

Figure 1.17
Slow- and sudden-onset natural disasters in West Africa



Source: FAO/GIEWS 2011

Map 1.2
Food emergencies in Africa, 1980–2011



Source: FAO/GIEWS 2011

of Benin and Cape Verde, have been affected by crises of various types, intensities and durations.¹⁴ Table 1.1 shows that over the years, Chad, Nigeria, Liberia, Sierra Leone and Côte d'Ivoire have been the most seriously affected.

Table 1.1
West African conflicts by intensity level, 1946–2011

	Intensity	Years level 1	Years level 2	Conflict 'Penalty'*
Benin		0	0	0
Cape Verde		0	0	0
Burkina Faso	1	2	0	2
Gambia	1	2	0	2
Togo	1	2	0	2
Ghana	1	3	0	3
Guinea	1	3	0	3
Mauritania	1	4	0	4
Mali	1	6	0	6
Senegal	1	10	0	10
Niger	1	12	0	12
Guinea Bissau	1	1	1	101
Côte d'Ivoire	2	3	2	203
Sierra Leone	1	8	2	208
Liberia	2	9	3	309
Nigeria	1	3	4	403
Chad	2	18	19	1918

* Level 2 conflicts (war) are given a relative weight 100 times greater than Level 1 conflicts (minor conflict). Source: Uppsala Conflict Data Programme UCDP/PRIO Oslo

The Centre for International Development and Conflict Management (CIDCM) estimates that all but three of the 25 countries with the highest risk of potential conflict are in Africa. Of these, ten are in West Africa.

Associating risks and resilience

Through the FAO's Global Information and Early Warning System (GIEWS), a composite index of vulnerability to food insecurity was

recently developed. The index combines risks and coping capacity. Several factors explain vulnerability to food insecurity. Some factors may place people at risk of becoming food insecure or malnourished (or increasingly so, if they already are), whereas other factors relate to coping capacity. Risk is often defined as the expected value of a harmful event (i.e. the probability of occurrence multiplied by the value of the loss attributable to the event). Resilience covers social coping capacity, which is linked to the access to education and healthcare services, and macroeconomic coping capacity, which is linked to the country's economic performance and its capacity to mobilise resources. A population group with low exposure to risk and with a high coping capacity is deemed to have a low degree of vulnerability. Conversely, a group with high exposure to risk and with a low coping capacity is considered highly vulnerable.

Using long-term structural indicators and frequently updated cyclical information (e.g. climate events or consumer prices), the vulnerability index value aims to (1) detect short-term changes in a country's risk of food insecurity, (2) track the trend of vulnerability to food insecurity ex post and (3) estimate the relative importance of the (natural) factors that cause such vulnerability.

The index value ranges from 0 to 1, with higher values corresponding to higher vulnerability. The index captures the three main



Some estimate that all but 3 of the 25 countries with the highest risk of potential conflict are in Africa.

elements of vulnerability: (1) the extent of exposure to potential shocks of various types, which depends on the extent of economic diversification, the degree of market access and the country's dependence on imported food products (relative weight in the index: 19%); (2) the relative severity of shocks and the effect on food security, which depend on the prevalence and effect of natural disasters, the variability of cereal production, the extent of conflicts and the level of price inflation (relative weight in the index: 56%); and (3) the social and macroeconomic coping capacity (relative weight in the index: 25%).¹⁵

In 2010, Chad was the West African country most vulnerable to food insecurity and Cape

Verde was the least vulnerable one (Table 1.2). The seven most vulnerable countries in the region are among the 20 most vulnerable countries worldwide. They (a) have a high structural exposure to food insecurity (Niger, Mauritania); (b) are more affected by disasters, whether natural, man-made or both (Chad, Benin); and (c) display less capacity to cope with shocks (Niger).

Table 1.2
FAO/GIEWS index of vulnerability to food insecurity, 2010

	Index
Chad	0.417
Benin	0.403
Niger	0.400
Mauritania	0.387
Mali	0.377
Nigeria	0.356
Liberia	0.348
Burkina Faso	0.345
Sierra Leone	0.343
Guinea	0.341
Togo	0.300
Guinea Bissau	0.298
Ghana	0.286
Senegal	0.283
Côte d'Ivoire	0.277
Gambia	0.271
Cape Verde	0.188

Source: Troubat, N., FAO/GIEWS 2011

Cape Verde's score is explained by its structural exposure to risk, the intensity of shocks and its coping capacity (Figure 1.18). Its social and macroeconomic coping capacity respectively increased to 62 and 13% as a result of the economic progress it achieved between 1980 and 2010. Its structural risk of food insecurity fell to 11% over the same period, and its exposure to shocks remained low.

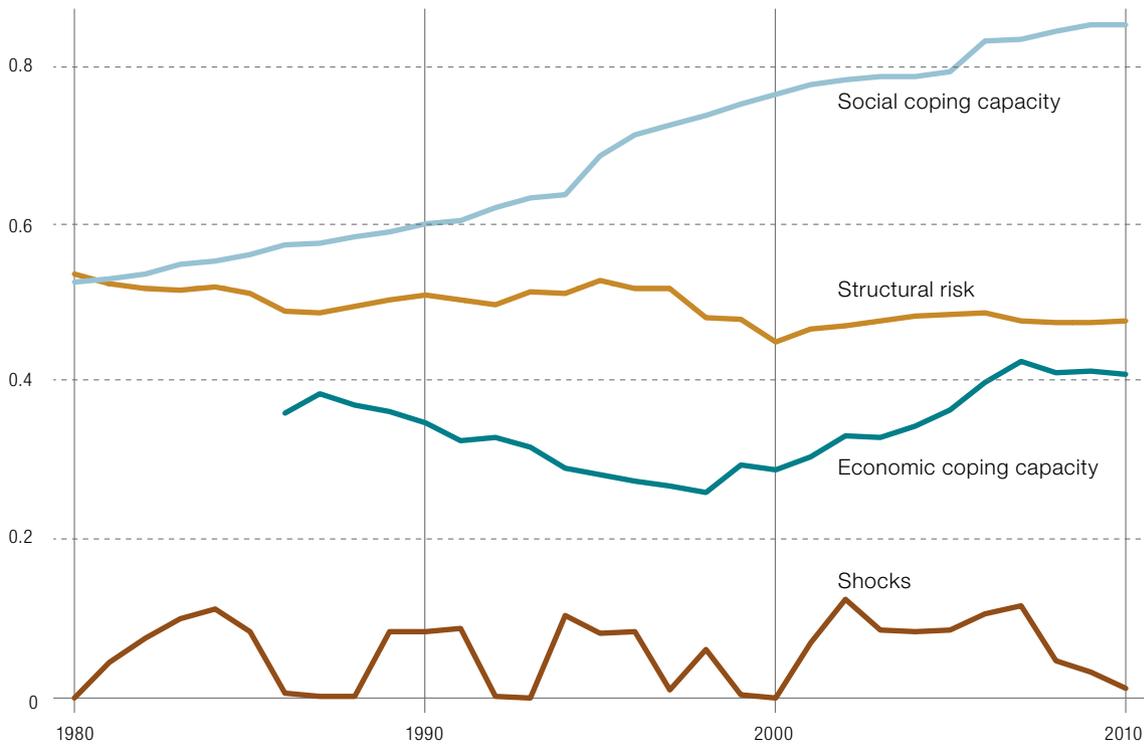
The prevalence of undernourishment and the vulnerability to food insecurity are linked at the regional level. When undernourishment is low and declining, the structural risk of food insecurity gradually declines or remains stable (e.g. Nigeria). Conversely, medium levels of undernourishment correspond to a stable or a rising trend for the structural risk of food insecurity in five out of seven cases. Countries with a high level of undernourishment display a rising structural risk of food insecurity.

The countries most likely to experience very severe shocks are those with high levels of undernourishment. Countries in this category (Chad, Sierra Leone and Liberia) are affected not only by natural disasters but also by conflict. The factors underlying coping capacity also correlate with the prevalence of undernourishment: in four out of five cases, coping capacity is flat or falling in countries with high levels of undernourishment. The countries with the highest vulnerability to food insecurity are Chad, Guinea Bissau and Niger.

The efforts made by West African countries and their regional organisations to implement national and regional food security programmes¹⁶ show the importance placed on giving consideration to risks and resilience. One of the three programmes of the regional partnership compact for the implementation of ECOWAP/CAADP focuses on reducing food vulnerability and promoting sustainable access to food. Its overall objective is "to help ensure the coverage of food needs of vulnerable populations and reduce the structural vulnerability of populations in rural as well as urban areas" (ECOWAS, 2009). The programme calls, inter alia, for the definition of a regional approach to providing safety nets and the promotion of regional instruments for food security.

The Regional Food Security Reserve Strategy, which puts this component of the ECOWAS/CAADP (2011) regional programme of investment into practice, was discussed with other regional organisations (UEMOA and CILSS) and stakeholder networks (producer organisations, NGOs). This regional strategy aims to ensure convergence and complementarity with national food reserve policies. It is also consistent with the CILSS Food Security Strategy Framework, which has an objective to "achieve complete food security for the Sahel by 2015".

Figure 1.18
Components of Cape Verde's index of vulnerability, 1980–2010



Source: FAO/GIEWS 2012

NOTES |||||

- 1 Settlement describes the growth and spatial distribution of the population within countries and/or regions.
- 2 WALTPS: West Africa Long-Term Perspective Study.
- 3 Energy production (in kcal) available for food consumption, which is calculated from FAO food balance sheets, excludes agricultural production not used for human consumption (such as raw materials and animal feed) and production not directly available for human consumption (seeds, waste, etc.).
- 4 www.fao.org/hunger
- 5 Marketed surplus production refers to the quantity actually sold on the market. It is calculated on the basis of average food availability per capita multiplied by the number of agricultural producers. This quantity, affected to producers' auto consumption, is then subtracted from the total production to obtain an initial approximation of the marketed surplus production.
- 6 Calculated in kcal.
- 7 Throughout the report, we use agricultural productivity to refer to productivity of agricultural labour calculated in terms of production (output) per farmer. The productivity of land (yield) is calculated as the output per area of land.
- 8 See esp. FAO/SOFI, 2008.
- 9 Food consumption and dietary diversity surveys, nutrition surveys and living standard surveys.
- 10 Simple average for the region.
- 11 This section brings together a number of data sources and types of analysis: (a) the FAO/GIEWS historical database of countries categorised as "in crisis and needing external assistance", (b) the CRED/OFDA database of natural disasters and humanitarian emergencies, (c) the University of Uppsala conflict data programme, and (d) data and analysis from the University of Maryland's Center for International Development and Conflict Management. This section also draws upon recent work by FAO as presented in the 2009 SOFI publication, "Addressing Food Insecurity in Protracted Crises".
- 12 Speculation may also be added to the list.
- 13 Uppsala University Conflict Data Programme, 2011 update.
- 14 The database distinguishes four types of conflict: extra-systemic, interstate, internal, and internationalised internal (such as the Biafra war). Intensity levels are coded as level 1, "minor conflicts", with less than 1 000 casualties, or level 2, "wars", with a large number of human losses.
- 15 The composition of the index and the relative weight of each variable are presented in Annex A.
- 16 It is commonly known as the National and Regional Agricultural Investment Programmes, as well as by its French acronyms PNIA and PRIA.

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Chapter 2

Economic geography and settlement dynamics

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Key messages

- Food security is one dimension of development. Economic geography, which links geography and interactions between economic agents, is a framework that can be used for analysing development;
- Settlement concentration is a response to the economic, social and political transformations in West Africa, urbanisation is consubstantial with development. Policies need to accompany these evolutions and better integrate them in food security strategies;
- Available population data – different definitions and methods, irregular censuses – do not allow for a regional analysis of settlement dynamics;
- A spatial demo-economic model allows for the distinction of population characteristics – agricultural and non-agricultural, modern and informal – by spatial environments – rural and urban.

2.1 THEORETICAL CURRENTS AND DEMO-SPATIAL APPROACHES

New economic geography and the 2009 World Development Report

The new economic geography has its origin in the contribution made by a generation of economists towards the understanding of the spatial dimensions of economic development. Following on from Paul Krugman,¹ they have drawn attention to the shift from an economic geography, based on the spatial distribution of natural endowments (elements of physical geography, exploitable resources, settlements, proximity to rivers and coasts, versus natural obstacles to trade), to a model that is more determined by interactions between economic agents, trans-

Concentration, lower transaction costs and the free movement of people, goods and information appear to be synonymous with economic development.



port and communication infrastructure, which facilitates mobility and the concentration of activities, people and innovations. “The central idea is that the agglomeration of production is the result from arbitrage between transaction costs and scale economies” (Montaud, 2003). With circular causation, “manufactures production will tend to concentrate where there is a large market, but the market will be large where manufactures production is concentrated” (Krugman, 1991).

When it is in its initial stages, economic development, based on a development of markets, is accompanied by spatial disparities and a concentration of people, both in and around the fastest-growing agglomerations (World Bank, 2009). It is generally assumed that urbanisation is an integral part of economic growth, both its consequence and its condition, and that the concentration of settlement is natural and irreversible. Therefore, as the participants in the 2006 World Urban Forum in Vancouver pointed out, it is preferable to foresee urban growth, and anticipate and accompany it as well as possible.

The consideration given to development policies concerning the geographical scale of ongoing transformation processes, including urbanisation, is one of the key contributions of *Reshaping Economic Geography* (2009 World Development Report – WDR, World Bank). The report advocates a major adjustment in urbanisation and rural development policies incorporated into an “overarching” spatial theory of economic development. For many years, the idea has prevailed that flows of migrants towards urban centres did not respond to a need for labour, placing an additional burden on town management and leading to the impoverishment of urban areas and deterioration in the living conditions of these once rural populations. The report proposes a positive understanding of the relationship between

population mobility and economic growth. It recalls that, while the social and institutional changes underpinning development, in particular the transition from an agricultural to an industrial and service-based economy, have been fully documented, its equally important spatial transformations have been less than closely examined. This report shows that economic development is, to a large extent, based on the exploitation of economies of scale and the movement of goods and services across space. Changes in the spatial distribution of the population and territorial development are manifested in:

- The concentration of activities (increase in the size of production units, proximity of up-stream and down-stream firms) and people (expansion of the labour market and local demand);
- The reduction in distance between economic agents and markets (expanding markets and lower transaction costs);
- The lowering of all natural and institutional barriers to trade (borders and regulations).

Concentration, lower transaction costs and the removal of barriers to the free movement of people, goods and information appear to be synonymous with economic development. They are both the means to, and the outcome of, economic development, in a mutually reinforcing process. In terms of public intervention, the aim is to design policies and institutions that can help developing countries benefit from economic concentration, while maintaining reasonable spatial and social disparities and promoting integration of areas into markets.

The 2009 WDR argument is based on three dimensions:

- Density: “density refers to the economic mass per unit of land area, or the geographic compactness of economic activity”;
- Distance: “distance refers to the ease or difficulty for goods, services, labour, capital, information and ideas to traverse space. [...] Distance, in this sense, is an economic concept”;
- Divisions: “[...] arise when borders are poorly managed. They range from moderate restrictions on the flow of goods, capital, people and ideas to more severe divisions triggered by territorial

disputes, civil wars and conflicts between countries. [...] It is the persistence of divisions between nation-states that sets the processes of economic geography apart for countries and regions”.

Demo-economic development models and the WALTPS²

Demographic growth, as experienced by developing countries in the 1970s, reframed the debate on the relationship between demography and economy, and the former’s negative impact on the latter (Malthusian effect). Many models have been developed along these lines, with acknowledged limitations in the lack of theoretical foundation and statistical weakness when applied to developing countries. However, they allow for integration into the same model of economic and demographic variables.

“The term demo-economic refers to the fundamental feature of the approach, relating to the fact that we seek to take into account both demographic and economic factors. However, the demo-economic approach is not a matter of merely juxtaposing two systems that were developed independently of each other, but rather by incorporating them into a single model” (Mesplé-Soms, 2001).

Dumont and Mesplé-Soms (1999) have defined the key features of demo-economic models. They:

- “take a macroeconomic approach [...] at a more or less high level of aggregation (international, national or regional) [...] to describe the relations that exist between the conditions of the activity and the demographic variables;
- are dynamic [...] and incorporate the temporal dimension;
- are highly endogenous [...] with a tendency for extreme limitation in the number of predetermined entities;
- are distinguished by different degrees of sectoral and spatial disaggregation in the demographic and economic modules (thus, population categories may be differentiated, or not, by sex and age, a distinction may be drawn, or not, between rural and urban regional zones, sectors of production may be more or less detailed);
- have a long-term perspective”.

The first generation supply-demand models, mirroring Malthusian theory, “consider that growth in output per capita is constrained by trends in factors of production (labour and capital)”. These models generally observe a neutral or negative relationship between demography and economic growth. Other models, from which the WALTPS drew, assume that production is determined by demand.

Although, these first generation models take little interest in the spatial distribution of population and economic activities, Bachue models and Isserman (1986) looked more closely

One of the most important vectors of change is rapid population growth and its correlation with urbanisation and the recomposition of settlement.



at the “modelling of the different developments in the territory of various urban centres and rural areas”. Consideration was not only given to demographic data, but also to the spatialisation of settlement dynamics, which is of crucial importance.

Demo-economic models offer a way of extending and adapting social accounting, which was initially used to analyse the impact of major developmental projects. The standard system of national accounts offers a framework to understand and project change. However, the conceptual framework is essentially adapted to advanced economies, where settlement dynamics have more or less stabilised, transport infrastructure has been extensively developed and firms trade with each other and, to a lesser extent, with other countries. The West African economies do not correspond to that definition or, more precisely, only a limited part of the economies – the so-called modern sector – does so (with a high degree of dependence on the outside world).

A Social Accounting Matrix (SAM) is a table similar to an input-output table, and includes (alongside a breakdown of economic activity into sectors and branches) the different economic agents, such as households, according to their primary activity (farmers, workers in the informal sector, the modern private sector, the public sector, etc.), enterprises (manufacturing and services), public institutions (central government and local authorities), the rest of the country and the outside world.

Agents’ accounts are balanced, in both income and expenditure (including accumulation), according to the principle that one person’s income is another person’s expenditure. Therefore, social accounting replaces the conventional categories of national accounting (sectors and branches of the economy) with the population categories concerned.

Based on SAMs, the WALTPS proposed a model particularly suited to developing economies, by breaking the population down into various strata (primary, modern and informal) distributed between different environments (economic or political capital, main cities and towns, small towns and rural areas). This settlement matrix is one of the inputs for demographic models.

The hypothesis (or paradigm) of this approach, formalised in a demo-economic and spatial model, is that while the minor – “modern” – part of these economies functions in the same way as in developed countries, the major part operates according to a different principle, whereby demand determines the supply. This particularly applies to the informal sector and to the satisfaction of basic needs, including food. The model allows for the construction and examination of the economic implications of future settlement patterns – i.e. projectable population numbers and plausible distributions of the population between different environments at more or less distant dates – in terms of income levels, investment and trade between the different strata and environments. Considering the existence of different economic behaviours, this approach is particularly well suited to analysing agricultural productivity, often underestimated in national accounts, which dissociate production and consumption, and therefore do not verify coherence between production and consumption data (Box 2.1).

To a certain extent, these approaches address the statistical weaknesses that can cause diagnostic errors and so poorly inform policy. Various factors contribute to these weaknesses: irregularity of censuses and surveys (consumption), lack and unreliability of statistics (and the difficulty of making them more reliable), non-homogeneity of definitions and calculations based only on national accounts (which, inter alia, omit the informal activities that account for a substantial share of economic activity).

Box 2.1

The West Africa Long-Term Perspective Study (WALTPS)

The study shows that one of the most important vectors of change in West Africa is the rapid population growth and its correlation with urbanisation and the recomposition of settlement. Settlement is defined as the growth and redistribution of the population in each country and across the region. Some of its consequences have been the densification of southern areas of Sahelian countries and northern areas of coastal countries, high urbanisation rates and the development of a network of secondary urban centres, the development of road networks connecting urban and rural areas and increasing market dynamics.

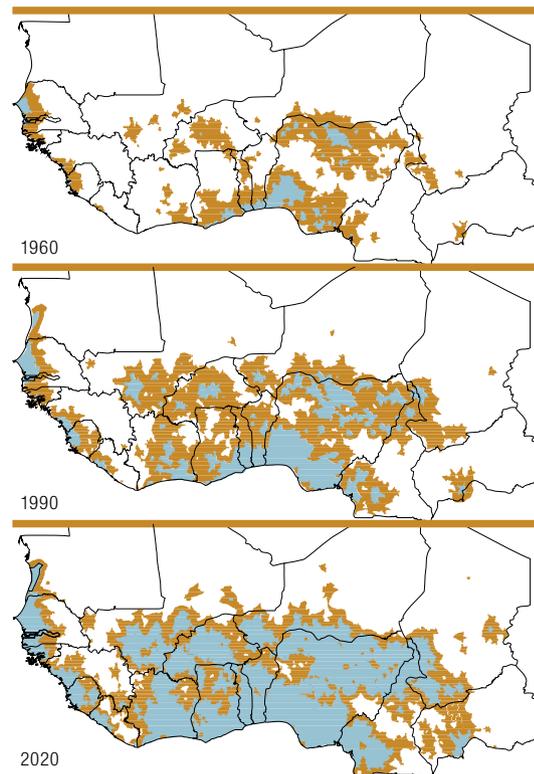
The study finds a correlation between rural population density, farm productivity and proximity to urban markets. Towns and cities are exerting an increasing influence on agricultural production in the surrounding rural areas (see map). The increasing commercial opportunities, which are seized by rural populations, enable them to overcome physical constraints and switch from extensive farming to more intensive methods of production. According to the WALTPS, this shift is not uniform. In the areas with the best connections to urban markets, a new class of agricultural entrepreneurs has emerged, working more intensively, and probably more sustainably, and investing their own savings in increasingly capitalist farms. However, these new entrepreneurs still remain in the minority.

The WALTPS describes an urban economy that absorbs a large share of demographic growth. It is, and will remain for some time, dominantly informal. The principal function of this popular economy is to integrate the “newcomers” (on the basis of sharing work, rather than accumulating capital). This informal economy includes a

deeply impoverished class, governed by a survival economy, in which many of the new urban dwellers are generally to be found. It only slowly generates an entrepreneurial class whose activity exceeds mere survival.

The concentration of the population, economic activity and trade (markets) stimulates growth and development. However, the vibrancy of this process is heightened, and its fruits are better shared by the implementation of the policies that accompany spatial and social mobility. These policies should encourage inherent transformations, as well as lessen their negative impacts.

Expansion of market tension 1960 – 1990 – 2020



Source: WALTPS 1994 © Club du Sahel / OECD 1994

The limitations of geo- and demo-economic approaches

The approaches used here are inevitably narrow, emphasising one central paradigm to the detriment of other processes, and the instruments

proposed do not cover the full range of economic, social and spatial development. The new economic geography underestimates the share of economic geography that remains dependent on natural resource endowments – all the more important where a country is in

an early stage of economic development – and the functioning of informal activities and the inertia or resistance to change by the populations concerned. Likewise, the results obtained from the proposed settlement matrices and demo-economic and spatial models underestimate the growing impact of globalisation on the transformation of developing economies. However, the combination of both of these frameworks, new economic geography and demo-economic modelling, is necessary. The former justifies the hypothesis of the continuing redistribution of settlement – urbanisation and the changing relationship between rural and urban population. The latter could give a better account of the functioning of the vast informal sector and its importance in the real economy of West African countries.

Fundamentally, no available model combines demographic change with economic development. Economic growth is widely held to be a major factor of declining fertility, especially through healthcare and education, but declining fertility is also said to be a factor of

economic growth, through the “demographic dividend” (the favourable trend in the relationship between the active and the inactive population). In the absence of a model, partial relationships, such as the link between educational level and fertility, or the earlier decline in fertility in urban areas compared to rural environments, must be accounted for, in addition to standard demographic projections. Only the exogenous growth in the population is considered in the reference framework, without incorporation of age structure effects (which could be relevant in analysing the active population of agricultural producers and non-producers).

The theories and paradigms put forward in the new economic geography primarily concern development, rather than food security per se. However, it could be argued that development is not synonymous with food security, and that food security has its own underlying dynamics. Our aim is not to consider all dimensions of food security (Box 2.2), but to consider those linked to settlement and market dynamics.

Box 2.2

Definition of food security

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

This definition presents four main dimensions of food security:

Physical availability of food: food availability addresses the “supply side” of food security and is determined by the level of food production, stock levels and net trade.

Economic and physical access to food: an adequate supply of food at the national or international level does not, in itself, guarantee household level food security. Concerns about insufficient food access have resulted in a greater policy focus on incomes, expenditure, markets and prices in achieving food security objectives.

Food utilisation: utilisation is commonly understood as the way the body makes the most of various nutrients in food. Sufficient energy and nutrient intake by individuals is the result of good care and feeding practices, food preparation, diversity of diet and intra-household distribution of food. Combined with good biological utilisation of food consumed, this determines the nutritional status of individuals.

The stability of the other three dimensions over time: Even if your food intake is adequate today, you are still considered to be food insecure if you have inadequate access to food on a periodic basis, risking deterioration in your nutritional status. Adverse weather conditions (drought, floods), political instability (social unrest) or economic factors (unemployment, rising food prices) may impact on your food security status.

Sources: FAO, World Food Summit, 1996; FAO, Food Security Information for Action: Practical Guides, 2008

The theoretical dimensions of demo-spatial modelling

The settlement matrices produced for this analysis provide a dynamic and spatial (by environment) representation of the change in the settlement structure of a country, or an entire region, at various dates. This structure determines the organisation of trade in goods and services, notably a relative equilibrium between supply and demand for food products. This approach serves as the basis for what could be described as the economic geography of food security. The present study does not produce a demo-economic model, but a set of plausible hypotheses regarding the developing relationships between settlement and economic and social change. It draws extensively on elements of previous work, particularly from the WALTPS, which offers a demo-economic and spatial analytical framework adapted to developing economies.

This analysis is based on the view that urbanisation is the main driver in the transformation of agriculture and the rural economy. Yet several studies see predominantly adverse effects in Africa, in contrast with the common acceptance of a virtuous circle of urbanisation in Europe. “Urbanisation has had a positive effect on development in Europe, the city being a factor of innovation, of greater trade, of monetisation. It was made possible by the support of food agriculture. It appears that, until the industrial revolution, Europe’s urbanisation rate has not risen beyond an acceptable threshold (10% to 14%), due to the level of agricultural development. In the 19th century, rapid urbanisation followed both, an agricultural and industrial revolution. The city as a whole was thus able to play a dynamic, positive role without becoming parasitical” (Leboutte, 1990). Also in West Africa, positive links between urbanisation and economic growth are revealed by a set of indicators. Its development shapes its own dynamics and at its own pace, defined both by national economic and political circumstances, and by the additional challenge of a globalised environment.

The retrospective analysis (1950 to 2010) in the present work underlies the construction of long-term projections (2050). These projections identify (future) trends and challenges, for which West African regional organisations

should prepare. Unquestionably, the exact pace of the projected dynamics will be more or less great depending on political or economic factors and statistical approximations. Of importance is not so much the timing as the understanding of these transformations and their impact on food security. Following this line of reasoning, this study proposes a coherent image of settlement, to the point when the ratio of urban population to rural population will be two (equivalent to a level of urbanisation of 66%). By asking questions regarding the capacity to produce growing surpluses with proportionally fewer and fewer farmers, about the necessary transformations in agricultural and farming systems, concerning the market access



Urbanisation is the primary driving factor in transforming agriculture and the rural economy.

for both consumers and farmers (in terms of infrastructure, capital and information) or about the availability and quality of information, the study seeks to highlight a number of future food security challenges. Although, most models assume political and climate factors to be exogenous, it is clear that they will affect the pace of economic and spatial change, as well as the onset of food crises.

Focusing on long-term dynamics, this analysis falls within the broader resilience debate that highlights the imbrications of chronic and cyclical food insecurity. For example, the capacity to generate agricultural surpluses influences not only the possible response to a crisis, but also the conditions for higher incomes for farmers from marketed surpluses and the conditions for improvements in market functioning. This geographic and dynamic approach to food security implies that food security policies go beyond agricultural and rural policy. Hence, the ongoing rural-urban transition, and its impact on the structure of the food economy, raises issues that concern urban, trade and regional land-planning and development policy.

In addition to their distinctive trajectories, West African countries share sufficient characteristics to support a comparison of national situations and to develop a regional approach. However, such comparisons are only possible if the data are homogeneous. Definitions of

urban environment differ from one country to another, with economic, social or administrative criteria providing their basis.

A demographic, numerical criterion is the most appropriate, especially for regional comparison and analysis. It has the advantage of being exhaustive and has been in use for decades, allowing for a comparative analysis of change over time and can be used to “seek regularities and similarities across a space fragmented by several states, whose borders have not always been where they are today” (Africapolis, 2008). In the context of this work, the conclusions drawn by Africapolis (2008) concerning the European urban networks are both relevant and pragmatic: “Although a definition as simple as that of the morphological

agglomeration does not capture the urban phenomenon in the full complexity of all its dimensions, the concept [...] is still of interest. In contrast to the hypermobility of networks and flows that now characterise space [...], the agglomeration, the dense and immovable core of a city, remains highly stable, demonstrating a particular longevity that often defies history”.

It is the role of West African regional organisations, willing to incorporate settlement issues into their policies, to equip themselves with the regional tools required to accomplish the mandate given to them. Developing a database, as described below, sheds light on what such an approach could bring in terms of understanding and mechanisms (Box 2.3) (Table 2.1).

Table 2.1

Definition of urban area in the World Urbanisation Prospects, 2009

Country	Official threshold							Other definitions
	20000	10000	5000	4000	2500	2000	1500	
Benin		x						
Burkina Faso		x						
Cape Verde								x
Chad								x
Côte d'Ivoire				x				
Gambia			x					
Ghana			x					
Guinea								x
Guinea Bissau							x	
Liberia						x		
Mali			x					
Mauritania			x					
Niger					x			
Nigeria	x							
Senegal		x						
Sierra Leone						x		
Togo								x
Total region	1	3	4	1	1	2	1	4

Source: United Nations 2009

Box 2.3

The evolution of definitions of urban area: the example of Burkina Faso

A survey of “Migration dynamics, urban integration and environment in Burkina Faso” was conducted in 2000, in order to gain a better understanding of urbanisation processes. It sheds light on population numbers, district by district, since the 1960s, and highlights the years in which referenced localities moved from rural to urban status. The survey found that:

1. In 1975, five cities were officially classed as urban areas (Ouagadougou, Bobo-Dioulasso, Banfora, Ouahigouya and Koudougou). The classification criteria were not specified (National Institute of Statistics and Demography, 1978).

2. In 1985, the definition of an urban area was based on a demographic criterion (10 000 inhabitants) and an equipment criterion (“the necessary minimum urban infrastructure, namely a drinking water and electricity distribution network”) (National Institute of Statistics and Demography,

1989). However, the definition was not rigorously applied and four places that did not fulfil the defined equipment criterion were counted as towns (out of the 18 listed).

3. In 1996, “urban areas comprised all districts with a minimum socio-economic and administrative infrastructure (schools, administrative services, drinking water and an electricity distribution network). Population was not a criterion, with the result that places with fewer than 10 000 or 5 000 inhabitants could be counted as urban. In the 1985 census, no district with fewer than 10 000 inhabitants was classified urban” (National Institute of Statistics and Demography, 2000). No official list of towns and cities, corresponding to this 1996 definition was published; with the result that urban areas remained a vague notion, since minimum levels of equipment were not defined. Three out of the 26 urban areas in 1996 had fewer than 10 000 inhabitants.

Source: Ouédraogo and Piché 1995

2.2 HOMOGENEOUS SETTLEMENT DATA FOR A REGIONAL APPROACH

Re-evaluating urban population in the light of the Africapolis data

Prior to the Africapolis study (2008),³ only national data, reproduced by the United Nations were available. These statistics are based on different national definitions and rare, irregular, and sometimes disputed, censuses. They do not allow for a comparison between countries, or for the detailed analysis of agglomeration processes in the region. As the authors of the Africapolis study pointed out, “errors in evaluating urbanisation can lead to partial diagnosis of development needs”. The same applies to devising regional food policies.

The retrospective data compiled by Africapolis make an important contribution to the understanding of settlement processes in West

Africa. The methodology combines the identification, enumeration, physical definition and historical reconstitution of the spatial growth of over 2 500 “agglomerations” (based on maps, satellite images and aerial photos) with census data, and other available population statistics.



Population statistics are based on different national definitions and rare, irregular and sometimes disputed, censuses.

The data presented are based on a numerical threshold of urban areas of 10 000 inhabitants. Urban functions or the level of urban infrastructure are not accounted for (Arnaud, 1998) in the definition of urban area used both by Africapolis and the authors of this study (Box 2.4).

Box 2.4

Definitions of urbanisation

Agglomeration

Literally, agglomeration is the action or process of gathering into a mass. In geography, the word refers to a continuously built-up area. For Geopolis*, continuity is defined as the maximum distance of 200 metres between constructions, not counting water bodies crossed by a bridge, parks or major road infrastructure (interchanges, car parks, airports, etc.). A Geopolis agglomeration may be considered urban or rural by the country's administration. In this database, it is considered as urban if the sum of the population of the local units over which it extends exceeds 10 000 inhabitants (CEPED, 2009).

Urbanisation level

The proportion of urban population in total population at a given time.

Urbanisation and urban growth

"Urbanisation is considered to be the process spanning all the economic and social phenomena, both urban and rural, that relate to a settlement trend in which the urban population rises sharply as a proportion of the total population. [...] It is also generally used to mean the urban population as a proportion of the total population and the trend in that proportion. Urban growth combines the effect of natural demographic growth with migrations between rural and urban areas" (Arnaud, 1998).

* Geopolis is the French confederation of earth sciences, an umbrella and promotional organisation for all associations, institutes and individuals involved in earth sciences.

On the basis of the Africapolis urban population data, this study proposes a new interpretation of regional settlement dynamics (total, rural and urban population) over the period of 1950 to 2010. This includes a re-evaluation of the total population of Nigeria, the inclusion of a relationship between the level of urbanisation and economic growth, and the application of a threshold of 5000 inhabitants for defining urban environment. The Africapolis data for 2010 and 2020 are projections. This analysis used Africapolis data up to 2000, and then used revised projections from that point forward.

On the basis of a morphological identification of agglomerations, the Africapolis study found differences between the number of urban inhabitants in the censuses and the number obtained from an agglomerated area on the basis of satellite images. For 2000, the difference was estimated at 18 million urban dwellers at regional level, with 75% of this figure attributable to the difference in evaluations of Nigeria's urban population (Table 2.2).

This difference cannot be explained by the difference in urban threshold, since it is higher in the official estimates used by the United Nations (20 000 inhabitants) than in the

Africapolis study (10 000 inhabitants). Although 14 agglomerations of between 500 000 and 1 million inhabitants have officially been identified (accounting for 8.9 million inhabitants), the Africapolis study found only five agglomerations (3 million inhabitants). The situation is complex, and this is only one explanation among many concerning this difference.

These differences are clearly not without importance for food security strategies. Nigeria, with almost half of the region's population, is West Africa's demographic giant. However, many studies question the reliability of census data and note the corresponding difficulties of interpretation.⁵

The 1991 census estimates led to a downward adjustment in population figures: 88 million inhabitants, which was 30% below the 120 million projected. This led to the annulment of the census and the publication of a reduced version of the data.

In 2006, the media declared the provisional results to be incorrect. The governor of Lagos State challenged the estimate of the population of Kano (9.4 million) as being greater than that of Lagos (9.1 million), which had until then been considered to be Nigeria's largest city (Box 2.5).

Table 2.2

Urban population according to the United Nations and the Africapolis study in 2000⁴ (million)

Country	UN (U20) (1)	Africapolis (U10) (2)	Difference (1)-(2)	Difference of (2) in relation to (1)
Benin	2.5	2.8	-0.3	-10%
Burkina Faso	2.2	2.4	-0.2	-10%
Cape Verde	0.2	0.2	0.1	27%
Chad	1.8	1.4	0.4	22%
Côte d'Ivoire	7.2	7.0	0.2	3%
Gambia	0.6	0.5	0.1	14%
Ghana	8.4	7.2	1.2	15%
Guinea	2.6	2.3	0.3	12%
Guinea Bissau	0.4	0.3	0.1	26%
Liberia	1.3	1.0	0.2	18%
Mali	3.2	2.1	1.0	32%
Mauritania	1.1	0.8	0.2	21%
Niger	1.8	1.7	0.1	6%
Nigeria	52.4	38.8	13.6	26%
Senegal	3.8	4.3	-0.5	-12%
Sierra Leone	1.5	1.2	0.3	17%
Togo	1.6	1.9	-0.3	-22%
West Africa	92.5	76.0	16.6	18%

Sources: Africapolis 2008 and revised UN population estimates 2011

The United Nations estimated the total population of Nigeria to be 123.7 million in 2000. Africapolis evaluated the country's urban population in 2000 at 38.8 million (threshold 10 000 inhabitants), compared to 52.4 million estimated by the United Nations (threshold 20 000 inhabitants). Given the need for homogeneous regional data, in particular for the level of urbanisation, an adjustment of Nigeria's total population is necessary. The difference between the urban population from the census data and from the Africapolis estimate (13.6 million) is subtracted from the total population. Therefore, the total population in 2000 would be 110.1 million (UN 123.7 million). This is the minimum adjustment, since the lower threshold for urban population (10 000 vs.

20 000 inhabitants) should lead to higher urban population figures in reality (Figure 2.1). This adjustment may be applied retroactively to 1950. In this case, the level of urbanisation is 35% in 2000 (31% Africapolis), which is closer to the UN figure (42.8%) and comparable to other countries in the region with a similar level of development.

Revised projections and definition of urban

As discussed, the Africapolis figures for 2010 and 2020 are projections. For the data used in this study (1950–2050), two adjustments have been incorporated: firstly, a review of urbanisation growth rates, based on new data and

Box 2.5

Disputed censuses in Nigeria

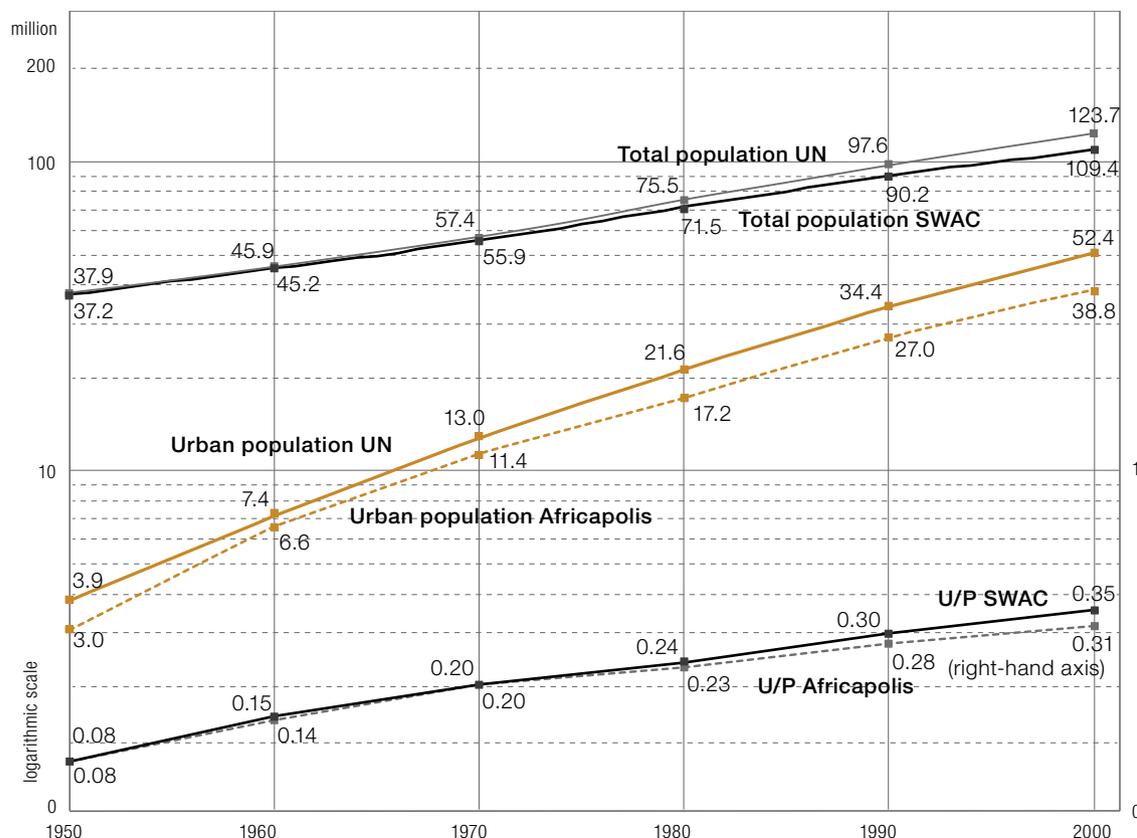
Data prior to 2006 are partial, and censuses were often disputed or annulled. The number of inhabitants used to define an urban area was not always the same: 5 000 for the 1953 census, 20 000 for the following exercises in 1962, 1963, 1973, 1991 and 2006. The 1953 census, organised under British colonial rule, estimated Nigeria’s population to be 30.4 million. The colonial administration used these results, and the distribution of population between north and south, to allocate seats in parliament. The political implications of this decision led representatives in the southern region to challenge the population figures for the northern region, which was suspected of being overestimated.

The first census to be conducted after independence, in May 1962, sparked

controversy and was cancelled by a unanimous vote in parliament. In the 1963 re-run, several sources pointed out substantial overestimates: population growth in excess of 82% in 11 years, or over 7% annually between 1952 and 1963, and over-representation of the 20–45 age group in the age pyramid (Africapolis, 2008; Ekanem, 1972).

When the provisional results of the 1973 census were published, several reports considered the figures to be overestimated in several states. The census was cancelled (Locoh and Omoluabi, 1995). However, from 1975, the data in the United Nations Demographic Yearbook were based on these estimates and a 3% annual average growth rate.

Figure 2.1
Settlement dynamics in Nigeria – intermediate results



Sources: Africapolis 2008; UN 2011; authors’ calculations

assumptions regarding economic performance and secondly, a reduction in the urban threshold to 5 000 inhabitants.

The authors of the Africapolis study found that the level of urbanisation in the region grew rapidly until 1980 and has since slowed. During the same period, they observed the continued emergence of small agglomerations. From these observations, the study concluded that the urbanisation process in the region is running out of steam and is not likely to exceed 50% of the total population in the future, or may even be less than this figure, thereby giving a structural interpretation of the observed slowdown. In that case, urbanisation would be regarded as an autonomous phenomenon, progressing independently of economic and political contexts.

From the standpoint of the report, the slower pace of urbanisation since 1980 is due to a combination of factors, notably economic, such as the rising oil price in the 1970s, the debt crisis and the structural adjustment programmes (SAPs) (Rakodi, 2006). Urban dwellers, who are more integrated into the market economy than rural populations, were harder hit by ensuing stagnation in private sector activity. Measures introduced by the SAPs, such as price deregulation, layoffs in the public and private sectors and cuts in services and subsidies expenditure,

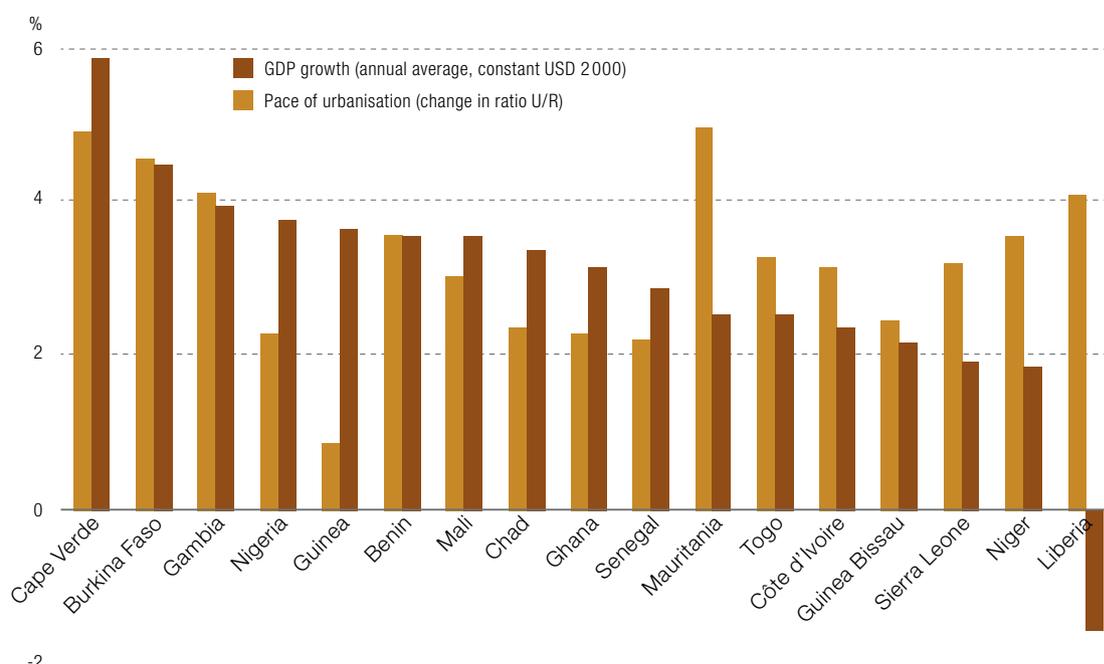
were another contributing factor. With most West African countries returning to strong economic growth since the early 2000s, an increase in urbanisation rates can be expected, and are observable in the region’s growth engines of Ghana and Nigeria. Further, in a mutually reinforcing process, economic activities associated with urban areas will provide additional support to economic diversification and progress (Box 2.6).

The comparison between GDP growth and the pace of urbanisation of the 17 West African countries shows that, with the exception of two

« In a mutually reinforcing process, economic activities associated with urban areas provide additional support to economic diversification and progress.

groups of countries, those with the highest rates of economic growth also experience the fastest urbanisation (Figure 2.2). This relationship is also confirmed by the World Development Report, “even in sub-Saharan Africa [...] faster urbanisation was associated with higher total GDP growth”. Liberia and Sierra Leone on the one hand, and Mauritania and Niger on the other, seem to constitute exceptions. The political situations in Liberia and Sierra Leone, with their

Figure 2.2
GDP growth and the pace of urbanisation, 1970–2000



Sources: Africapolis 2008; World Bank 2011; authors’ calculations

Box 2.6

Links between urbanisation and economic growth

Guillaumont's study in the 1990s looked at the structural factors of urbanisation; GDP per capita, surface area and terms of trade (negative relation). Of the three hypotheses, the study confirmed that the log of GDP per capita is the most significant at 60%. "The urbanisation rate increases with GDP per capita, because activities diversify in the sense of greater industrialisation, itself mostly situated in urban areas. Because of the upper limit on the urbanisation rate (100%), a semi-logarithmic relation may be assumed".

The authors of the 2009 WDR distinguish between three phases of urbanisation with corresponding levels of development: incipient (less than 25%), intermediate (approximately 50%) and advanced (over 75%). The corresponding per capita GDP levels (in constant 1990 USD) for each of these three urbanisation levels are:

- average per capita GDP of USD 2 500 corresponds to countries with an urbanisation level below 50% (low-income and lower-middle income), and average per capita GDP of USD 3 500 would correspond to an urbanisation level of 50%;
- average per capita GDP of USD 9 000 corresponds to countries with an urbanisation

level between 50% and 75% (upper-middle income countries), and average per capita GDP of USD 10–11 000 would correspond to a level of urbanisation of 75%;

- average per capita GDP of USD 21 000 corresponds to countries with an urbanisation level of over 75% (high-income countries).

The report states that the "relationship between development and economic concentration is positive and roughly linear when comparing developing countries with a GDP per capita of less than USD 10 000. But this relationship starts to level off when higher-income countries are included in the sample" (WDR, 2009).

The report mentions that the transition from an agrarian economy to an industrial and services economy is "helped, not hurt, by healthy agriculture, which helps towns and cities prosper" (WDR, 2009). The "rural-urban transition" sees the proportion of the non-agricultural population in rural areas increase with the level of urbanisation and the development of division of labour in urban areas. This shift reflects the gradual integration of agriculture into the market economy, helping to diversify agricultural production and to make agriculture more productive.

economic repercussions and resulting population movements, certainly explain the observed distortions, while the urbanisation process in Mauritania and Niger started from a very low level in the wake of colonial rule.

Insofar as the authors consider that the observed decline in the pace of urbanisation in the 1990s was cyclical, due to slower economic growth, we have raised the projections for the pace of urbanisation for the period 2000–2010. Our estimates are slightly lower than in the previous decade, albeit higher than the decline in the pace of urbanisation projected by Africapolis (Figure 2.3).

The final element of the data homogenisation consists of the inclusion of towns with over 5 000 inhabitants (lowering the classification threshold for urban population from

agglomerations of 10 000 inhabitants or more to 5 000). Towns with 5 000 to 10 000 inhabitants have been catalogued by Africapolis for projection purposes (the towns with 5 000 inhabitants are likely to grow and become towns of 10 000 inhabitants). The rank-size law was applied to complete the information regarding agglomerations in this bracket. The linear form of rank-size distribution implies that application of the 5 000 inhabitant threshold increases the number of urban centres and the urban population, as suggested by Africapolis, and consequently increases the level of urbanisation, especially approaching the year 2000.

These adjustments lead to a revision of the total population and the split between urban and rural population. The region's level of urbanisation (U/P) in 2000 and 2010 would be 0.36

Shares of population living in urban agglomerations and GDP per capita



Note: The size of each circle indicates the population size of that country. PPP = purchasing power parity. The agglomeration index uses the following criteria: density 150 inhabitants per km² or more; access time of 60 minutes or less to a sizeable settlement, defined as one that has a population of more than 50 000.

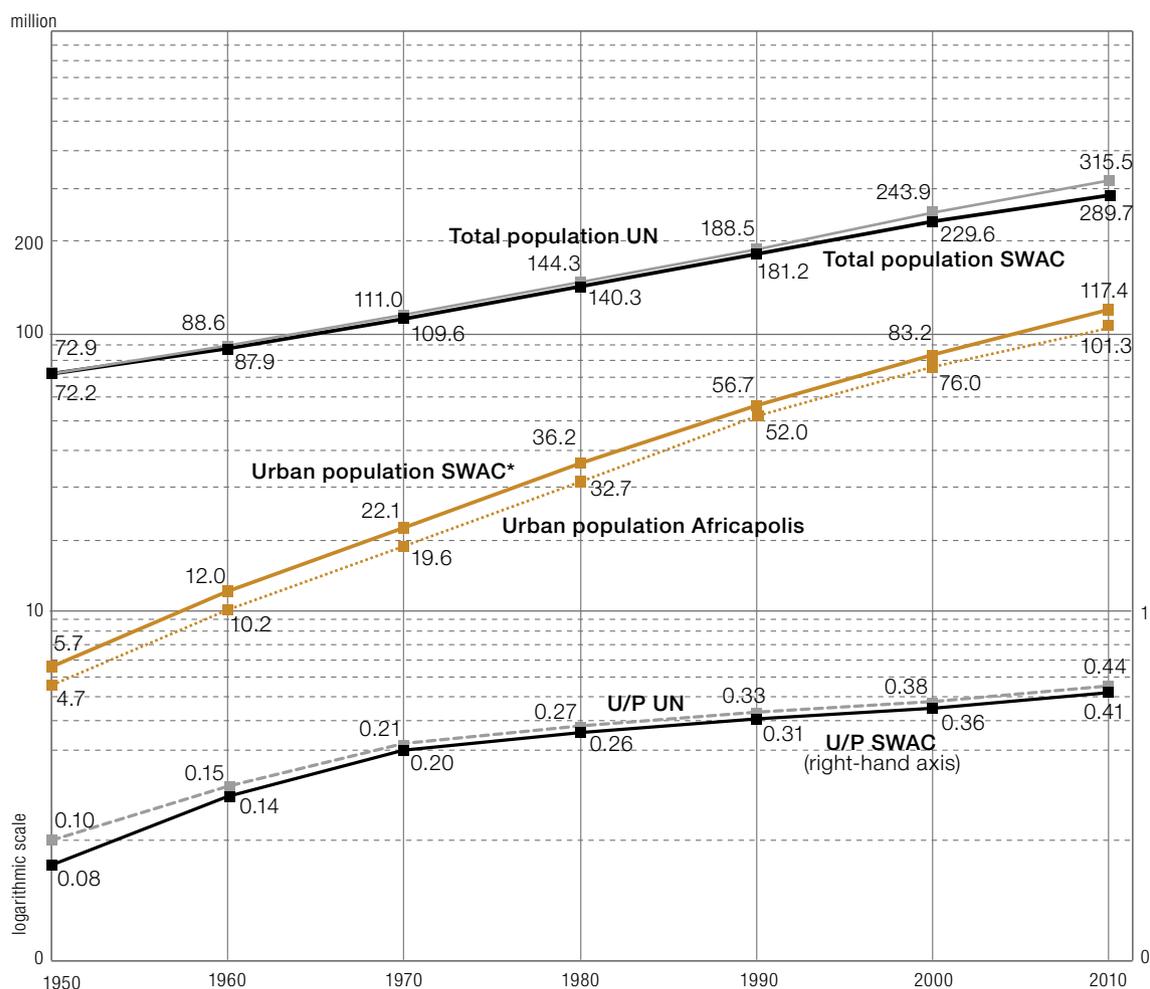
Source: World Bank, World Development Report 2009, page 60

and 0.41 respectively. The total regional population in 2010 is estimated to be 289.7 million (Figure 2.3).

These statistics are useful, only because urban population is measured according to one standard definition, without considering other criteria (administrative, morphological or functional). On the basis of these data, and the indicators that measure economic and spatial

transformations (e.g. a ratio of non-agricultural to agricultural population), a detailed retrospective description of settlement dynamics (migration and urbanisation) allows us to identify the characteristics of ongoing processes, such as the spread of urban network and market connections, providing important information regarding the agricultural sector.

Figure 2.3
Settlement dynamics in West Africa



* Urban population SWAC/OECD at 5 000 inhabitants threshold
Sources: Africapolis 2008; UN 2011; SWAC/OECD 2012

NOTES

- 1 Winner of the Nobel Prize for economics in 2008.
- 2 West Africa Long-Term Perspective Study, carried out by the Club du Sahel/OECD in the 1990s.
- 3 Africapolis, a study of urbanisation in West Africa. The study was supported by AFD's Africa Department and co-ordinated by SEDET (CNRS/Université Paris Diderot). www.afd.fr/lang/en/home/publications/travaux-de-recherche/archives-anciennes-collections/NotesetEtudes/Africapolis
- 4 The year 2000 is used in this section because it corresponds to the base year produced by Africapolis (2008). It does not correspond to a census.
- 5 See the Africapolis study (2008) for a more detailed description.

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Part II
People, Places and Transformation Dynamics

Chapter 3

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Spatial restructuring and economic transformations

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Key messages

- West African regional migrations show various temporal features – long, temporary, circular – and scales – internal and intra-regional. These migrations are people’s responses to changes in their environment;
- West African migration systems are constantly evolving, contributing to demographic transformations and regional construction. Policies should accompany these mobility processes;
- Urban growth is manifested in the concentrations in the biggest cities and in the development of a network of small and medium-sized cities. This urban network constitutes the core of the spatial organisation of trade and markets. The average distance between urban agglomerations of more than 10000 inhabitants has been divided by 3, from 111 km to 33 km;
- The urbanisation process has also increased the heterogeneity of rural settlements. 58% of rural inhabitants live in high-density areas (more than 50 inhabitants per km²) covering only 20% of non-desert land area;
- Rural areas with the highest density and best connections to cities are also more diversified local economies. 25% of the rural population is no longer engaged in agricultural activities;
- Today, the non-agricultural population comprises 50% of the total population, a tenfold increase since 1950. This evolution also highlights the emergence of a market economy;
- The food economy, along the entire value chain from producer to consumer, is predominantly informal. Understanding and accompanying its dynamics are crucial for current and future food challenges.

3.1 A HISTORY OF MIGRATION *by Nelly Robin*¹

In recent years, West Africa has again become a major geopolitical concern. The Sahel is a place of central interest in understanding this development and its implications, specifically with regard to international migration. Its geographical location assigns it a crucial role in the present-day dynamics of migration by linking together:

- African regions from Congo to Morocco passing through Niger, Mali or Senegal;
- People from West Africa and other more distant regions such as the Middle East or Asia; and
- Migration systems based on traditional and other more recent patterns, linked in particular to migration and human trafficking.

The current context of regulations on international migration and national political crises risks undermining the fairly well established ECOWAS model of free movement, which embraces very dissimilar national circumstances. However, intra-regional mobility is a major concern for West Africa, conditioning its economic development and political stability. The aim of this section is to examine the development of migration processes in West Africa, from the colonial period² to the 21st century, and then to understand the territorial restructuring these migrations have caused and the diversification of actors that drive their current dynamics.

At the outset, however, it is worth viewing these population movements in the present

regional and international context. From this angle, several major trends are noteworthy:

- Only few Africans emigrate outside their continent. In the year 2000, less than one person in 100 aged 25 or more born south of the Sahara lived in an Organisation for Economic Co-operation and Development (OECD) country; this was three times less than in the case of those born in North Africa, and 13 times less than Central America (Beauchemin and Lessault, 2009). Thus in 11 out of 15 West African countries, over 50% of their emigrant citizens remained on African soil. The two countries with the highest proportion of emigrant citizens outside Africa were Cape Verde and Liberia, in Europe and the United States, respectively (UNDP, 2009b). Furthermore, few refugees emigrated beyond the continent.
- Europe is the main destination for the minority of Africans who leave their continent: only 1% of Africans emigrated to Europe. The inhabitants of the poorest countries are in fact the least mobile; according to the UNDP, the median emigration rate in a country with low human development is lower than 4%, compared to 8% in countries with high human development (UNDP, 2009a). In fact, out of 49 million EU residents³ born abroad,⁴ only 0.31%⁵ were of sub-Saharan origin and barely 0.1% of West African

origin⁶, as opposed to over 33% of European origin.⁷ In addition, barely 11% of Africans⁸ residing in the EU were born in West Africa, compared to 25% born in Central Africa⁹ and 55% in North Africa¹⁰ (Eurostat, 2012).

- West Africa is the foremost region for immigration in Africa. West African migration occurs far more within the region than outside it. According to calculations based on population censuses, the region is home to 7.5 million migrants, most of whom are from another West African country, or almost 3% of the regional population. This proportion, which has been rising since 1990, is above the African average (2%) and easily exceeds that of the European Union (0.5%) (SWAC/OECD, 2008). This trend is not new. In 1990, the Network of Surveys on Migration and Urbanisation in West Africa (NESMUWA) recorded 22 000 occurrences of migration from West Africa to the European Union, as opposed to 258 000 such cases between West African countries. In addition, Beauchemin and Lessault (2009) note that “flows towards Europe have been offset by 6 600 cases of migration in the opposite direction. In other words, one in every three departures for Europe has been offset by one return”.

Against this background, migration flows between ECOWAS member states is one of the key issues in the regionalisation process, which:

- is characterised by the intensity of mobility within national territories and the intensity of flows between them;
- results from the activities of actors who manage various networks, old or new, cross-border or global; and
- is supported by international institutions, specifically ECOWAS,¹¹ an area of free movement.

In 2006, at the 30th ECOWAS Ordinary Summit, the Heads of Government¹² mandated the ECOWAS Commission to define a common approach to migration on the part of the member states (which was adopted in 2008).¹³ The same year,¹⁴ the ECOWAS Mediation and Security Council restated this priority when it asked the President of the ECOWAS Commission to “pursue the consultative process for the definition of a common approach to the

management of intra-regional migration and migration to Europe in all its aspects”. This political commitment is derived from the ethos of the founding Treaty of ECOWAS, which in 1975 established freedom of movement as one of its general principles:¹⁵ “Citizens of member states shall be regarded as Community citizens and accordingly member states undertake to abolish all obstacles to their freedom of movement and residence within the Community”.¹⁶ In 1979, the Protocol on Free Movement of Persons, Right of Residence and Establish-



Intra-regional mobility is conditioning West African economic development and political stability.

ment¹⁷ set out the legal standards and methods of applying them, which were planned in three stages: (1) right of entry and abolition of visas;¹⁸ (2) right of residence;¹⁹ and (3) right of establishment²⁰ (Robin, 2009a).

In fact, West Africa is the only African region to have adopted a common approach – which does not reject national identity – a strong symbolic gesture. All of these elements raise the question of regional integration. Yet “areas of regional integration have often originated in a phase of colonial history. Theories of regional integration should therefore be viewed in relation to their context” (Hugon, 2003).

Reshaped migration patterns

Coast-bound mobility: from the slave trade to colonisation

Undoubtedly in West Africa, the colonial period established the basis for a migration system with economic and spatial logics that remained unchanged for more than two decades, stretching from independence until at least the mid-1980s. Therefore, it would be helpful to place the new geography of international migration in West Africa in a historical perspective, in order to identify the transition processes that have shaped its development and gain a better insight into the phenomena stimulating it.

The slave trade sapped the lifeblood of the peoples of West Africa. Colonisation drove them towards production centres developed by the European powers. As Doudou Diene has emphasised, “The slave trade represents a dramatic

encounter of history and geography. [...] The resultant slavery system, an economic and commercial business, linked different regions and continents: Europe, Africa, the Indian Ocean, the Caribbean and the Americas”.²¹

Colonisation succeeded in this first form of “globalisation” and stimulated regional migration, particularly to areas of groundnut cultivation, the “Navetanes”²² of Senegambia, and to the coffee and cacao plantations of the

British Gold Coast. The West African migration system has thus followed the routes of colonial economic regionalisation that endured after the period of independence,²³ its paths linking the Sahelian regions to cash-crop (groundnuts, cacao, coffee) regions and to the coast, mainly along the Gulf of Guinea (Map 3.1). At the periphery, the process of regional integration has been strengthened by the myriad of cross-border movements.

Map 3.1

West African migration flows just after the period of independence



Source: Poutier 1995

At the same time, intercontinental migration essentially flowed towards the industrial (car and steel manufacturing) regions of the former European colonial countries. Thus West African migration combines two areas of movement, from South to South and from South to North. As a result, a bipolar phenomenon shaped by colonial heritage and post-colonial dependency evolved. This process is essentially an internationalisation of the West African migratory system, structured around the South to South or South to North bipolarity, a centre-periphery

dynamic, at the regional and international level, rather than globalisation in the sense of migratory movements and paths to different areas worldwide.

The end of the 20th century: a transition phase

However, the mid-1970s ushered in a period of agricultural crises in the South and industrial crises in the North. The former were local; the latter, international. Together, they contained the seeds of a reshaping of the West African migratory system.

From this perspective, the end of the 20th century was a transition phase. The major historical trends were shifting: the polarity of the coast, initiated by the Arab-Islamic and transatlantic slave trades and fully materialised under colonisation, was weakened. New trends were emerging, characterised by the growing diversity of regions of emigration and immigration and the emergence of transit countries, and the beginning of emigration from the Senegal groundnut basin, heralding the growth of the Mouride diaspora,²⁴ and the emigration of natives from the major urban centres. Dakar thus became the foremost region for Senegalese emigration, overtaking the Senegal River basin, the traditional region for emigration towards Africa and Europe (Robin, Lalou and Ndiaye, 1999).

Up to the beginning of the 21st century, crisis situations in West Africa became more numerous, occasionally intensifying and more persistent. Climatic and chronic agricultural crises, spreading into urban areas by a growing rural exodus, were succeeded by long-term economic and social crises that led to political conflicts on a regional scale.

Meanwhile, the control of international migration became a firm priority on the political agenda of states in the North, particularly European. From 1973–74, the western European countries decided to halt all forms of immigration of workers. In 1995, the Schengen Agreement came into force and defined an area of free movement of persons between the signatory and associated states, at the same time ensuring stronger protection at the outer borders of the area.²⁵ Some of the ensuing measures (in particular the new air transit visa) have weakened and impacted the spatial restructuring of mobility in West Africa.

In West Africa, this period was marked by a weaker regional economy, while cross-border trade continued and the spatial dimension of international migration evolved. The rules underlying the globalisation of West African migration became discernible, announcing a profound restructuring of the migration that until then had been driven by colonial domination. This was no longer just a matter of cyclical adjustments in reaction to the chronic economic crises arising from the succession of

droughts in the 1970s and 1980s (Lalou, 1996), but a fundamental change in the rationale underlying the West African migratory system.

New spatial patterns at the advent of the 21st century

These changes were encouraged and sustained by the development of the urban network, the emergence of a more structured transport network, and the development of new information technology networks.

Population growth in West Africa has resulted in considerable mobility of people within the region, which in turn is restructuring population settlement. At the same time, the urban network was evolving: the region was no longer solely polarised by the big coastal hubs, but also structured around a network of secondary towns situated “in between”, from the Sahara to the Gulf of Guinea. In addition, as national urban networks become denser, “they connect with each other” (SWAC/OECD, 2006) and thus facilitate the mobility of persons (Metropolisation and networks of towns).

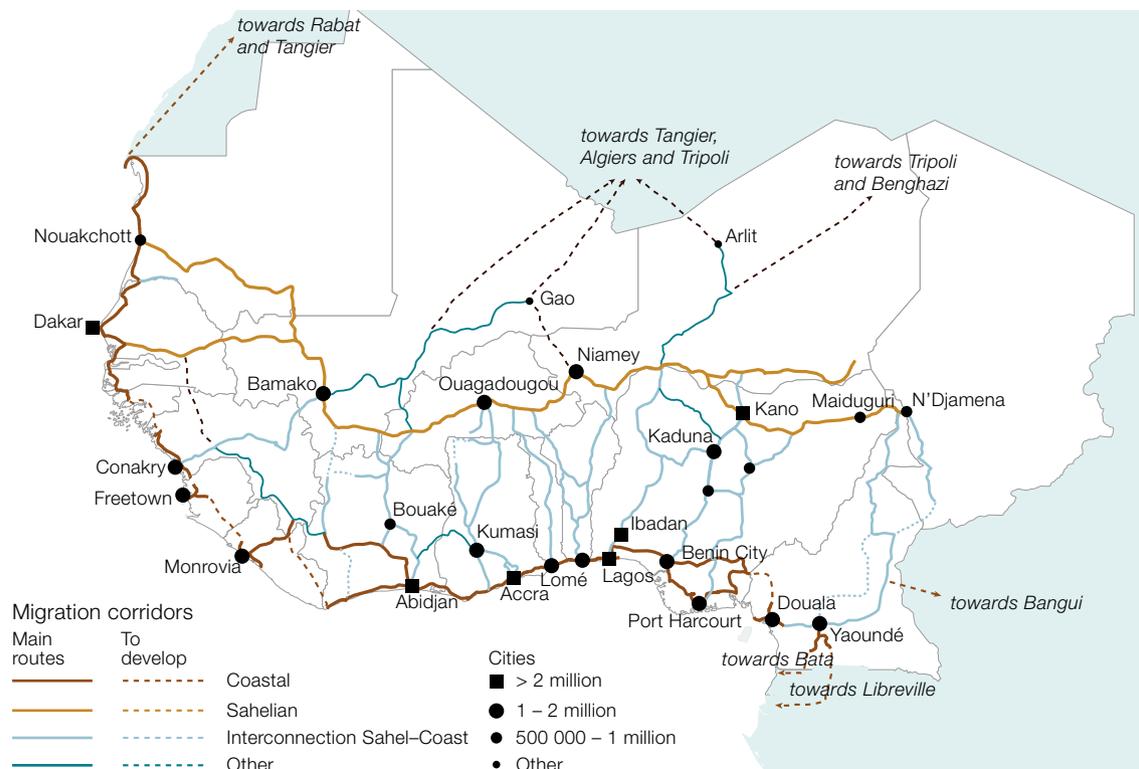
Also, a transport network emerged that is structured around two dominant east/west routes: (1) the coastal route, or “pioneer-axis” that is in transition and affected by the regional and global economic crisis; and (2) the Sahelian route, with its towns increasingly influencing the development of the urban network. Furthermore, both routes are linked by north/south and

« The region was no longer polarised by the big coastal hubs, but has become structured around a network of secondary towns situated in between these coastal hubs.

south/north routes connecting the capitals of the Sahelian countries (Niamey-Ouagadougou-Bamako) to the big ports in the Gulf of Guinea. At the same time, the organisation of regional transport is changing with the densification of the road infrastructure network (Map 3.2). As a result, two major east/west routes are developing and contributing to the emergence of new migration corridors based on “[...] an alignment [...] between the main urban network and the primary road system” (SWAC/OECD, 2006). There is also an “emerging” middle route.

Map 3.2

Towns, cities and traffic corridors in West Africa



Source: Regional Atlas on West Africa, SWAC/OECD 2009

In addition, the spectacular spread of mobile phones is undoubtedly one of the keys to the regionalisation of international migration patterns that are increasingly linked to globalisation. [Map 3.3](#) shows areas covered by at least one mobile phone operator in West Africa. Major regions of emigration clearly stand out, such as the groundnut basin in Senegal or the Kayes region in Mali. The importance to migrants of the telephone as a means of communicating with their families or communities of origin is undisputed. Migrant associations thus funded the connection of their villages to the telephone network, even though they may not yet have been on the electricity grid. However, the spread of the Global System for Mobile Communications (GSM) in certain sparsely populated, hard-to-access areas is at first sight astonishing. Yet these outlying settlements are a further reminder of the roads and transport intersections used by migrants wishing to follow land routes leading to the gateways of Europe via the Sahara. Thus the establishment of the GSM is now an essential aspect of the organisation and management of smuggling networks. The mobile phone has become an

instrument for facilitating and speeding up the spread of information.

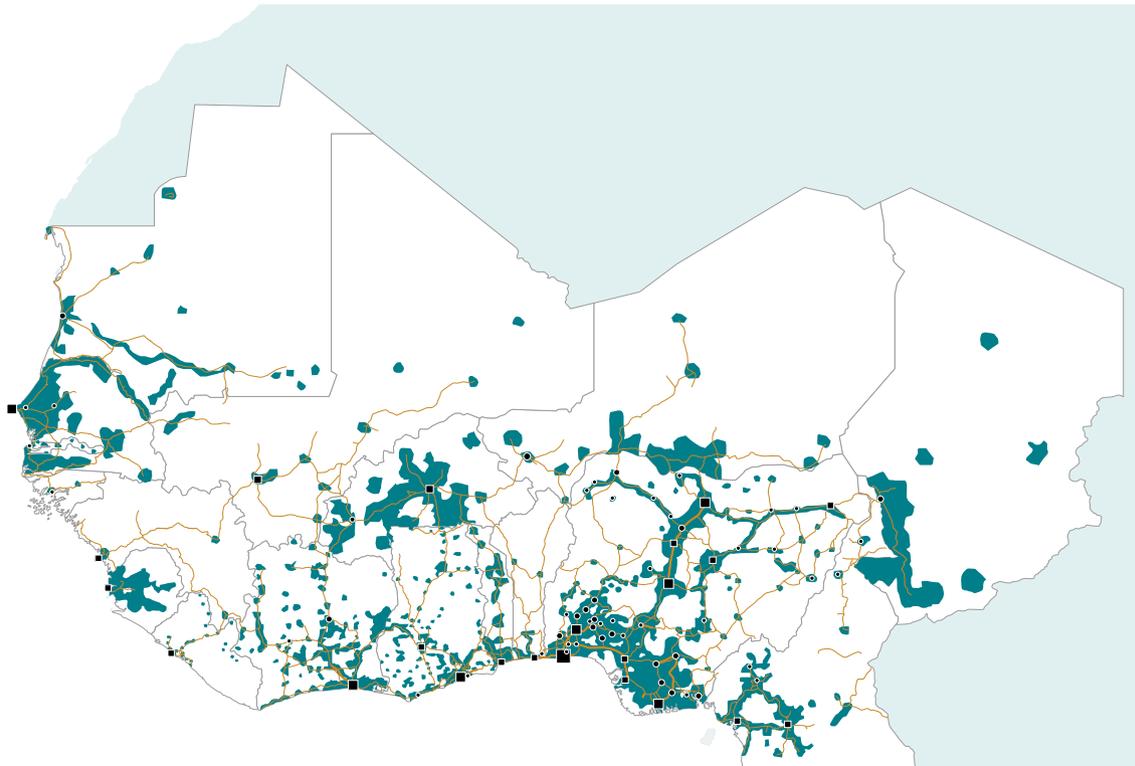
The political space for the free movement of persons is today boosted by the vitality of the virtual space of new information technology. More generally speaking, the emerging transport network links the national urban networks to each other; together they promote the renewed regionalisation of international migration flows, which is itself supported by the development of new information technology.

All these factors contribute to a radical transformation of regional migration patterns, which in the past were primarily drawn to economic hubs along the coast and are now focused on the hinterland around the edge of the Sahara. In this context, the capitals of Niamey, Ouagadougou, Bamako and Dakar are an East to West and West to East route of high traffic, incorporated in the global networks.

The beginning of the 21st century is therefore characterised by a geographical transformation and spatial redistribution of international migration ([Map 3.4](#)), which constitutes an essential force for a new form of regionalisation.

Map 3.3

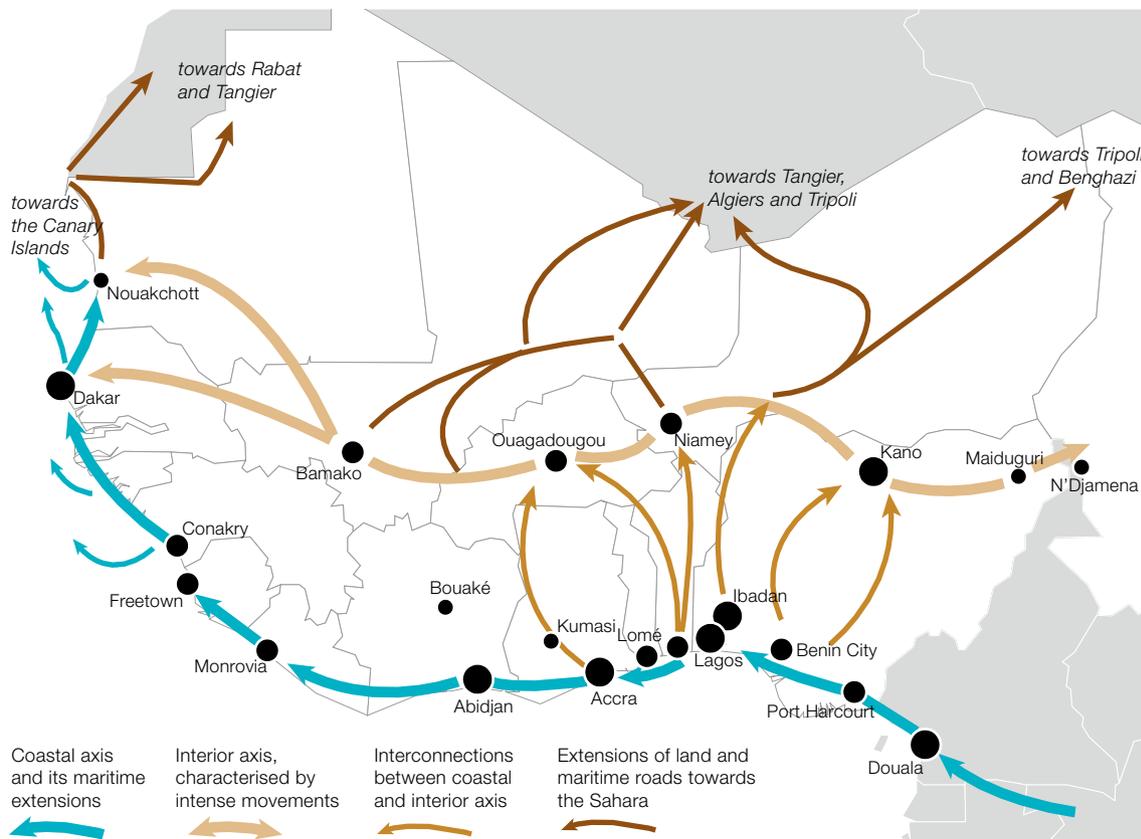
GSM coverage in West Africa, 2006



Sources: GSM World 2007; SWAC/OECD 2007

Map 3.4

Geographical transformation and territorial redistribution of migration in West Africa



Summary diagram by Nelly Robin, CEPED (IRD) 2009

Diversified motivations and actors

The motivation of migrants, states and traffickers is becoming more diversified. Depending on the time and place, their operational principles are either reinforcing or conflicting. This growing importance of actors is the result of various factors that are both endogenous, stemming from socio-political crises affecting the countries in the region; and exogenous, in their use as a hub for human trafficking or as an external border of the Schengen area. All such factors are interrelated and contributed to the appearance of new migrants, local or from other regions, and new routes which often revived former trade or migration itineraries.

Thus, several thousand immigrant workers in Côte d'Ivoire returned to their country of origin after the attempted coup d'état of 19 September 2002. These returns gave rise to new intended emigrants who are contributing to the restructuring of regional migration patterns. Former immigrants to the Côte d'Ivoire, or new emigrants from communities who have been weakened by the return of their native citizens, are all seeking fresh opportunities, especially in the direction of the EU, in which contacts may be established with relatives who

The migration pattern changes reflect people's ability to adapt to the social and political contexts of their countries of origin.



have previously emigrated. In a study on the Centre d'Information et de Gestion des Migrations (CIGEM, or the Migration Information and Management Centre)²⁶ in Mali, Natsuko Funakawa (2009) states that most returning migrants received by this centre come from Africa, and rarely from Europe. Among them, many are involuntary returning migrants – meaning “people who have not chosen to return to their country of origin of their own accord” – come in part from Côte d'Ivoire. Most of them wish to leave again; these new prospective emigrants chose Europe and favour land routes.

The recordings at the Kidira land border post, between Senegal and Mali, of entries and exits of West African citizens are indicative of these recent trends. Until 2003, Kidira was one of the crossing points of sub-Saharan immigration into Senegal. From 2005 onward, this border town also became an exit point

towards the trans-Saharan routes. In 2005, over 15 000 Malians entered Senegal via this border post while, in the same year, approximately 11 000 crossed it in the opposite direction.²⁷ Besides the very active cross-border trade in the area, migrants travelling along these routes transiting through Senegal attempt to reach Europe over land and then by sea, either via Niger, Algeria and Libya or Morocco, or via Mauritania, Morocco or the Canary Islands. This border post stands on the extension of two land routes converging towards Bamako: one relatively short route comes out of Niger, while the other longer route links Congo, Cameroon and Nigeria, and then follows the Gulf of Guinea coastline (Benin, Togo, Ghana) before veering towards Burkina Faso and Mali.

The Côte d'Ivoire crisis affecting the region as a whole also led to a redistribution of the population in other countries. Thus the 2006 general census of the population and settlement in Burkina Faso recorded 610 805 returning migrants from Côte d'Ivoire between 1996 and 2006. In addition, “the census carried out by the Provincial Committees for Emergency Assistance and Rehabilitation indicated, for example, that 10% of “repatriates” settled in the Poni region and 4% in the Comoé region”, both in the southwest of Burkina Faso (Ouédraogo and Dabire, 2009). Ouédraogo and Dabire (2009) state that “the data from a recent survey confirm the size of the flows towards the southwest and Cascades regions. [Indeed], 60% of the migrants recorded arrived between 2000 and 2007, and 50% after 2002. [...] The events in Tabou²⁸ triggered a continuous flow of returning Burkinabe citizens, a movement that reached a climax with the events of 2002”. It should be stressed that such returns are not necessarily to the regions of origin of migrants. The Ivorian crisis also obliged some migrants to revise their travel plans “as they went”.²⁹

These changes occurring in the development of current migration patterns reflect the ability of migrants to adapt to the social and political contexts of their countries of origin, transit or host countries, which are constantly varying. Indeed, while West African emigration today is still driven by economic considerations, the latter are increasingly tied to political factors, linked to the conflicts and retreat from democracy affecting a growing number of West African states. “In this sense, the current Malian

crisis has undoubtedly had repercussions on migration patterns in the Sahel; but we do not yet dispose of information needed to assess the evolution of the situation". On 10 July 2012, the UNHCR issued the following statement: "the political instability in Bamako and insecurity in northern Mali continue to trigger the flight of thousands of refugees to neighbouring countries or other regions of Mali. Over 365 000 people are estimated to have been displaced since January".

Multiple mobilities contribute to the emergence of the spatial dynamics shaping and structuring West Africa. These migration

motivations are combining with economic and political motivations, which together are instrumental in the development of a "regional reality", itself linked via different mobility systems to a variety of areas in the world. Simultaneously, globalised networks are integrating West Africa into their migration strategies, exploiting the political scope (ECOWAS)³⁰ or hard and soft infrastructure for migration offered by the region. Today, West African migration is not only connected to the world through the flow of international migration, but also organised by globally active migration networks.

3.2 MULTIFACETED URBANISATION

The many regional forms of mobility, along with the demographic forces linked to them, are contributing to the dynamics of population settlement. The development of urbanisation is one of its manifestations. It assumes two forms: (1) the growth of major cities; and (2) the growth of a network of small and medium-sized towns. The first form is linked to the integration of national economies into the international economy and began rapidly, before slowing down from the 1980s onwards with the onset of the financial and economic crises. As a response to these shocks, a second form of urbanisation has come to the fore and promoted the development of the domestic market (national and regional), particularly for agricultural products. This network of small- and medium-sized towns provides the essential hubs for the spatial organisation of domestic markets. These towns are the "connective tissue between rural and urban areas. They act as market centres for agricultural and rural output, as stimulators of rural non-farm activity, as places for seasonal job opportunities for farmers, and as facilitators of economies of scale" (WDR, 2009).

Growing urbanisation at a slower pace

As the countries in the region have populations of very different sizes – ranging from a few hundred thousand (Cape Verde) to over 100 million (Nigeria) – the comparison of levels of urbanisation says more about the transformation in regional settlement than does any comparison of the size of urban populations.

The level of urbanisation (U/P) grew rapidly between 1950 (8%) and 1980 (26%) and continued to grow, albeit at a slower pace, between 1980 and 2010 (41%) (Table 3.1). This regional trend towards a lessening in the urbanisation growth rate after 1980 is common to all countries, with towns still growing but at lower rates (Map 3.5). This second phase coincides with the structural adjustment programmes (SAPs). In addition, for producer countries, the cacao crisis from 1988 to 1992 coincided with the SAPs. As a result of these shocks, the development of secondary towns is becoming more pronounced.

Coastal urbanisation is getting denser with larger and more agglomerations. Also, an urbanised strip has emerged, in the south of the landlocked countries and in the north of the coastal countries. In addition, an urban network along the port-centre corridors (south-north) is also becoming apparent.

The regional level of urbanisation is strongly influenced by that of Nigeria, which accounts for half the population in the region. Compared to the regional average, urbanisation levels in the different countries varied from 21% (Niger) to 59% (Togo) in 2010 (Table 3.1).

Eight coastal countries (Togo, Cape Verde, Côte d'Ivoire, Senegal, Liberia, Benin, Ghana and Gambia) have a level of urbanisation above or close to 50%. With the exception of Mauritania, most countries with levels between 30 and 50% are still experiencing periods of crisis or political conflict. However, levels in Liberia rose from 17 to 51% between 1970 and 2010, and in Sierra Leone from 15 to 38% in the same period.

Table 3.1

Level and pace of urbanisation

	1950	1980	2010	1950–1980	1980–2010
Benin	4%	35.3%	49.2%	7.6%	1.1%
Burkina Faso	2%	12.2%	30.3%	5.7%	3.1%
Cape Verde	10%	25%	58%	3.2%	2.9%
Chad	3%	15%	22%	5.6%	1.3%
Côte d'Ivoire	7%	36%	55%	5.7%	1.4%
Gambia	11%	27%	48%	3%	1.9%
Ghana	13%	31%	49%	3.1%	1.6%
Guinea	4%	25%	32%	6.3%	0.9%
Guinea Bissau	9%	21%	41%	2.9%	2.3%
Liberia	3%	26%	51%	8.1%	2.3%
Mali	4%	15%	24%	5%	1.6%
Mauritania	0%	21%	35%	-	1.9%
Niger	2%	11%	21%	5.4%	2.2%
Nigeria	10%	27%	42%	3.4%	1.5%
Senegal	15%	41%	52%	3.4%	0.8%
Sierra Leone	6%	22%	38%	4.4%	1.9%
Togo	8%	37%	59%	5.2%	1.6%
West Africa	8%	26%	41%	4.0%	1.5%

Sources: Africapolis 2008; SWAC/OECD 2012.

In Mali, Chad and Niger, three landlocked countries, levels stand below 25%. Burkina Faso, which at the beginning of the 2000 belonged to this group of countries with low-levels of urbanisation, experienced strong growth (2.5% annually) in the level of urbanisation between 2000 and 2010. The growth rate in the level of urbanisation for Chad was 1.7% for the period from 2005 to 2010, an increase compared to the preceding five-year period (1%). However, it is difficult to attribute this acceleration to the calmer period experienced by the country in the last two years.

Urban concentration and the development of secondary towns

Today, urban settlements cover 0.2% of the region's land area³⁷ (Moriconi-Ebrard, 2011).

This type of land cover may assume various forms, from the concentration in a primary city to an even distribution across the territory. It is important to examine the spatial distribution of urban concentration, as this is indicative of the stage reached in the urbanisation process. Also, the linkages between these different points in the network will be considered.

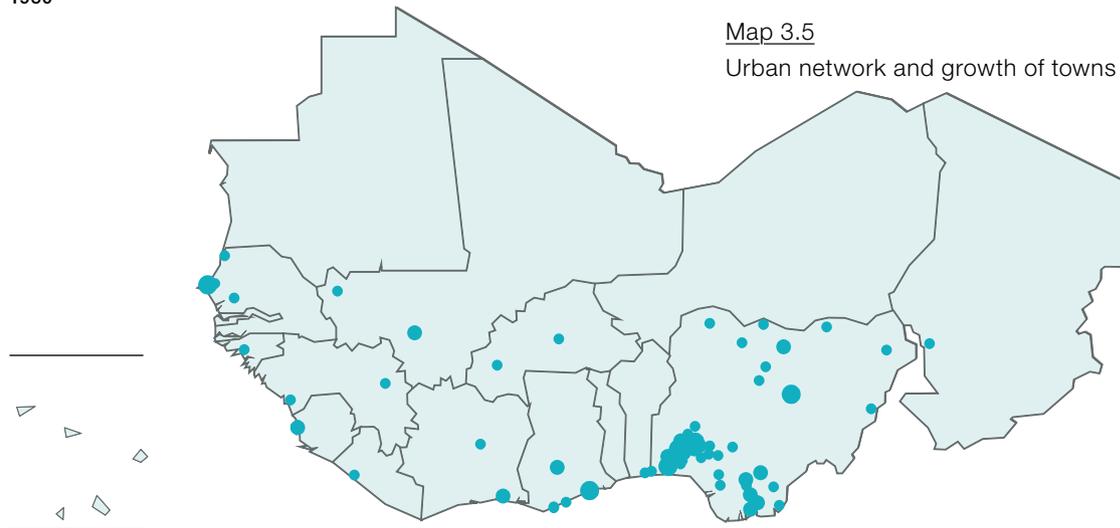
Macrocephaly – the concentration of the urban population in a country's foremost cities – is a common feature of urbanisation in sub-Saharan Africa. It is reflected in the dominant influence of a single city, most often the capital, at the expense of other urban centres. It may be measured by the share of the first city's population (or the first two) in the total urban population.

Senegal and Côte d'Ivoire are strongly macrocephalic, with 47 and 38% of their urban

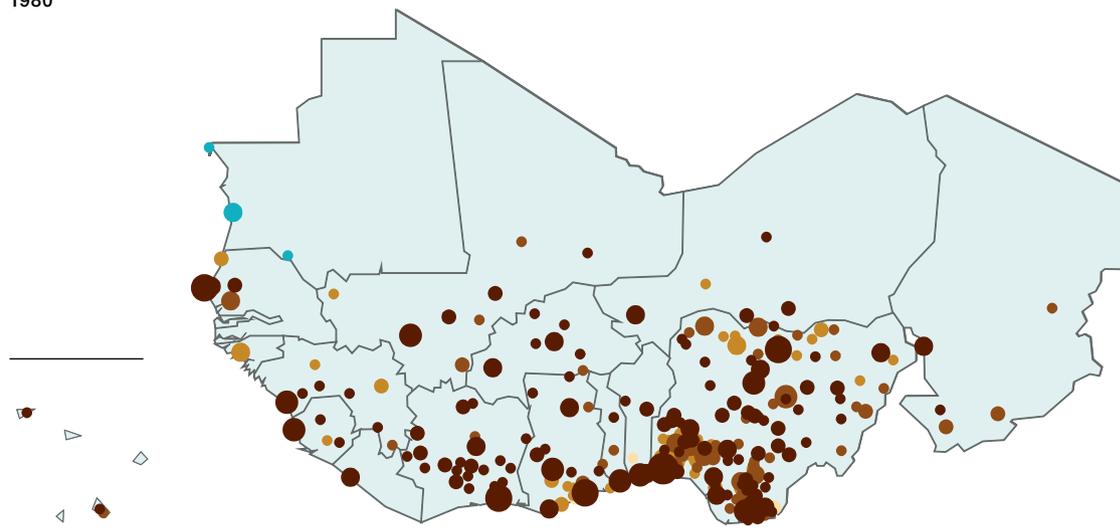
1950

Map 3.5

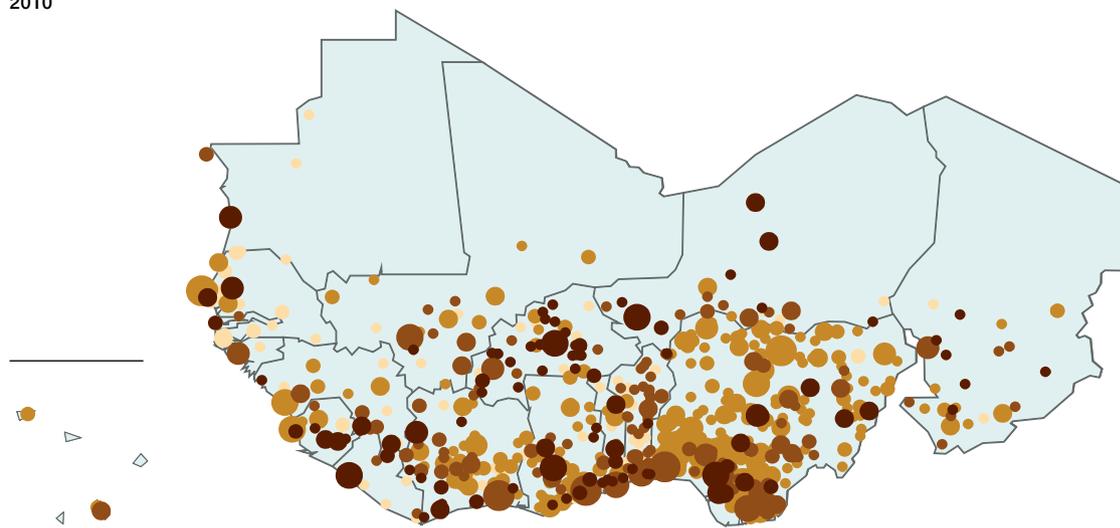
Urban network and growth of towns and cities



1980



2010



Growth of city population,
1950 – 1980 and 1980 – 2010 (%)

- Not applicable
- < 200
- 200 – 299
- 300 – 400
- > 400

Cities, inhabitants

- 20 000 – 50 000
- 50 000 – 100 000
- 100 000 – 350 000
- 350 000 – 1 million
- 1 – 2 million
- > 2 million

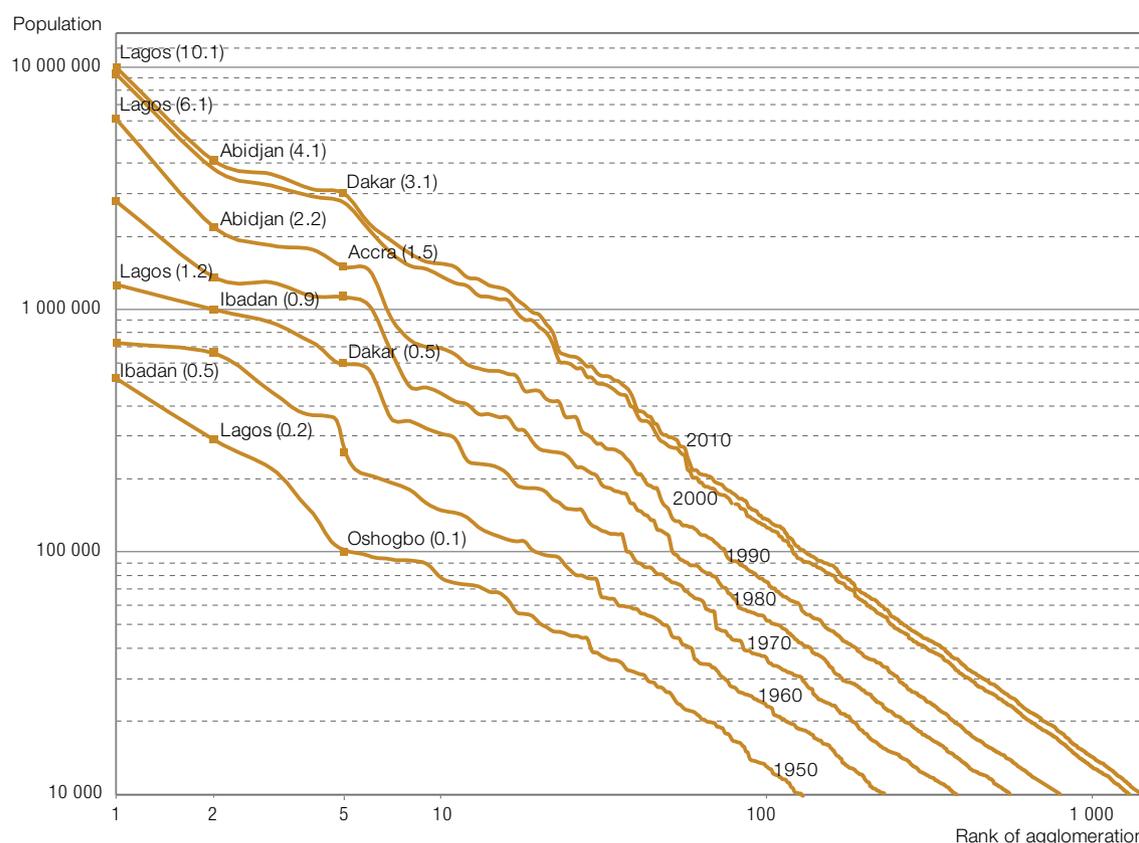
Source: Africapolis 2008; SWAC/OECD 2012

populations respectively, concentrated in Dakar and Abidjan.³² In some countries there may be two major cities, often the economic capital and the political capital, and occasionally several competing with each other in terms of population. This applies in particular to Nigeria, in which Lagos, Ibadan and Kano each has a population of between 2.5 million and 10 million. Macrocephaly is higher in the small coastal countries that trade directly with the rest of the world. Also, the phenomenon is more marked in countries in which the primacy of a city dates from the 1960s. However, while macrocephaly is marked within many West

African countries, it is disappearing at a regional level.

Urban growth in West Africa affects not only the largest urban centres but also small and medium-sized ones (Figure 3.1). The cumulative rank/size distribution of towns at the regional level appears close to “Zipf’s law”³³ (or “Pareto’s law”).³⁴ It is the commonly observed distribution of urban centres according to their rank where the biggest city is twice as populated as the second biggest, three times more than the third, and so on. The West African distribution is comparable to the majority of other world regions.

Figure 3.1
Distribution of urban settlements 1950–2010



Sources: Africapolis 2008; SWAC/OECD 2012

Although by 2010 Lagos, the largest city, moved ahead compared to the next four largest cities in the region (Abidjan, Accra, Ibadan and Dakar), it did not achieve outright primacy (defined as a size ratio greater than or equal to 5 with respect to the second city). This can be interpreted as the progressive integration of the regional market. Simultaneously, the reorganisation of the urban structure and the dynamic

growth of small towns illustrate the settlement process at work in the region. Indeed, a parallel shift in the curve is observed over time, implying a steadily increasing number of towns, all of which are growing (although their rank may vary). The number of centres with a population of over 5000 rose from approximately 500 in 1960 to around 1500 in 1990, and to 2800 in 2010.

Overall, the share of the population of secondary towns in the urban population of countries is increasing. The authors of *Africapolis* (2008) detected in this the beginning of the urbanisation process, in which countries in the region have reached different stages: one of initial urbanisation based at the outset on a small number of settlements; then the appearance and development of secondary towns until the urban network is large enough for the pool of rural migration to start dwindling. Finally, when the demographic transition is accomplished, the number of urban centres and the urban population level out, with some centres losing ground to others.

Metropolisation and networks of towns

Different forms of equilibrium are developing between the leading urban settlement and

secondary ones, in accordance with their roles in the urban network and the influence of the dominant city. These phenomena are a means of understanding the potential linkages and scope for movement and trade between places.

Some forms of equilibrium result from the metropolisation of one or several urban settlements within the urban network. Metropolisation is defined by political and economic power and the ability to interact with the global urban network. Hence, what leads urban settlements to become metropolises depends more on their capacity for connectivity³⁵ and connectedness³⁶ than population density or the scale of their infrastructure (Bavoux *et al.*, 2005; Levy and Lussault, 2003). By analysing the population distribution between the first and second agglomeration, it is easier to understand imbalances (in terms of population) and the developmental stages in urbanisation (Box 3.1).

Box 3.1

Glossary of metropolisation

“Metropolisation is a notion built through extension of the term ‘metropolis’ (etymologically: the mother-city) in order to designate a process of qualitative transformation, both functional and morphologic, of very large cities (Leroy, 2000; Moriconi-Ebrard, 1996; Ascher, 1995).

Compared to the classical concentration process represented by cities in general, metropolisation is characterised by an increase of weight of the largest cities in the distribution of some functions, as well as by the concentration of population in metropolitan areas. Contradicting some ‘forecasts’ about the decline of big cities, the metropolisation process relies on a networking of the main agglomerations in which phenomena of connectivity tend to prevail over proximity relations.

Functional mutations of the largest cities generate re-compositions in urban morphology. Besides phenomena of urban sprawl, metropolisation implies, in numerous cases, the formation of a discontinuous and heterogeneous internal structure, which in periphery alternates

areas of low density and secondary centralities (e.g., edge-cities, business centre, technopolis). The combination of these processes leads to formation of ever more fragmented urban spaces, which question the models of distribution of city dwellers or of activities in relation to a single centre, such as those of W. Alonso or of C. Clark.

Interpretations vary as to the logic underlying the metropolisation process. Some like F. Moriconi-Ebrard see in metropolisation the logical outcome of a settlement system favouring concentration. This author proposes a metropolisation ratio verifying that for the same urbanisation ratio, the number of inhabitants living in the metropolises of a country strictly depends on its size. On the other hand, others such as P. Veltz see the territorial result of post-Fordist regulation modes combining the uncertainty of the economic situation and flexibility of the job market. Californian geographers such as A. Scott or M. Dear insist on relations between functional and social mutations of very large cities and new forms of urban territoriality.”

Two indices can be used to illustrate the equilibrium of an urban network: the index of primacy and the index of macrocephaly (Box 3.2). Both are independent of the level of urbanisation of the territory considered. Table 3.2 presents the indices for Togo and Nigeria. In Togo, Lomé was the primate city for the years 1950, 1970 and 2010. In Nigeria, Ibadan held this position in 1950 and 1960, and since then Lagos.

In 2010, the primacy of Lomé (P_i) over the second city, Sokodé, was lower than in 1970. The increase in the index of macrocephaly (M_i) over the period shows the significant influence

Lomé accumulated within the Togolese urban network. The difference in terms of population between Lomé and secondary towns grew from 29.2 in 1970 to 133 in 2010. However, the rise in the R_m value – the number of secondary towns that would have to be added to equal the size of the biggest city – from 18 to 58 shows that the change in the relative importance of Lomé was attributable to an increase in the number of urban centres and not a higher concentration of the population in those already existing in 1970. A growth in the number of urban centres was thus paralleled by a trend towards more polarised dominance of the main city.

Table 3.2

Indices of primacy and macrocephaly in Togo and Nigeria

	1950	1970	2010		1950	1970	2010
Togo P_i	3.82	7.05	2.07	Nigeria P_i	1.79	1.27	3.18
Togo M_i	6.34	29.22	133.00	Nigeria M_i	5.64	3.42	11.40
Togo R_m	7	18	58	Nigeria R_m	4	3	7

Source: SWAC/OECD 2012

Box 3.2

Definitions of the indices of primacy and macrocephaly

Index of primacy

The index of primacy (P_i) compares the population of the largest urban centre P_1 to that of the second largest P_2 by simply dividing the two numbers. This ratio indicates the relative primacy of P_1 over P_2 .

The ratio is limited in not accounting for the fact that the difference between P_1 and P_2 may be modest; while the nature of the urban network might be explained by the differences between P_2 and P_3 or between P_3 and P_4 . The index does not capture situations of bi- or multi-polarisation within a network.

Index of macrocephaly

The index of macrocephaly (M_i) qualifies the relation between the largest urban centre and the urban network. It is calculated by dividing P_1 by the population of city ranked R_m+1 , where

R_m is the number of secondary cities that would need to be added to reach the population of P_1 .

This index provides information about imbalances between the urban and rural population. However, it is less used as it requires information that is sometimes unavailable. R_m is an indicator of the growth of all urban centres comprising the network. A high M_i index shows that a centre has significant macrocephaly vis-à-vis the entire urban network; it may thus be said that it operates just like a metropolis. Concomitantly, the corresponding R_m indicates the influence of this city within the network. While the relative impact of an urban centre may be substantial, it may wane over time; this is what is expressed when R_m is high. It thus points to strong urbanisation resulting from the emergence of new urban settlements rather than the growth of existing ones.

In Nigeria, the difference between the first and second city was slight between the 1950s and 1970s before growing in 2010. At the same time, *Mi*, the index of macrocephaly, remained at a low level at which a small number of urban centres had to be added to equal the population of Lagos. Thus while the primacy of Lagos grew in relation to the secondary city, it did not rise as much as in Togo with respect to the domestic urban network. Instead, there was a discernible increase in the population within existing urban centres. Nigeria is more illustrative of a multipolar situation. These examples shed light on the different stages of urbanisation in the region.

Therefore, urbanisation in West Africa assumes a wide variety of forms, and its pace varies. It comprises the following successive stages, like those that have occurred elsewhere in the world, linked to economic and social development:

- *original urbanisation*, i.e. the emergence and growth within rural areas of entities displaying urban features (particularly the appearance of non-primary activities), in conjunction with the development of a local trade economy still tantamount to a rural economy;

- the growth of *hierarchical urbanisation*, as the trade economy expands to broader levels, largely associated historically with the organisation of nation states and national markets, with the corresponding phenomenon of primacy; and
- *concentrated urbanisation* (ad hoc), linked to economic expansion at the global scale, notably the industrial economy and then of the service economy, driven by economies of scale made possible by the lowering of transport costs and the associated decline of national influence over the economy.

Urbanisation and the restructuring of rural population settlement

Simultaneously to urban growth, the rural population more than doubled (2.6) between 1950 and 2010, rising from 66 million to 172 million. The growth rate peaked in 1981 (2%) before starting to decline. There was a short acceleration in growth at the beginning of the 2000s (the annual average growth rates for the 1990s and 2000s are similar). The long-term trend of declining rural growth is set to continue (Chapter 5) and lead to a smaller rural population in 2050 (Box 3.3).

Box 3.3

The concept of rurality in West Africa

The concept of rurality is the subject of long-standing debate and controversy. From this debate, three criteria defining rurality have been selected:

- Population density and the size of human settlements: typically rural areas have low population density and small, scattered human settlements.
- Land use and the predominance of agriculture and forestry: limited area covered by buildings.
- “Traditional” social structures and community identity and heritage issues.

The typology of regions is determined in relation to their degree of rurality (predominantly rural, significantly rural, or predominantly urban). The

proportion of the population from basic rural communities (first level units) determines the degree of rurality of regions.

The thresholds generally used to distinguish regions are over 50% for the “predominantly rural” and between 50% and 15% for “significantly rural” regions. These criteria respond inadequately to changes in rural societies and to their differences, whether in West Africa or elsewhere in the world. Consensus has yet to be reached to define and characterise rural areas and rurality in a coherent and uniform manner, with a view to understanding all the dimensions of rural development and building the basis needed for the development of related statistics and analysis.

Source: Regional Atlas on West Africa, SWAC/OECD 2009

“As long as the volume of production is essentially a function of labour employed, urban markets, regional and global, stimulating marketed agricultural surplus production and setting relative prices for producers, constitute the main determinant for the location of rural settlements in sub-Saharan Africa” (ISTED, 1995).

The process of urbanisation is restructuring national and regional rural settlement patterns. Besides substantial migration towards urban centres, intra-rural mobility and a restructuring of settlement towards fertile agricultural areas are occurring. At the regional level, rural settlement patterns are very urban-oriented in the sense that settlements are becoming denser, controlled for ecological conditions, around urban centres and following infrastructure networks.

Except in a few agricultural regions, rural population is concentrating in areas close and well connected to towns and cities (Map 3.6). Thus heterogeneity of rural population density has similarly increased: today 15% of the rural population live in high-density areas of over 150 inhabitants per km², covering only 2% of non-desert land areas.

The growth of a dense network of urban areas has reduced the average distance between villages and urban centres. The average distance between urban agglomerations of more than 10000 inhabitants has been divided by three since 1950, from 111 km to 33 km. In addition, the remoteness of rural areas has been radically reduced by the revolution in mobile telephony

The process of urbanisation is restructuring national and regional rural settlement patterns.



that began barely a decade ago. These “new connections” are providing new opportunities for increasing numbers of West Africans, both rural and urban. They have greatly improved and contributed to the inclusion of rural communities within the market economy.

To measure the intensity of interaction between food-producing areas, which are essentially rural, and the towns and cities in which these food products are processed and consumed, the West Africa Long-Term Perspective Study (WALTPS, 1998) introduced the concept of “market tensions”, reflecting the

intensity of the “signal” sent out by towns to their hinterlands (Box 2.1).

A distinction is thus apparent between areas strongly linked to the market, those linked up to a point, and those only tenuously connected to it. “The density of rural settlement indeed firmly correlates with market tension: the more an area is exposed to the market, the higher the density of its population. In the West African context, this relation accounts more satisfactorily for the strong variations in population density than agro-ecological criteria, whose influence is only very significant at high levels of population density” (Cour, 2007).

These forces underlie a market development process, expressed by a group of towns joined by transport and communication networks, which drives the transformation of agricultural production systems. Rural areas with the largest population and most effectively connected to towns and markets are more diversified local economies. Yields and agricultural labour productivity are also higher in these areas (Chapters 4 and 6).

Evolution of the relationship between urban and rural population

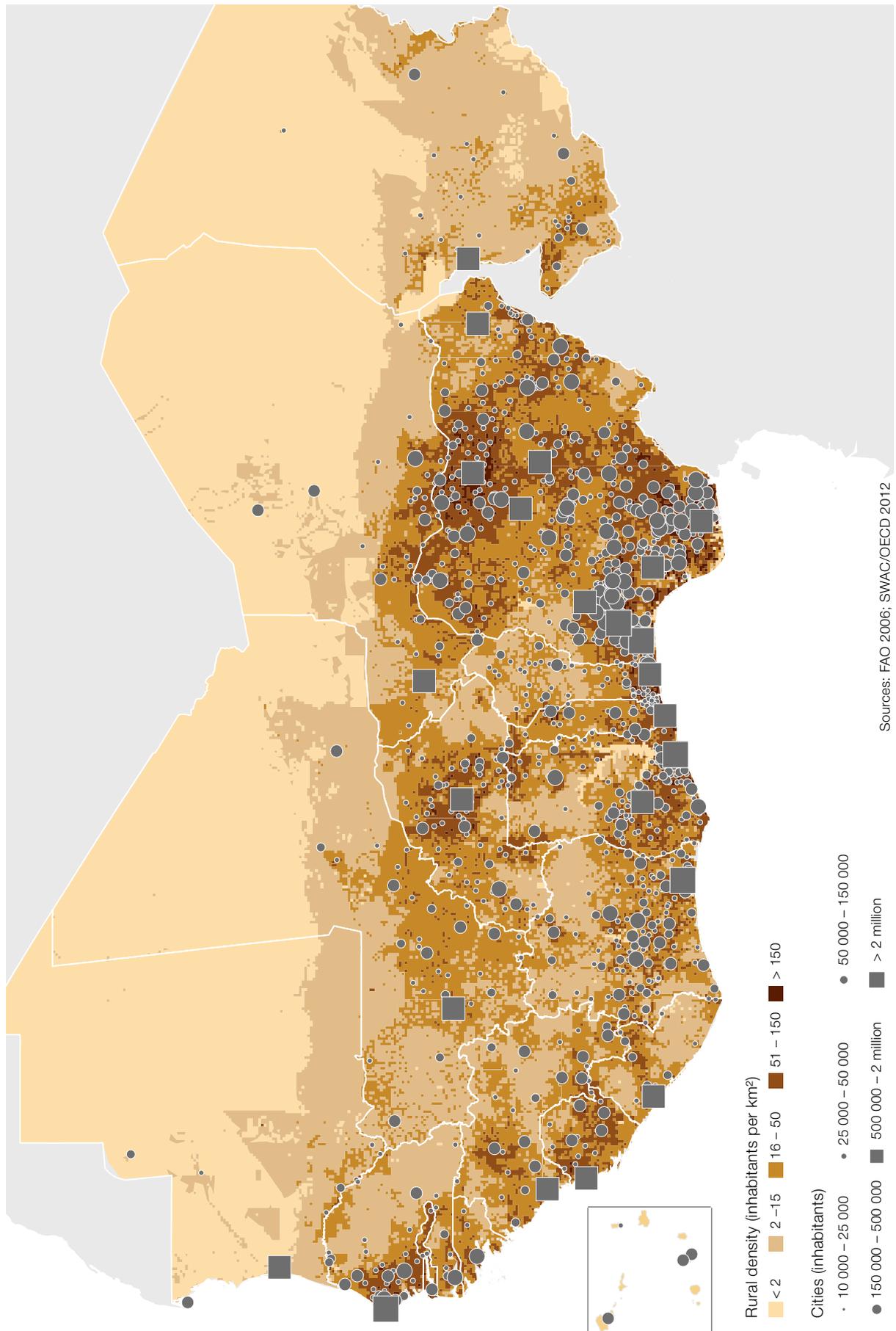
These rapid and profound transformations have corresponded to the evolution in the relationship of urban to rural population. On the one hand, urbanisation has created a growing market for agricultural production; on the other, upstream and downstream economic activities of agricultural production (e.g., inputs, marketing, processing) have sustained and driven the development of the network of small and medium-sized towns and big cities alike.

The ratio between urban and rural population (U/R) measures, as a first approximation, the relation between non-food producing consumers – mostly urban – and food producers – mostly rural. Its evolution over time and across the region has had implications for food security: relative decline in the number of rural people in relation to the number of urban dwellers, a growth and concentration of the latter, and a change in the spatial relationship between both groups.

The number of urban dwellers for every rural inhabitant increased sevenfold between 1950 and 2010, from 0.09 to 0.68 (Figure 3.2). Potentially, therefore, a West African farmer

Map 3.6

Rural density and urban network in West Africa, 2010



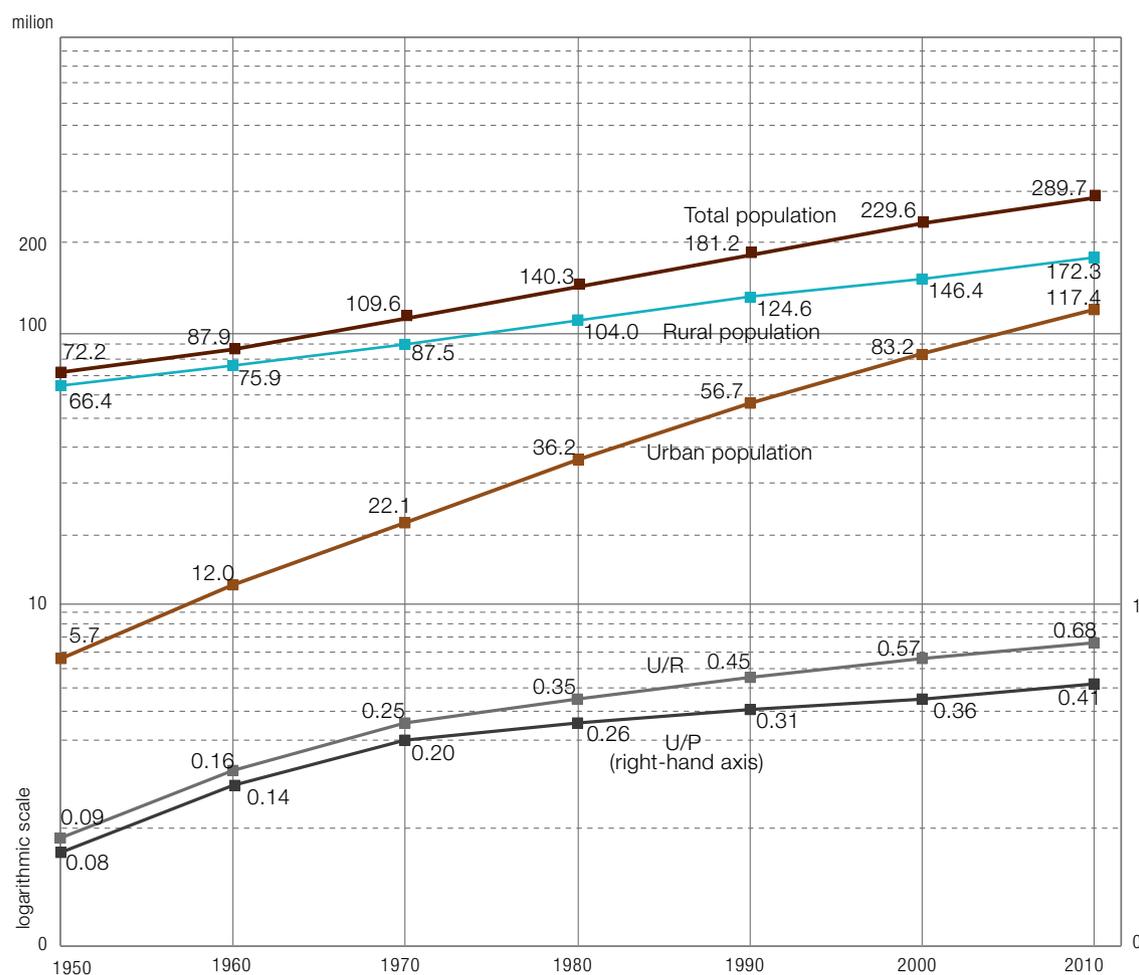
today would be able to sell on average seven times more food to consumers in the region than in 1950. Over a generation, this trend in the U/R ratio has led to new characteristics of food insecurity.

Parity between urban and rural populations has not yet been reached, which means that there are still more rural than urban dwellers and, thus by approximation, more food producers than non-food-producing people. Parity will be reached by 2020. At the global level, this happened in 2005. There are big country variations at the regional level with countries with a U/R ratio greater than 1, such as Togo, Cape Verde, Côte d’Ivoire, Senegal and

Liberia, and others, Niger, Chad and Mali with a ratio of around 0.3 (Table 3.3). This relation also affects population projections, as fertility falls faster with urbanisation. The population growth rate should therefore become markedly slower when urban/rural parity is reached.

The indicator undoubtedly confirms the relative decline in the number of rural people compared to the number of urban dwellers. It reveals the growth and concentration of the urban population and the change in the spatial relationship between the two groups. However, it provides an unsatisfactory approximation of the evolution in the relation between the agricultural and non-agricultural population.

Figure 3.2
Total, rural and urban population



Source: SWAC/OECD 2012

Table 3.3
Evolution in the U/R ratio in West Africa

	1950	1960	1970	1980	1990	2000	2010
Benin	0.04	0.13	0.24	0.54	0.70	0.84	0.97
Burkina Faso	0.02	0.04	0.07	0.14	0.23	0.31	0.43
Cape Verde	0.11	0.18	0.22	0.33	0.56	0.93	1.39
Chad	0.06	0.10	0.17	0.28	0.32	0.51	0.61
Côte d'Ivoire	0.03	0.07	0.11	0.18	0.21	0.24	0.29
Gambia	0.07	0.16	0.35	0.55	0.71	0.87	1.20
Ghana	0.13	0.10	0.19	0.38	0.58	0.80	0.93
Guinea	0.14	0.27	0.39	0.45	0.50	0.72	0.97
Guinea Bissau	0.04	0.07	0.18	0.33	0.39	0.40	0.46
Liberia	0.10	0.09	0.26	0.26	0.34	0.45	0.70
Mali	0.03	0.08	0.21	0.35	0.57	0.65	1.03
Mauritania	0.04	0.05	0.10	0.18	0.23	0.27	0.31
Niger	0.00	0.02	0.08	0.25	0.45	0.45	0.54
Nigeria	0.02	0.04	0.07	0.12	0.19	0.21	0.27
Senegal	0.11	0.20	0.29	0.36	0.48	0.62	0.72
Sierra Leone	0.18	0.31	0.45	0.70	0.83	0.92	1.08
Togo	0.09	0.16	0.40	0.59	0.74	0.94	1.43
West Africa	0.09	0.16	0.25	0.35	0.45	0.57	0.68

Sources: SWAC/OECD 2012; UN revisions 2010

3.3 UNDERSTANDING THE ECONOMIC AND SOCIAL TRANSFORMATIONS

A rural population that is steadily less agricultural

Distinguishing between agricultural and non-agricultural populations is vital to understanding diversification processes in the rural economy and the structural changes in agriculture. The agricultural population does not live solely in rural areas; urban areas do

accommodate agricultural producers. The share of agricultural producers in urban areas depends on the size of the urban centre and evolves with economic development. The ratio of the non-agricultural to the agricultural population (NAP/AP) highlights the division of labour between agricultural producers and net food consumers, as well as the “transition to a relatively small [...] agricultural labour force”

(Mortimore, 2003). It also provides an estimation of the market size for food products.

In 1950, the urban population of West Africa was insignificant and, apart from a few areas of export crops (groundnuts, cacao and café), most agriculture was little more than subsistence agriculture. Aside from a few public-sector jobs (in administration, education and health care), rural life consisted essentially of agricultural activity. The agricultural population could thus be likened to the rural population.

In the 1990s, the proportion of the rural population not earning a livelihood from agriculture was estimated at 15% in the Sahelian countries (Kanté, 1992). Today, this propor-

The ratio of the non-agricultural to the agricultural population provides an estimation of the food product market size.



tion is probably closer to 25%. Furthermore, the FAO stresses that the rural population is expanding much faster than the agricultural population. This is especially true of Nigeria, where the former decoupled between 1980 and 2010 (Figure 3.3). According to the FAO, less than half of the 80 million rural Nigerians are now agricultural producers.

Analysis of the data from 163 countries³⁷ reveals a strong correlation ($R = 0.83$ and $R^2 = 0.7$) between the level of urbanisation (calculated as U/R) and the share of the non-agricultural population (calculated as NAP/AP) (Figure 3.4). The higher the level of urbanisation, the higher the share of the non-agricultural population. The correlation also confirms that urbanisation has an accelerator effect on the NAP/AP ratio (the slope of the regression line = 1.21).³⁸

The location of 17 West African countries, highlighted dots in Figure 3.4, shows that they do not deviate significantly from the mass of other countries in the world. However, the positions of 15 of the 17 West African countries, below the regression line, imply that the share of the non-agricultural population in the total population (NAP/AP) is lower than the share expected given the level of urbanisation (U/R). Is there a West African exception? In the three countries furthest from the regression line (Burkina Faso, Guinea and Gambia), or in

other words the three countries for which the expected values of NAP/AP , given their level of urbanisation (U/R), are furthest from those observed, the data for agricultural population display marked inconsistencies.

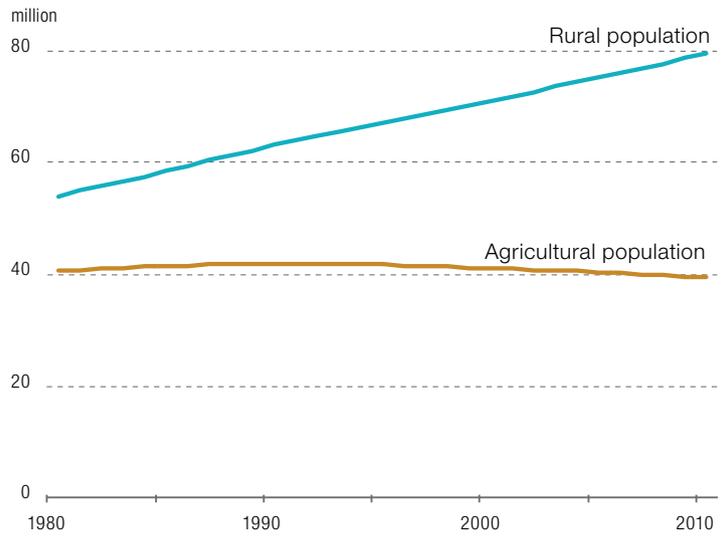
Inhomogeneous concepts and statistics

As with the U/R ratio, use of the NAP/AP ratio for devising regional policies is only meaningful if, besides being available, the national data are also homogeneous. This is not yet the case. National agricultural censuses are infrequent and irregular. In addition, the consistency of the results with those from general population censuses is not systematically ensured.

The FAO defines the agricultural population as “all persons depending for their livelihood on agriculture, hunting, fishing and forestry. [...] This population is not necessarily an exclusively rural population”. Elsewhere, the FAO guideline on farm surveys considers that “a household is a farm household if at least one of its members works in agricultural production, on their own account or on behalf of the household”. This guideline is no doubt intended for the counting of all agricultural labour, but it may also lead to an overestimation of the “agricultural population” insofar as the household head may work in a non-farm sector, and insofar also as, in a considered farm household, several active members may not work in agriculture.

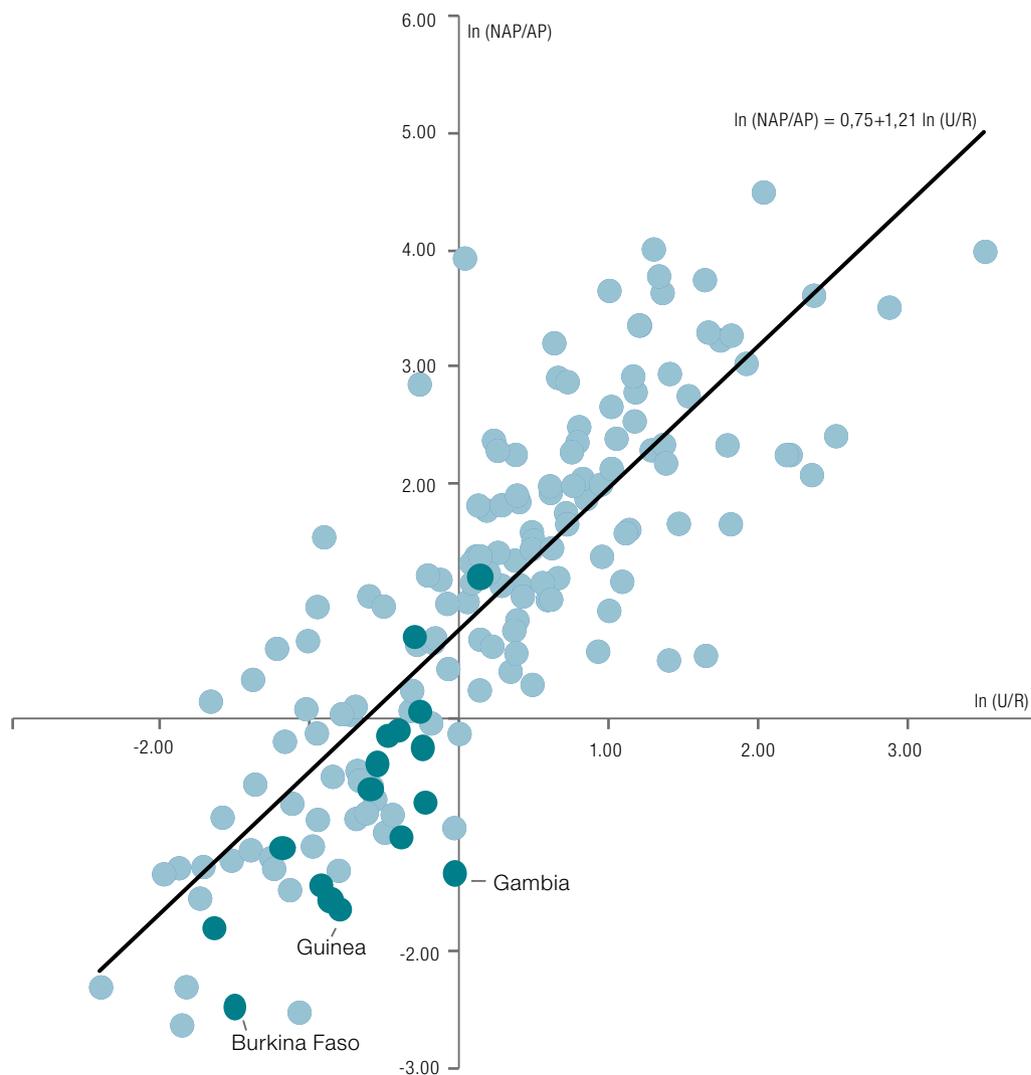
The difficulty in standardising definitions is illustrated by comparing rural population data with agricultural population in Senegal in 2002. Table 3.4 shows that the agricultural population in Senegal, estimated at 7.6 million by the FAO, exceeds the rural population (5.8 million in the 2002 census) by 1.8 million. These figures would imply that Senegal had an urban agricultural population (1.8 million, agricultural population minus rural population) of almost 45% of the total urban population. Given that Dakar accounts for half of the total urban population, the 45% figure seems improbable. Also, the NAP/AP ratio of 0.29 appears abnormally low in comparison to other countries in West Africa with a comparable level of urbanisation. Therefore, the agricultural population appears to be overestimated.

Figure 3.3
Rural and agricultural population
in Nigeria



Source: FAOSTAT 2011

Figure 3.4
U/R and NAP/AP for 163 countries, 2000



Sources: UN revisions 2010; FAO 2011

Table 3.4
Agricultural and rural population in
Senegal in 2002

	Population
Total population TP (Census)	9.8 million
Rural population RP (Census)	5.8 million
Urban population UP (Census)	4 million
Agricultural population AP (FAO)	7.6 million
Non-agricultural population NAP (FAO)	2.2 million
AP – RP (considered as urban agricultural population)	1.8 million
Urban agricultural population as % of total urban population	45%
NAP/AP	0.29

Source: Ministère de l'agriculture – DAPS, report on trends in agriculture and households' living conditions, Senegal (Évolution du secteur agricole, des conditions de vie des ménages et de la vie chère au Sénégal), March 2009.

Taking another example, in Burkina Faso in 2010, the share of the agricultural population in total population was 92%, constant since 1980 (FAO, 2011). This is also appears highly improbable given that over the same period the level of urbanisation increased from 12 to 30% (U/R ratio from 0.14 in 1980 to 0.43 in 2010). This means either that the relative share of the urban population engaged in agricultural activities was growing with urbanisation, or that the share of non-agricultural activities in rural areas was decreasing.

The obvious overestimation of the agricultural population, in both cases, has repercussions on the estimation of agricultural productivity, which appears very low with little or no improvements, contrary to observations in the field.

Therefore, these data – published by countries and international organisations (UN, FAO, World Bank) – do not provide sufficiently reliable figures, vital for policy formulation, on the relation between the non-agricultural and agricultural populations. This is less the result of poor quality of censuses (of the population and agriculture) and surveys (of health and standards of living, etc.) than the fact that definitions of rural population and agricultural population

vary from one country to another, from one institution to another, and over time. Even after a “smoothing out” intended to produce plausible time series, these figures cannot be aggregated to obtain regional data, or usefully compared between countries in the region or with international data. Moreover, the censuses and surveys have not been regularly carried out, which implies an extrapolation of missing data. The theoretical interval of 10 years, which is already long for rapidly transforming societies, is almost never applied.

Naturally, one can recommend that regional bodies ensure that future population censuses and surveys are conducted using common methods and based on common definitions. This must become a priority for those responsible for regional policies, whose actions are currently informed by partially false or incomplete assessments due to a lack of reliable and homogeneous figures.

The contribution of modelling in overcoming statistical inconsistencies

Temporary short- and medium-term palliative, modelling is capable of providing West African regional policy makers with consistent and useful information about trends in the agricultural and non-agricultural populations and the transformations they induce, especially regarding food security. The following paragraphs set out the modelling proposed for estimating the agricultural population in urban areas and then for the same population in a rural environment.

A fraction, AP_u, of the total agricultural population, AP, of a country – often greater than 10% today and declining with the progress of urbanisation – corresponds to households residing in urban settings and counted within the urban population. This particular stratum of urban and peri-urban farmers plays a vital role in structural transformations in the agricultural sector, because of the environment in which they live and carry out their activities (e.g., market gardening, horticulture, poultry farming, fishing).

Modelling of AP_u is based on two main assumptions: (1) the probability of being a farmer decreases with the average density of the agglomeration (which is itself a growing function of the agglomeration's total population);

Box 3.4

Regional settlement statistics and food security policy design

“Data harmonisation should take into account ongoing activities at the ECOWAS Commission, through the AGRIS (Agricultural Information System) project; at UEMOA in the SIAR project (Regional Agricultural Information System covering 4 domains: food security, the agricultural sector, international trade negotiations and markets); at AFRISTAT via the harmonised and simultaneous population and housing censuses project; and at the FAO through its CountrySTAT programme, as well

as harmonised data available at the CILSS and its specialised agencies (AGRHYMET, INSAH). Settlement dynamics also require developing new and simple indicators to monitor these changes. It is necessary for that purpose to have demographic and consumption data which provide information on food security in its accessibility dimension. Improving the quality of raw data will necessitate a finer redefinition of concepts prior to data collection as well as regularly updating survey results.”

Source: Joint conclusions of the technical workshop: “Regional settlement statistics and food security policy design”, 15–16 February 2012, organised under the auspices of the UEMOA by the SWAC Secretariat, Ouagadougou, Burkina Faso.

and (2) this probability is a decreasing function of the country’s level of economic development (estimated by the ratio U/R) for a given size of the urban agglomeration (Box 3.5). Given the lack of sufficient surveys on rural households, similar assumptions are used to estimate the agricultural population in a rural environment (APr).

The total agricultural population is the sum of the agricultural population in rural areas (APr) and urban areas (APu). Differences between the total population in both environments and their agricultural strata constitute the non-agricultural urban populations (NAPu) and non-agricultural rural populations (NAPr), respectively. Hence, the model provides standardised estimates of national agricultural populations, AP, and of the ratio NAP/AP.

A snapshot of the regional agricultural population

At the regional level, the ratio NAP/AP reached 1 in 2010, corresponding to parity between the non-agricultural and agricultural populations. This ratio increased tenfold since 1950 (Table 3.5). However, the breakdown is heterogeneous across the different countries in the region (Map 3.7). In 2010, the NAP/AP was above 1 in 10 countries, including all countries of the Gulf of Guinea: Benin, Cape Verde, Côte d’Ivoire, Gambia, Ghana, Guinea Bissau, Liberia, Nigeria, Senegal and Togo. Agricultural market productivity, the quantity of agricultural production marketed per producer, in these countries is thus potentially greater because of the domestic market that the non-agricultural population represents (Chapter 4).

Table 3.5

Trends in the ratio NAP/AP at the regional and sub-regional level

	1950	1960	1970	1980	1990	2000	2010
West Africa	0.11	0.20	0.34	0.48	0.65	0.83	1.00
West Africa excluding Nigeria	0.08	0.15	0.28	0.45	0.60	0.74	0.94
ECOWAS	0.11	0.21	0.35	0.49	0.66	0.86	1.04
UEMOA	0.08	0.13	0.26	0.44	0.61	0.74	0.92
CILSS (10 countries)	0.07	0.10	0.19	0.33	0.46	0.53	0.64

Source: SWAC/OECD 2012

Box 3.5

An estimate of the agricultural population in urban and rural environments

In an urban environment:

The total urban agricultural population, AP_u , is the sum of the agricultural populations of all urban population centres, V , in a country: $AP_u = \sum AP(V)$.

The proportion of the agricultural population $AP(V)$ of each city with a population V is $AP(V)/V = 1/(1+\alpha V)$. This relationship implies that the probability of belonging to the agricultural sector declines with the size of the city. It may also be expressed, for an urban centre at a given time, as $NAP(V)/AP(V) = \alpha \cdot V$.

The parameter α depends on the level of development and the complexity of the economy represented by the ratio U/R . The model is based on the hypothesis that α is proportional to $(U/R)^\beta$ with a constant coefficient of proportionality, λ : $\alpha = \lambda(U/R)^\beta$. The parameter β is the elasticity of the NAP/AP ratio of an urban centre of size V compared to the variable U/R . This formula expresses the second assumption of the model: the more developed an economy, the more urbanisation, represented by the U/R ratio, is advanced, and the more the agricultural fraction of the population of a town of a given population is low.

The simplest way of obtaining the value of the parameter λ is to take a country with a level of urbanisation close to 50% at the time considered, such that $U/R = 1$. The ECOLOC studies (2001–02)³⁹ indicate that, for Côte d'Ivoire in particular, at a particular time at which $U/R = 1$, some 6-7% of the population in a town of around 100 000 inhabitants (i.e. $V = 100$) is agricultural. The equation $NAP/AP = \alpha \cdot V$ thus gives a value of 0.15 for λ .

Estimation of the value of the parameter β is more complicated since this involves knowing

how the ratio NAP/AP of towns of a given size has evolved over time and in relation to the ratio U/R . Here it is assumed that, in each country, the average ratio NAP/AP , not of urban centres of a particular size, but of the entire urban distribution, namely NAP_u/AP_u , varies with respect to the U/R ratio of the country concerned in accordance with a law similar to the one applicable in other countries throughout the world.

In a sample of approximately 100 countries (excluding City States and Island States), the elasticity of the ratio NAP/AP in relation to U/R is of the order of 1.10 (Annex B). The value of the parameter β , leading for each country in the region to a correlation between the variables NAP/AP and U/R close to the correlation noted at the international level, is: $\beta = 0.8$ (Annex B). This coefficient implies that the value of the parameter α triples (from 0.15 to 0.45) when the ratio U/R quadruples (e.g., from 1 to 4). The proposed model is thus set with the values $\lambda = 0.15$ and $\beta = 0.8$ for the majority of countries.⁴⁰

The table below presents the values of the agricultural fraction of the urban population derived from the model, for a range of urban centres of different sizes, and for different levels of urbanisation (U/P) (from 26 to 66%). For countries with a level of urbanisation less than or equal to 50%, the proportion of the agricultural population in towns with less than 10 000 inhabitants is more than 50%. That said, other non-agricultural activities are significant in towns down to 5 000 inhabitants (between 30 and 45% today) and distinguish these small towns/urban centres from the "rural environment in the strict sense": they are "semi-urban centres" forming the first level of physical market organisation (food assembly markets) and provide their agricultural population a

Share of the agricultural population in urban centres and extension to the rural environment									
$\beta = 0.8$									
$\lambda = 0.15$									
U/P	0.09	0.17	0.23	0.29	0.33	0.50	0.67	0.80	
U/P	0.10	0.20	0.30	0.40	0.50	1.00	2.00	4.00	
$\alpha = \lambda * (U/R)^\beta$	0.02	0.04	0.06	0.07	0.09	0.15	0.26	0.45	
$AP(V)/V = 1/[1+(\alpha * V)]$									
V	urban centre*								
	10 000	0.4%	0.2%	0.2%	0.1%	0.1%	0.1%	0.0%	0.0%
	5 000	0.8%	0.5%	0.3%	0.3%	0.2%	0.1%	0.1%	0.0%
	1 000	4.0%	2.4%	1.7%	1.4%	1.1%	0.7%	0.4%	0.2%
	500	7.8%	4.6%	3.4%	2.7%	2.3%	1.3%	0.8%	0.4%
	200	17.4%	10.8%	8.0%	6.5%	5.5%	3.2%	1.9%	1.1%
	100	29.6%	19.5%	14.9%	12.2%	10.4%	6.3%	3.7%	2.2%
	50	45.7%	32.6%	25.9%	21.7%	18.8%	11.8%	7.1%	4.2%
	20	67.8%	54.7%	46.6%	41.0%	36.7%	25.0%	16.1%	9.9%
	10	80.8%	70.7%	63.6%	58.1%	53.7%	40.0%	27.7%	18.0%
5	89.4%	82.9%	77.7%	73.5%	69.9%	57.1%	43.4%	30.5%	
rural environment*									
3	93.3%	89.0%	85.3%	82.2%	79.5%	69.0%	56.1%	42.3%	

Source: SWAC/OECD 2012
(* in thousand)

much more favourable physical and economic environment than in rural areas distant from any urban centre. Semi-urban centres may be associated with the urban environment (U5 definition) or the rural environment (U10 definition); the choice should depend on the specific issue concerned.

Rural environment:

The population, defined as “rural population” (total population minus the urban and semi-urban populations), is spread across thousands of villages of just a few people up to 5 000 inhabitants, which are not dealt with individually. Despite an increasingly dense urban network and the development of agricultural activities closely woven into the urban fabric, the agricultural population is still primarily rural.

It is expressed as the ratio APr/R , the agricultural fraction of the rural population.

As a first approximation, the formula $AP(V)/V = 1/(1+\alpha V)$ was extended to the rural environment, where V (the size of villages) is the median size of villages, 3 000 inhabitants. Choosing a lower size V would result in higher APr/R ratios. Rural household survey data and other observational data can provide more precise information on the value of V , including country and local characteristics (such as coastal, landlocked, forest, Sahelian or semi-desert).

The ratio NAP/AP is smaller in the Sahelian countries (below 0.5, or less than one non-agricultural producer for two agricultural producers). The countries with the lowest ratio in 2010 were Niger (0.39), Chad (0.42) and Mali (0.47). The proportion of the non-agricultural population in the total population of Mauritania

In 2010, the total population was evenly divided between non-agricultural producers and agricultural producers.



is relatively high (45%, NAP/AP = 0.83), due to its unfavourable agro-climatic conditions and the size of its mining sector. A farmer from these countries thus appears to have a smaller domestic food market (excluding exports and non-food agricultural products).

The settlement matrices simplify the description of these transformations (Table 3.6). They summarise, for a given date, the distribution

of the total population by environment (urban and rural) and by stratum (agricultural and non-agricultural). In 2010, the total population was evenly divided between non-agricultural producers and agricultural producers, whereas parity between urban and rural dwellers was not yet reached. The majority of agricultural producers are in a rural environment, but non-agricultural producers now represent 25% of the total rural population. Similarly, a significant portion of the agricultural population is living in urban areas. However, it should be noted that although the absolute number of the urban agricultural population has been growing (+27% between 2000 and 2010), its relative share in the urban population is decreasing (from 14% in 2000 to 12% in 2010). By contrast, non-agricultural producers are increasingly present in the rural environment (increase from 22% in 2000 to 25% in 2010), underlining the growing importance of markets for food security.

Table 3.6
2010 Settlement matrices for West Africa

2010 (in million inhabitants)	Urban environment	Rural environment	West Africa	Breakdown by stratum in %	Growth rate 2000–2010
Agricultural stratum (AP)	15	130	145	50%	1.4%
Non-agricultural stratum (NAP)	103	42	145	50%	3.4%
Total population (P)	117	172	290	100%	2.4%
Breakdown by environment in %	41%	59%	100%		
Growth rate 2000–2010	3.5%	1.6%	2.4%		
NAP/AP ratio			1.00		1.9%
U/R ratio			0.68		1.8%

Source: SWAC/OECD 2012

In a dynamic approach, a set of such matrices can illustrate the evolutions over time in settlement trends. Depending on the information available, the various environments may be described in greater detail, for example, by separating primary cities from secondary towns. In exactly the same way, it is possible to distinguish, within the NAP stratum, the people who derive their revenues mainly from the modern economy from those who depend

on the informal economy. These settlement matrices constitute the starting point for demo-economic modelling. Through successive iterations between settlement matrices and social accounting matrices, and on the basis of surveys, a demo-economic approach can compensate for the lack of information on the informal population and its revenues. While such an exercise lies beyond the scope of this study, it is important to appreciate its

1950

Map 3.7

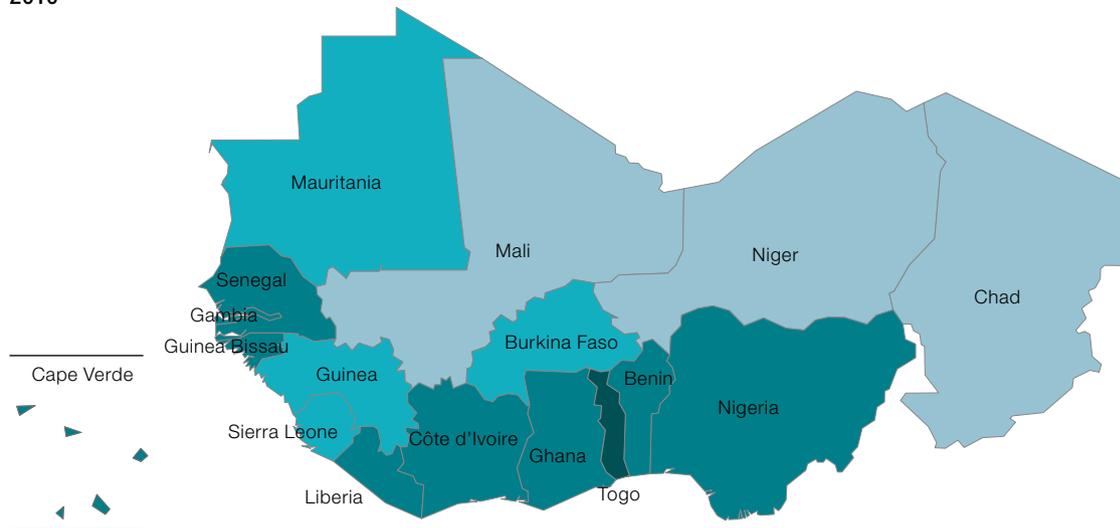
Trends in the ratio NAP/AP in West Africa



1980



2010



NAP/AP value

Source: SWAC/OECD 2012



value as a crucial theoretical framework for a sound understanding of the forces at work and their spatial, social and economic implications.

The following section will simply offer a first evaluation of the informal economy from a demographic and settlement perspective.⁴¹

3.4 ECONOMIC AND SOCIAL ROLE OF THE INFORMAL ECONOMY

In West Africa, as in all sub-Saharan Africa, most non-food-producing consumers of food comprise households that derive their income from the informal sector, or “the informal economy”. Informal activities produce and distribute goods and services required by the majority of people who are increasingly urban and lack the income needed to purchase the goods produced and marketed by the modern economy. Consequently, much of the food consumed by this group is supplied by “informal networks”, which are not covered or are incompletely covered by conventional national accounting systems. Despite its major significance, the informal economy remains imprecisely defined, poorly measured, and thus largely neglected by food security policies.

Cour (2006), citing Christine Kessides, sums up the interrelationship between informal sector, urbanisation and food security in the context of rural-urban transformation: “in sub-Saharan Africa, towns generate over 80% of economic growth,⁴² more than 80% of jobs are

created in the informal sector,⁴³ and urbanisation is one of the main drivers of modernisation in agriculture and income growth in rural communities”. However, the informal sector is not unique to African economies. It represents between a quarter and a third of GDP in the countries of Asia or Latin America and it still reaches 16% of GDP in the OECD countries (OECD, 2002).

Established definitions, limited tools

The term “informal” was first used in 1972 to refer to all urban activities that offer jobs not governed by labour law and regulations. Given the growing significance of these activities in recent decades, the International Labour Organization (ILO) and the Economic and Statistical Observatory for sub-Saharan Africa (AFRISTAT) have attempted to define them precisely, in order to bring as much informal activity as possible within the scope of national accounting systems.

Box 3.6

Informal sector and the informal economy

“While in 1993 reference was made solely to the informal sector (like a group of institutions), it has since become the view that ‘informal’ attributes are also characteristic of other aspects of economic life. So we now therefore speak about the informal economy, comprising:

- the informal sector,
- informal employment (some of it within formal entities),
- non-commercial household production,
- [...] all within a local context that each country is free to define”.

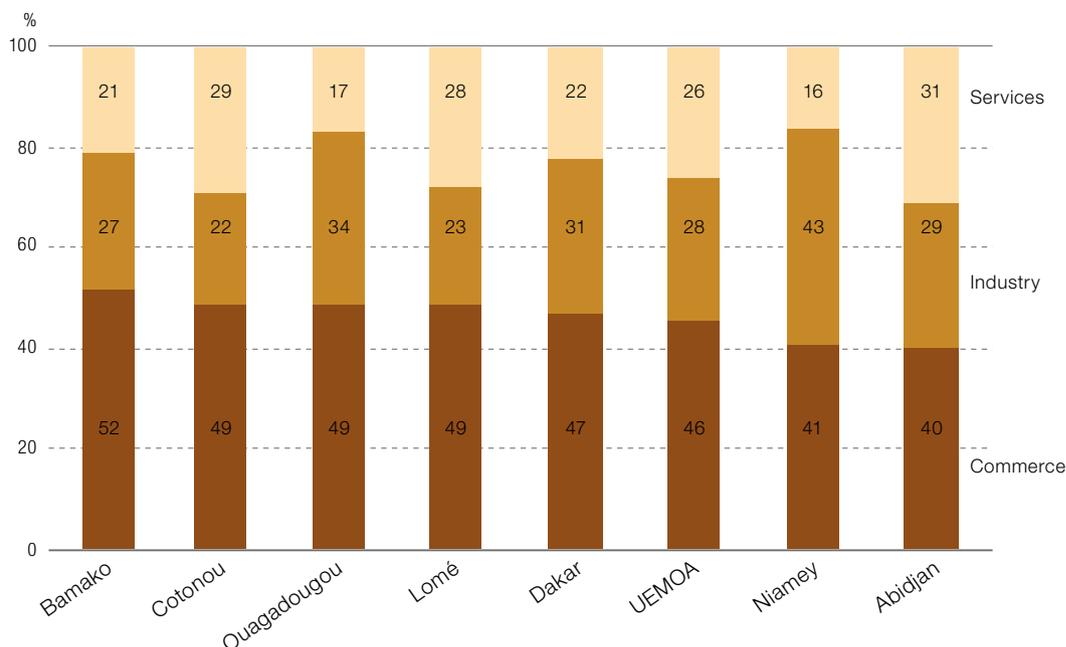
Source: Sérurier 2004

In conceptual terms, the informal economy is defined as: “consisting of units engaged in the production of goods or services with the primary objective of generating employment and incomes for the persons concerned. These units typically operate at a low level of organisation, with little or no division between labour and capital as factors of production, and on a

small scale. Labour relations – where they exist – are based mostly on casual employment, kinship or personal and social relations rather than contractual arrangements with formal guarantees” (ILO, 1993).

For statistical purposes, the informal economy is defined as “a group of informal production units (IPUs) which, according to

Figure 3.5
Informal production units by sector, 2003



Sources: Leenhardt 2005 and authors' calculations

the System of National Accounts (SNA), form part of the household sector as unincorporated enterprises producing at least in part for the market” (ILO, 1993).

These enterprises are not constituted as separate legal entities independent of the households or household members that own them, and for which no complete sets of accounts are available that would permit a clear distinction of the production activities of the enterprises from the other activities of their owners. Therefore, any flows of income and capital between the enterprises and the owners cannot be identified. The informal economy so defined, irrespective of place of work, amount of capital, duration of activity and its operation as principal or secondary activity, comprises two kinds of IPUs: (1) those with own-account workers, who may employ unpaid family members or employees hired on a casual basis; and (2) enterprises employing one or more employees on a continuous basis, up to a limit recently set at five by the Delhi Group of the United Nations Statistics Division.

This definition includes:

- The concept of private unincorporated enterprise, according to the terminology advocated by SNA 93, meaning the production unit of the household sector and the

reference to the lack of formal written accounts; and

- The notion of informality, in the ILO sense, with the concept of non-registration.

The ILO recommends identifying IPUs and the jobs they provide by mixed surveys, using household surveys to identify all economic units that meet the definition of the informal economy. This type of survey thus includes activities that conventional “enterprise surveys” fail to identify. Over the past two decades, efforts have been made to establish a uniform methodology. For West Africa, this has been the goal of the PARSTAT programme (Regional Statistical Support Programme)⁴⁴ for multilateral monitoring of the UEMOA countries, launched in 2001–02 and based on 1-2-3 surveys.⁴⁵

The findings of the PARSTAT programme reveal the dual structure of employment: in the seven capitals surveyed, informal employment accounted for between 73 and 81% of total non-agricultural employment in 2002. Commerce was the leading sector compared to artisanal handicraft (industry) and “services”, accounting for 40 to 52% of all IPUs surveyed, depending on the town (Figure 3.5). PARSTAT programme also shows that the average enterprise size (IPU) and the proportion of employees (wage labourers) are very similar in the cities surveyed.

An average 1.4 to 1.7 people work in these IPUs, and between 10 and 17% of them are employees.

An earlier survey conducted in 1982 in the 10 largest towns in Benin revealed another important feature of the informal economy's structure: the number of IPUs per urban inhabitant varies little with town size. At that time, there was 1 IPU for every 5.5 residents in Cotonou, 1 for every 6 residents in Porto Novo, and on average 1 for every 5.7 residents in the other towns in the survey.

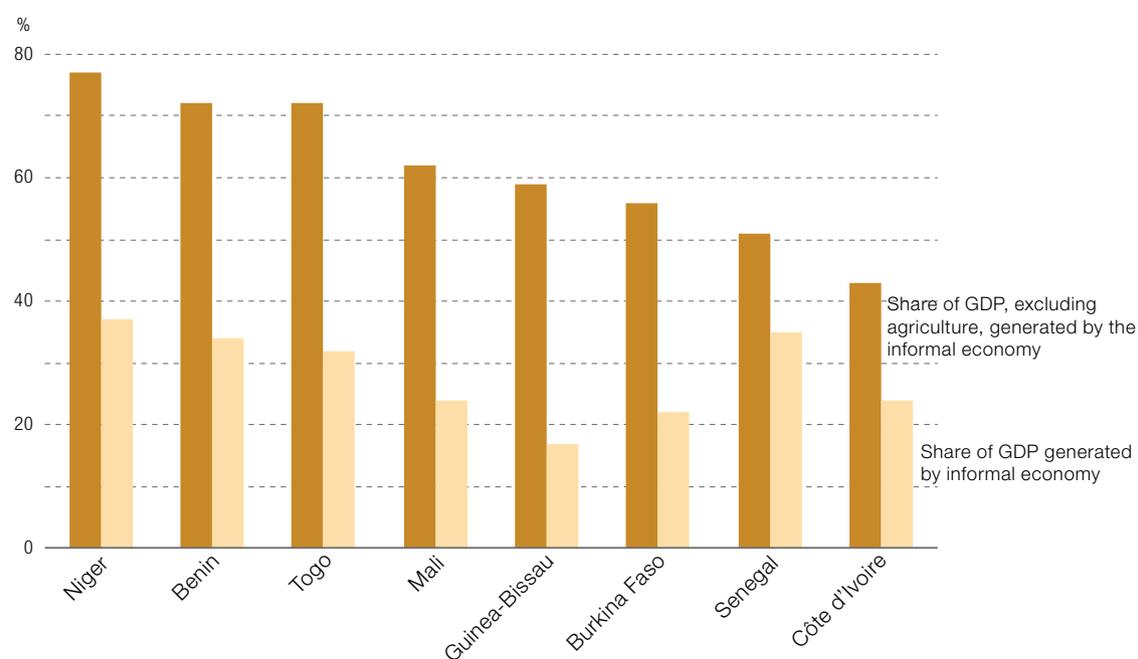
The importance of the informal economy is also reflected in its contribution to the GDP, despite the difficulty in obtaining reliable estimates (Figure 3.6). This figure shows that the informal economy, excluding agriculture, accounts for a third of the GDP or over in Niger (37%), Benin (34%), Senegal (35%) and Togo (32%). If the agricultural sector is included, the contribution to the GDP reaches over 70% for Niger, Benin and Togo. Its size also explains why it is common to find large formal-economy businesses using the informal economy in their commercial strategies. A survey conducted in Benin states that "the modern private sector cannot exist without the informal sector which, for some modern businesses, is their best customer" (Igué, 2008). Food security of urban

and rural populations alike largely depends on the complex dynamics of this interrelationship.

Efforts to cover these activities and networks more effectively in national accounting, especially with the IPU concept, were essential to achieve greater accuracy in measuring the economies of the countries concerned. The "informal" sector is not an economic sector in the usual sense of a set of "branches" of economic activity. It concerns all branches of the economy, including agriculture, finance, trade and health. It is a "parallel economy" but not separate, because its relations with the modern economy are many and complex. Because it does not conform to national accounting and overlaps with the modern sector, studies (such as those of PARSTAT) still underestimate its real size. In practice, this economy is defined essentially by default: "informal" covers any economic activity that does not comply with the obligations to register, keep accounts and pay taxes – even in recent studies, such as PARSTAT.

The proposed economic and statistical definition also ignores the fact that the "informal sector is not a homogeneous grouping in which economic reasoning prevails over the obligations and other implications of social life" (Rogerson, 1996).

Figure 3.6
Informal economy contribution to GDP, 2000



Sources: Charmes 2000 and authors' calculations

Informal activities as an essential part of the urbanisation process

Informal activities have often driven urbanisation – even if urban development is accelerated still further by the growth of the modern sector or, conversely, slowed down by its contraction. The rapid urbanisation of sub-Saharan Africa is not based on the demand for industrial labour or, more generally, the supply of modern employment arising from industrialisation and external trade. It is the population transfer within the informal economy between traditional food farming and the informal urban sector which has been the main driver of contemporary urbanisation in sub-Saharan Africa.

With the crisis and structural adjustment of the 1980s and 1990s, migration and urbanisation have slowed. By contrast, the share of informal sector activities in the urban population has increased, especially with the entering of people let-off modern employment, both public and private; this has led to increasing impoverishment (i.e. increased competition led to a worsening of working conditions, rather than modernisation). This is the “informalisation” of the urban economy.

The great majority of migrants who leave their rural environment for a town are not seeking a salaried employment in the modern sector; they wish to enter the informal economy with which they are familiar, via their family or community contacts. At first glance, this population transfer replicates the one that underpinned the trend towards urbanisation in Europe, before the Industrial Revolution. But the context is different: global trade competes with local products, reduces the number of corresponding urban jobs, and keeps down wages, while population growth is much higher than it was in pre-industrial Europe. However, it is appropriate to refer to a pre-industrial type of urbanisation, with the multiplication in urban “small jobs” in production, commerce and services, in which commerce dominates production, which is more exposed to international competition than services.

In the context of a steady and abundant supply of labour, the informal economy, primarily urban-based, has as its main function to absorb and employ as many newcomers as possible, providing minimum means of

existence (and thus income), rather than to increase its productivity – meaning the production of goods and services per unit of labour. “The growth in informal employment is a phenomenon inherent in the development process. It does not materialise in the instantaneous replacement of one form of economic organisation by another. A host of informal activities constitute an aspect of development, in that they acquire their form and their rationale both from traditional society and modern society” (Lachaud, 2000). The development of the informal sector is thus an integral part of the rural-urban transformation shaping West Africa.

Africa is experiencing a dual urbanisation in which the modern economy co-exists with an informal economy, but with interactions. This dual nature is set to persist for two reasons: (1) continued urbanisation is inseparable from economic growth; and (2) the scenario of sustained economic growth up to 2050 presupposes that the modern public and private sector will employ a growing proportion of urban people.

Informal trade and the food sector

Historically, the term “informal” has primarily denoted activities not recorded in the urban environment; however, “there is no reason [...] for reducing its scope to urban areas alone or to non-agricultural activities” (Maldonado, 2000). Informal non-agricultural activities are very much a part of the rural community. The seasonal nature of agricultural labour is conducive to developing secondary activities, but also agricultural progress and evolving consumption patterns of farmers imply the expansion of services in a rural environment. In addition, traditional agriculture (or family farming) accounts for the greater share of the informal economy, existing alongside a “parallel trade”. Thus the informal economy is part of the food economy, an overall primary, secondary and tertiary, urban and rural as a pre-industrial (or pre-capitalistic) type of economy, embedded in a modern global economy.

The term “parallel trade” commonly designates trade of legal goods via illegal or non-official channels – distinct from small-scale production and service activities, commonly referred to as “informal”, or criminal activities.

In West Africa, it involves local and imported products, and concerns a limited number of actors. Its roots and current networks derive from the trade routes that crossed vast areas of the continent for several centuries prior to the borders recognised by the OAU.

This large-scale trade conforms increasingly less to aspects of comparative advantage of national economies, as entire parallel trade networks are organised by small groups of very large traders. Over time, a complex but rational pyramidal system has grown up with

The food sector – in both urban and rural contexts and at all stages of production, trade and distribution – is a predominant sector of the informal economy.



urbanisation, combining formal and informal networks. On the one hand are “informal farmers” who depend on small-scale assemblers to sell their production and obtain credit and on rural markets to supply themselves with producer and consumer goods. In addition, the very dynamic urban markets cater predominantly to consumers from the informal sector. On the other hand, at an intermediate level in major urban centres, highly structured trading communities control specialised regional markets (e.g., livestock, tomatoes, onions) and run the main food networks (cereal and tuber crops, meat, fruit and vegetables), providing collection and assembly, transport and wholesaling for imported and exported agricultural produce. Finally, at the top of the pyramid, regional and continental trading of cereal crops (mainly wheat and rice) is controlled by major traders, who are often close to those in power.

The food sector is predominantly part of the informal economy, urban and rural and at all stages of production, trading and distribution. Food security relies on the sound functioning of this “food sector”, above all for the most destitute urban dwellers but also for rural people in times of crisis. This has underpinned the emergence of a coherent system.

Aside from agricultural production, three branches of the economy are particularly involved in food security: trade, transport and processing of food products. Although no reliable data exists at the regional level, these three branches generate half of the total private-sector employment, assuring the

large majority of collection, storage, transport and distribution of local and imported food products. Therefore, food security is highly dependent on informal activities – even in agricultural and rural communities, where food crises caused by climate factors, droughts and locust invasions can turn producers into net consumers.

Non-criminal informal activities appear to be a popular – though not necessarily optimal – response to the basic needs of a great swathe of people and thus to food security. The informal sector is now one of the priorities of economic and social policies. Yet it is a sensitive issue for the public authorities because its activities cannot be termed legal. There is a contradiction between the interventionist impulse to establish normality and the concern not to undermine fragile economic and social equilibriums, which makes it hard to devise coherent policies.

The existence and role of the parallel or informal economy appear as a structural element in the development of West Africa; they are structural in sense that they derive from both internal and external factors, likely to persist and impact economic actors and policy makers.

There is no comparison in the gap in economic development between the region and the rest of the world, and the gap that existed between the most advanced economies and those that joined the global economy. In an integrated world, this difference prevents the regional economy from managing at its own pace the gradual transfer of the active population from agricultural activities to modern-type activities, faced with the import of goods from advanced countries. The sudden appearance on the world market of emerging economies draining the entire investment capacity of the advanced economies may mean that Africa remains limited to exporting primary products (agricultural and mined), postponing industrialisation consistent with the growth of its population. This growth is penalising the consumption and saving potential of households, limiting the ability of the regional market to support a change in production. These various factors are acting in a circular (systemic) fashion, sustaining the dual economic structure characteristic of regional economies. The “informal” economy is also a way in which African societies and economies resist and adapt to globalisation.

Integrating informal activity in food security policies

Policies towards the informal sector

Commenting on the best institutional policy towards the informal sector in terms of ensuring sustainable food security, Maldonado (2000) notes that “there were the advocates of stricter control over the conditions for engaging in informal activities in order to guarantee a return on investment in modern enterprises, given the threat of unfair competition from the informal sector (this view was very widespread in Africa, as a result of the decline of the regulatory role of the state). On the other hand, there were those who believed that the legislative and administrative system must be thoroughly reformed in order to free the initiative and economic potential of microenterprises (the approach adopted by the neo-liberal reform movement in Latin America). Both of these perspectives are reflected in the ILO’s Recommendation 169,⁴⁶ which calls for recognition of the importance of the informal sector as a source of jobs, but simultaneously calls on countries to ‘seek progressively to extend measures of recognition to the informal sector’, though it recognises that integration of the informal sector may reduce its ability to absorb labour and generate income. The legal status of informal establishments, their relationship to the State and the role of public institutions are therefore of major importance [...].

Second hypothesis: an inadequate institutional framework. The illegal nature of informal sector activities is attributed to the widespread inadequacy of the existing institutional framework and its regulatory system. In a good many countries, the tax and commercial law, investment and urban planning codes and rules governing the exercise of certain trades and apprenticeships clearly do not relate to local realities, which are marked by the new forms of production and social organisation. The resulting exclusion and spatial segregation deprive the most disadvantaged population groups of their livelihood, and do not help solve the problems arising from the poverty in which these people live. H. De Soto therefore concluded that it is much simpler and less costly to integrate legal and informal workers in a single, non-discriminatory economic and legal system by reforming the law, than to attempt

to change people’s behaviour and cultural make-up. Such integration would include both removing restrictions from the legal system and incorporating all workers into a new legal framework. This would have to respect and integrate, or be based on, the extralegal rules and sound practices that are spontaneously created by both legal and informal entrepreneurs. The effort, initiative and entrepreneurial potential of the people operating in the informal sector in fact represent a new culture and a human capital which are essential for economic take-off. The question is how to meet the challenge of transferring the vitality, determination and hopes of this emerging business class to the rest of the country. The answer is by changing institutions and legal texts”.

It seems counterproductive to replace informal activities with a modern form of organisation, practices and techniques to meet basic needs, including food and nutritional needs of populations and especially the poorest and most vulnerable; or to institutionalise informal activities, by insisting on the enforcement of all laws and regulations associated with the modern economy. The informal economy is a system in which the informal income of some is the informal expenditure of others. Institutionalising an informal activity reduces its already weak competitiveness in relation to imports, and/or lowers its employment level, even though labour is the abundant factor. Yet this does not mean that the public authorities should neglect this economy. Nwaka (2005) argues that “what is needed is not less government, less control, or mindless deregulation of economic and planning activities, but rather a more enlightened, more participatory, and more equitable form of state intervention that eliminates needless restrictions, and provides a more appropriate and flexible regulatory framework that is compatible with local conditions and yet reasonably efficient and environmentally sustainable”.

It is not because they are seeking to evade taxes and charges that informal activities fail to obey professional or customary regulations. These activities need to pool resources and costs and require, more than large-scale enterprises, an appropriate physical setting or support from external savings provided by the local or national community. Negotiations and progress are thus welcome as long as they

satisfy real needs affecting those concerned, in terms of priorities and the level of service. The practice of “participatory budgeting” is one example of this kind of management.⁴⁷

For such collective negotiations to proceed, it is vital to develop and support professional organisations – associations or unions, particularly of traders and transporters in terms of food security. These negotiations concern improving the transport and road network; action to prevent road harassments, the concentration of activities for electricity and water supply services; and improving, extending and managing physical transaction infrastructure (e.g., markets, warehouses and transport). By including opportunities for “regularisation” in negotiations on a specific or sectoral service, rather than conditioning negotiations on administrative or fiscal regularisation, the framework for broad agreement about more effective economic performance will be developed in simple, successive stages.

Among the ways forward in assisting the “informal sector” to modernise and gradually integrate a formal economic activity are formalising oral or tacitly accepted regulations in written form, drafting and registering contracts between private actors as well as

Economic development will occur through this informal/modern sector duality or not at all.



negotiations between private and public actors, and establishing or supporting ad hoc bodies to deal with problems and dispute settlements. In this respect it might be worth considering the experience of other regions, keeping in mind that contexts can vary.

“The real problem is how to connect the two sectors [modern and informal]. The ideal would be for the two to co-exist constructively. Economic development [...] will happen with this duality or not at all” (Bain, 2001). The establishment and management of regional food security policies, an in-depth evaluation, and an understanding of the role and functioning of the informal economy are essential. As Meagher (1996) emphasises, some of those in the informal sector who are involved in the “parallel trade” are very powerful. Their power and control over the cereal trade in particular give them an influential role in food security.

Knowing how to initiate dialogue with them in order to reduce or improve management of periods of food insecurity that result from drought or speculation is a key issue.

Grasping and spatialising the informal economy to guide food security strategies

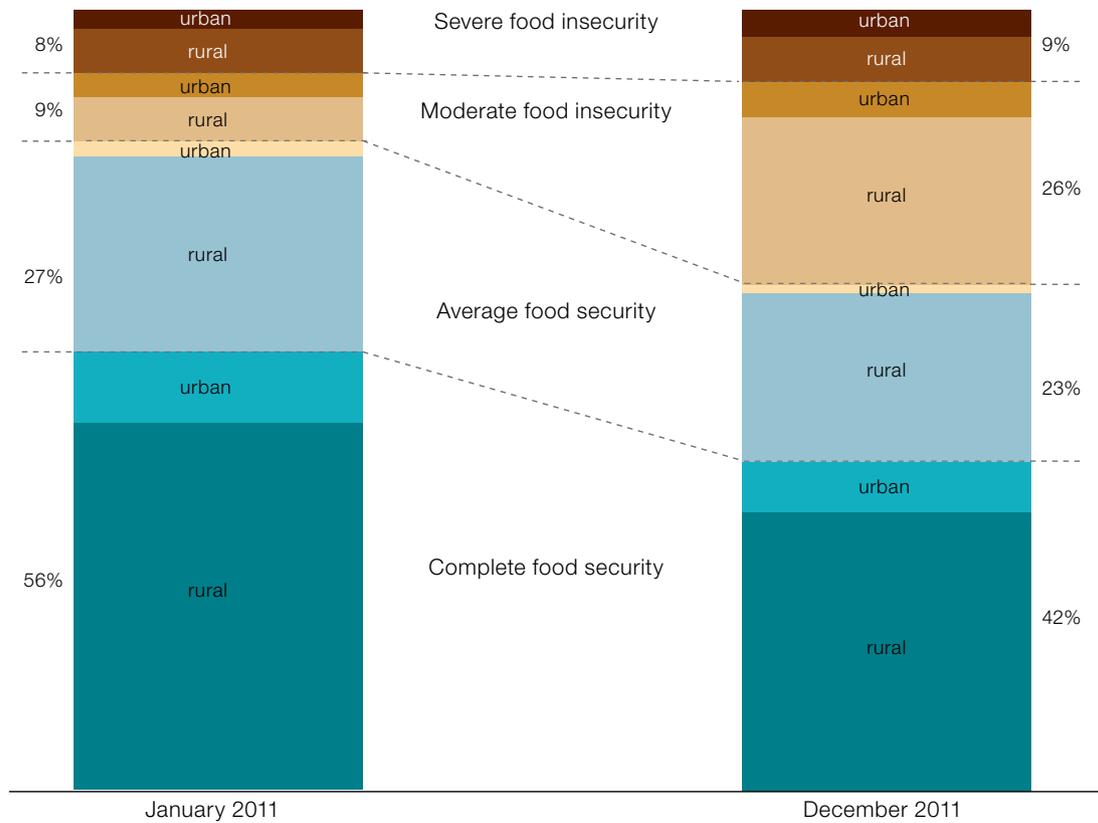
The overlap between the informal economy and food security has been discussed in the preceding sections. Food insecurity affecting urban populations is for the most part in the informal sector, both in terms of production and consumption. This trend is set to continue as a result of the growth in population and the continuation of the urbanisation process. Policies need to integrate these ongoing transformations and their impact in terms of urban food insecurity in their food security strategy.

This is a further argument for coordinating food security policies and urban policies, and for separating food security strategies from exclusively rural and agricultural policies. An evaluation of vulnerability to food insecurity in Niger confirms the necessity to improve targeting of mitigation action by the DNP-GCA (Dispositif National de Prévention et Gestion des Crises Alimentaires), in particular towards urban populations (Figure 3.7).

It is difficult to estimate informal population figures accurately without a very sophisticated modelling approach. The figures below have been estimated based on a series of studies carried out in some cities, but have not been integrated in a model as in the case of the agricultural and non-agricultural populations (Table 3.7). The purpose of the table and the settlement matrix is to present the kind of information that regional organisations could obtain if they employed a demo-economic model and a working framework provided by social accounting in addition to national accounting (Table 3.8). Between 1950 and 2010, the share of the informal population in rural areas remains the large majority (90%). In the urban environment, the proportion of the informal population has decreased but still represents a clear majority. Urban food insecurity will become more discernible because of the size of the informal population. Food security policies will need to integrate this evolution, as virtually all urban food insecurity impacts the informal population.

Figure 3.7
Food security by environment, Niger

Food security and insecurity in urban and rural areas, Niger, January and December 2011
(share of total population, in %, and by environment)



Source: Republic of Niger, Private office of the Prime Minister, Early warning system co-ordination unit, December 2011, Assessment of rural and urban household vulnerability to food insecurity, preliminary findings.

Table 3.7
Informal population in rural and urban environments

	Rural		Urban	
	Informal population (%)	Formal population (%)	Informal population (%)	Formal population (%)
1950	80	20	28	72
1960	80	20	51	49
1970	80	20	65	35
1980	87	13	73	27
1990	90	10	75	25
2000	90	10	78	22
2010	90	10	73	27

Source: SWAC/OECD 2012

Table 3.8

Settlement matrices in West Africa

2010 (in million inhabitants)	Urban	Rural	West Africa	Share in total population %	Growth rate 2000–2010
Agricultural stratum (AP)	15	130	145	50%	1.4%
Non-agricultural stratum (NAP)	103	42	145	50%	3.4%
Informal stratum (NAP1)	75	38	113	39%	2.9%
Modern stratum (NAP2)	28	4	32	11%	5.3%
Total population (P)	117	172	290	100%	2.4%
Breakdown by environment in %	41%	59%	100%		
Growth rate 2000–2010	3.5%	1.6%	2.4%		
NAP/AP ratio			1.00		1.9%
U/R ratio			0.68		1.8%

Source: SWAC/OECD 2012

A recent document by the United Nations Economic Commission for Africa (UNECA) confirms the need for a homogenous definition of the informal economy before undertaking any regional analysis: “International or temporal comparisons for a given country to reflect the contribution of the informal sector (or informal economy) to the economy (in terms of added value, income distribution, employment creation) would not be possible without a consensus on the definition of the informal sector or informal employment and without an adequate methodology recognised by all countries” (2007).

This report argues that the region does not possess an adequate framework for analysis and modelling, in which it would be possible to store and process data on the informal sector and analyse its interaction with the rest of the economy (Cour, 2007). The biased interpretations based on economic and social equilibriums in national accounts impacts the definition of regional food security strategies. The complementary mechanisms proposed here aim to provide additional information for narrowing interpretation bands (Annex B). The settlement matrix provided in this study estimates the size of the informal population and its localisation. This last dimension is vital and requires the integration of settlement dynamics in food security strategies.

The current analysis provides, for each country and year, a breakdown of the population by urban and rural setting and into two strata: agricultural and non-agricultural. Within the non-agricultural population, the informal and modern strata still need to be distinguished. A food security policy must specifically take into account the informal population, given that “informal” activities are the source of income for a large part of the urban population.

As with the agricultural stratum, there is a lack of any reasonable measurement of the informal population. A simple, efficient approach to standardising the population in the informal stratum is to calculate it as the difference between the already estimated non-agricultural population and the modern population, as recorded in official documents. From the standardised database constructed as explained above, “settlement matrices” may be established at different dates for each country, for the West Africa region as a whole and for each sub-regional entity.

At this stage, the agricultural population is not divided into informal and formal agricultural populations, as in the case of the non-agricultural population. The framework might eventually be refined if the surveys and statistics allow for it.

Established at different times, the various settlement matrices would provide a dynamic

and spatial (by environment) interpretation of the balance between the supply and demand for food products. These demo-economic indicators and the ratio NAP/AP yield initial information that is already useful, albeit still insufficient.

With the demo-economic model used in WALTPS and the ECOLOC work, it is possible to link each settlement matrix to a real economy matrix with a comparable structure, giving the contributions from each population category

(environment-stratum) to total “real GDP” and the corresponding “productivities” or added values per capita. An approach of this kind (broadened and conducted at the regional level) would provide information on the GDP and the income of the informal population. By this means, it would be possible among other things to gain better insight into on-going transformations, their possible long-term impact, and food security equilibriums in terms of consumer and producer revenues.⁴⁸

NOTES

- 1 The author of section 3.1 is Nelly Robin.
 - a. Some of the findings in this section are derived from research done under the Programme of the OMAE (“West African international migration observatory for a new co-operation between West Africa and the EU”) carried out with financial support from the European Union. The content of this document is the sole responsibility of the IRD (Institut de Recherche pour le Développement, CEPED) and can in no way be taken to reflect the position of the European Union.
 - b. Some of the passages in the same section have been published previously in the review *Hommes et Migrations*, no. 1286–1287, July–October 2010, pp 48–60.
- 2 Most West African countries gained independence between 1957 and 1975.
- 3 27 countries.
- 4 Population by sex, age group and country of birth.
- 5 153 010 persons born in sub-Saharan Africa and resident in the EU.
- 6 44 319 persons born in West Africa and resident in the EU.
- 7 Born in an EU country other than the reporting country.
- 8 418 578 persons born in Africa and resident in the EU.
- 9 Angola, Democratic Republic of Congo, Central African Republic, Congo, Cameroon, Gabon, Equatorial Guinea, São Tomé and Príncipe and Chad.
- 10 Algeria, Egypt, Western Sahara, Libya, Morocco, Sudan and Tunisia.
- 11 Founded by the Treaty of the Economic Community of West African States and signed in Lagos on 28 May 1975.
- 12 Meeting in Abuja in June 2006.
- 13 33rd Ordinary Session of the Authority of Heads of State and Government in Ouagadougou on 18 January 2008.
- 14 Ouagadougou meeting on 20 December 2006.
- 15 Treaty of the Economic Community of West African States was signed in Lagos on 28 May 1975.
- 16 Chapter IV, article 27, paragraph 1.
- 17 The ECOWAS Protocol on Free Movement of Persons, the Right of Residence and Establishment was agreed in Dakar on 29 May 1979.
- 18 Supplementary Protocol A/SP1/7/85.
- 19 Supplementary Protocol A/SP1/1/6/89.
- 20 Supplementary Protocol A/SP25/5/90.
- 21 Director of the Division of Intercultural Dialogue, The Slave Route, UNESCO, www.abolitions.org.
- 22 The Navetanes correspond to huge movements of seasonal workers from West Africa, generally associated with groundnut growing, especially in Senegal and Gambia. The etymology of navetane is linked to the Wolof word *nawete* meaning “rainy season”.
- 23 Most West African countries achieved independence between 1957 and 1975.
- 24 The Mourides are an Islamic religious brotherhood in Senegal.
- 25 The first signatory countries were the Benelux countries, France and Germany.
- 26 The CIGEM was inaugurated in Bamako in October 2008. In February 2007, following the meetings in Rabat (July 2006) and Tripoli (November 2006) and the political dialogue between Mali and the European Union (September 2006), Mali, ECOWAS, France, Spain and the European Union signed a joint declaration on “Migration and Development” which refers to the establishment of the Centre.
- 27 Data from Senegal border post registers, which have been collected and analysed by the Institut de Recherche pour le Développement (IRD) under the OMAE Programme, the “West African-international migration observatory for a new co-operation between West Africa and the EU”, *EuropAid*, the AENEAS Programme, European Commission, 2007–09.
- 28 Tabou is a town in western Côte d’Ivoire. In 1999, it was the scene of political violence.
- 29 As is borne out by the route of Jean-Baptiste, recorded by Laurent Zamponi in 2004: “He left Casamance (Senegal) five years earlier. From Côte d’Ivoire in which he lived for some time, he tried to get to Libya via Dirkou (Niger) but was turned back at the border. He then tried his luck by going via Tamanghasset and Ceuta from where he crossed over to Spain in a small boat in which a place cost EUR 1 000 [...]”. This testimony is taken from a November 2004 mission report by the “Médecins du Monde” NGO entitled *Rapport de mission exploratoire auprès des populations migrantes en transit par le Niger* (“Exploratory mission report on migrant populations transiting through Niger”).
- 30 This applies most notably to those who, when they cross the border into Benin, show only an identity card on which no rubber stamp reveals their date of entry, enabling them to remain in the country for longer than the 90 days laid down in the

ECOWAS Treaty. The ease with which those who are not citizens of an ECOWAS country can obtain at least one identity card from one of the ECOWAS member states encourages the transit through West Africa of people from other areas of the world who are on the lookout for accessible routes through which they can still reach Europe.

- 31 Excluding Chad.
- 32 Yamoussoukro is the political and administrative capital, while Abidjan remains the economic capital.
- 33 "Zipf's law" defines the distribution of the size of towns. All identified urban settlements are classified in decreasing order of size. This classification is shown on a graph with logarithmic coordinates. Each urban centre is identified by its position, n , in the classification (horizontal scale) and by its population P_n (vertical scale). The resultant graph reveals how far the distribution deviates from "Zipf's law", which relates the population of a centre to its ranking in accordance with the formula $P_n = A/n$ represented by a line parallel to the diagonal of the square.
- 34 With, $P(n) = A/n^b$ with b slightly less than 1.
- 35 Defined as the "ability of a network to offer alternative routes between places. It reflects the extent to which a network is closely-knit or arborescent".
- 36 Defined as the "ability of a network to establish links between places, and to enable trade and mobility. A network is connected if all places may be reached from one of the others or, in other words, if there is a chain between any two peaks in the corresponding graph"; or a "link between the components of a network, proximity in a topological metric theory".
- 37 The city states as well as the smallest Island states and, in particular, the archipelagos in the Pacific were withdrawn from the sample.
- 38 The coefficient, which in the case of a log-log specification may be interpreted as elasticity, is indeed greater than 1. In other words, when the U/R ratio rises by 1%, PNA/PA increases by more than 1.
- 39 The ECOCLOC Programme – "Managing local economies in West Africa". This set of studies dealing with decentralisation in West Africa and its effects at local, regional and national levels, shows how players from all sectors and all levels involved in a general process can take part in furthering the economy. With reference to real-life examples (study stage, social dialogue and consultation stage, and stage of economic promotion and implementation of activities), decentralisation is studied using around 60 downloadable documents.
- 40 However, it is plausible that the urban growth of the landlocked countries (Mali, Burkina Faso, Niger and Chad) has been partly "exported" to neighbouring countries. Otherwise put, these countries are doubtless under-urbanised within their national borders, considering the state of their economy. To take account of this factor, the landlocked countries will be given a slightly greater parameter λ value, for example $\lambda = 0.17$, so that the proportion of agricultural population of comparable size is reduced by around one-tenth (Annex B).
- 41 A training seminar in MDE was organised in Ouagadougou in December 2012 to pass on this tool to the technical and statistical departments of ECOWAS, UEMOA and the CILSS (member regional institutions of the SWAC).
- 42 The growth of value added in the majority of sub-Saharan countries, as in other regions, is essentially attributable to 80-90% of the secondary and tertiary sectors, which are primarily urban.
- 43 The main particularity of production and growth in sub-Saharan Africa and in developing countries generally is the informal economy. In Africa, the informal workforce is thought to account for 78% of non-agricultural employment, 93% of job creation and 61% of urban employment.
- 44 This project covers cities in several countries using the same definitions and a methodology similar to that recommended by the ILO. It covers the capital cities of seven Francophone countries (Abidjan, Bamako, Cotonou, Dakar, Niamey, Lomé and Ouagadougou). Some countries including Benin and Mali have repeated the survey to update their data. Furthermore, the international seminar on the informal economy organised by AFRISTAT in Bamako in October 2008 proposed setting up a unit to coordinate methodological research and implement a pilot project in some African countries, to test the viability of a system of national employment surveys and mixed surveys on the informal economy.
- 45 The 1-2-3 surveys are conducted in three stages: Stage 1 consists of sampling and identifying households to be surveyed. The analysis focuses on employment and socio-economic and demographic characteristics. Stage 2 consists of surveys of the informal production units identified in Stage 1, and Stage 3 analyses household expenditure. This makes it possible to include the characteristics of the production units in an analysis of the determinants of income from work.
- 46 Concerning employment policy (supplementary provisions); 1984.
- 47 This is the name of a practice first introduced in Porto Alegre (Brazil), which involves giving neighbourhood organisations responsibility for allocating a share of the city's investment budget to their preferred headings.
- 48 A meeting at the UEMOA headquarters in Ouagadougou in February 2012 provided a first opportunity to introduce and discuss with representatives of the regional organisations, the value of the settlement matrix in efforts to achieve food security. With UEMOA in the process of establishing a new co-ordinated statistical division, the context is ideal for fresh efforts to conduct censuses, improve data standardisation, and carry out feasibility studies on the potential of interpretation mechanisms and resources such as settlement matrices or, better still, demo-economic modeling, in a transitional stage towards sounder statistics and more refined projections. The training organised in October following the February meeting discussed the contributions of both these tools and the timeliness of pursuing such an approach.

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Market dynamics and regional integration

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Key messages

- Over two thirds of household food demand is satisfied on the market. This demand translates into increased shares of marketed quantities in total production;
- Producing a marketable surplus implies the emergence of complex trade-offs at the level of individual producers in terms of factors of production (land, labour and capital) and risks. The inherent complexity explains the graduality of the transition from subsistence to market-based agriculture and hence the existence of intermediary production systems;
- Transformations of agricultural production systems are closely related to human and economic geography and hence spatially heterogeneous. Market connections (physical infrastructures, institutions and services) play a crucial role in the spatial configuration of markets and the evolution of production systems;
- Maize quantities marketed in West Africa increased from 0.6 million to 4.8 million tonnes between 1980 and 2007. They increased twice as fast as production of maize;
- Urban demand is the key parameter in spatialising intra-regional flows. Available food consumption surveys indicate significant underestimations of quantities marketed and trade flows;
- Interdependencies created by the regional market affect production decisions, consumption behaviour and the reach of national policies. These interdependencies are not sufficiently integrated in food security analysis and policy formulation.

4.1 MARKET DYNAMICS AND FOOD SECURITY

Markets are the primary source of food supply

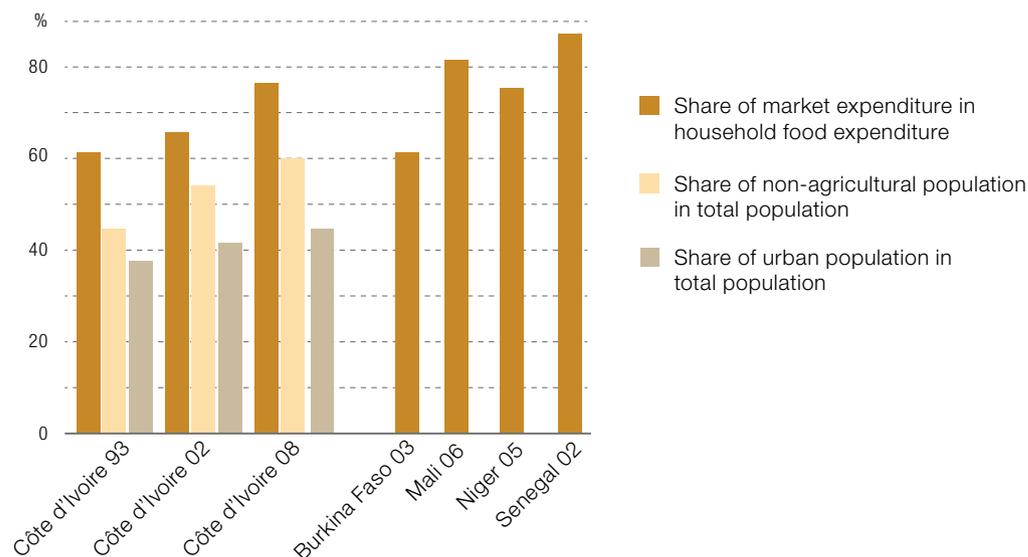
Markets have become the primary source of food supply for West African households. While auto-consumption still accounts for a significant share in total consumption, household food needs are increasingly being met through the market (Figure 4.1). The Strengthening Regional Agricultural Integration in West Africa programme (SRAI, Michigan

State University) estimated that, in the 2000s, markets provided between 62% (Burkina Faso) and 87% (Senegal) of household food supply in the five countries covered.⁷ Senegal's high share is barely surprising given the high consumption of imported rice, whereas the figures for the Sahelian countries are more revealing of the ongoing transformations.

Urbanisation is a determinant factor in the transformation of how households acquire food. In urban areas, almost all food is market bought,

Figure 4.1

Share of market expenditure in total food expenditure



Sources: MSU, SRAI programme 2011; FAO, PopSTAT; SWAC/OECD 2012

with an average 93% of household consumption being supplied through various market distribution channels. A recent study (ACF, 2009) estimates that 94.8% of households in the Matoto community (Guinea), which account for one third of Conakry's inhabitants, buy food on the market. The increase in the ratio of non-agricultural to agricultural populations (NAP/AP), linked to the process of urbanisation, provides a good measure of food market development. There is a close correlation between the proportion of non-agricultural producers in the total population and the proportion of market supply in total food expenditure (Figure 4.1). Côte d'Ivoire, in particular, saw a sharp rise in the proportion of food bought from markets, which coincided with an increased pace of urbanisation (the level of urbanisation rose from 42% in 1993 to 53% in 2008, an increase of 26%).

Urbanisation also creates new needs. Demand for "luxury" foods, meat, dairy products and vegetable oils, increases (de Haen *et al.*, 2003). It is also associated with dietary shifts towards more processed and pre-prepared foods (Popkin, 2001; de Haen *et al.*, 2003). Many basic food staples consumed today in Africa, such as rice, maize, cassava, banana, groundnuts, etc., have been introduced from other parts of the world. Consumption of these products were first introduced in urban centres and then spread to rural areas. Over time, the growing demand for these new products created the conditions for corresponding markets and local supply to emerge.

Markets play a key role in food security. They are vital channels for ensuring households' access to food. In this context, two points need to be specified. First, at the micro-level,

many analyses show that vulnerable agricultural households (in particular, pastoralist and agro-pastoralist) are net food buyers, often with household production only covering up to 40% of food needs. During lean periods or crises, they have to sell accumulated capital, mostly livestock, to make up for harvest shortages and/or price increases, which creates a spiral of poverty and food insecurity. Second, the

« Urbanisation is a determinant factor in the transformation of how households acquire food.

emergence of the market's role in food security has also led to an evolution of food security in itself: from only availability to accessibility of "sufficient, safe and nutritious foods [...]" (definition of the World Food Summit, 1996). This definition of food security is the translation of changes in food insecurity driven by market dynamics. To grasp the major transformations and consequences inherent in the emergence of an agricultural market economy, a clear understanding of what the market actually encompasses is crucial (Box 4.1).

Interconnected activities

The most common understanding of the market, in the context of African agriculture and food security, is one of price setting by traders carrying out transactions in a physical market place. This narrow view biases analyses of agricultural transformations in important ways. It does not take into account the interactions of myriad variables and actors and thereby the resulting complexity of the process. Linked to

Box 4.1

The transformation of food insecurity

The great famines of 1973 and 1983 that have devastated Sahelian communities have strongly marked the international community. Unconsciously, they have led to a likening of food insecurity and severe food crises at a great scale. Yet, these two events represent more profound and more lasting ruptures. They have led to a

spread of structural vulnerability across the Sahel, leading to the emergence of new, more blurred, more precarious and also more chronic forms of insecurity. Beyond cyclical crises, the Sahel has become one of the hardest hit regions of the world by hunger and malnutrition due to its production variability, poverty and market failures.

Source: CILSS 2004

this is the failure to appreciate the obstacles posed by market imperfections, particularly severe in West Africa. Also, it overestimates the influence of one group of actors, in this case traders, and by consequence underestimates the influence of others. This has clear consequences for policy makers concerned with structural mid- to long-term strategies for food security.

For our analysis of structural transformations, the market should be interpreted as all interconnected activities that are necessary, from producing a product to its final destination, the consumer. This basically means everything from planning production, growing, harvesting, transporting, storing, processing, distributing and advertising to selling. An essential part of this chain is information. Who and where are the buyers? What is the product, and how and in what quantity do they want it? What is the price and what is the supply? Who is producing and what are the volumes available? The market is therefore a complex network of institutions, infrastructures and services. The ability to access and integrate into the system determines the success of the transformation process at the individual and macro-level.

The “market” encompasses more than just trades. It should be interpreted as all interconnected activities from producing a product to its consumption.



“Too many successful efforts in raising production yields have ended in failure when farmers were unable to market the increased outputs. Understanding how to access rural credit, or how to develop warehouse receipt systems and especially how to sell any increased output, becomes as important as learning how to maximize input efficiencies or build fertile soils” (Pretty *et al.*, 2011).

Linked to the complexity of these interactions is that markets are spatially and temporally irregular. Markets do not spread in a homogeneous fashion. Location is a key parameter. It determines the relative importance and interplay of the above-mentioned variables. This is more obvious in terms of infrastructure but is indeed similar, particularly in the West African context, in terms of institutions and services. The temporal irregularity resulting from intra- and inter-annual variability impacts the market

functioning regionally and locally. Therefore, the agricultural transformations induced by the market occur in different places, at different paces and in different forms.

These transformations are difficult to detect in the macro data available and also in the many reports on African agriculture, unfortunately. The heterogeneity in terms of environments and livelihoods, in the absence of detailed and localised data, can only be described by using case studies and/or long-term trends. These studies provide localised descriptions of the transformations of agricultural production systems and the processes that induce them.

Producing for the market

Global logic and individual arbitrage

At the macro-level, producing for the market essentially means increasing output for marketable surplus. Production can be increased through expanding the cultivated area, extensive farming system, and/or increasing yields, intensive production system. Intensification can be defined by increasing investments in terms of labour and/or capital per unit of land cultivated. The sustainable shift from intensification of labour towards an intensification of capital characterises an agrarian transition (Jouve, 2006). Low population densities and availability of land in West Africa, plus existing land tenure systems, have favoured predominantly extensive farming practices.

The data shows a slowing of the growth rate in cultivated area and a simultaneous increase in yields only since the 1990s (Figure 1.11). The countries of the Gulf of Guinea and of the Atlantic with higher rural densities saw a reversal occur before the Sahelian countries. However, the data at the sub-regional and national level cannot show the important differences that exist within countries and across areas, masking areas where the “traditional” system is still possible because arable land is abundant and/or demand centres (markets) are distant.

At the micro-level, the production decisions – moving from self-sufficiency towards producing a planned, stable marketable surplus – are considerably more complex. Farmers’ production decisions are based on constraints (land, labour and capital), risks and multiple objectives. The individual production functions are however closely linked to

the broader structural transformations of the economy. Urbanisation and the growth of a non-agricultural based economy are the most powerful transformations (Box 4.2).

Understanding the processes and conditions that incite producers to produce a growing marketable surplus requires understanding the interactions and range of objectives, constraints and risks producers' production decisions are based on.

The difference between producing for household food consumption and a marketable surplus can be so important that "a small farmer with market access producing a high value crop and another farmer on the same size farm producing a staple food crop for home consumption can hardly be compared in a meaningful way" (Von Braun, 2005).

However, smallholder producers are viewed as one homogenous group characterised by limited land and capital, high exposure to risk, low input technologies and low market orientation. Yet, it is necessary to identify and conceptualise the important differences in livelihoods and production systems to understand producers' constraints and target policies according to the various realities.

Not all smallholders are equally land and capital constrained, market-oriented or vulnerable to risk (Chamberlin, 2008). The graduality of the transition from subsistence to market-oriented production implies that between these two lie a variety of intermediary or hybrid production systems. In West Africa, the large majority of farmers are in a hybrid production system, producing for both auto-consumption and the market (Box 4.3).

Intensification and yield versus labour productivity

In terms of the intensification of agricultural production, West Africa is lagging far behind other areas. Although agricultural production growth over the past three decades has been impressive, exceeding the rate of population growth by 1.8%, many observers question the extensive nature of this production growth. Although the data shows a picking up in yield growth and a slowing in area growth, the argument that West African farmers are not producing enough per area cultivated is receiving widespread attention.

There can be no doubt that if West African farmers are to be able to feed the region's

Box 4.2

From random to planned surplus

"Urban demand is only likely to influence producers' decisions when it reaches a certain relative importance (threshold of urbanisation rate of 20% for the emergence of planned food surplus production and 50% urbanisation rate for transition towards more intensive farming practices)" (Cour, 1994).

The exact quantity of agricultural output cannot be planned precisely. Climate variables, such as quantity and length of rain, temperature, and other environmental influences (locusts, pests), can lead to significant variations in output produced. Output variations calculated in terms of five year moving average in regional production growth, were 15% for sorghum, 14% for millet and 13% for maize between 1964 and 1990. At the national level, these figures are twice as high.

In 1960, with a NAP/AP ratio of 0.2, a "random" production surplus of 20% would be sufficient to satisfy demand from all non-agricultural producers. Any surplus above that would exceed demand. Incentives for producers to move from random to planned surplus production systems, necessitating labour and/or capital investments to intensify production, will be localised (producers close to large urban centres with a high share of non-agricultural producers) at best in such conditions. By 2010, the NAP/AP ratio had increased to 1.0. Or in other words, satisfying demand from non-agricultural producers cannot be achieved with a "random" surplus. Producers would need to produce exactly double of what they need for their own consumption. In reality of course, various factors beyond such simple estimations of market size will influence individual producers' decision on producing a planned and sizable surplus.

Box 4.3

Defining family farms

The widely used term family agriculture covers a large range of often very different situations. The structure and activities of farming systems varies greatly with agro-ecological conditions, countries and socio-cultural groups. Family farms represent at least 80% of all farmers in West Africa (Wiggins, 2009).

The contribution of “small” family farms towards supplying cities and countryside is vital. They also provide the majority of rural employment in countries where the rural/urban transition is far from being completed.

Source: Zoundi 2012

Widely confirmed by various authors (Bonnal *et al.*, 2003), family agriculture is the dominant form of agricultural production in Africa. Family farming is characterised by the use of household labour but also by a close relationship between the type of activities, the composition of the household and employed capital. Contrary to a purely commercial form of agriculture, social and cultural values as well as diversification and risk management occupy an important place within a family farm. The relationship between economic, social and cultural dimensions and its multiple objectives justify the term of “multi-functionality” (Bonnal *et al.*, 2003).

growing population, yields have to increase. For policy makers to be able to provide the right framework, institutions and services needed for the transition towards intensive production systems, it is important to analyse the factors and constraints influencing producers’ investment decisions in intensification. This is crucial because for producers intensification is a result of a process and not an objective in itself.

Producers distinguish between labour productivity and yield, the productivity of land. Labour productivity is output produced per unit of labour employed, or in other words revenue, either in terms of food or money from selling surplus production. Extensive production systems often require little labour and

The graduality of the transition from subsistence to market-oriented production implies that between these two lie a variety of intermediary production systems.



can therefore have high labour productivity. When land is available, producers’ strategy is to increase production by increasing the area cultivated.

Yields, or land productivity, increase with investment per cultivated area. Such investments can be made in the form of inputs, such as improved seed varieties and fertilisers, machinery and production techniques, and in

terms of labour. The first form of intensification is generally labour intensification (Box 4.4).²

An FAO study on cassava production in Nigeria (FAO, 2005) provides a particularly interesting example. A survey of three Nigerian villages in 1973, one with high population density, one with medium population density and one with low population density, showed that yields were higher where population density was lower. The same three villages were analysed again 20 years later. By then, yields in the high-density village had doubled, and they had declined by 15% in the low-density village. This is explained by “the doubling of cassava yield in the high population density village is because farmers planted the high-yielding TMS varieties [Tropical Manioc Selection] at high stand densities, employed hired labour and enjoyed ready access to a nearby market” (FAO, 2005). Farmers in the other villages continued to plant local varieties. This case highlights two important aspects of the transition towards intensification. The first aspect is the notion of thresholds, a level at which traditional systems are not viable any longer (Malthusian evolution), that necessitates farmers to adapt by intensifying production to provide sufficient output to assure, at minimum, survival (Boserupian evolution). Second, intensification is a gradual process. Farmers and input market adaptation take time.

Box 4.4**ECOWAP and agricultural productivity (Regional Agricultural Policy for West Africa, ECOWAS)**

“ECOWAP sets out the principles and objectives for the agricultural sector, the direction that agricultural development is expected to take, and the main lines of intervention in the sub-region. These are designed to enable it to exploit its potential to achieve (i) sustainable food security in member countries; (ii) decent remuneration for those involved in the agricultural sector; and (iii) to expand trade on a sustainable basis, both within the sub-region and with the rest of the world. The three major

themes of this policy are: 1) Increasing the productivity and competitiveness of West African agriculture; 2) Implementing a trade regime within West Africa; 3) Adapting the trade regime vis-à-vis countries outside the region. The first axis of intervention focuses on improving food security, increasing producer incomes and recognising their status, and reducing poverty”.

Source: ECOWAS 2004

Between food security and commercialisation

Until today, for the majority of farmers, the basic objective has been to assure household food security. A large share of producer households’ food consumption is still auto-produced. Yet, producers increasingly enter the market. Therefore, producers’ production functions are balancing between food security and revenues. Available land, labour and capital are divided into producing for household food needs, marketable surplus or other off-farm activities.

The trade-off at the producer level is basically one of opportunity costs between producing a planned surplus and alternative uses. Available capital, land and labour are split between the various objectives. For instance, producing improved varieties of maize for selling on the market absorb land, labour and capital, reducing their availability for alternative uses (such as increasing production for auto-consumption and reducing food buying on the market, engaging in off-farm employment, or not use available land and labour).

“The farm level determinants of increasing commercialisation are the rising opportunity costs of family labour and increased market demand for food and other agricultural products. Family labour costs rise due to increasing off-farm employment opportunities, while positive shifts in market demand are triggered by urbanisation and/or trade liberalisation” (Pingali and Rosegrant, 1995; cited in Timmer, 1998). Off-farm employment opportunities are an important source of revenue. Studies by the International Institute of Tropical Agriculture show that (Baco

et al., 2011; Bamie *et al.*, 2010; Fofana *et al.*, 2011; Wiredeu *et al.*, 2010) off-farm activities such as self-employment, wage labour, petty trade, etc. contribute between 10 and 33% of household income. In Senegal, non-agricultural activities account for 54% of rural household income at the national level (WFP, 2011).

The IITA studies (Baco *et al.*, 2011; Wiredeu *et al.*, 2010) also confirm the link between investing (in terms of adopting improved seed varieties) and producing for the market. In



The farm level determinants of increasing commercialisation are the rising opportunity costs of family labour and increased market demand for food and other agricultural products.

both studies, the authors found a positive link between marketing and adopting improved seed varieties. In addition, harvested area had a positive impact on adopting improved varieties in both countries. In Benin, “adopters” planted twice the area (2.9 versus 1.6 ha) with maize than “non-adopters” with identical total farm size (10.6 versus 10.1 ha), leading the authors to conclude that produced surplus quantity was destined for marketing. This conclusion was further confirmed by considerably higher revenues by “adopting” farmers. An empirical study on maize intensification in Nigeria (Salau *et al.*, 2012) found a positive, significant relation between farm size and technical efficiency and between farming experience and access to credit and technical efficiency.

Risks and revenues

Given the limited resources of producers, production decisions are strongly influenced by risks. These risks are production related, such as drought and pests, and market related, such as the level of supply and prices for output and food bought on the market. In West Africa, with high intra- and inter-annual price fluctuations, the absence of insurance and safety nets risks are particularly high. Farmers must balance between profitability and risks. This trade-off between profitability and risks also explains that the necessary investment for producing for the market takes place gradually and on a small-scale trial basis.

Investments in production and specialisation in a few crops allow farmers to acquire knowledge of seed varieties, fertiliser use, production techniques and marketing channels over time. These are important steps in increasing yields and profits and thus reducing associated risks. The example of the above

average food staple yields in cotton production basins shows how policies can reduce risks and thereby accelerate intensification. “The example of cotton production areas, where yields for food staples are generally higher than average, shows that durable support services, combined with a marketing guarantee and stable prices can accelerate the process of agricultural intensification” (Cour, 1994).

An important feature of the intensification process is its accelerating nature. For instance, risks for better endowed farmers are lower than for poor farmers. Better endowed farmers have higher technological application, better access to inputs, markets, and larger land holdings (Chamberlin, 2008). Further, intensification necessitates investments in the form of tools/machinery and other off-farm inputs; these are acquired with revenues earned from marketed surplus. Transaction costs for buying inputs, selling output and adopting new techniques also decrease with size.

4.2 CONNECTING TO MARKETS

Access to information

Information defines the efficiency of all markets. Climate and environmental variables significantly influence production, and with it, market functioning. The resulting lack of predictability, combined with food’s strategic role, amplifies the demand for information about the other, less unpredictable elements of the market.

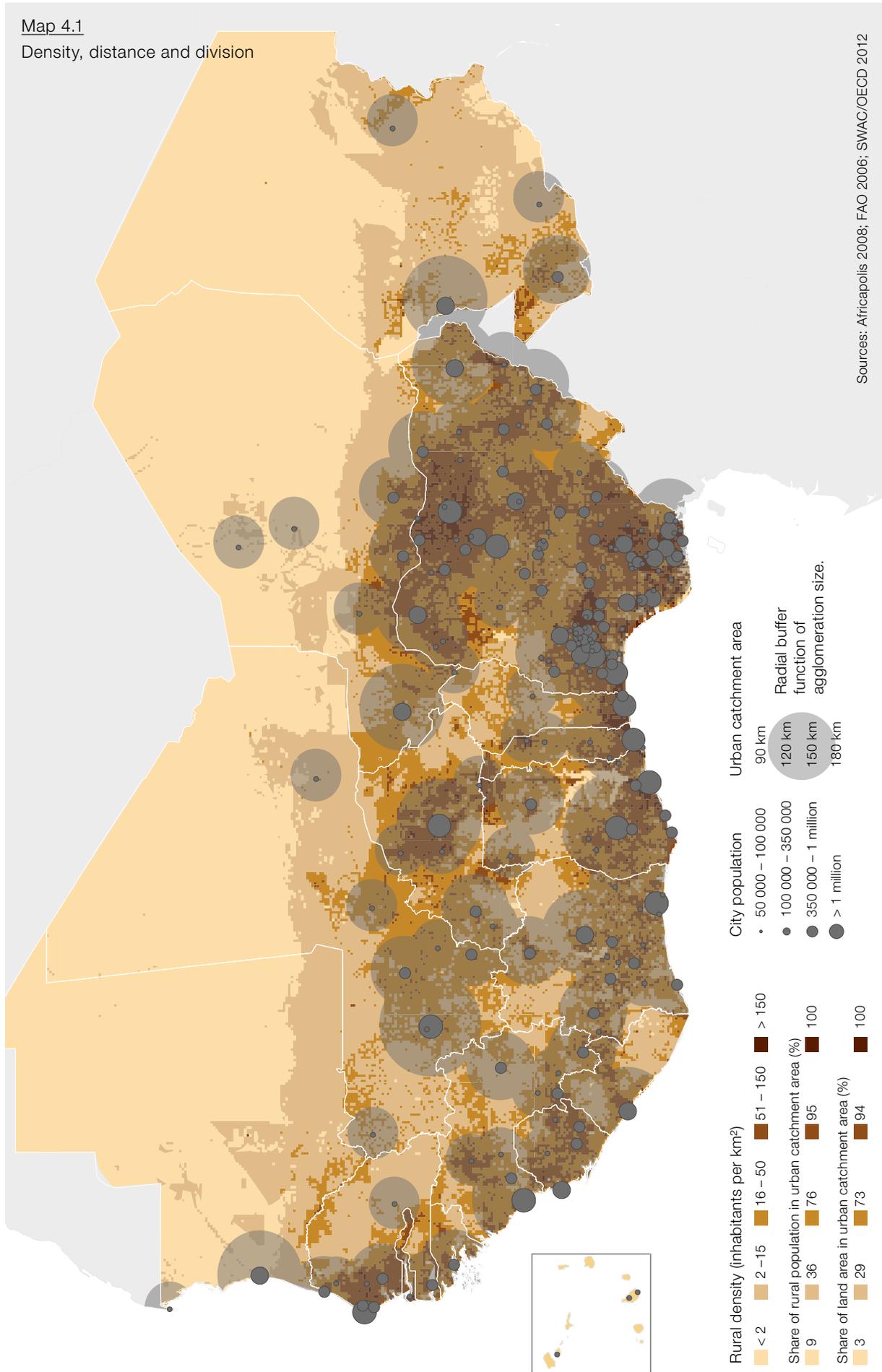
Over recent years, the impact of information, particularly in terms of mobile phones and communication technologies (ICT), on agricultural markets in West Africa has been well documented. Market functioning has improved in several respects. Studies have shown that mobile phone coverage has led to falling price dispersion across markets (Aker *et al.*, 2010; Aker 2010). Price transmissions are broader and faster, nationally and across borders. These impacts reduce speculation and arbitration possibilities (Araujo *et al.*, 2008; Araujo and Simonet, 2011) and have positive impacts on accessibility.

However, there remains a lack of analyses and studies of the impact on producers and production. How does information influence producers’ production decisions and risks?

What is the role of information in accompanying the broader structural transformation and transition towards planned marketable surplus production? The impact of missing information is naturally hard to quantify. But there is little doubt as to the need of a whole range of new information for producers ready to invest in planned surplus production. Information is needed on what products, in what quantities and what quality consumers want, and where, when and at what price to sell products. What are the costs of transporting products to the selling point?

A project on the cross-border cereal trade in the Kano-Katsina-Maradi area (CILSS *et al.*, 2006) that involved stakeholders from the value chain (producer, transporters and traders) identified lack of information (prices, exchange rate, laws and regulations) as a key constraint in commercialising agricultural products. A recent study (Svensson and Yanagizawa, 2009) on maize markets in Uganda quantifies the impact of market information on producer revenues. In the areas surveyed, maize farmers with regular access to market information (daily radio news bulletin on market prices broadcasted in local languages) sold their surplus at

Map 4.1
Density, distance and division



Sources: Africapolis 2008; FAO 2006; SWAC/OECD 2012

prices 15% higher than farmers without access.

Although, communication technologies have facilitated access to information, closeness to markets remains a key factor. Information does not spread homogeneously. It depends on a range of factors, such as income, the type of communication technology (e.g., cell phone or radio) and connection to markets.

Proximity and access

Urbanisation is creating an increasing heterogeneity in the geographic space. One's location within a network of urban areas of different sizes is a determinant factor for the production of goods and services, not least agricultural products. The market opportunities created by urbanisation are the main driving force behind changes in the rural economy, increasing the spatial differences between rural areas.

Differences between rural areas are stark. High density rural areas exceeding 150 inhabitants per km² and well connected to large urban centres co-exist with other areas, where densities do not exceed 10 inhabitants per km²

Market opportunities created by urbanisation are the main driving force behind changes in the rural economy.



and the nearest urban market is more than six hours away. Such differences can be bigger within countries than across countries. Also, these differences have persisted and have often increased over time (WALTPS, 1994).

The demand stemming from large urban centres will continue to have a stronger impact on agricultural production in nearby areas that are well connected to these markets. The advantages of closeness to markets, information, services and labour will continue to outweigh the disadvantages of density. Geography and spatial differences have to be integrated into the analyses of structural transformations of agriculture.

Distance to markets and the role in agricultural transformations

An analysis of spatial variation in market attractiveness and its correlation with rural settlement patterns in West Africa for the period 1960–1990 shows that variations in rural density are more closely related to variations in market

attractiveness than agro-ecological criteria (WALTPS, 1994). In 2000, 15% of the rural population lived in high-density areas with more than 150 inhabitants/km², accounting for only 2% of the non-desert land area. All high-density rural areas are in the catchment area of an urban centre of more than 50 000 inhabitants (Map 4.1). In contrast, low- to medium-density rural areas (2-50 inhabitants/km²), account for 41% of the rural population but 80% of the land area. 33% of these inhabitants are more than 90 km away from an urban centre with 50 000 inhabitants or more.

Distance to market is a key parameter in defining the attractiveness of an area. It measures how easily goods are transported, services are delivered and information, capital and labour move between two locations. Distance is an economic concept as much as a physical one. Distance in terms of trading goods includes time and costs. Access to and the quality of infrastructures affect economic distance. Borders, policies and informal taxation can further increase distance (World Bank, 2009).

In agriculture, transport costs, quality and time have a strong impact on profitability. The FAO estimates that up to 25% of the consumer price for maize is transport cost (FAO, 1999). The high share of transport costs in the final price is also linked to the high weight to value ratio of agricultural products. Also, goods are often perishable and have to be transported quickly or are easily damaged (eggs, vegetables, etc.), adding costs.

Agricultural transformations and intensification are closely linked to distance and density variables. The integration into the market economy of agriculture takes place gradually, starting where the incentives to produce a marketable surplus are highest and cost/risks are lowest, in areas that are close to and well connected to consumption areas.

The role of infrastructures in promoting commercialisation

West Africa is burdened by a lack and high costs of transport infrastructures (road, rail, water, etc.) and service infrastructure (warehousing, conditioning and marketing). Both play a crucial role in moving goods and services. The road is the main form of transport in Africa, accounting for 80-90% of total inter-urban and inter-state transport of goods, and often the

only option of accessing rural areas (UNECA, 2007). However, the road density in West Africa is very low. The World Bank's Rural Access Index estimates that only 38% of the rural population had access to road infrastructure at the beginning of century (Figure 4.2). The supply of small towns and urban agglomerations depends on a network of rural roads that link production and consumption.

An extensive USAID funded evaluation of commercialisation and private investment in agriculture in Nigeria (Manyong *et al.*, 2005), based on stakeholder interviews, identified infrastructure as the most critical constraint to private investment in agriculture. The infrastructure constraints included physical criteria, such as quality of roads, marketing and processing facilities, and other criteria, including electric power supply and telecommunications. In total, 13 constraints were evaluated, ranging from environmental and financial to land tenure constraints (Map 4.2).

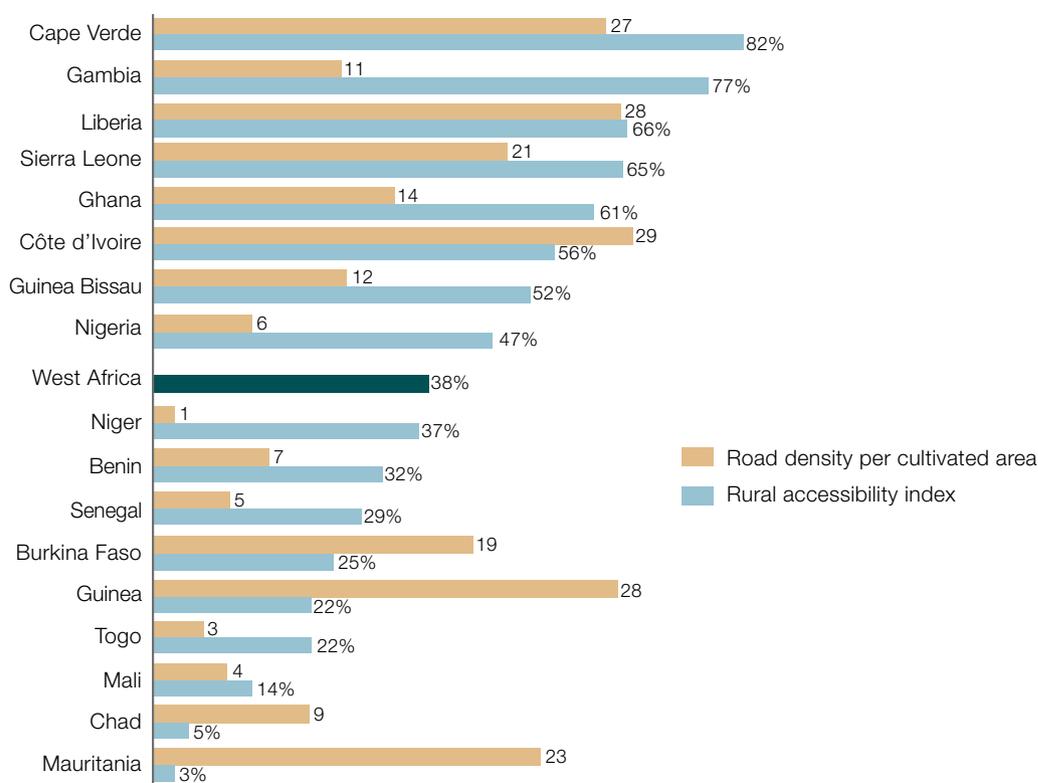
Although there have been considerable improvements in road infrastructure, the

region continues to bear very high transport costs. Today, the transport cost barriers are higher than tariff barriers. Table 4.1 presents the costs for some corridors. According to a recent USAID study (2012), transport costs on the Lomé-Ouagadougou corridor vary between USD 2 201 and 5 155, depending on the direction of trade. Exporting, north-south movements, is cheaper and faster, which is explained by smaller quantities of goods and more competition. On the alternative axis from Tema to Ouagadougou, transport costs are higher, ranging from USD 3 014 to 5 371, and transport time is longer.

Several factors explain the high transport costs: the state of rolling material, petrol prices, customs and port duties and informal payments. Delays on border crossings, co-ordination problems and harassments account for a significant share in total costs. However, the main factor is the absence of competition in the sector, and hence the high profit margins for operators (Teravaninthorn and Raballand, 2008). Particularly in West Africa, the existence of cartels and restrictive licence attribution policies are

Figure 4.2

Rural accessibility index and road density per hectare of cultivated land



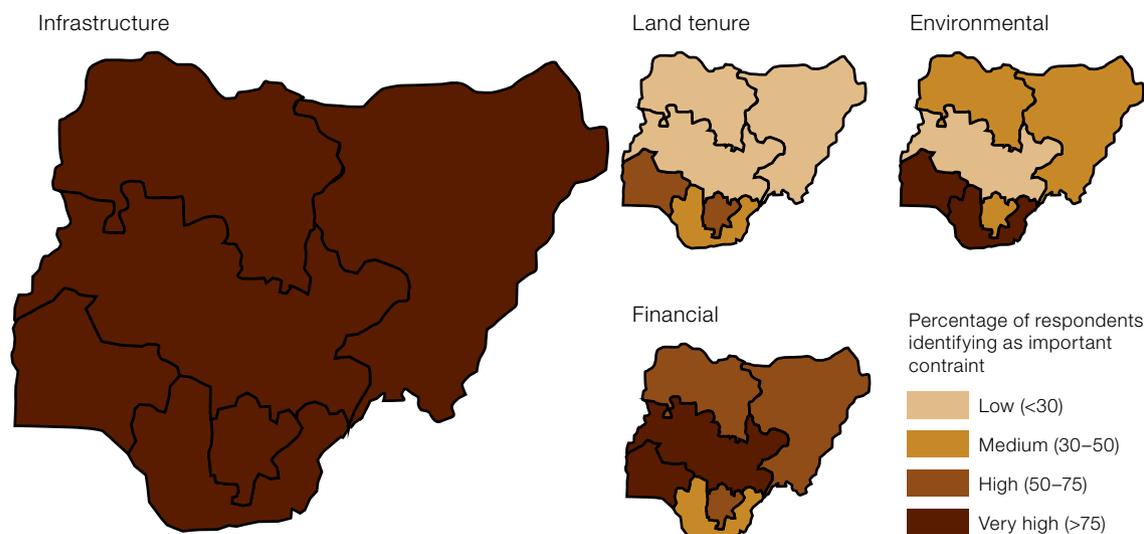
* Percentage of rural population (or habitable areas) who live within 2 km of the nearest all-weather road.

** km per 1 000 hectare of cultivated area.

Source: World Bank

Map 4.2

Constraints to private investment in agriculture in Nigeria

Source: Manyong *et al.* 2005

responsible for the bad quality and high costs of transport. Even after accounting for road quality and informal taxes and payments, the costs incurred by transporters cannot explain the high prices compared to other regions of the world. According to Teravaninthorn and Raballand (2008), prices are between 50 and 100% more expensive than in Europe or the US. Profit margins can reach 160% of costs along certain corridors (Douala-N'Djamena) and are generally highest in West Africa (Table 4.1).

The quality, costs and time-distance of the road network influences the spatial configuration of production and markets. The change of the N'Gaoundéré-Moundou axis, completed in 2008, highlights how transport infrastructures modifies the functioning of markets and production systems (Box 4.6). Markets closer to the new road have seen their status grow and their activities diversified (grouping, warehousing and transporting), while other have lost out.

Table 4.1

Road transport costs

	Lomé-Ouagadougou (2009)		Téma-Ouagadougou (2008)	
	Imports	Exports	Imports	Exports
Distance (in km)	1 020		1 057	
Total costs* per truck load (USD)	5 155	2 201	5 371	3 014
Normal time (in days)	8.4	3.3	13.5	5.8
Average delays (in days)	6.3	2.1	8.7	2.8

* Transport & logistics

Source: USAID, West Africa Hub Trade 2012

Box 4.5

Urban agriculture

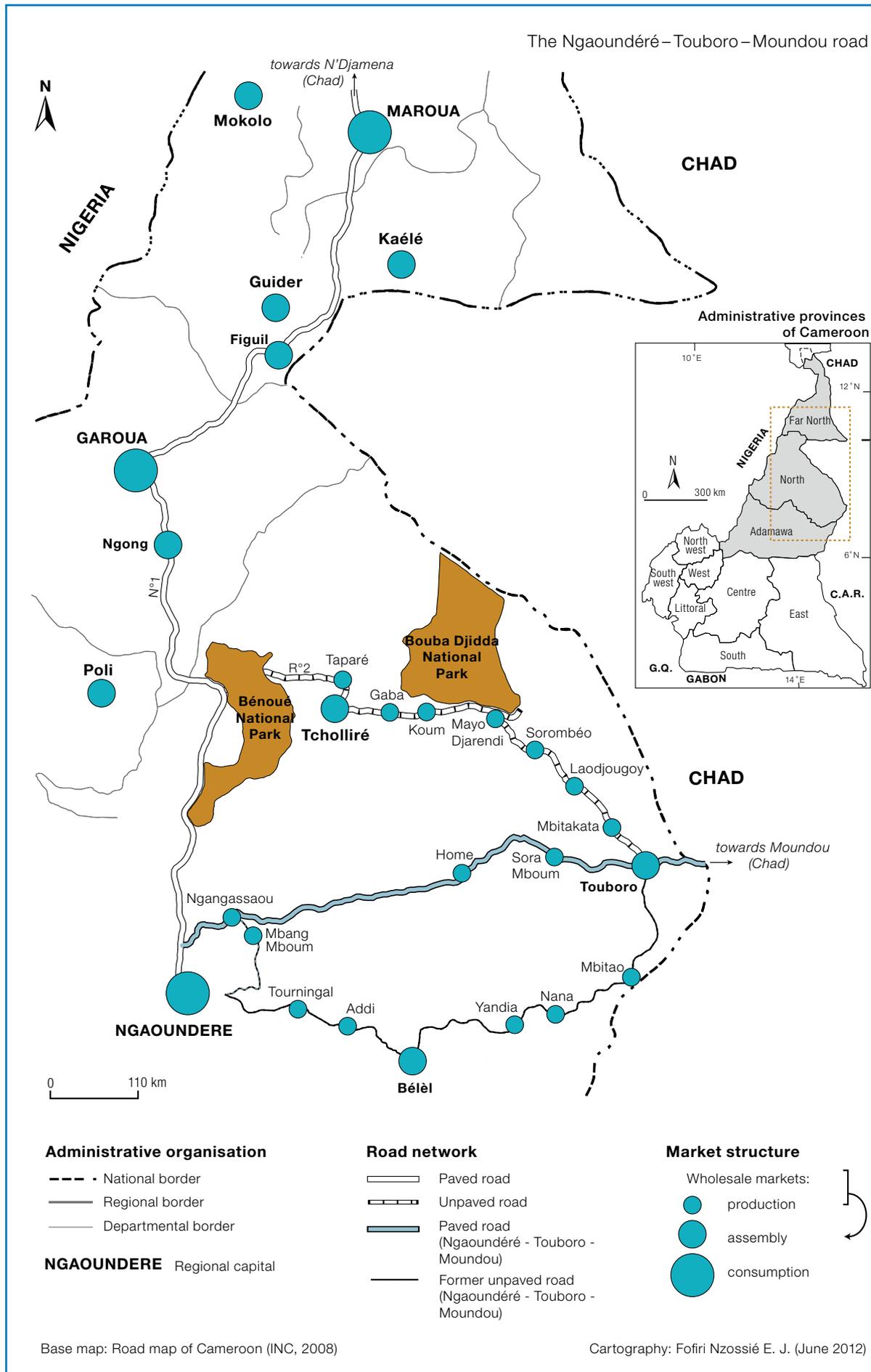
Urban and peri-urban agriculture, also known as urban proximity agriculture, illustrate the effect of market connection on intensification. Urban horticulture and livestock production (especially poultry) have increased considerably in recent decades. Urban agriculture is a flourishing economic activity that benefits from proximity to markets; it is characterised by very small plots, a high degree of specialisation, high use of inputs (labour, fertiliser and equipment) and market-oriented production (no regional supply and very low auto-consumption). Operating logic and structures are different from those of rural farmers. Urban agriculture is the creation of an urban population that brings investment and innovation and is essentially market oriented. Prosperous market gardening, poultry and dairy farming activities develop and expand in and around all the towns and cities in the region (Toulmin and Gueye, 2003). The private sector invests massively in the peri-urban production of poultry, pork and milk (Romanik, 2007).

In most urban centres, urban agricultural production represents a high proportion of local trade in fresh vegetables. In Accra, 92% of vegetables traded and up to 50% of poultry and eggs are produced in the metropolitan area (Egyir and Beinpuo, 2009). In Bamako, urban

agriculture produced around 7 000 tonnes of vegetables in the 1990s (FAO, 2005).

The advantages include very low transport costs, which reduce wastage, especially for vegetables; fewer intermediaries and greater market power (wholesalers also prefer to source locally in order to reduce losses due to spoilage and other factors); fixed contracts (with restaurants and shops, for example), reducing risks and search costs; and access to inputs and labour (Tallec and Bockel, 2005). In Bamako, producers were estimated to accrue 83% of profits, compared with 16% for downstream services, that is, for wholesalers and retailers (Tallec and Bockel, 2005).

The main limiting factors for local urban agriculture are the size of plots and access to land. In Bamako, urban farmers' plots are smaller than 0.1 hectare, with an average size of 0.04 hectare. Only 9% of farmers have plots of 1 hectare or more. However, the average income of small producers in the mid-1990s amounted to FCFA 323 000 a year, 38% more than the average day labourer, while large producers were earning FCFA 1.5 million (Tallec and Bockel, 2005)



Box 4.6**Road infrastructure as a factor (re)shaping the marketplace**

North Cameroon, situated in the Sudano-Saharan zone, is an area of 164 000 km² with an estimated population of 6 million, of which 35% is urban (BUCREP, 2010).ⁱ Its mainly agricultural economyⁱⁱ supplies major domestic and cross-border trade networks with Nigeria, Chad, Gabon, Equatorial Guinea and the Central African Republic. This makes the region an important agricultural trading hub, even though many rural markets are not easily accessible. North Cameroon had an estimated 9 306 km of roads in 2010, 8% of them paved, and a density of 0.057 km/km². Unpaved roads link areas of production to urban consumption centres. The dynamics of market creation have determined a spatial configuration that depends on the quality of the road network, unpaved vs. paved roads. Markets can be divided into three types according to their level of accessibility:ⁱⁱⁱ

- *Production wholesale markets*: they cover one or more adjacent production areas; access is difficult, especially at harvest time;
- *Assembly markets*: they span several producer markets and are located in administrative centres (departments and districts), which are more easily accessible;
- *Consumption wholesale markets*: the urban and peri-urban markets of provincial and regional capitals.

This spatial configuration of markets heightens the role of intermediaries (usually from production areas) between urban wholesalers and producers. Geographical analysis of the market basin highlights the structural role of road infrastructure in both the structure of trading chains and local specialisation. Road improvements affect the geographical configuration of markets. That is the case with the road linking Ngaoundéré, Touboro (Cameroon) and Moundou (Chad)^{iv} (392 km). The paving completed in 2007 polarised the supply of urban centres and neighbouring countries in cereals (maize and millet) and pulses (groundnuts, cowpeas and soya) from

the Touboro department. After completion of the new, the quantity of maize exported to Ngaoundéré and South Cameroon rose from under 30 000 tonnes before 2003 to 78 000 tonnes in 2004 (DAADER,^v 2006). However, the polarisation of trade in the department has not caused any notable structural changes in Touboro, the principal town.

In contrast, the new route has brought profound changes, incorporating new assembly and transport points within the production areas crossed (Ngangassaou, Home, Sora Mboum, etc.) into a domestic and cross-border trade network, while at the same time marginalising many previously accessible markets. One illustration is the market in Mbang-Mboum, one of the peri-urban warehouses of cereals, pulses, fresh vegetables and firewood for the main town of the Adamaoua region, now 7 km off the new route. Situated 60 km from Ngaoundéré on the old route, its supply of Ngaoundéré was based on two practises: urban wholesalers and semi-wholesalers came to the weekly market (Wednesday), while motorists and travellers made day-to-day purchases as they passed through the village. Roadside stalls had sprung up along the road through the village, bringing local residents additional daily income. The bypassing of the Mbang-Mboum market has had three major consequences for the population:

- The ending of roadside sales and hence the disappearance of a source of daily income;
- An almost 50% reduction in sales of the village's production, produce now being sold only at the weekly market;
- A fall in vegetable production (tomatoes, lettuce, peppers, culinary plants, etc.), previously seen as a promising transformation of agricultural production, and a fall in cereal production (maize), whose production benefited from knock-on effects of fertilisers used for vegetable production.

continue next page

Box 4.6

Another consequence of paving the road has been to change the pattern of supply to towns further to the north (Garoua, Maroua and Kousseri). Traffic on the unpaved Tcholliré-Toubo regional road, which used to carry 80% of foodstuffs from Toubo, has fallen by over 70% in favour of the new, paved road (Toubo-Ngaoundéré), making Ngaoundéré a major redistribution hub between North and South Cameroon. The change in Ngaoundéré's positioning as a key transit point and interface between the north and the south has been more symbolic than economic, since the city has not so far become a regional food market for north Cameroon.

Transporting farm produce to urban consumption centres is a significant gamble for retailers. The cost of transport per tonne can amount to as much as 30% of the consumer price due to the logistical organisation of trade imposed by the state of the roads. Two categories of vehicle are used to transport food from producer wholesale markets to consumer markets. Because of their flexibility, small vehicles (motorbikes, pick-ups and mini-buses)

collect small quantities of food (one to three tonnes) from producer markets and take them to assembly markets to form stocks of 15 to 30 tonnes. These are then trucked to cities and neighbouring countries. This structure induces additional handling costs, which are passed on to urban consumers.

Economic operators' decisions to invest in food transport are also factors in the state of the roads. Seasonal factors that restrict access to production areas have turned truckers to the transport of more profitable goods (fuel and manufactured goods).

The organisation of markets and agricultural trade circuits between territories are being (re) drawn and (re)oriented with the road network. Some producer markets are becoming assembly (or pre-storage) markets, thus also influencing trade patterns. The strategic role played by the regional transport system in supplying urban areas underlines the importance it needs to be given in the analysis and design of policy.

Sources: Fofiri Nzossié *et al.* (2011) and Fofiri Nzossié (2012)

4.3 DEFINING REGIONAL MARKET SHEDS

Dynamic regional trade

Intra-regional trade is reputed to be weak in Africa, especially in West Africa. According to the African Development Bank, it amounted to USD 8.6 billion in 2008 (Table 4.2). The ECOWAS Commission is more pessimistic and puts forward the figure of USD 7 billion for the same year.

There is no reliable and systematic source of information about the size of the regional market, in terms of either amounts traded or the direction of flows. Official trade statistics (FAO) on the main staples (millet, sorghum, maize, rice, manioc and yam) show very low and sometimes falling trade volumes. Trade in maize (including extra-regional exports) amounted to 0.4 million tonnes on average in

2007–09, representing 1.8% of total production (Figure 4.3). This is lower than the 1980–82 average of 0.44 million tonnes, representing 19.2% of production at the time. Field observations of flourishing inter-regional trade in agricultural products contradict these data.

These underestimations are due to the fact that the vast majority of transactions are informal and hence not counted in official statistics and national accounts (Chapter 3). Also, the large number of small transactions and the exemption of customs duty on unprocessed products do not facilitate measuring.

Few studies actually quantify the real scale of intra-regional trade in agricultural products. The FARM study reckons that it is underestimated by 400% (and by 200–300% with total trade, non-agricultural products included)

(FARM, 2008). The MISTOWA³ project's evaluation report estimates the value of intra-regional agricultural trade at USD 635 million in 2007 (Soulé and Gansari, 2010). In addition, the authors estimate that "regional transactions involve several million tonnes of cereals, especially millet, sorghum and local maize". They identify five principal market basins:

- A western basin centred on Senegal, trading mainly in local rice, millet and sorghum;
- A central basin comprising Côte d'Ivoire, Ghana, Togo, Mali and Burkina Faso, trading mainly in maize;
- An eastern basin comprising Nigeria and its neighbours Benin, Niger and Chad, which accounts for 60% of total intra-regional flows. These flows involve millet, sorghum, maize, cowpeas and re-exported rice (from Benin to Nigeria);
- The Ibadan-Lagos-Accra conurbation, comprising agglomerations in Nigeria, Benin, Togo and Ghana. Flows concern maize (300 000 tonnes) and re-exports of rice (500 000 tonnes);
- The Sahelian belt spanning Mauritania, Mali, Burkina Faso, Niger and Nigeria (millet and sorghum).

Table 4.2

Intra-African exports, 2008 (USD billion)

Exports	AFRICA	SADC	ECOWAS	COMESA	AMU	UEMOA	ECCAS	CEMAC
AFRICA	45.9	19.0	12.1	15.3	6.3	6.3	6.2	2.3
SADC	19.4	15.2	1.8	9.4	0.5	0.4	2.9	0.2
ECOWAS	12.7	2.3	8.6	0.2	0.3	4.9	1.7	1.5
COMESA	10.3	4.0	0.3	5.5	2.1	0.1	1.4	0.1
AMU	7.0	0.1	1.1	2.1	4.6	0.7	0.3	0.2
UEMOA	5.0	0.3	4.1	0.2	0.3	2.2	0.5	0.3
ECCAS	4.3	3.2	0.4	0.5	0.1	0.2	0.5	0.4
CEMAC	1.0	0.1	0.4	0.1	0.1	0.2	0.4	0.4

Source: AfDB African Statistical Yearbook 2010

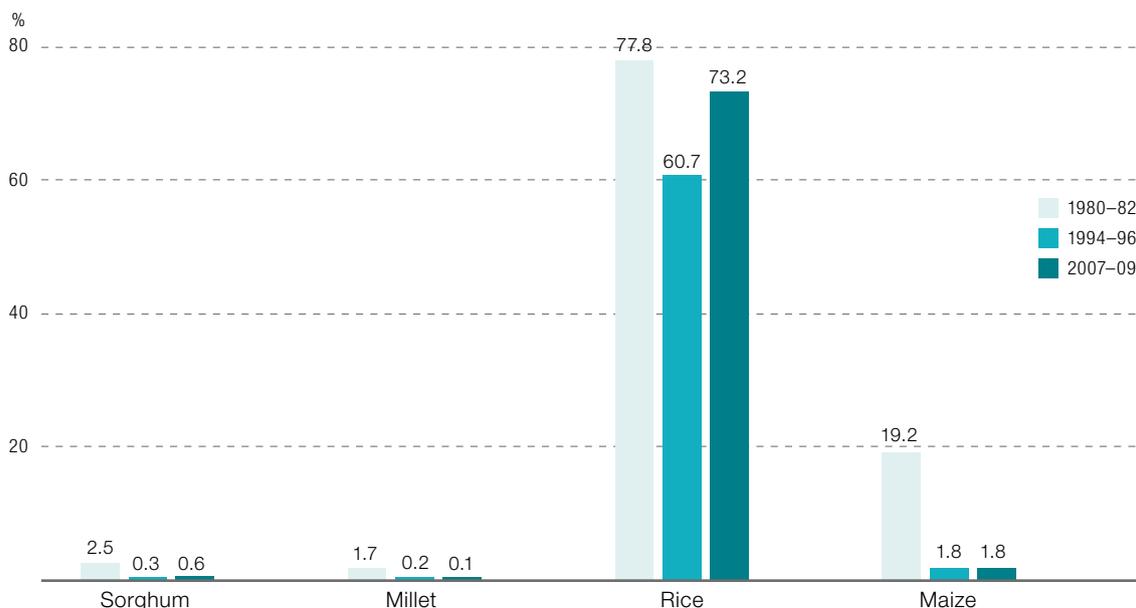
More detailed information about trade flows within certain market basins is available. CILSS estimates that 500 000 tonnes of dry cereals are shipped each year from the Sudanian zone towards the Sahel in the eastern basin (Benin, Nigeria, Niger and Chad), with 80 000–110 000 tonnes coming from Benin and the rest from northern Nigeria (2010). CILSS (2010) estimates that in the 2000s, Benin exported 104 000 tonnes of cereals annually to Niger (maize, sorghum and gari) and 80 000 tonnes to Nigeria (soya beans, yams, maize, gari and sorghum), while each year Nigeria exported 540 000 tonnes of millet, sorghum and maize to Niger. Niger also imported 15 000 tonnes of cereals, mostly maize, from Burkina Faso. CILSS⁴ estimated the total volume of cereals

(sorghum, millet, maize and rice) traded between Burkina Faso and its neighbours in the last quarter of 2009 at 34 000 tonnes. ATP⁵ estimated that 26 000 tonnes of maize were traded from Burkina Faso in 2011, including 24 000 tonnes to Niger. Côte d'Ivoire was estimated to have exported 28 000 tonnes of maize over the same period, including 22 000 tonnes to Mali.

Underestimations in official statistics introduce a structural bias into the assessment of food security and the region's tremendous dynamism. Consequently, it is difficult to evaluate the growing interdependence between policies, flows and production, biasing interpretation of the real capacity of supply to meet food demand.

Figure 4.3

Trade in main cereals according to the FAO (share of production in %)



Source: FAO 2012

The regional market and food security

The FAO produces annual food balance sheets for each country which provide the quantities available for human consumption (Box 4.7). This information is an essential contribution in food security and nutrition policies and provides the basis for calculating food energy supply. In the absence of data from food consumption surveys, supply is treated as food energy intake and used for country consumption profiles and trends.⁶

Comparisons of data in terms of nutrients – energy, proteins, carbohydrates and fats – show discrepancies between food balance sheet estimates and the results of consumption surveys. At the macroeconomic level, food balance

The quantity actually consumed differs significantly from the food balance sheet estimates. Consumption of maize and sorghum is overestimated and of rice underestimated.

sheets use national aggregates (production, imports, exports, etc.) to calculate the quantities available for human consumption; they should therefore correspond to the sum of all possible consumption (private and public, at home and outside the home, etc.). Consumption

surveys collect microeconomic data, which is more reliable (Ramasawmy, 2012) and limited to household choices and behaviour.

The following examples show the bias that can result from the difficulty of capturing the quantities traded and hence the quantities actually consumed which ought to show up in food balance sheets.

Food supply and consumption in Burkina Faso

In 2003, the Burkina Faso National Institute of Statistics and Demography conducted a survey of household living conditions.⁷ The study tracked the food expenditure of 8 500 Burkinabe households in 425 census zones. SONAGESS⁸ provides monthly price data collected by market under the Agricultural Market Information System (AMIS). For four cereals (sorghum, millet, maize and rice), the average quantity consumed per capita is calculated after applying the observed price levels. The quantity actually consumed differs significantly from the food balance sheet estimates except for millet (Table 4.3). Consumption of maize and sorghum is greatly overestimated (by 15 and 19%, respectively). Rice consumption is underestimated by 26%. Taking these four food items alone, the difference translates into a reduction in food energy supply of 114 kcal/capita/day.⁹

Table 4.3
Availability versus consumption in Burkina Faso, 2003

in kg/capita/year	Food balance sheets (FAO 2003)	QUIBB (INSD 2003)	Difference
Sorghum	89.6	75.2	+19 %
Millet	72.6	72.8	0 %
Maize	48.1	41.9	+15 %
Rice	16.6	22.3	-26 %

Sources: FAO 2012; INSD, Household Living Conditions Survey and authors' calculations

Box 4.7

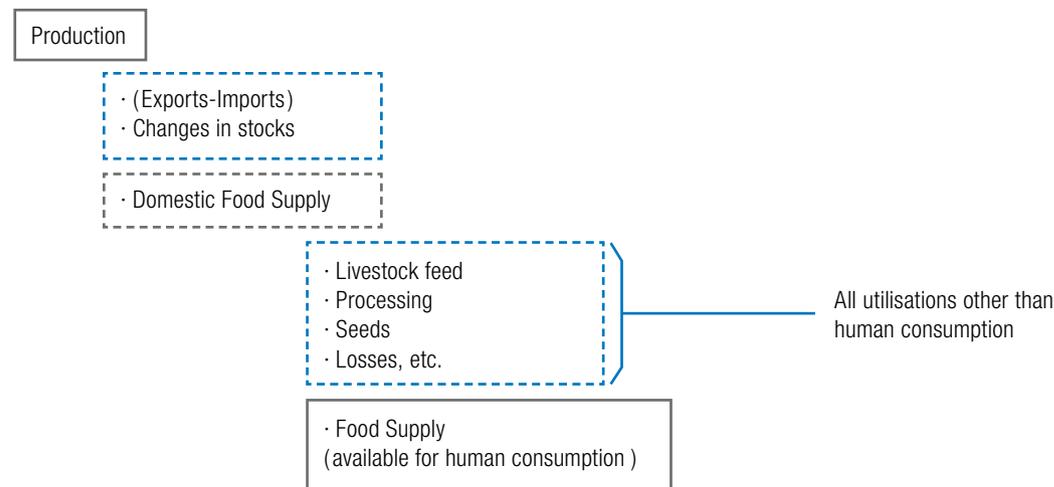
Food balance sheets

“The food balance sheet shows for each food item – i.e. each primary commodity and a number of processed commodities potentially available for human consumption – the sources of supply and its utilisation. The total quantity of foodstuffs produced in a country added to the total quantity imported and adjusted to any change in stocks that may have occurred since the beginning of the reference period gives the supply available during that period. On the utilisation side, a distinction is made between the quantities exported, fed to livestock, used for seed, processed for food and non-food uses, lost during storage and transportation, and food supplies available for human consumption [...]. The per caput supply of each food item available for human consumption is then obtained by

dividing the respective quantity by the related data on the population actually partaking of it [...].

Once estimates of the other components of the domestic supply have been made, the estimate of food available for human consumption is usually derived as a residual. Since the estimate of food available for human consumption is derived as a residual, its reliability would depend on the availability and accuracy of the other components on which it is based. In the case where the majority of the basic data are available and reliable, and the adjustments are based on sound judgement, the estimate of the food available for human consumption is likely to be reliable”.

(FAO, Food Balance Sheets – A Handbook, 2003, p. 2–7)



The sign of the differences correspond to what one would expect, assuming that regional flows are underestimated in food balance sheets. Burkina Faso is known to be a major producer of sorghum, millet and maize and a net importer of rice. The differences in maize and sorghum – not consumed according to INSD – amount to 80 000 and 185 000 tonnes, respectively,⁷⁰ or 12% of total production. These quantities have probably been exported, in which case they should be found entering a neighbouring country. Hence, errors in food energy supply estimates of one country can have repercussions on the estimates of other countries in the region. Likewise, national imports of rice would be underestimated by 73 000 tonnes.

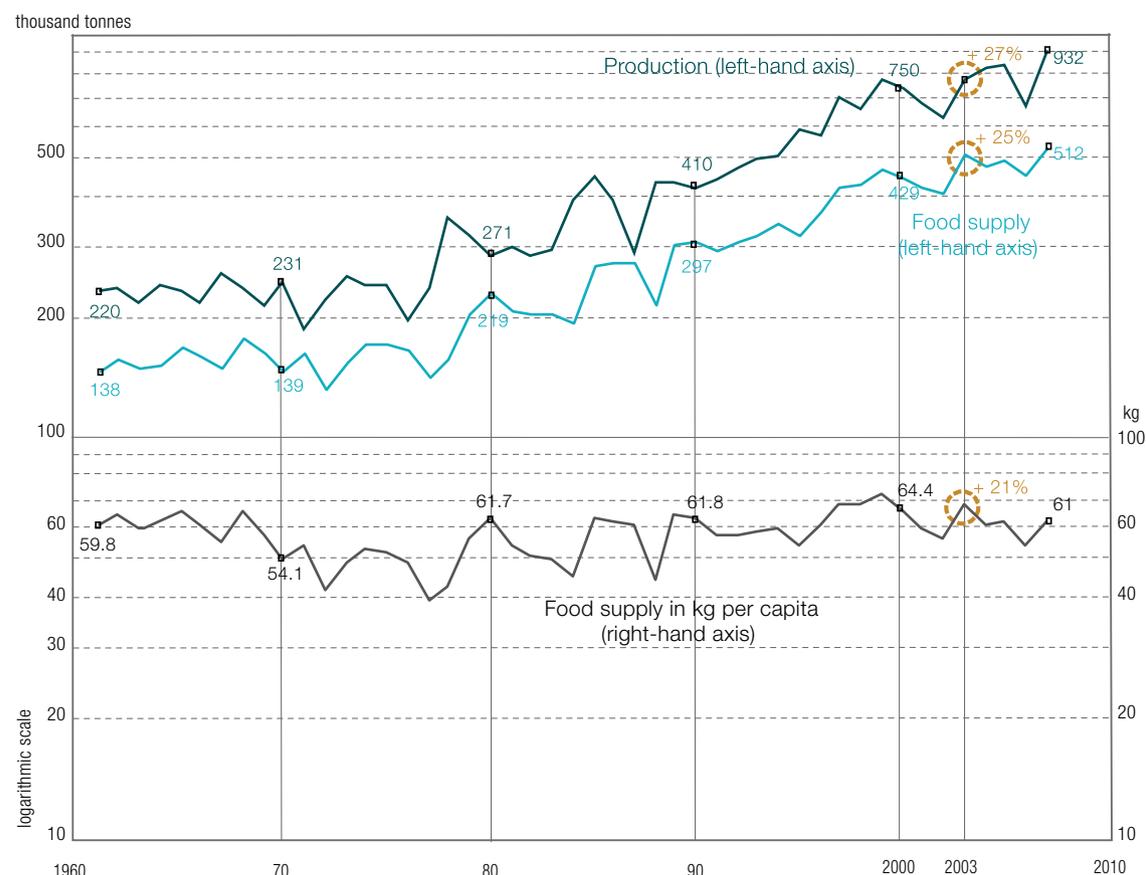
Benin’s maize food balance sheets

An analysis of trends in Benin’s food balance sheets reveals certain inconsistencies when compared with food consumption habits. Variations in production are reflected almost proportionately in the food supply balance (as

a percentage): maize production jumped 27% in 2003, domestic food supply by 25% and per capita food supply by 21% (Figure 4.4). Given inertia in consumption habits, such increases in per capita consumption seem unrealistic. Even with the fall in prices observed by AMIS Benin during the period,⁷¹ the price elasticity of demand for maize (-0.41 according to USDA) means that it could not have had such an effect on consumption. It is more likely that the rise in production fed into informal intra-regional exports of maize. Recorded exports of maize in 2003 represented only 0.01% of production.

Cereal production in Benin is dominated by maize and has increased considerably since the 1980s. It has been part of food trade in the region since the early 20th century. The first flows towards the south of the country, then Nigeria, went hand-in-hand with the organisation of assembly markets (Pobé, Dogbo and Ouègbo) (Igué, 2008). Besides Nigeria, surplus maize was also exported to Ghana beginning in the 1920s. Taking advantage of the development

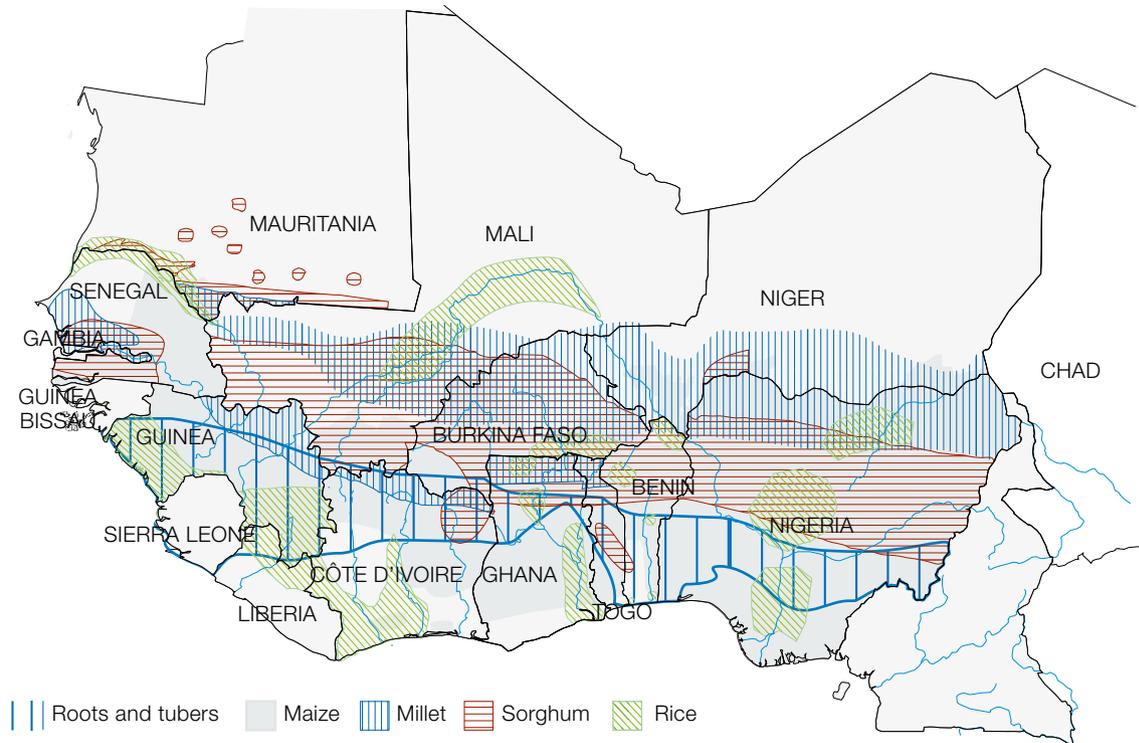
Figure 4.4 Evolution of production and availability of maize in Benin



Sources: FAO FBS and authors’ calculations

Map 4.3

Main production zones



Sources: CILSS; CIRAD; FAO; FEWSNET; WFP; SWAC/OECD 2009

of cotton farming,¹² the cultivation of maize spread throughout the country, “thus making Benin a surplus producer of maize [...], surpluses which are sold to Nigeria, Niger and Togo” (Igué, 2008). Informal exports to neighbouring countries were estimated at 30 000 tonnes in the early 1990s (Igué, 2008). For the same dates, FAO food balance sheets report zero exports of maize.

Benin is the leading producer of maize in per capita terms (129 kg/capita/year), a position it maintained between 1980 and 2009 (Figure 4.5). Although there is little doubt that average maize consumption in Benin is high, it is difficult to estimate and monitor their consumption other than by food balance sheets, which are thus both conceptually and statistically at odds with reality. In a region that witnesses the fast emergence and integration of its markets, food balance sheets seem an inadequate tool to supplement the need for information about consumption and trade flows necessary to frame food security strategies. Similar to the progress in price monitoring, there is a need for synthetic and hierarchical information systems to provide data on household food consumption and nutritional intake.

In order to highlight what such information can provide, the authors attempted to estimate the marketed surplus quantities with the twin objective of (1) highlighting the very strong dynamic of emergence of food

« Devising food security strategies necessitates understanding the functioning of and identification of the main trade basins.

markets – rendering traditional perceptions and tools for tracking food security obsolete, and (2) providing a first approximation of the scale of regional trade flows. The exercise was conducted for maize but could be applied to other crops.

Identifying regional maize market sheds

Encouraged by agro-ecological complementarities and public-sector initiatives, and boosted by settlement dynamics, the volume of trade in food products will continue to grow. Devising food security strategies necessitates understanding the functioning of and identification of the main trade basins.

The aim is (1) to quantify and spatialise marketed surpluses, and (2) on the basis of this information, to estimate the direction and relative size of intra-regional flows. The exercise is based on an original methodology which allows identifying marketed quantities more accurately. Market sheds are then defined by superposing this information on demand, assimilated to urban consumption. This approach helps to

This methodology allows identifying marketed quantities more accurately.



identify geographical interdependence between production and consumption zones, information which could be of particular interest to the current initiative relating to regional food reserves (Box 4.8).

The starting point of the analysis was to construct food balance sheets at the regional level that neutralise national biases resulting from the omission of intra-regional trade flows. The share of production intended for food consumption alone was then identified. By combining data on food production and agricultural population, the quantity of maize marketed was found after subtracting producers' auto-consumption. Further, at the regional level, a distinction was made between urban areas, capital cities and secondary cities on the one hand and rural areas on the other, because of differences in consumption habits.

The analysis looked at maize for the following reasons:

- Compared to other cereals, maize production and consumption habits are more homogenous across the region (Map 4.3). Extra-regional flows are small (2% in 2007), thus not influencing the interpretation of regional food balance sheets. However, intra-regional trade flows have increased considerably.
- Maize is one of the main cereal staples. Its share in total cereal production (in terms of area under cultivation) increased by 70% between 1980 and 2009, from 11% to 19%.
- Maize has a dual function for producers – auto-consumption and marketable surplus – as a result of which it has become a cash crop.

Production dynamics

Regional production amounted to 52 kg per inhabitant in 2008–10. It varies from less than 1 kg per capita in Niger to 129 kg per capita in Benin (Figure 4.5). Benin has been the region's largest producer by volume per capita since the 1980s. Production per capita has risen fastest over the last 15 years in Gambia (8.2%), Guinea (7.8%), Mali (7.2%) and Burkina Faso (6.4%). Nigeria is by far the largest producer overall, producing 7.4 million tonnes in 2008–10, representing 49% of the regional total. However, this share has been falling for 15 years (it was 65%

Box 4.8

The regional network of national food reserve and food security management agencies (RESOGEST)

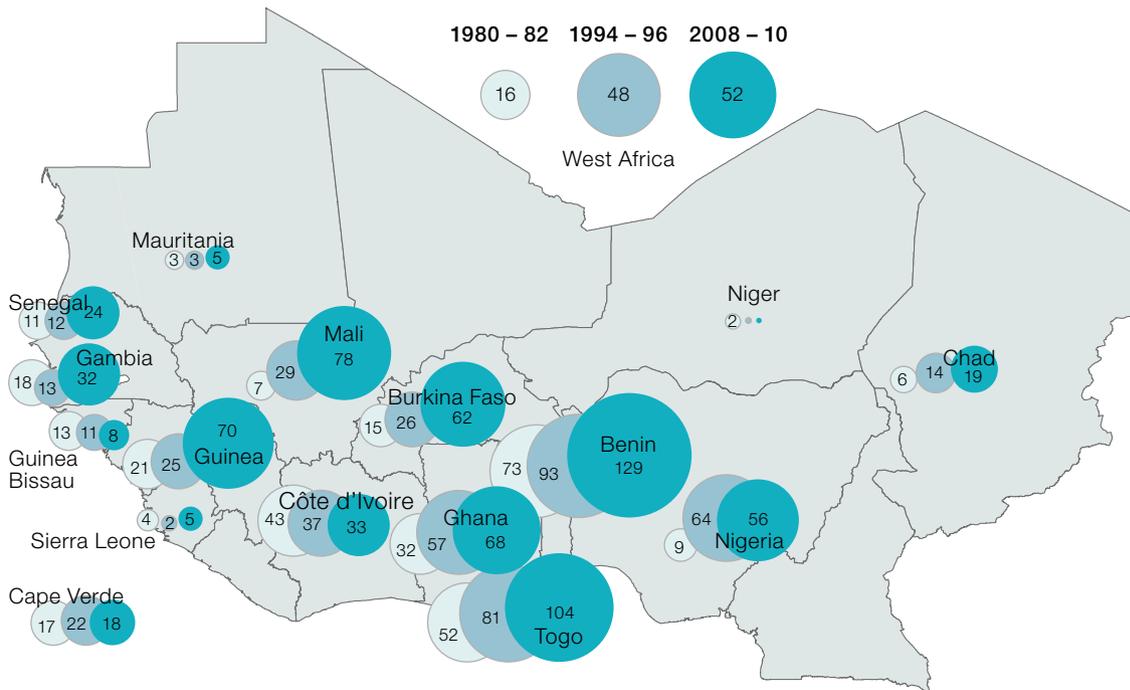
RESOGEST, promoted by the three West African regional institutions, aims to:

- Evaluate the agricultural or food needs of vulnerable populations such that decisions can be taken on the basis of reliable information on supply and demand (deficits and surpluses);
- Use information and analysis produced by the regional system on prevention and management of food crises and other natural disasters (published in March, September and November);
- Share information about management of the logistics chain and the time frame between the observation of food needs and their supply.
- Constitute a reserve of at least 5% within each country's national security stock which can be mobilised in the form of loans, gifts or sales in response to urgent needs in another Sahelian or West African country facing an acute food crisis;
- Promote cereal trading between countries with net surplus and those with net deficit through triangular operations (purchase, sales and loans) and stimulate sub-regional trade in agricultural produce and food products;

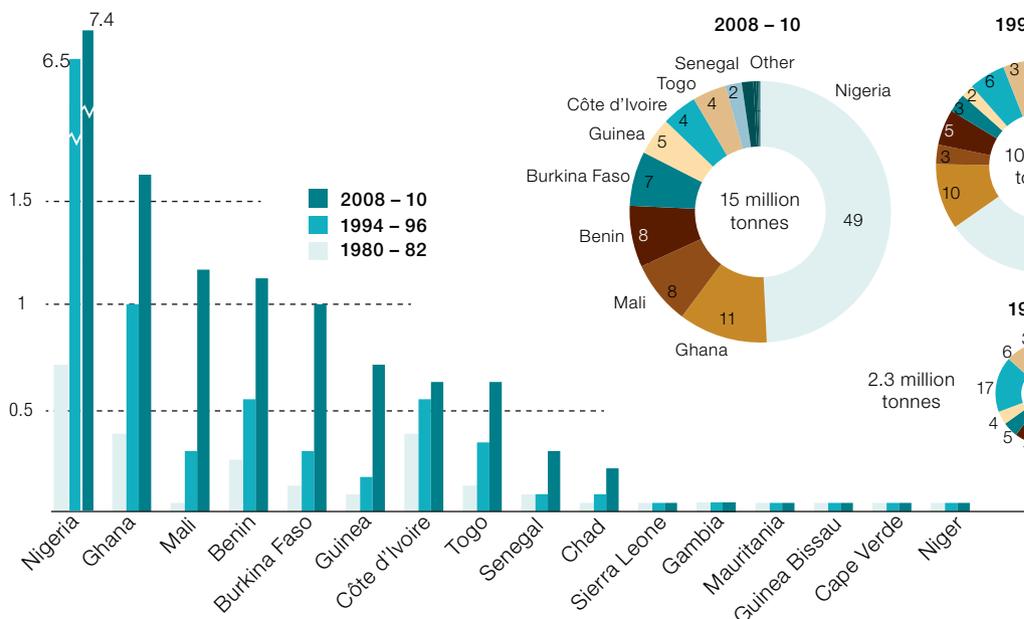
Source: SWAC/OECD 2012

Figure 4.5
Maize production in West Africa between 1980 and 2010

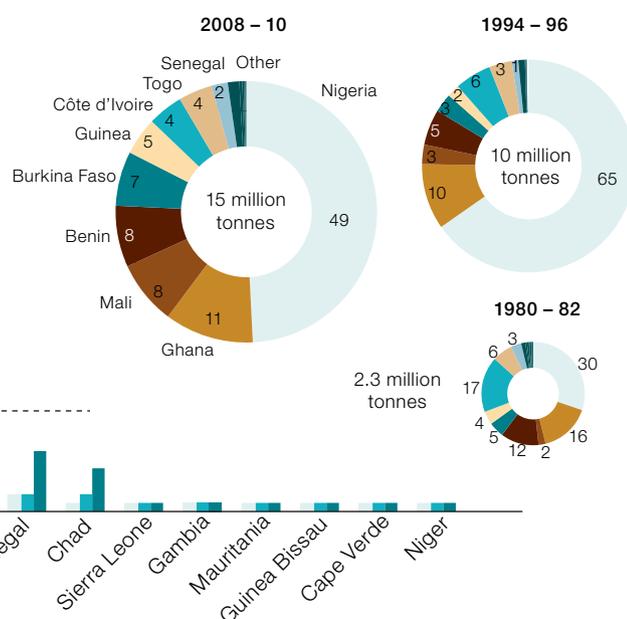
Per capita maize production (kg per person)



Total maize production (million tonnes)



Share in total maize production (%)



Sources: FAO 2012 and authors' calculations

in 1994–96). Two groups of countries are the main production centres:

- A basin encompassing Ghana, Togo, Benin and Nigeria, representing 72% of regional production, which is less than in 1994–96 (84%);
- A basin comprising Mali, Burkina Faso, Côte d'Ivoire and Guinea, whose share of total production has risen from 13 to 24% over the same period.

Constructing food balance sheets at the regional level

In view of the difficulties of accounting for intra-regional flows in national food balance sheets, domestic supply and food available for human consumption at the regional level are estimated. In 2007, regional production accounted for 95% of domestic maize supply, supplemented by net imports (2%) and variations in stocks (3%) (Figure 4.6). At regional level, possible intra-regional flows are therefore cancelled out in food balance sheets. The regional supply of maize available for human consumption thus gives a more reliable picture of regional consumption (assuming that other food balance sheet variables are reliable). Food available for human consumption is the share of domestic supply after subtracting all utilisation not intended directly for human consumption (Box 4.7).

In 2007,¹³ the domestic maize supply was 12.7 million tonnes and the supply available for

human consumption was 7.5 million tonnes, or 27.9 kg/person. Per capita, the amount of food available for human consumption was more than twice as high as in 1980. Food balance sheets indicate a clear improvement in production aggregates for the region as a whole, though the main food balance sheet items have remained relatively constant in relative terms since the 1980s (Figure 4.7). Animal feed has increased from 20 to 25% of total production, while waste subtracted from production has fallen from 17 to 13%. The share of seeds has fallen from 3 to 2%, while quantities processed have risen from 0.2 to 1.1%, an increase of almost 500%.

The assumptions concerning calculation of waste used in food balance sheets are mainly based, country by country, on expert opinion (FAO, 2012). In the light of studies of maize in Benin, Ghana, Mali and Nigeria, the share of waste reported in food balance sheets could be overestimated (IITA, 2010a; IITA, 2010b; IITA, 2011a; IITA, 2011b). Post-harvest losses at the farm level are estimated not to exceed 0.6% in Nigeria and to vary between 0.5 and 4.8% in Ghana and between 0.1 and 7.6% in Mali.

Size of the market

The supply of food available for human consumption does not measure the size of the market, and hence potential flows. Some availability, mainly producers' auto-consumption, is not marketed. Food balance sheets provide no

Figure 4.6

Production, domestic availability and food availability at the regional level, 2007

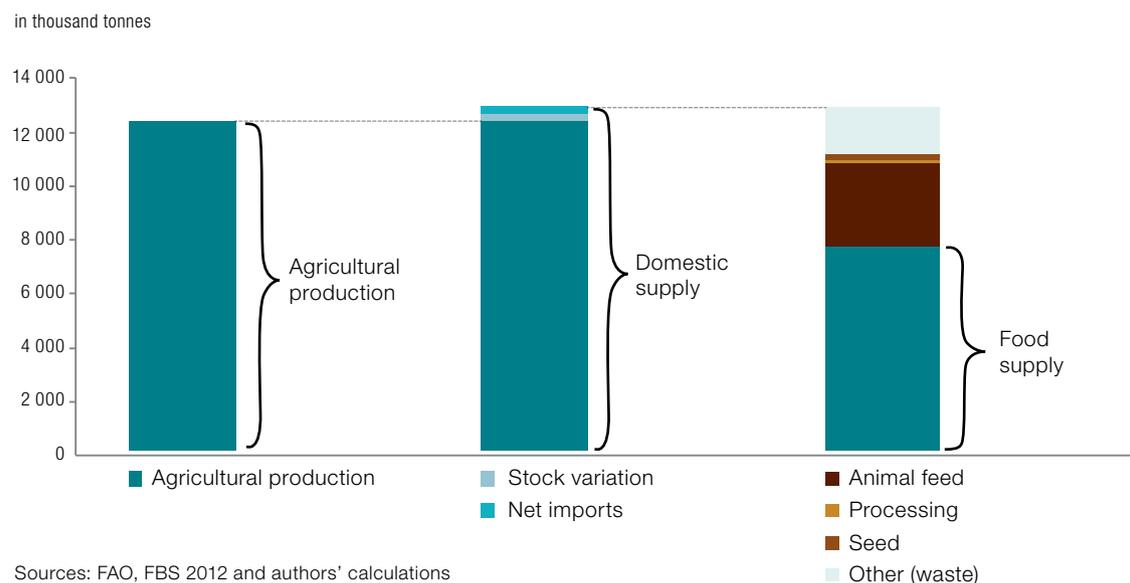
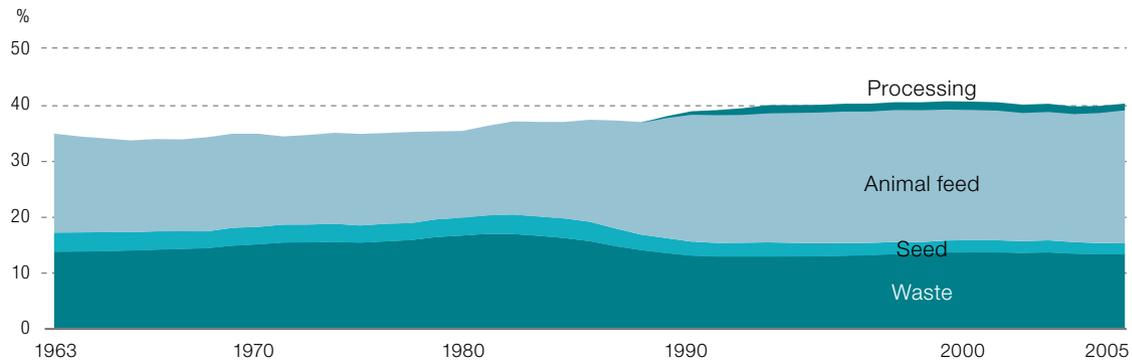


Figure 4.7

Non-food utilisation as a share of maize production



Sources: FAO, FBS 2012 and authors' calculations

information about this item. In order to calculate it, the authors use data on food available for human consumption, assimilated at the regional level to consumption, and draw on existing information about urban consumption to identify rural consumption. Consumption is assumed to be uniform according to the environment (rural vs. urban).¹⁴

Aggregate data give a regional food consumption figure of 27.9 kg per capita, or 7.5 million tonnes. On the basis of data from a recent study of urban and rural food consumption in West Africa (Bricas *et al.*, 2009), urban consumption is estimated at 30.3 kg per capita (3.2 million tonnes). From these two figures for consumption per capita (regional and urban), we can deduce regional rural consumption of 26.4 kg (4.3 million tonnes). [Total population x Food available for human consumption per capita (27.9) = (Rural population x Rural consumption) + (Urban population x Urban consumption (30.3)].

Producers are divided into urban agricultural producers (APu) and rural agricultural producers (APr). Producers' consumption is calculated as the sum of the consumption of

urban producers and rural producers. Total producers' consumption is 26.7 kg (bearing in mind that food consumption habits are determined by environment). Following Haggblade *et al.* (2012), auto-consumption is estimated at 90% of total consumption, giving a figure of 24.1 kg per producer, or 3 million tonnes (Annex C).

To determine marketed surplus, all utilizations not intended directly for human consumption (animal feed, seeds, food processing, post-harvest losses) are subtracted from agricultural production. This gives a "net food" production figure of 7.8 million tonnes (Annex C).

Marketed surpluses are thus defined by subcontracting auto-consumption (3 million tonnes out of net food production of 7.8 million tonnes), plus or minus variations in stocks (Figure 4.8). A total of 4.8 million tonnes of maize were thus traded on West Africa markets in 2007, representing 60% of net food production. The proportion was 35% in 1980 or 0.6 million tonnes (an eightfold increase in 27 years).

Marketed surpluses are thus rising faster than production, reflecting the shift of maize towards a cash crop. There was a spectacular

Table 4.4

Maize consumption by environment and by stratum

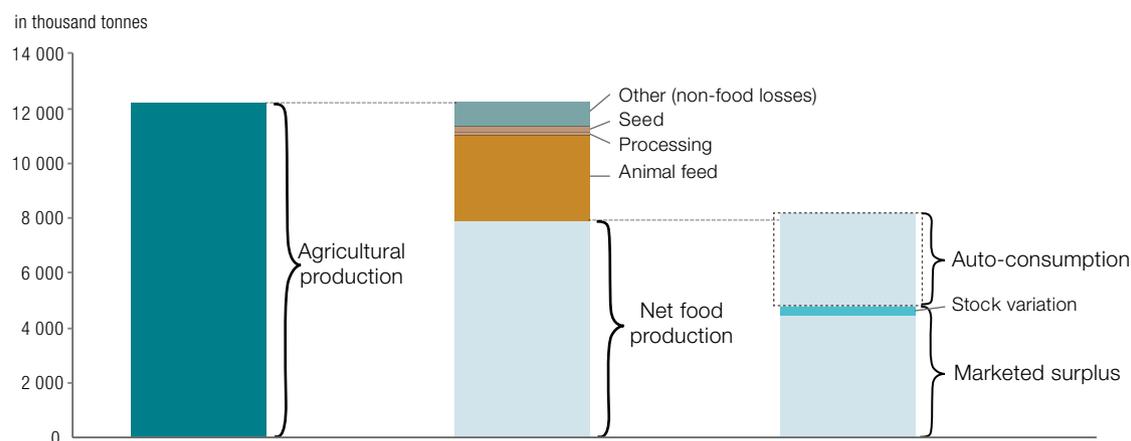
in kg/capita/year	Urban (UP)	Rural (RP)	Total consumption	Self-consumption (90%)
Non-agricultural producers (NAP)	30.3	26.4	29.2	-
Agricultural producers (AP)	30.3	26.4	26.7	24.1
Total	30.3	26.4	27.9	-

increase in production and marketed surpluses between 1980 and 1990, with production rising from 2.2 to 8.3 million tonnes and marketed surpluses from 0.6 to 2.6 million tonnes, an increase of 12 and 14% a year, respectively (Figure 4.9). Maize production is increasingly market-oriented.

This trend reveals a transformation in production systems, ultimately reflected in

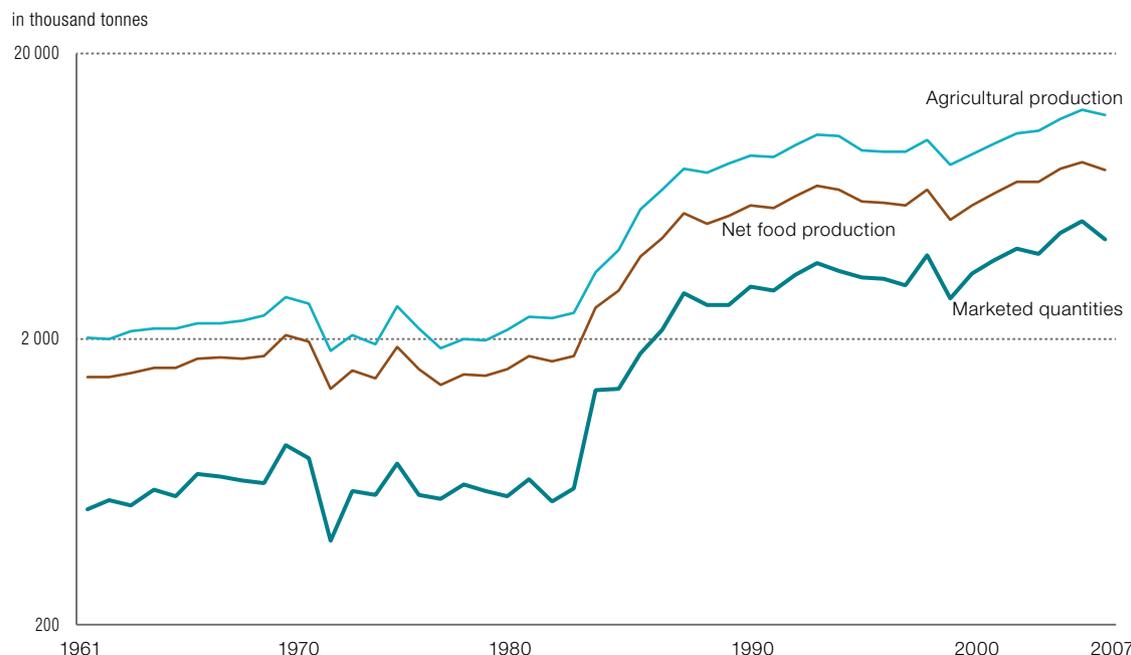
higher yields, which for maize rose by 60% between 1980 and 2007. Commercial yields – calculated as the ratio of marketed surpluses to total cultivated area planted with maize – more than doubled over the period (+130%). A performance on this scale implies profound changes in agricultural systems, driven by the market (market crops have higher and faster-growing yields than subsistence crops).

Figure 4.8
Production, auto-consumption and marketed surplus, 2007



Sources: FAO, FBS 2012; SWAC/OECD 2012

Figure 4.9
Maize production and marketed surpluses



Sources: FAO, FBS 2012; SWAC/OECD 2012

Marketed surpluses and thus the size of the regional maize market, estimated at 4.8 million tonnes, are twice as high as those estimated by Haggblade *et al.* (2012). They depend in particular on producers' auto-consumption, which accounts for nearly 40% of net food production. In this analysis, auto-consumption is based on an estimate of the population of agricultural producers – and not rural population – providing a more precise measurement. The difference is also explained by a 20% lower benchmark production level.

Spatial distribution of marketed surpluses

It is possible to give a breakdown of regional marketed surpluses by sub-national surplus zone (Map 4.4).¹⁵ Within the surplus production zones identified by FEWS NET, they are distributed according to their share of regional production and productivity differences in relation to regional averages.¹⁶ Data on yields and available land per producer have been used where there is no information on productivity.¹⁷

Nigeria “produces” 60% of the marketed surplus, or 2.9 million tonnes. Benin, Togo and Ghana jointly account for 0.8 million tonnes, and the other major maize producers (Côte d’Ivoire, Burkina Faso, Mali and Guinea) account for 0.7 million tonnes.

Generally speaking, marketed surpluses are more concentrated than production, mainly in two zones.

- The eastern basin covers the Nigerian federal states of Taraba, Plateau, Kaduna and Niger, the crescent around Parakou (Benin), Atakpamé and Sokodé (Togo), and the Tamale and Bolgatanga zone (Ghana). About 3.8 million tonnes of maize, 83% of the regional marketed surplus, comes from

this basin. Polarised by Nigeria, the market of Kano (Dawanau) is a regional market-place. The markets of Jibya and Illela (Nigeria), Malanville (Benin), Gaya, Birni-Konni, Maradi and Matamèye (Niger) act as assembly and border transit markets.

- The central basin, mainly the regions of Sikasso in Mali, Korhogo in Côte d’Ivoire, Bobo Dioulasso in Burkina Faso and Kankan in Guinea, accounts for 740 000 tonnes, 16% of the regional marketed surplus. Transactions are structured around the markets of Bouaké (Côte d’Ivoire), Bobo Dioulasso and Ouagadougou (Burkina Faso) and Sikasso (Mali).

Demand centres

The quantities consumed per agglomeration are calculated by multiplying population figures by data on consumption per capita (Bricas *et al.*, 2009). These data are estimated in a uniform way at the regional level and make a distinction between the urban consumption of primary and secondary cities and towns. According to the calculations, urban zones consume 3.2 million tonnes, or 67% of the marketed surplus.

To urban demand is added demand stemming from rural non-agricultural producers, which increases with the diversification of non-agricultural activities, and the share of rural producers' consumption provided by the market (set at 10%).

Urban dwellers in Nigeria represent by far the biggest market for maize in the region, followed by urban dwellers in Ghana and Benin (Figure 4.10). Nigerian cities account for 53% of regional urban consumption. Lagos alone accounts for 280 000 tonnes, more than all the cities of Mali, Burkina Faso and Nigeria

Box 4.9

Marketed surpluses – millet, sorghum, rice, manioc and yams

The millet and sorghum markets are the two largest regional cereal markets, just ahead of maize. In 2007, the amounts of millet and sorghum marketed on the regional market varied between 5.4 and 5.2 million tonnes. The figure for rice was 3.4 million tonnes. However, a substantial proportion of millet and sorghum production is auto-consumed, with only a third

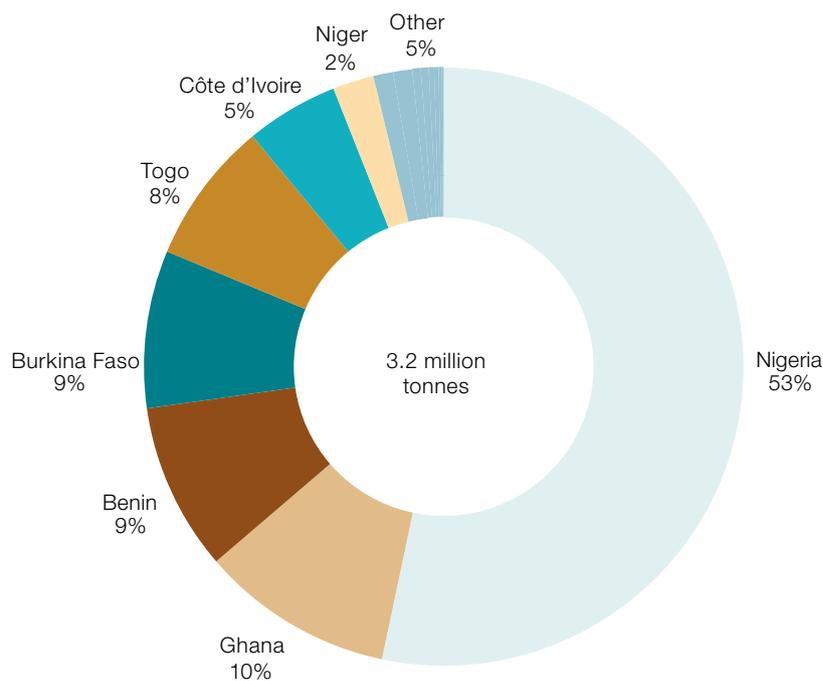
being marketed. In contrast, nearly two-thirds of locally produced rice is traded on the regional market.

The equivalent figures are 20.5 million tonnes for manioc and 25.1 million tonnes for yams. A substantial proportion of yam production is marketed, whereas a substantial proportion of manioc production is auto-consumed.

Figure 4.10

Regional urban consumption shares by country, 2007

Urban consumption by country

Sources: Bricas *et al.* 2009; SWAC/OECD 2012

put together. The coastal arc, especially the conurbation that stretches from Accra to Port Harcourt, thus appears to be the leading demand basin for maize, accounting for approximately 70% of regional consumption (Map 4.5). In the major agglomerations of the Sahelian basin, consumption habits are dominated by millet, sorghum and rice, supplemented over the last few years by maize.

Estimating trade flows

As a general rule, food flows converge on cities. Map 4.6 combines surplus zones with the major demand centres. The direction of flows is based on information provided by FEWS NET¹⁸ and West Africa Trade Hub. In addition, expert opinion and surveys contributed to determine the intensity of flows. Quantities traded depend on the size of the demand market and the surplus capacity of the production zone. Market prices and distances (transport costs) are also taken into consideration.

Most maize flows towards the major consumer markets on the Gulf of Guinea coastline: Lagos, Ibadan and Cotonou. In addition to attracting a substantial proportion of Nigerian surplus production from the main middle-belt

production basins, the conurbation receives significant quantities from neighbouring countries. Benin and Togo in particular export substantial quantities towards demand basins in southern Nigeria. Ghana is another participant in this major trade corridor. Much smaller quantities are traded in the north. In the northernmost part, the main flows leave Kano for Maradi, then Niamey and Zinder. Additional flows towards Niamey and eastern Niger originate in the north of Benin (Malanville) and Togo.

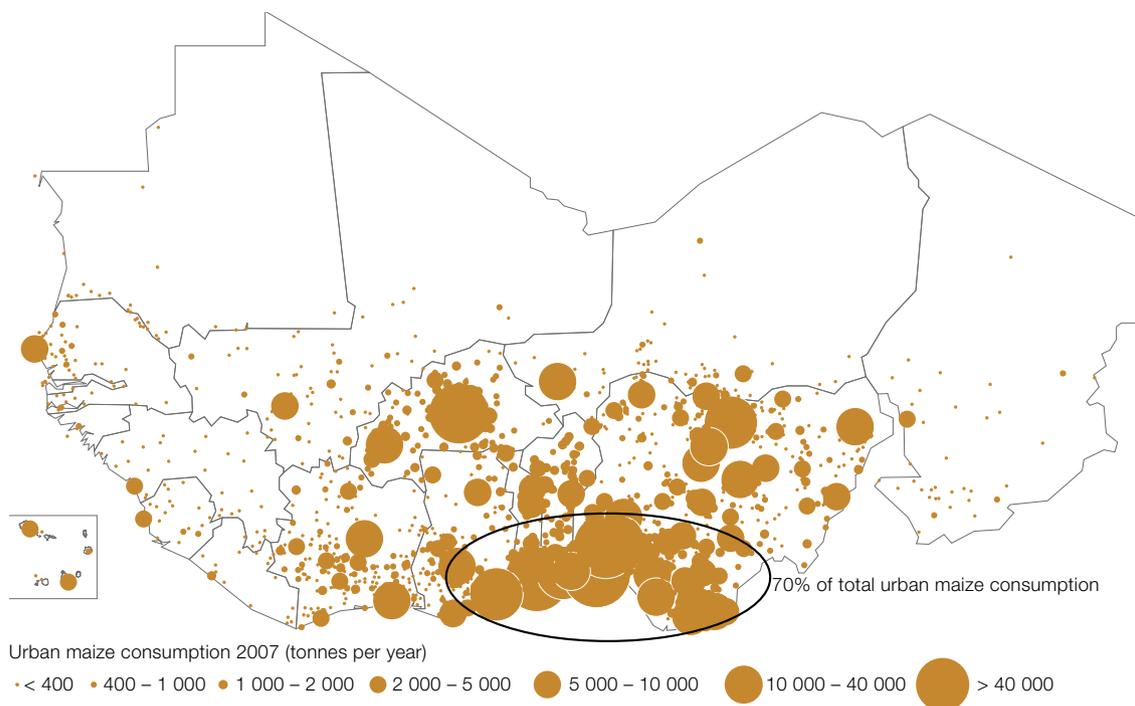
In the central basin, maize flows in particular from the production zone located between Mali, Burkina Faso and Côte d'Ivoire towards the major urban centres of Burkina Faso and

« Most maize flows towards the major consumer markets on the Gulf of Guinea coastline: Lagos, Ibadan and Cotonou.

Mali. From Bamako, the flows extend westwards towards Kayes (Mali), Mauritania and Senegal. Some of the flows from Bobo-Dioulasso and Ouagadougou continue towards Niamey. These flows are also fed by Ghana (Tamale). The production zones in Côte d'Ivoire send most of

Map 4.5

Urban maize consumption basins, 2007

Sources: Africapolis 2008; Bricas *et al.* 2009; SWAC/OECD 2012

their marketed surplus towards the nearest consumer centres, the coastal cities of Abidjan (Côte d'Ivoire), Accra (Ghana) and Lomé (Togo).

This analysis cannot replace actual trade data. Individual flows cannot be quantified from the available data. However, the study offers a better understanding of the links between growth in the marketed share of production,

Trade flows that are small in relation to production may represent a substantial proportion of marketed surpluses.



concentration of demand in urban centres and the interdependence between market sheds, reflected in trade flows.

First, basing calculations on marketed surpluses rather than production provides more accurate information about flows and their effects on market functioning, since flows are fed only by marketed surpluses. Thus, trade flows that are small in percentage terms in relation to production may represent a substantial proportion of marketed surpluses. This information is particularly relevant to an understanding of price transmission.

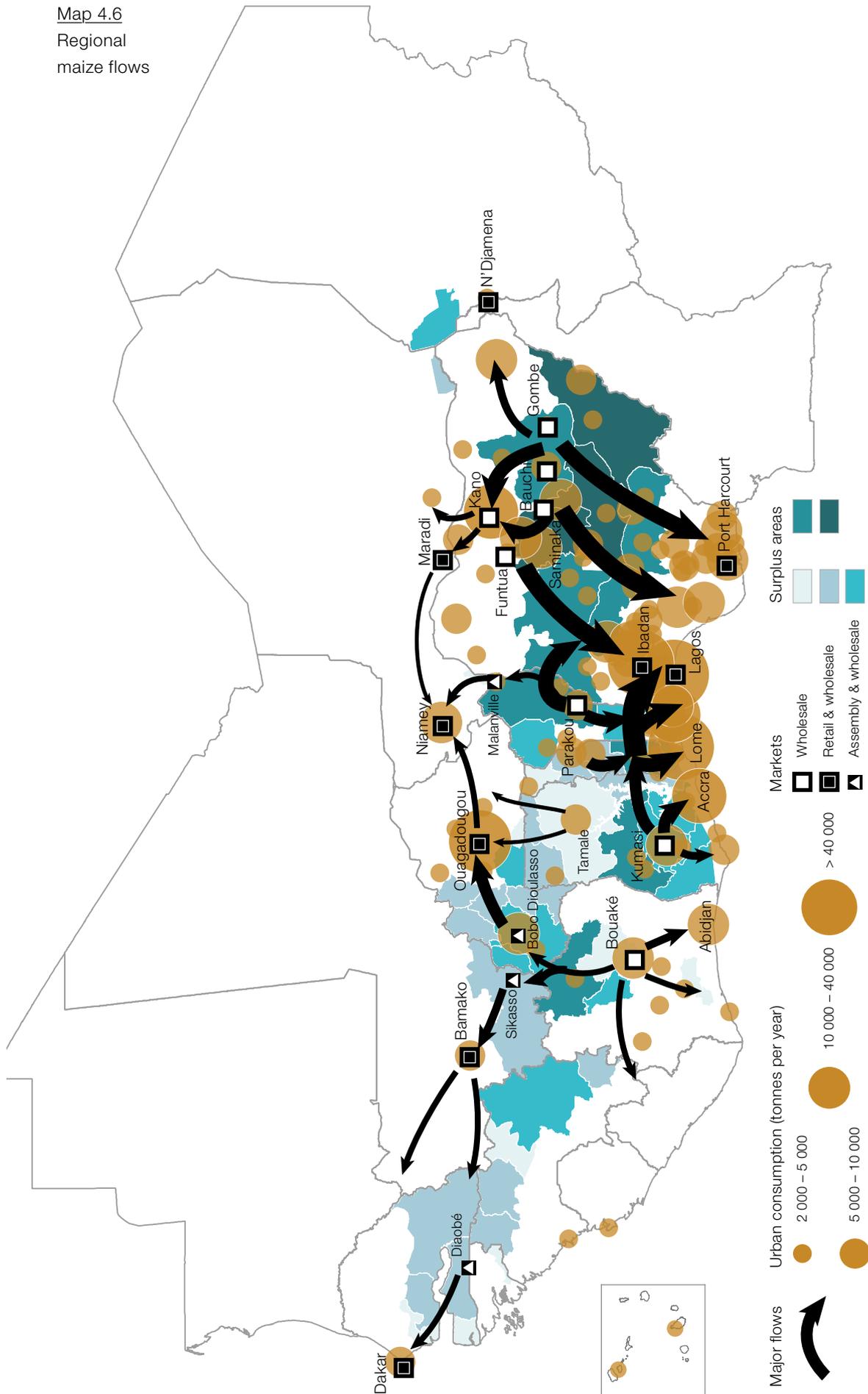
Second, the analysis highlights the relative importance of maize flows and interdependence

between market sheds. The majority of intra-regional flows are towards the major consumption zones of the Gulf of Guinea, especially in the south of Nigeria. The data indicate that they could be 30 to 40 times greater than flows towards the Sahel.

Access to reliable, recent data, especially consumption data, that are homogenous at the regional level, would enhance the analysis proposed here. A household survey carried out by Nigeria's National Bureau of Statistics between 2009 and 2010 gives maize consumption per capita of at least 78 kg/capita/year, compared with 29 kg/capita/year in FAO food balance sheets. Consumption in urban areas would thus be 45 kg/capita/year and 110 kg/capita/year in rural Nigeria. Calculated on this basis, demand would amount to 2.3 million tonnes in urban Nigeria and 2 million tonnes in rural Nigeria, excluding auto-consumption. Total food needs expressed on the market would amount to 4.3 million tonnes^[**]. Compared with the previously calculated national marketed surplus of 2.9 million tonnes, this gives a national shortfall of 1.4 million tonnes.

[**] This corresponds to the amount per capita (78 kg) multiplied by Nigeria's total population as estimated by SWAC/OECD (125.2 million in 2010).

Map 4.6
Regional
maize flows



The analyses are thus particularly circumscribed by the fragility of consumption data and their spatialisation. Harmonised survey methodologies at the regional level would provide information about national surpluses and shortfalls and lead to a better understanding

of the volume of flows. Consumption data are critical not only in the assessment of food security (food energy intake and changes in consumption habits) but also in the analysis of market variables relevant to food security strategies.

4.4 APPREHENDING THE INTERDEPENDENCIES

Defining the geography of interdependence

The growing importance of the market in food consumption and production is creating stronger interdependence among actors and across geographic areas. Also, the increasing spatial concentration of both, food production and consumption further intensifies interdependence. The geography of these interactions is increasingly defined more by market dynamics than by policy or administrative units. Intra-regional trade flows are revealing interdependence across national borders.

Market-oriented agriculture has increased the complexity of food security and food policy. Food security and food policy encompass all domains that influence food producers, food consumers and food marketing agents and how they are linked through the market. Hence, understanding market dynamics and the influence of geography is crucial for policy making. Therefore, identifying the geography of interdependence is a necessary starting point.

Market sheds are defined on the basis of food movements along trade corridors from surplus to deficit areas. Generally, a market shed, or market basin, is a network of deficit markets that are linked by common supply and/or price movements (Haggblade *et al.*, 2012). They provide an

The geography of interactions is defined more by market dynamics than by policy or administrative units.



appropriate geographic level for designing food policies. Identifying the geographic linkages across the market network helps to explain the impact and design of food policy interventions.

More than just quantities

Intra-regional flows are the result of complex market dynamics. They depend on a variety of

variables, including the size of production, the size of demand, prices, transaction costs, flow of information, access to, quality and cost of infrastructures, availability of consumption substitutes, policies (trade, production and exchange rates), etc. Together, they determine the size and direction of flows and hence carry information on the relative importance of the respective variables. This information allows policy analyses to evaluate the influence of domestic policy making. Also national food security evaluations depend on this information since they determine the quantity of food that is actually available for consumption. Intra-regional flows are particularly important, as they impact availability in importing as well as in exporting countries.

The size of flows is however just one indication of interdependence. Even in the absence of trade, or with only small quantities traded across borders, market integration creates interdependence. This is caused by transmission in prices. Price transmission occurs when increases in price of one product in a given market causes an increase in the price of the same product in a different market (or fall in price). This can occur even in the absence of trade actually taking place between these two markets. The condition for this to happen, however, is that a difference in price large enough to exceed transaction costs would lead to trade. Therefore, any factor large enough to influence prices in one location within a market shed can impact prices across the market shed. Clearly, price movements of larger markets have stronger influence.

Studies on market integration in West Africa (Aker *et al.*, 2010; Aker, 2010; Araujo *et al.*, 2008; Araujo and Simonet, 2011) based on price transmissions confirm that markets are relatively well integrated, nationally and regionally. Prices are transmitted across markets and price difference can mostly be explained by

transaction costs. However, these studies also highlight that price differences are high, due to insufficient trade flows, which are explained by high transactions costs, policies and a strong border effect.

However, some analyses suffer from important drawbacks that reduce their usefulness for policy analysis. An important drawback is the absence of well-defined market sheds, leading to an incomplete selection of markets. In one study (Aroujo *et al.*, 2008), market integration between Mali, Burkina Faso and Niger have been analysed. The results show that the Maradi market has a large influence on markets in Niger and also Burkina Faso. As pointed out by the authors, the inclusion of Nigeria, and in particular the Dawanau market in Kano, would probably have changed these results. Another problem is related to the different roles individual markets occupy in a market shed which should be accounted for in analyses. Large wholesale markets, assembly markets or retail markets have specific functions and importance in terms of price signalling power. This should also include more in-depth analyses of factors that influence prices (supply, demand, availability of substitutes, elasticities, etc.). The lack of information on demand variables appears to be particularly important. Understanding the design and architecture of an entire market shed is crucial.

Anticipating long-term dynamics

Prices of food staples are an important element of food security as they determine accessibility. Therefore, an important aspect of food security early warning is understanding how prices interact across market networks. This provides two important benefits; first, knowing which markets tend to have a signal effect (price setting) on other markets allows policy makers to focus on a smaller amount of information (number of markets and variables that have the strongest influence on this market), and second, price transmissions are not always instantaneous but can offer information on possible future trends.

The integration of markets implies that conditions and expectations in neighbouring countries will also impact prices, availability and access. “Thus traders will increasingly come to make decisions about how much to buy, when and at what price and about whether

to store or not, on the basis of the harvest in neighbouring countries as well as the one in which they are operating” (Shepherd, 1999).

However, the structural elements of food security, such as urbanisation and the development of processing industries (generally in proximity of consumption centres), are increasingly interdependent. The growth of demand consumption centres and the development of processing industries that have higher demand elasticities can lead to structural changes in quantities demanded and prices.

“Moreover, much higher prices in central and southern Nigeria meant that southward trade within Nigeria became more attractive, limiting trade flows between Niger and Nigeria. Imports of cereals continue to take place from northern Benin to southwestern Niger, reflecting lower grain prices in northern Benin. As a result, the central and eastern parts of Niger, which depend more on imports from Nigeria, are hardest hit by grains shortfall and high prices” (CILSS *et al.*, 2008).

The geography of these major structural transformations can already be defined with some degree of confidence. Food security policies need to integrate these dynamics and propose adequate responses.

Promoting regional policies

The benefits of regional market integration for food security and agricultural production have been widely analysed and theorised. They include the reduction in the volatility of food availability, increased diversity of products available, reduced price volatility, economies of scale in production, and incentives for production specialisation and growth. However, the benefits on the ground appear less obvious. In stark contrast to this are the perceived negative consequences. Particularly during food crisis situations, protectionist measures aimed at securing food supply on the national territory can lead to export bans and import subsidies.

“The promotion of regional trade is one of the most effective ‘quick-wins’ for reducing food price volatility in smaller countries (World Bank, 2005). Regional production varies less than production in individual countries, and despite large and positive correlations in maize production among countries, there is generally [a positive outlook] for intra-regional

trade in all but the worst years. Govereh *et al.* (2008) demonstrate that natural market sheds span borders throughout sub-Saharan Africa” (World Bank, 2011).

Given the current level of food market integration and the structural dynamics towards more interdependence, national and regional long-term food policy strategies have to be defined in this context. In a region characterised by agro-ecological and production

Governments have to provide the necessary conditions for facilitating access towards these opportunities.



complementarities, record climate variability, large spatial differences in settlement patterns (locally, nationally and regionally), and cultural and institutional homogeneity, the important foundations for deeper integration exist.

Already today, a large number of producers and consumers are reaping the benefits of integration. These benefits, however, are inherently difficult to quantify. This is because of the complexity of interactions across many variables, as well as a lack of data and analyses. However, for designing efficient food policies

understanding and integrating the regional dynamics is crucial. This will require the right analytical tools, based on the appropriate geographic space and reliable data.

Food policy issues, ranging from agricultural performance and distribution to consumption are all related. Regional interdependence is increasing the need for integrating information on a greater geographic scale into the mechanisms to address them. The impact of national food policies is already influenced by developments outside the territory. For instance, preliminary analyses have shown that maize production decisions by Benin farmers are more closely related to market dynamics in Nigeria than Benin.¹⁹ As explained previously, the repercussions can be structural.

The opportunities created by integration by far exceed the possible negative side effects. However, governments have to provide the necessary conditions for facilitating access towards these opportunities. Investments in infrastructures, access to information, production inputs and markets are needed in each country; however, these improvements should be designed to integrate the regional dimensions.

Box 4.10

The regional market in UEMOA's Agricultural Policy (PAU)

Integration implies [...] that market regulations between member states are equitable, meaning that efforts are made toward a harmonisation of production and quality standards. This will ensure fair internal competition among producers and guarantee the quality of UEMOA products, and non-UEMOA products imported from the region, to customers and consumers. Union citizens will better recognise the Union's principles if they also reap some of the benefits in their daily lives – in particular in their consumption. The credibility of the Union in constructing the common market depends on the capacity of its various institutions

(notably the Court of Justice) to enforce the engagements of its member countries. Improving the functioning of agricultural markets in the region requires the consideration of its current specificities, in particular the important role of the informal sector in warehousing, processing and marketing activities, the fragmentation of production, weak technical capacities, lack of organisation of the sectors' operators, an environment not conducive to competition and the vital importance of trade in satisfying food needs.

Source: UEMOA 2002

NOTES

- 1 The results stem from five surveys conducted in Senegal (2002), Burkina Faso (2003), Niger (2005), Mali (2006) and Côte d'Ivoire (2008).
- 2 It is important to bear in mind that increases in labour input do not guarantee higher labour productivity.
- 3 MISTOWA: Market Information Systems and Traders Organizations in West Africa (programme funded by USAID).
- 4 Results of a pilot project tracking cross-border flows (September-December 2009).
- 5 ATP: Agricultural Trade Promotion (programme funded by USAID).
- 6 The FAO points out that food balance sheets measure human consumption "from an availability standpoint".
- 7 The survey used the CWIQ – core welfare indicator questionnaire – methodology.
- 8 Société Nationale de Gestion des Stocks de Sécurité Alimentaire (National Food Security Reserve Management Agency).
- 9 For proteins and fats, the margin of error is between 4.9 and 2.5% respectively.
- 10 These amounts correspond to the differences between FAO and INSD estimates, per capita, multiplied by the total population.
- 11 AMIS Benin: Benin's Agricultural Market Information System.
- 12 The use of fertiliser for maize is directly linked to the use of fertiliser for cotton.
- 13 FAO food balance sheets beyond 2007 were not available at the time of writing.
- 14 Based on results of various consumption surveys.
- 15 The FAO now provides information about the quantity of cereals produced, in particular maize, at various administrative levels and for various years (AGROMAP, 2012).
- 16 Assuming that the share of regional marketed surpluses by country (S_n/S_r) depends mainly on national production as a share of regional production ($prod_n/prod_r$), the ratio of national to regional productivity ($prodté_n/prodté_r$), the ratio of national to regional auto-consumption per capita ($auto_n/auto_r$) and the ratio of auto-consumption to production at regional level ($auto_r/prod_r$) (see Annex C).
- 17 Assuming that productivity ($Prod/AP$) = available land per agricultural producer (L/AP) x yield ($prod/L$) (see Annex C).
- 18 FEWS NET Production and market flow maps.
- 19 Estimated by correlations of land area cultivated in Benin to prices Nigeria and Benin. Area cultivated is the main production decisions by farmers and can be considered as one direct response to market dynamics. Correlations have been estimated on lagged prices ($n-1$).

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- i Bureau Central de Recensement et d'Étude de la Population, final report on the 2005 population and housing census. North Cameroon represents a little over a third of the country (475 000 km²).
- ii On average, 2 000 000 tonnes/year of cereals (millet, maize and rice), pulses (groundnuts, cowpeas and soya) and roots/tubers (manioc, sweet potato and yam).
- iii Several classifications have been suggested by various authors, depending on the dominant role of the players (wholesale or retail markets), the geographical location (border markets), etc. The one proposed above mainly takes account of the level of accessibility.
- iv Ngaoundéré and Touboro are two towns in Cameroon, and Moundou is a Chadian town. Over 70% of the funding required to complete the road linking the two countries was provided by the European Union under its Regional Indicative Programme (RIP) for EU-Central African co-operation. It is concerned more with intensifying co-operation within the Economic and Monetary Community of Central Africa (CEMAC) than with opening up agricultural production areas.
- v Statistics from the Touboro Délégation d'Arrondissement de l'Agriculture (DAADER) for the period 2000–2008 show that food production plummeted by over 40% between 2003 and 2005 following a decline in rainfall from 1 679 mm in 2002 to 1 108 mm in 2005. The statistical series on food exports from 2002 to 2008 thus displays a concavity that reflects the scale of the impact of climate change on farming.

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Part III
Forward-looking Scenarios for Settlement and Agricultural Transformations to 2050

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Population settlement projections

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Key messages

- Although population growth is slowing, the demographic transition has not been completed. West Africa’s population will double between now and 2050. Policies accelerating the demographic transition would allow for benefiting from a demographic dividend;
- West Africans’ adaptation strategy to the ongoing demographic, social and economic transformation remains migration from the Sahel to coast and cities – the share of extra-regional migration will thus remain small;
- The urban population will reach 400 million by 2050; there will then be two urban dwellers for one rural. These facts call for a rethinking of food security strategies in terms of both urban and rural realities and space;
- The town-countryside relationship needs to be understood as a *continuum* in which markets play a crucial role. Relations are facilitated by the characteristics of the area, places, networks, infrastructures and actors;
- An active policy of limiting the level of urbanisation, assuming that is possible, would have negative impacts on the region’s economy, including farmers living standards;
- Promoting resilient food systems necessitates urban planning and management that is favourable to developing economic activities, both formal and informal.

5.1 TOWARD COMPLETION OF THE DEMOGRAPHIC TRANSITION

A vision for 2050

The concepts of projection, forecasting, and forward planning are interrelated and thus sometimes conflated. They cover a variety of aspects and serve, however, different purposes. Forward planning has been defined as “a science concerned with the future development of society, seeking through the study of various relevant causal factors, to encourage consideration of the future in present-day decision making”. It is part of an anticipatory

One may thus refer to “pre-active” anticipation as preparing for expected changes and “pro-active” anticipation as stimulating desirable changes.



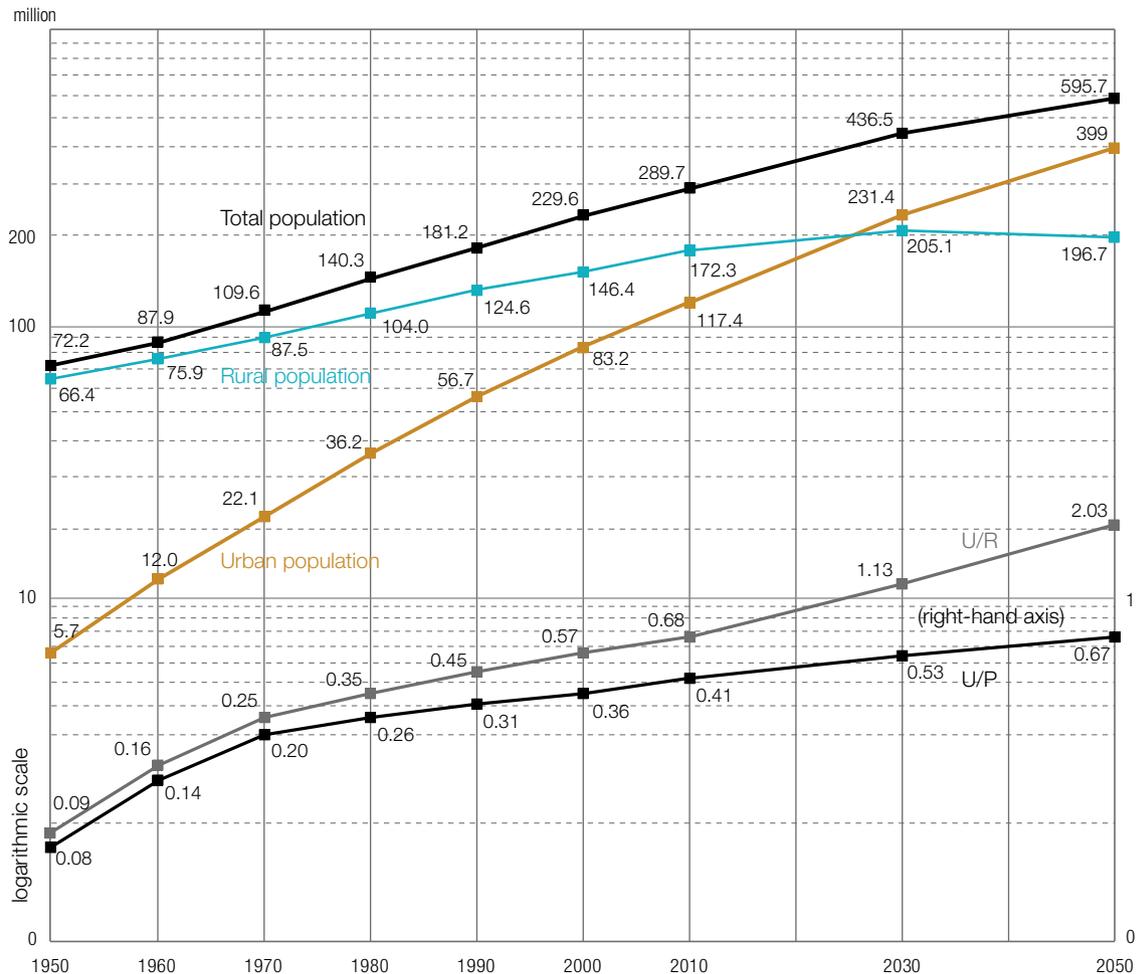
approach whose aim is “to inform present action with due regard for possible and desirable future occurrences” (Godet, 2004). One may thus refer to “pre-active” anticipation as preparing for expected changes and “pro-active” anticipation as stimulating desirable changes. Forward planning⁷ thus speaks to readiness for the future but should also be regarded as a technique to support *action-oriented* decision making. The forward-looking scenarios regarding population and urbanisation discussed below are to be viewed from this angle.

Population growth in the region is slowing down. The population grew very rapidly in

the two decades from 1970 to 1990, rising from 110 million in 1970 to 181 million in 1990 (Figure 5.1). In 2010, annual growth rates reached the level of the 1960s. The completion of the demographic transition – referring to the shift from an initial situation in which low growth is the result of a high death rate and a high birth rate to a final situation in which low growth results from similarly low birth and death rates – is under way everywhere. It is already more advanced in coastal countries than in Sahelian countries and in the urban population compared to the rural population. The pace of urbanisation (urban growth) was fastest in the two decades from 1950 to 1970; urban population growth fell below 5% annually from 1970 onwards. The prospect of continuing high urban growth in the period up to 2050, suggest that fertility should fall with an increasingly faster rate to sustain the the demographic transition. In 2050, based on United Nations low-variant population projections and after data homogenisation (Chapter 2), West Africa will have 595 million inhabitants, or twice as many as it had in 2010. The average annual growth rate for the period from 2010 to 2050 would be 1.8%, which is lower than that observed during the 1950 to 2010 period (2.3%).

The United Nations demographic projections should be viewed as an estimation on how the world population might develop, depending on certain scenarios. Several working hypotheses have been formulated about underlying

Figure 5.1
Population in West Africa 1950–2050



Source: SWAC/OECD 2012

trends in the fertility and death rates and international migration.

At the global level, the population should continue to grow in the years up to 2050 (UN WPP, 2010). However, this growth is almost entirely limited to the least-developed regions. The group of 50 least developed countries should experience particularly fast population growth. In West Africa, the population increased fourfold between 1950 and 2010, thus doubling every 30 years, at an annual rate of 2.34%. Today it stands at almost 300 million.

For its population projections in the period up to 2050, the United Nations retains four projection variants whose only difference lies in the total fertility rate used – high, average, low and constant fertility. All four scenarios point to continued population growth over the next 40 years. However, the pace of growth will slow steadily to varying degrees from the beginning

of the projection period, depending on each hypothesis (Annex D). Actual realisation of the United Nations' low-fertility hypothesis will depend on sustained growth in urbanisation and the implementation of demographic policies. This is the hypothesis we have focused on.

The United Nations assumes that migration will generally show lower rates in the 2040–50 period than in 2000 (Léridon, 2009). The organisation remains very cautious about intra-regional migration, the scale of which is especially hard to determine because of its dependence on political, economic and climatic factors. In this chapter, we use exactly the same population projections as the United Nations projections, expect that regional migration is assumed be more marked, especially from Sahelian countries towards coastal countries. Projecting migration is a politically sensitive and sometimes problematic exercise, but it is crucial

for constructing a forward-looking vision of population settlement that integrates observed past trends. Economically motivated regional migration will continue even if, as in the past, some states might adopt, for domestic policy reasons, more restrictive attitudes toward the application of the ECOWAS Protocol on Free Movement of Persons, Right of Residence and Establishment. Economic performance will, as in the past, remain the underlying structural determinant. Furthermore, the region will continue to witness movements of refugees or internally displaced populations or other more temporary, short-distance migration caused by climatic incidents. These population settlement dynamics are a key factor in the economic and spatial restructuring of the region.

Policy levers

Fertility, urbanisation and demographic dividend

The urbanisation process is an important vector in lowering fertility. Surveys show that urban populations have a lead of more than one decade over rural populations in terms of declining fertility. In Kenya, where the decline is well-advanced, the time lag between the two environments is 15 years (Joseph and Garenne, 2001). The time lag is also dependent on the size of urban centres. Continued urbanisation should thus lead to a reduction in the total fertility rate. Also, the spread of urban centres of all sizes reduces average distances from rural households, facilitating the spread of the reproductive behaviour of urban environments.

The phenomenon is duplicated in West Africa, with variations from one country and period to another (Figure 5.2). In 2005–10, Cape

The urbanisation process is an important vector in lowering fertility.



Verde, with a fertility rate of 2.6 children per woman – close to that of countries that have completed their demographic transition – recorded the highest level of urbanisation in the region (58.2%). Countries with an intermediate fertility rate, such as Ghana (4.3), Togo (4.5), Côte d'Ivoire (4.6) or Senegal (5.0) had relatively high levels of urbanisation (49%, 59%, 55% and 52%, respectively). Mali (6.5) and Niger (7.2), which have very high fertility rates, have a

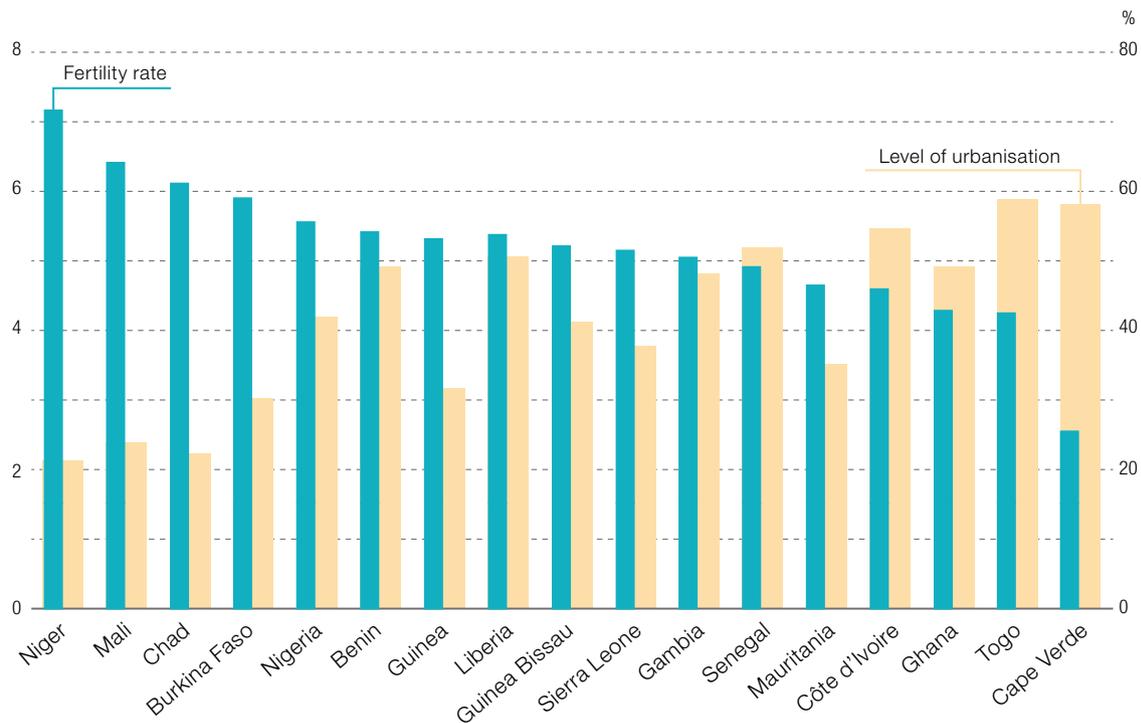
level of urbanisation of only 24 and 21%, respectively. Continued urbanisation should therefore accelerate the decline in fertility rate and the demographic transition.

The *de facto* occurrence of the United Nations low population growth hypothesis implies a fast drop in fertility rates. However, high fertility will be compounded by the impact of the demographic momentum, meaning a rise in the number of women of child-bearing age, stemming from the previously slow fall in fertility (women of child-bearing age in 20 years time have already been born). The Sahelian population could more than triple (and even quadruple in Niger), whereas in the coastal countries it could increase by a factor of 2.5 or less by 2050, excluding migration. The low demographic variant presupposes the implementation of active and diversified demographic policies. If implemented, these need to combine short- and long-term measures. They should involve the spread of modern contraception methods, the use of traditional methods, and media campaigns to inform people of the advantages of lower birth rates, etc. These measures could benefit particularly from leveraging urbanisation and education, in order to benefit from the *demographic dividend*,² which contributes to development in general and food security in particular.

Demography and economic development are intertwined in a complex circular relationship. Economic growth is a positive factor in lowering fertility, but at the same time, lower fertility is a decisive factor in economic growth. Strong population growth may seem desirable if an area's small population size and low level of urbanisation are hindering its development or when the economy can satisfy the growing demand for training needed to achieve technical progress and attract investment and entrepreneurs.

Econometric research on the links between economic growth and population growth has long overlooked the impact of changes in age structure associated with demographic transition (Guengant, 2011). During the phase of the demographic transition marked by a decline in fertility, the decrease in the number of dependent persons per active person³ creates a capacity for savings and productive investment that drives strong sustainable growth. The decrease in the dependency ratio is a function of

Figure 5.2
Level of urbanisation and fertility rates, 2005–10



Sources: United Nations 2010; SWAC/OECD 2012

a prior fast reduction in fertility. The acceleration of the demographic transition has enabled emerging countries to enter the *demographic window of opportunity* and to benefit from a demographic dividend. Thus, between 1970 and 1980, the birth rate in China fell dramatically, marked by a fall in the crude birth rate from 34 to 17‰ in 10 years. With a crude death rate close to 10‰, annual natural population growth fell from 2.4 to 0.7% (UN WPP, 2010). The resulting demographic dividend was equally important.

In China, the proportion of non-active to active population was 38/100 in 2010 compared to 77/100 in 1970, dividing the burden of the non-active on the active by two. This is thought to have contributed to the country's economic performance over the last 20 years as well as to the ageing of the population (Guengant, 2011). In the United Nations medium-fertility variant, the dependency ratio will rise again to 64/100 by 2050, and the old-age dependency (of the over 65s) will increase from 11/100 to 42/100. These data illustrate the *window of opportunity* process. From 1970 to 2010 in West Africa, the dependency ratio remained unchanged at 86/100. In 2050, it will be 64/100 (medium-fertility variant) and 56/100 (low-fertility

variant). The dependency of the over-65s is still very slight (8–9/100) and that of the under 15s high (55–47/100). This time frame can thus not be associated with the population ageing. In contrast, total dependency (of the under-15s and over 65s combined) only falls below 60 (56/100), in the low variant after 2035.

China, with its single-child policy, remains an extreme case; yet it illustrates how the demographic dividend may provide strong leverage for development. Only the implementation of a resolute population policy can help lower the birth rate fast enough to open the *window of opportunity* and to allow for benefit from the demographic dividend. The gains in terms of productive capacity and income – development – could contribute directly to food security, while the decrease in the dependency ratio reduces the proportion of the most vulnerable population (children and the elderly), also in terms of food insecurity.

Essential population policies

The first national population policies date back to beginning of the 1990s. However, certain initiatives with a demographic dimension (health care, education, hygiene, etc.) date

from farther back. The promotion of modern “family planning” by national member associations in the IPPF⁴ began at the end of the 1960s. Standing midway between demographic policies (in the strict sense) and policies for economic and social development, current national population policies are defined as “a set

Any delay in the decrease of fertility rates creates more uncertainty about improving food security.



of measures taken deliberately by a national authority or a government to influence demographic parameters and/or to take account of the demographic outcomes of sectoral policies in a country’s sustainable development process” (Assogba, 2003).

Since 1990, these policies have focused on the high fertility and the uneven geographical distribution of the population, as well as on migration and urbanisation. They involve the combined aims of lowering fertility and ensuring reproductive health and health in general, including the fight against AIDS and the prevention of infant mortality. As the political context has been favourable, these policies have received substantial financial support. However, the slender results are being criticised in light of the sums invested.

However, even if these measures do not fully account for the decrease in the birth rate of -7.6 between 1975–80 (47.7%) and 2005–10 (40.1%), they have certainly contributed to it (Figure 5.3). In addition, the decrease is almost entirely offset by the lower death rate.⁵ Nevertheless, the two factors combined have resulted in a levelling off of natural growth in the region. For a faster demographic transition, the crude birth rate would have had to fall by over 1.3% annually from the beginning of the 1980s to reach 32.6‰ in 2010. Other reasons suggested for the modest performance are the inadequacy of political commitment and/or of resource allocation, the poor management of resources, weak programme planning and coordination, insufficient knowledge of regional demographic systems, and sociocultural constraints. Yet national population policies are regarded as relevant aspects of food security (Ouédraogo, 2011) for achieving the Millennium Development Goals (MDG) (UNDP, 2003; UNFPA, 2003; UNFPA, 2004). Moreover, the impact of this

decrease will be felt only belatedly with respect to implementation of the measures adopted.

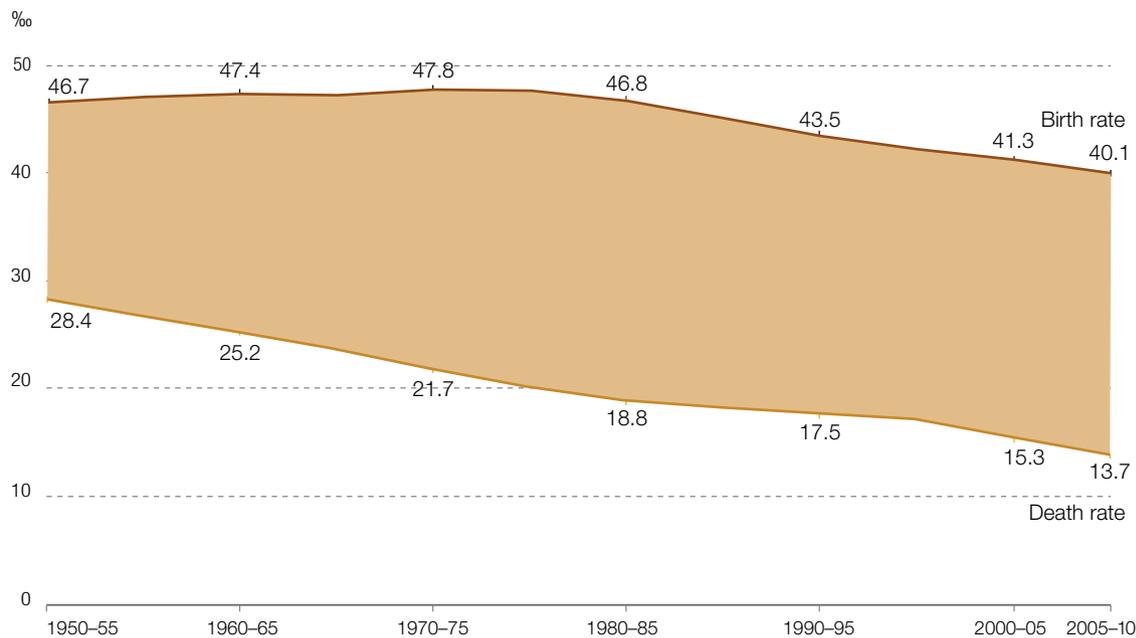
Population growth is slowing down in West Africa. This trend is conducive to growth and development. Yet completion of the demographic transition is likely to be held up by demographic momentum and continued high fertility, especially in the Sahelian countries. Any delay in the decrease creates more uncertainty about improving food security. Food security policies should monitor the pace of the demographic transition, especially in countries in which it has progressed the least, and endeavour to speed up its completion.

Contraception, education and information

The initial decrease in fertility in West Africa has begun after the introduction of family planning programmes. The latter are often challenged over concern for the conditions underlying changes in reproductive behaviour. The continued decrease in fertility,⁶ though slow, places these reservations in perspective. An analysis of fertility rates concludes that the use of methods of contraception is the most decisive factor in lowering fertility for all ages and countries (Kirk and Pillet, 1998). The report prepared for the conference “Population, Development and Family Planning in Francophone West Africa: The Urgency for Action”⁷ drew attention to the fact that “a significant proportion (up to 30%) of the demand for birth control expressed by women in relationships was unsatisfied” (Guengant, 2011). The extensive general use of “modern methods of contraception” depends on a prior change in cultural norms, family structures and education. Improved access contraception methods and stronger actions to prevent the spread of AIDS would have helped to lower fertility, without placing strong pressure on reproductive behaviour per se.

There is broad agreement in the international community regarding the decisive part played by education in the process of controlling demographic variables (Hugon, 2008). Decreasing fertility correlates with literacy. It is “the means for broad diffusion of various ideas, concepts and means for individuals, and a means of self-expression when confronted with other forms of power (state, institutions and cultural norms)” (Locoh, 1985). However, the aims of education for all for 2015 are still

Figure 5.3
Birth and death rates in West Africa*



* West Africa excluding Chad

Source: United Nations 2010

proving hard to achieve in the majority of African states. Only 10 countries out of 48 in sub-Saharan Africa had achieved universal primary education by 2000. School enrolment rates in West and Central Africa rose from 40 to 50% in the case of girls and from 50 to 60% for boys between the beginning and end of the 1990s (UNESCO, 2005). Such quantitative progress obscures qualitative malfunctioning. The population of schooling age (6–12 year olds) is 3 times higher in Africa than in industrialised countries. To achieve identical primary school enrolment rates, the relative financial commitment that would be required (with respect to GDP) is almost 10 times higher. To achieve the aim of the MDG,⁸ the number of children enrolled would have to rise from 64 million (in 2000) to 140 million in 2015, corresponding to an annual growth rate of 5.2%, compared to the 3.2% observed between 1990 and 2000 (Hugon, 2008). Moreover, if the education of girls is a relevant factor in influencing fertility, its impact only becomes significant with secondary education.

While many researchers are interested in the impact of institutional education systems on social trends, television series and radio

serial dramas both contribute to rapid changes in the perception of illiteracy, reproductive health or family size (Brown, 2011) (Box 5.1). Fertility decreases quickly in countries with substantial migration to Europe, such as Morocco whose population growth fell from 2.8% in 1971 to 1.4% (2004).⁹ Use of the media



If the education of girls is a relevant factor in influencing fertility, then its impact becomes significant only for secondary education.

and social networks could constitute an original approach to demographic policy. There is no need to devalue traditional birth control when it meets with broad approval from the population. Any action to encourage a change in fertility should be directed first at cultural institutions, including social groups and communities, religious, economic and corporate organisations, and via them, couples and women, as these bodies have a much more direct impact than distant national institutions and constitute a reassuring frame of reference for the emergence of new individual behavioural patterns.

Box 5.1**Lessons from Mexico and Ethiopia**

"In 1974, Miguel Sabido, a vice president of Televisa, Mexico's national television network, ran a series of soap opera segments on illiteracy. The day after one of the characters visited a literacy office wanting to learn how to read and write, a quarter-million people showed up at these offices in Mexico City. Eventually 840 000 Mexicans enrolled in literacy courses after watching the series. Another series dealt with contraception; over the span of a decade this helped reduce Mexico's birth rate by 34%.

In Ethiopia in 2002, two years after the broadcast in Amharic and Oromiffa of radio serial dramas by the Population Media Centre, which addressed issues of reproductive health and gender equity, a survey found that among married women in the Amhara region who listened to these dramas, there was a 55% increase in clients at family planning service centres. The fertility rate in the region dropped on average from 5.4 to 4.3 children per woman in the period".

Source: Brown 2011

5.2 FOCUSING ON CITY DEVELOPMENT

Continuation of urbanisation

Between 1950 and 2010, urban growth absorbed much of the natural increase in rural populations in the region, especially in countries in which urbanisation was lagging behind at the time of independence. The region's rural population tripled in 60 years, whereas the urban population grew by a factor of over 20 and stood at 117 million. In the period up to 2050, the West African urban population is set to triple (399 million). This trend raises questions about what urban policies will enable towns to host the increase in population vulnerable to food insecurity.

The scenarios for future urbanisation are based on the urban population figures produced by the Africapolis study. From these figures, the urban population for 2025 and 2050 is estimated.

The region's rural population tripled in 60 years, whereas the urban population grew by a factor of over 20.



The projections are informed by past trends and assume economic growth (Chapter 2). The reduction, continuation or increase of urban growth are functions of economic performance. Urbanisation and economic growth may not be perfectly correlated, but trending in the same direction. Over the 1950–2010 period, regional GDP grew more than sevenfold to reach USD 141 billion.¹⁰ The growth in GDP per capita

varied considerably over time. The sharp fall in economic growth in the decade from 1980 to 1990 appears to have been directly tied to two main factors: first, the strong decrease in the volume and price of exports and, second, the decrease in net money transfers from the rest of the world. In 1990, net transfers were almost zero; interest payments on debt by the region were virtually identical to net capital transfers (Cour, 1995).

The recovery in economic growth in most countries in the region from the end of the 1990s should result in an urbanisation growth rate for the period 2000–2010 at least equal to that of the previous decade. We thus defer in our projections to the point at which urbanisation starts to slacken, which the Africapolis study put at the beginning of the 2000s (Chapter 2). With sustained economic growth, the level of urbanisation in the region should reach 67% by 2050 (an U/R ratio of 2), as a result of rural-urban migration, natural growth and the absorption of villages by towns. The region may have an urban population similar to the United States or the 27 European Union countries, though with a lower level of urbanisation. Nigeria would account for an estimated 50% of the region's total urban population. The demo-economic model indicates that a forced reduction in urbanisation, assuming it were possible, would have a negative impact on economic performance in the region, including the standard of living of farmers and rural

people, just as slower urbanisation between 1980 and 2000 was coupled with economic sluggishness.

Over the long-term, higher average incomes in West Africa are clearly inseparable from industrialisation, synonym for labour productivity. One of the arguments hitherto used by donor agencies and many African leaders to justify restraining urbanisation is that it has not been accompanied by industrialisation, as was the case in Europe. After undergoing some measure of growth when countries had just achieved independence, industrialisation slackened. Also because of its size, Nigeria appears industrialised, yet it is no more so

than the average level for other countries in the region. Aside from its oil industry, which generates one-third of its GDP and accounts for 95% of its export revenue, the Nigerian manufacturing sector contributes less than 7% to GDP, and imports satisfy 66% of national consumer demand for manufactured products (IFPRI, 2006). In the short- and medium-term, industry will probably represent only a limited share of regional employment. Continued urbanisation will be largely independent of the growth in industrial employment. Besides manufacturing production, towns are crucially instrumental in commerce, and thus contribute to the development of a market economy (Table 5.1).

Table 5.1

Differences in United Nations and SWAC/OECD estimates of urban population in 2050

	UN/WPP	SWAC/OECD	Difference
Benin	14 490	14 797	2.1%
Burkina Faso	25 801	21 653	-16.1%
Cape Verde	502	458	-8.9%
Chad	10 295	11 633	13.0%
Côte d'Ivoire	29 319	31 617	7.8%
Gambia	2 960	2 595	-12.3%
Ghana	35 520	35 574	0.2%
Guinea	13 443	12 903	-4.0%
Guinea Bissau	2 010	1 837	-8.6%
Liberia	6 384	6 653	4.2%
Mali	24 937	20 183	-19.1%
Mauritania	4 282	4 104	-4.2%
Niger	20 546	18 314	-10.9%
Nigeria	277 916	184 738	-33.5%
Senegal	17 579	17 052	-3.0%
Sierra Leone	6 599	6 594	-0.1%
Togo	6 597	8 322	26.2%
West Africa	499 179	399 026	-20.1%
West Africa excluding Nigeria	221 264	214 288	-3.2%

The SWAC/OECD projections for urban population do not differ – except for Nigeria – significantly from the United Nations WPP figures. Based on the Africapolis estimates for Nigeria’s urban population, which are considerably lower than the official statistics (Chapter 2), the projections for Nigeria are automatically lower (by 33.5%) than the United Nations estimates. Two groups of countries stand out: the Sahelian countries and the coastal countries. Due to the assumptions about more pronounced intra-regional migration, the estimates result in a higher urban population in coastal countries and lower in Sahelian compared to those of the United Nations.

Accompanying the growth of cities

Urban development and food security policies

A policy aimed at food security calls for a constructive attitude toward growing urbanisation. The growth of towns or, more accurately, the steady increase in the ratio of the urban population (mainly non-agricultural) to the rural population (predominantly agricultural) is a powerful force for agricultural progress, in that it offers farmers an expanding outlet for what they produce (Chapter 6). However, for this potential to materialise, urban populations must have a sufficient income. This

Urban centres structure market economies, hence the need to encourage rural-urban “co-development” based on mutual interdependence.



issue refers notably to the majority of households whose income is derived from informal activities (Section 3.4). Urban centres structure market economies, hence the need to encourage rural-urban “co-development” based on mutual interdependence. The promotion of resilient food systems involves the effective management of towns and cities and of the activities that develop as a result, particularly urban-proximity agriculture. These activities may assure greater food security as well as an extra source of income and shorten the food value chain.

In 2000, the FAO launched the “Food for the Cities” initiative. The food security problem is not confined to rural producers and does not affect them alone. The 2008 riots over escalating

food prices were a reminder that it is vital to take account of urban populations in devising food security strategies. These outbursts have indeed been a reflection less of food shortage than of a more general question of urban poverty (Bricas and Daviron, 2008). Although the urban population is still smaller overall than the rural population, the U/R ratio is set to triple and reach two by 2050, corresponding to two urban dwellers for one rural. Food policies need to anticipate and accompany these transformations, accepting and understanding the urbanisation process, including its interdependence with rural areas, as part of development. Urbanisation, often badly or inadequately managed, may initially lead to a transfer of poverty from the countryside to the towns. The majority of “new-urbanites”, facing expenditures arising from urban life, are very poor. However, observations have shown that their living conditions improve over time. Also, the deterioration in environmental and social conditions linked to the development of cities and towns, in particular the largest, has also been a feature of past decades. However, it is essential to go beyond the debate between “pro” and “anti-urban”, to accept the inevitable growth of urbanisation, to acknowledge the driving role of cities in development, and to plan urban growth in relation to the rural environment. “The inexperience of the authorities, the lack of strategic vision and management failings [...] underlie urban problems today: the growth in inequality and exclusion, under-equipped infrastructures and networks and environmental damage” (Paulais, 2006).

Today, however, urban policies are still not being developed to accommodate urban growth at a discernible scale.” Much has been done – with the support of the international community – to restructure and provide basic services for existing informal settlements and neighbourhoods. These restructuring operations have at least demonstrated that the official recognition and inclusion of such entities in urban works programmes have had positive effects on economic development: the transformation of housing and the emergence of remunerative activities are almost instantaneous (provided that restructuring satisfies a real demand and does not aim at a level of services that the occupants cannot afford). The goal should be to achieve urban expansion

in real time and organise the progressive provision of equipment of neighbourhoods in relation to the available resources of inhabitants and the urban authorities. Providing basic services and equipment to new neighbourhoods to accommodate all new urbanites is effective in combating social segregation, a cause of chronic food insecurity. Pragmatic and inclusive urban management is a means of realising the potential opportunity that urban growth represents for agricultural producers and of simultaneously achieving improvements in food and living conditions for the most disadvantaged urban populations. Such an urban policy means adopting an inclusive attitude toward the informal sector. This sector assures the needs of the most vulnerable groups, especially in terms of food insecurity (Chapter 3).

Growing density, market management and resilient food systems

Towns and cities accommodate many, varied and dense population, which results in scale and agglomeration economies, labour specialisation, a growth in productivity, innovation and economic growth (Chapter 3). In this respect, the densification of African towns and cities is becoming a highly pertinent issue. The search for a denser living environment is often recommended mainly on the grounds that one with low density is costly in terms of infrastructure and services. Urbanisation occurs along transport corridors, and extensive areas more distant from these corridors may go undeveloped (Chapter 4). Such land use, which makes heavy demands on resources and is less ecologically viable, may delay progress in the provision of public services. In fact, West African cities, particularly the largest, are not as scattered as is generally thought. The Africapolis study (2008a) has calculated that, overall, urbanised land areas¹² represent 14 000 km², or 0.24% of the total land area¹³ – negligible for the region as a whole. This corresponds to an average urban density of 75 inhabitants/ha, which puts West Africa “far behind the extreme densities registered in Egypt and South Asia (200 to 300 inhabitants/ha) but ahead of Europe and North America (10 to 30 inhabitants/ha)” (Africapolis, 2008b). This varies, of course, depending on the size of the urban centres and the natural surroundings. Furthermore, housing accounts on average for just half of

the urbanised land area and the density of neighbourhoods in these towns is very diverse: 10% of high income households occupy up to one-third of the housing space, 15% of middle income households occupy around 15%, while the remaining 75% representing the poorest households share the rest. The most precarious neighbourhoods are home to 15–20% of the population living on less than 2% of the housing area: at the centre of the greatest conurbations, the density is over 300 inhabitants/ha and up to over 800 inhabitants/ha (Lagos). The immediate provision of services for the whole urban population is unlikely, especially in terms of, drainage and roads, given the capacities and financial resources of local communities. But the progressive development of urban infrastructure¹⁴ is only feasible if land occupation is not very dense. It is difficult to equip (in terms of sanitation, electricity, roads) “a posteriori” very densely populated areas. Low density urban centres are more capable of satisfying the requirements of “sustainable development” and doing so more cheaply.

Urban planning laws and regulations are an excellent means of redressing problems that often arise from the process of urbanisation. Urbanisation of the land occurs in previously rural areas in which regulations concerning urban planning, building and environmental protection are often flawed. Furthermore, urban development sometimes stretches over several administrative areas, each with its own territorial competence. Based on these observations alone, a revision of the strategies and institutions of urban planning seems warranted. To accompany urban development, urban legislation should be strengthened, and its reach extended to include suburban areas. The way in which urban development and management are funded is crucial in ensuring that towns and cities are inclusive and sustainable. Even if the responsibilities and powers of executive authority have been decentralised in many countries in the region, oversight of budgets often remains the prerogative of the upper echelons, so that local administrative authorities are often unable to allocate large sums of money to urban development; and even when they can, they often lack the capacity to make the most of those resources. Thus, reforming municipal funding systems and strengthening their potential are important aspects of any

development strategy. In this respect, the main challenges to be overcome are as follows: overhauling municipal funding systems to make them more effective; finding new sources of external funding; and establishing sounder links between official urban development funding mechanisms and those serving poor urban dwellers.

The town-countryside relationship should be understood as a *continuum* in which the role of markets is key. Markets are the meeting places for producers and their customers, and supply towns with fresh produce, craft products and fuels. According to the central place theory, the network organisation of small, medium and large cities should contribute to a smooth functioning of the different aspects of supplying urban goods: collection, storage and redistribution. In fact, these markets may be held not in the towns themselves but in their immediate hinterlands. Thus in certain regions, the market is a longstanding pre-colonial tradition that may not have given birth to a town, it may be a place of simply periodic contacts (FAO, 1997). Elsewhere, the town may be a purely

colonial creation for serving administrative, religious or military purposes. Entrusted with few economic functions, it may have preceded the establishment of a market, or not had one at all. However, the movement of goods between the rural and urban areas is still driven by the market, inevitably more or less connected to the urban environment. The interactions are thus furthered by the natural environment, locations, networks, infrastructures and actors. Yet farmers are not always able to access markets easily and may run into logistical problems linked to transport and storage, along with those of obtaining credit and information (Chapter 4). In the short-term, these barriers may give rise to uncertainty over the income of rural households, and in the medium- or long-term restrict scope for extending their activities. In addition, they may prevent the steadily expanding urban population from satisfying its food needs. If towns and cities are to be made more inclusive and contribute to strengthening the resilience of rural and urban households, it will be necessary to invest in market infrastructure and institutions.

NOTES

- 1 The plausible scenarios established in forward planning do not amount to genuine projections or forecasts. Godet (1983) defines a projection as "the extension into the future of a past trend, in accordance with certain assumptions concerning extrapolation or trend inflection". When this appraisal is combined with a probability of occurrence at a given time, one speaks of forecasting.
- 2 Situation of a country characterised by a very young population and that is experiencing a decrease in its fertility. The active population becomes more numerous than non-active persons. Without a fall in fertility, there is no demographic dividend.
- 3 The dependency ratio – the number of people aged under 15 and over 65, for every 100 people aged between 15 and 65 – may be taken as a proxy for the ratio of non-active persons to active persons.
- 4 IPPF: International Planned Parenthood Federation.
- 5 Lowering the crude death rate is also an integral part of national population policies.
- 6 Provided by demographic and health surveys in the countries of sub-Saharan Africa.
- 7 Ouagadougou, Burkina Faso, 8-10 February 2011, organised by the IRD.
- 8 Universal primary school enrolments in 2015.
- 9 A pace of decline very similar to the WPP 2010 low variant for West Africa up to 2050.
- 10 In constant USD 2 000.
- 11 See the recommendations made at the World Urban Forum in Vancouver in 2006.
- 12 Africapolis (2008a) figures: settlements of over 10 000 inhabitants.
- 13 Urbanised land areas represent 0.4% of the total area if the uninhabited Sahelian-Saharan areas are excluded.
- 14 Such as a road network, public transport and water supply and sanitation systems.

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The future of agricultural systems

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6.3	Anticipating and accompanying transformations in agricultural systems	171

Key messages

- The agricultural population will begin to decline over the next 40 years. The ratio of the non-agricultural population to the agricultural population will be 3.5 in 2050, an increase of 250%, implying major transformations of agricultural systems;
- Data on land availability and potential reveal significant discrepancies. The lack of precise definitions, particularly for pastures and permanent meadows, has led to over-estimations of arable land in the Sahel;
- Based on performance in past decades, a threefold increase in agricultural production appears feasible. This production increase will stem from an increase in the area harvested (1.3% annually) and significant improvements in yields (1.7% annually);
- The evolution of agricultural systems will be dominated by two features: the specialisation of small and medium-sized farms in production destined for the market and the emergence of very large farms. This process will be accompanied by an increase in average farm size and the increased concentration of food production;
- The agricultural transformations will be spatially and temporally diverse. Agricultural policies must be conceived and targeted at producers with different profiles, challenges and constraints;
- The future of agricultural systems in West Africa will depend on improvements in the functioning of the common regional food market, the revival of regional co-operation regarding land rights and support for producers and agricultural investment.

6.1 FUTURE STRUCTURE OF REGIONAL POPULATION AND CHANGES IN AGRICULTURE

An even agricultural population to feed a growing population

The transformation of production systems, linked to the evolution of the non-agricultural and agricultural populations and the relationship between the two, will be one of the major challenges in the decades ahead. This challenge is identified in national and regional agricultural policies. Thus, UEMOA's Agricultural Policy (APU) notes that "if urbanisation continues at the same rate, the current relationship between towns (cities) and the rural environment should be inverted in 20 years. Whereas in 1990, taking UEMOA as a whole, one urban dweller was a potential customer of two rural inhabitants, projections for 2020 point to a radical change because one farmer will have to feed more than one urban dweller. This presupposes that farmers wishing to satisfy growing demand from (urban and rural) non-producers will have to raise their productivity considerably" (UEMOA, 2002).

The total population will double between 2010 and 2050 (from 289.7 million to 595.7 million), while the agricultural population should level out. After continuing to grow slowly for some years, the agricultural population will start to decrease around 2025 and reach some 130 million in 2050 (Figure 6.1). The majority of this population will live in rural

areas, with a declining proportion in towns and their peripheries. Expressed in full-time equivalents,⁷ the agricultural population will satisfy at least a significant share of the demand from the steadily growing non-agricultural population. The non-agricultural population is set to triple between 2010 and 2050 (from 144.5 million to 464.8 million).

Table 6.1

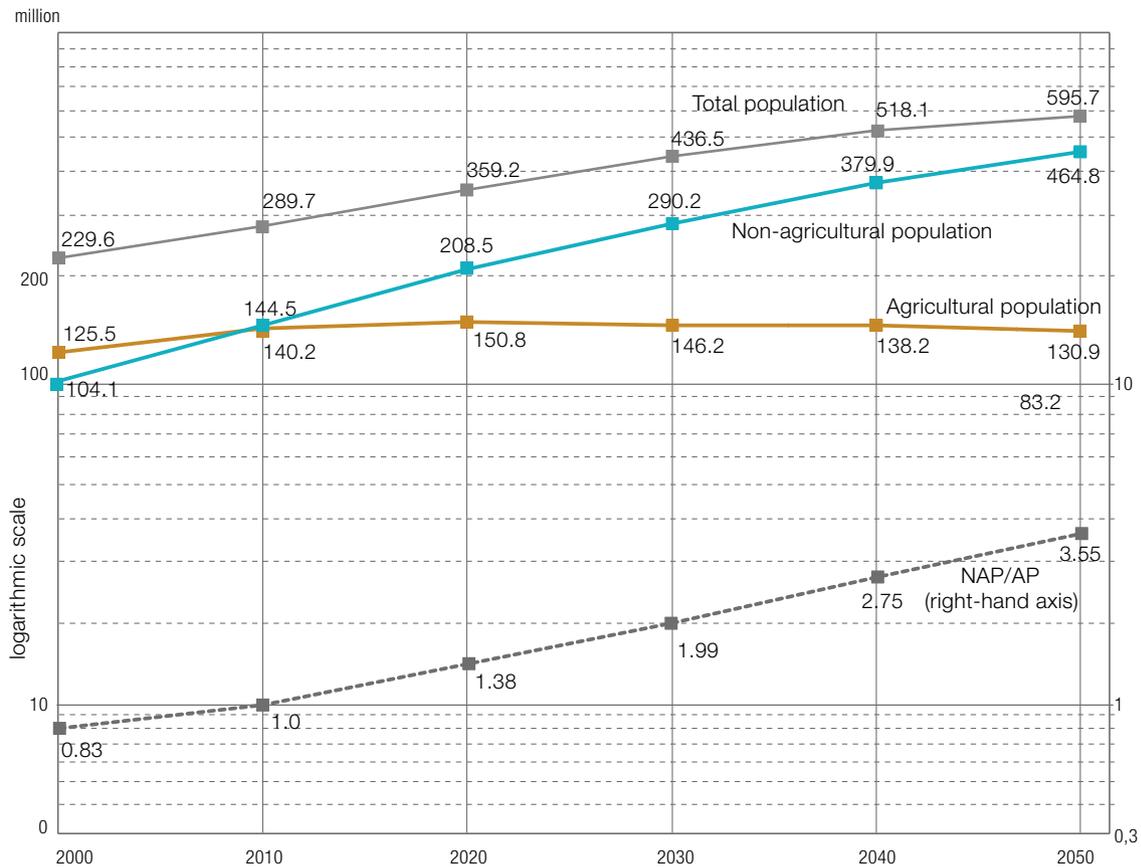
Agricultural and non-agricultural population in urban and rural areas

Year	Rural areas		Urban areas	
	AP (%)	NAP (%)	AP (%)	NAP (%)
1950	94	6	46	54
1980	84	16	21	79
2010	75	25	12	88
2020	71	29	10	90
2025	69	31	8	92
2050	56	44	5	95

Source: SWAC/OECD 2012

These evolutions will be spatially diverse and depend on the level of urbanisation. Whereas a parity between the non-agricultural

Figure 6.1
Projection of agricultural and non-agricultural population



Source: SWAC/OECD 2012

and agricultural populations (NAP/AP = 1) was reached in most coastal countries in 2010, this will not occur until around 2030 in the landlocked Sahelian countries (Burkina Faso, Chad, Mali and Niger), which were still only modestly urban in 2010. Consequently, changes in agricultural systems will also vary over time, depending on the area (agro-ecological conditions, market connection) and the level of urbanisation.

The share of the non-agricultural population in rural areas is set to increase and reach 31% of the total rural population in 2025 and 44% of that population in 2050, a trend linked to the growing diversification of activities in rural areas (Chapter 3).

Agricultural transformations in alignment with the population structure

Non-agricultural population growth is having an accelerating impact on the division of labour between agriculture and other sectors of the

economy, the growth of agricultural incomes and rural development. It is thus instrumental in improving food security. A dominant activity at the outset, agriculture is contributing to the development of towns and non-agricultural sectors or, in other words, to the growth of markets vital to its own future. Similarly, towns are witnessing the emergence of new needs and activities that provide outlets for labour, as well as new markets stimulating in transformations in agricultural systems (the emergence of local supply and/or new products).

Growth in the level of urbanisation, particularly around a level of 50%, leads to an increase in the share of marketed surplus production and hence incites producers to adopt new production techniques. These techniques increase labour productivity as a result of mechanisation and, where land constraints demand it, growing output per hectare with greater investment in inputs.

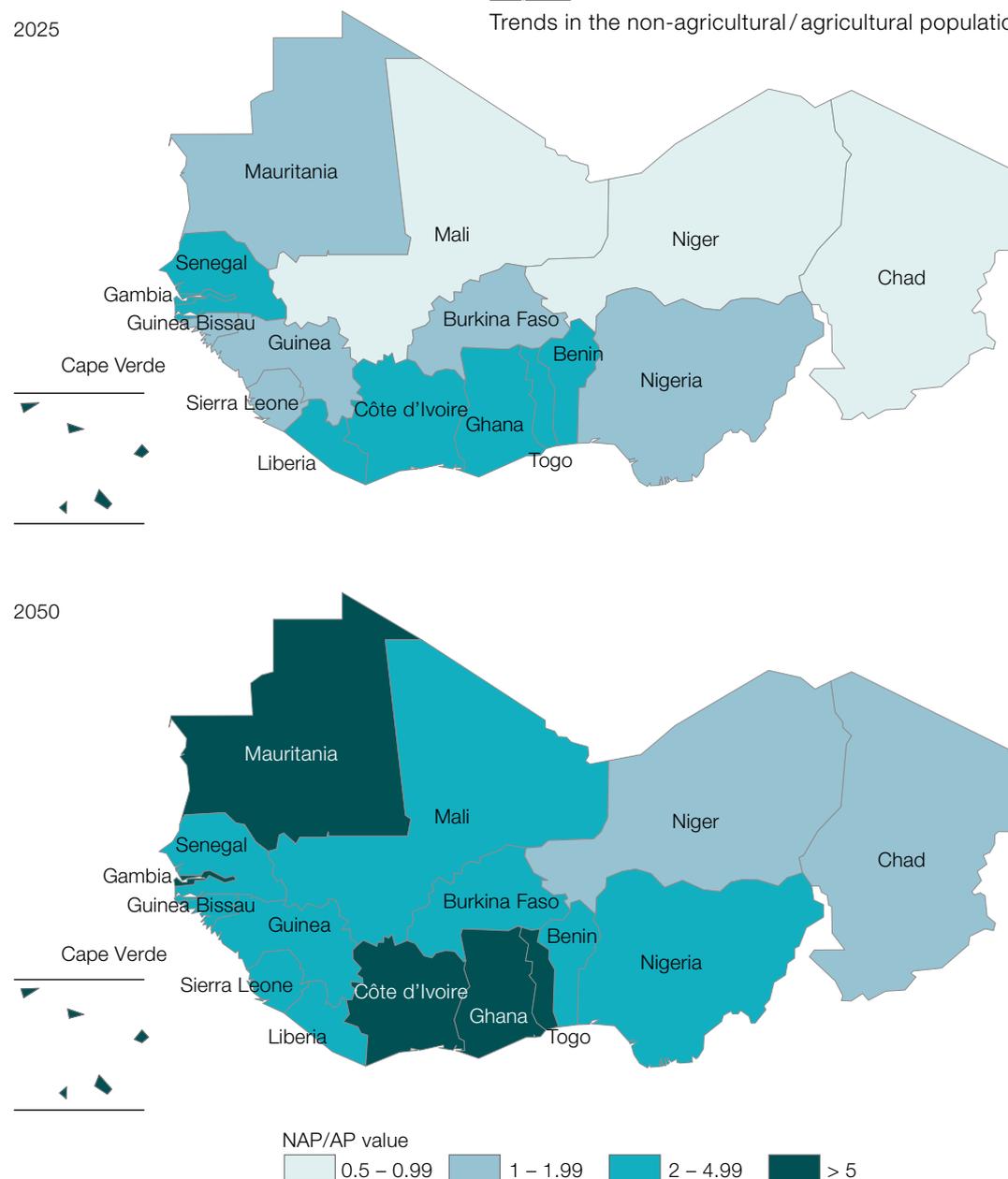
In the areas most distant from markets and/or poorly connected to them (those

with high transaction costs), the ratio of the non-agricultural population to the agricultural population will vary little over time. It is also improbable that farmers' production methods in those areas will evolve quickly. Current national and regional strategies are not supported by spatial analyses of agricultural areas, their potential, their settlement features or their position within the market. A precise mapping of such characteristics is needed in order to implement targeted agricultural and food policies and to more effectively prevent food crises.

In the coming decades, West Africa should witness nothing short of an agrarian revolution characterised by larger farms employing more capital and agricultural inputs. The 2012–2016 ROPPA five-year plan stresses, moreover, that the new larger proportion of urban dwellers is a “historical transformation that represents an opportunity for producers, if they achieve, to satisfy the needs of this population. For this demand to be satisfied by the regional rather than the world market, there must be a massive transformation of agricultural systems and value chains” (ROPPA, 2012).

Map 6.1

Trends in the non-agricultural/agricultural population ratio



Source: SWAC/OECD 2012

6.2 LAND USE PROSPECTS AND CHALLENGES

The necessary harmonisation of land use data

The harmonisation of population settlement data has already been discussed (Chapter 2). For identical reasons, a regional analysis of agricultural transformations and their relation to food security requires the harmonisation of concepts and data on the availability of land and its various uses. However, the available data sources point to very different findings and possible future developments.

The existing literature affirms the existence of plentiful reserves of agricultural land in West Africa. These conclusions are based on the information available in national and international databases. However, these databases exhibit significant variations due to the various methods of assessing land potential and use. Three main databases exist: (i) the International Institute for Applied System Analysis (IIASA) – an institute that produces data on land, its use and its potential jointly with the FAO; (ii) the FAO statistical database (FAOSTAT); and (iii) the Center for Sustainability and the Global Environment (SAGE) at the University of Wisconsin.

The method used by the IIASA to determine potential relies on characteristics related to the climate, soil and topography. They are set in context with the needs of several varieties of cultivated plants. A theoretical yield is calculated for three methods of cultivation, depending on the level of input use (low, medium or high). Various types of risk are taken into account, along with the renewal of soil fertility. Finally, the theoretical yield is compared with the observed maximum yield. The land is then classified into one of the following five categories:

- (i) “Very suitable” for cultivation if the theoretical yield is over 80% of the maximum yield;
- (ii) “Suitable” for cultivation if the theoretical yield is between 60 and 80%;
- (iii) “Moderately suitable” for cultivation if the theoretical yield is between 40 and 60%;
- (iv) “Not very suitable” for cultivation if the theoretical yield is between 20 and 40%; and
- (v) “Unsuitable” for cultivation if the theoretical yield is below 20% of the maximum yield.

There are two drawbacks to this approach: first, areas classified as pastures are not viewed by the IIASA as suitable for cultivation; second, land with a slope of more than 30% is regarded as unsuitable for cultivation even though such land is used in some countries.

The FAOSTAT data are based on official national statistics. The main limitations at the regional, or international level, are the various definitions and methods used in estimating land availability, as well as the lack of precision

« Databases exhibit significant variations due to the various methods of assessing land potential and use.

in concepts such as pasture and fallow land. The FAO definition includes semi-arid land within pasture. However, some countries, such as Saudi Arabia, do not include such land as pasture in their statistics (Saudi Arabia reports 486 km² of pasture, whereas the FAO records 1.7 million km² – or 80% of the total land area of the country). While, at the world level, these local differences might be negligible, they may lead to misinterpretations at the regional level. This is the case in the Sahelian countries, where permanent pastures are particularly extensive (Figure 6.2).

In addition to these estimates based on land cover, other studies (Gazull, 2009) propose taking into account socio-economic factors that affect land use. Here, the focus is on technical, financial, logistic and social constraints on utilisation. All of these constraints contribute to making land potential only partially achievable, but they are rarely included in analyses. Table 6.2 summarises these differences in estimating land availability and use.

The utilisation and awareness of land potential are essential elements of food security analysis. The availability of coherent, harmonised and spatialised data is an important element for regional organisations and their member countries to use in better anticipating changes in production systems. Thus, these nations will be able to develop effective support and well-defined food security strategies. The development of such data should be part of international initiatives assisting West Africa in facing its future food challenges.

Table 6.2

Summary of methods and data sources on land available

Database / institution	FAOSTAT / FAO	GAEZ (Global Agro-Ecological Zones study) / IIASA + FAO	SAGE (Center for Sustainability and the Global Environment)
Sources used	National statistics Estimates by FAO experts	Statistics and data from Satellites: climates, soils, topography	Statistics and data from Satellites: FAO data and many cross-checked national and sub-national sources
Geographical coverage	228 countries and various groups of countries	158 countries, 22 regions, 18 agro-ecological areas	2 605 administrative units (states, provinces, etc.), 160 countries, 20 regions, 18 agro-ecological areas
Reference dates for results	Each year from 1961 onwards	The 1990s decade	1992
Methods	Compilation and standardisation of national statistical sources and other sources	Comparison of the needs of 154 varieties of cultivated plants and edaphic characteristics Comparison of how output varies with the level of use of inputs	Comparing, cross-checking and harmonising data from many statistical sources and from satellites
Observations	-Imprecision of certain definitions, particularly "permanent grasslands and pastures"; -Inconsistent use of some definitions	-No account taken of socio-economic factors -A static analysis which does not consider land damage or improvements (terracing, drainage)	-A strictly agro-ecological analysis -No account taken of land use alternatives to crop-growing -A static analysis

Source: Roudart 2011

Potential and use of land

Most land resources are in semi-arid areas

According to FAO statistics, the total agricultural area, including cultivated area,² permanent meadows and pastures,³ is 335 million hectares, of which 236 million are permanent meadows and pastures,⁴ including land kept fallow for over five years. In theory, it might be held that permanent meadows and pastures represent agricultural land reserves. However, large proportions of these lands cannot be easily exploited for agricultural activities. Indeed, 70% of the area in this category is in Sahelian countries (Figure 6.2).

While semi-arid areas are suitable for rearing livestock, especially cattle (50% of the total heads were in Sahelian countries in 2006), this land cannot be readily used for crop growing given the low amount and high variability in rainfall. The actual availability of agricultural land in West Africa is thus open to question. To take into account the constraints

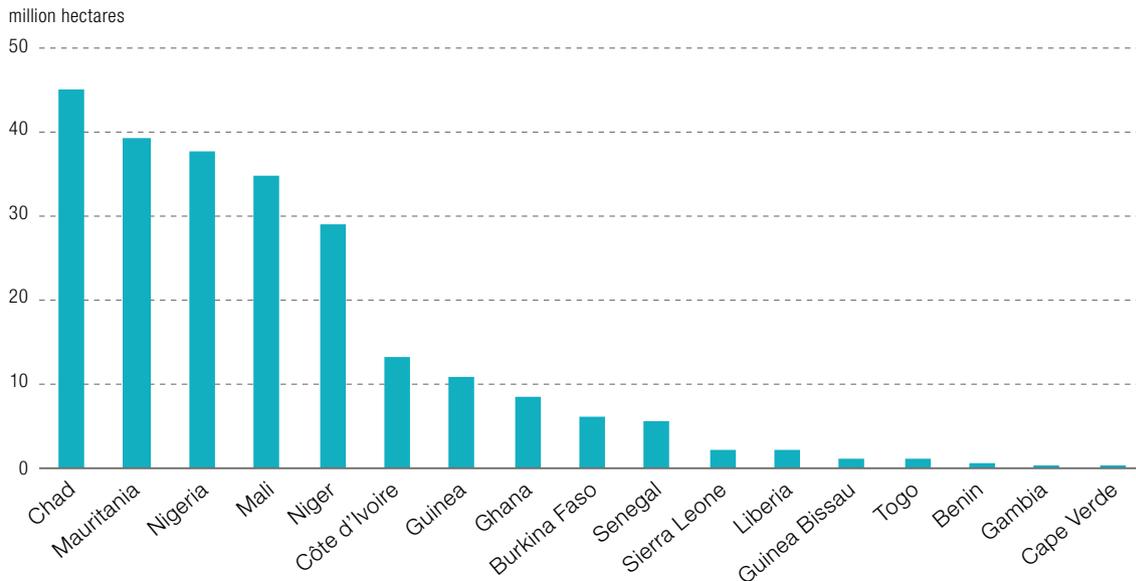
on crop-growing agriculture, we must consider the fact that only half of the permanent meadows and pasture area in Sahelian countries (Mauritania, Mali, Niger, Chad) represents agricultural land potential. Thus, agricultural land potential would total 255 million hectares, rather than 335 million hectares.

Changes in land use

The amount of cultivated area grew only very modestly until 1980 (Figure 6.3). It rose from 65 million hectares in 1961 to 69 million hectares in 1980, which corresponded to an average annual growth rate of 0.3%. During the 1980s, the average annual growth rate increased to 1% and has reached 2.3% within the last decade (2000–07). In addition, harvested area and production grew at a faster pace.

In 2009, the land cultivated amounted to 38% of agricultural land potential as compared to 25% in 1961. This proportion varies from one country to another. Low in the Sudanese Sahelian region, this proportion is greater in

Figure 6.2
Permanent meadows and pastures, 2009



Source: FAO 2012

Box 6.1

A broad definition of fallow land

One may distinguish between two main forms of fallow land for the purposes of soil reclamation:

- First, natural fallowing involves temporarily stopping the cultivation of a field or a part of one for some years to encourage the restoration of soil fertility. In traditional systems, the length of time involved may be up to 20 years, which is judged optimal for naturally recovered fertility. There is, thus, short-term fallowing (less than five years according to the FAO) and long-term fallowing (over five years). The latter is naturally subject to land availability.

- Second, improved fallowing involves planting food crops along with soil-improving species of trees or shrubs – generally fast-growing pulses that absorb nutritive elements in great quantities in lower layers of the soil while fixing atmospheric nitrogen. These nutritive elements derived from the depths of the soil and the atmosphere then return to the surface and improve soil fertility through falling leaves and decaying roots and branches.

Source: Sado 2008

the wet coastal areas because of their high population density, which exceeds 150 inhabitants/km² in some areas. Also, within country variations can be significant.

In 2009, three groups of countries could be distinguished:

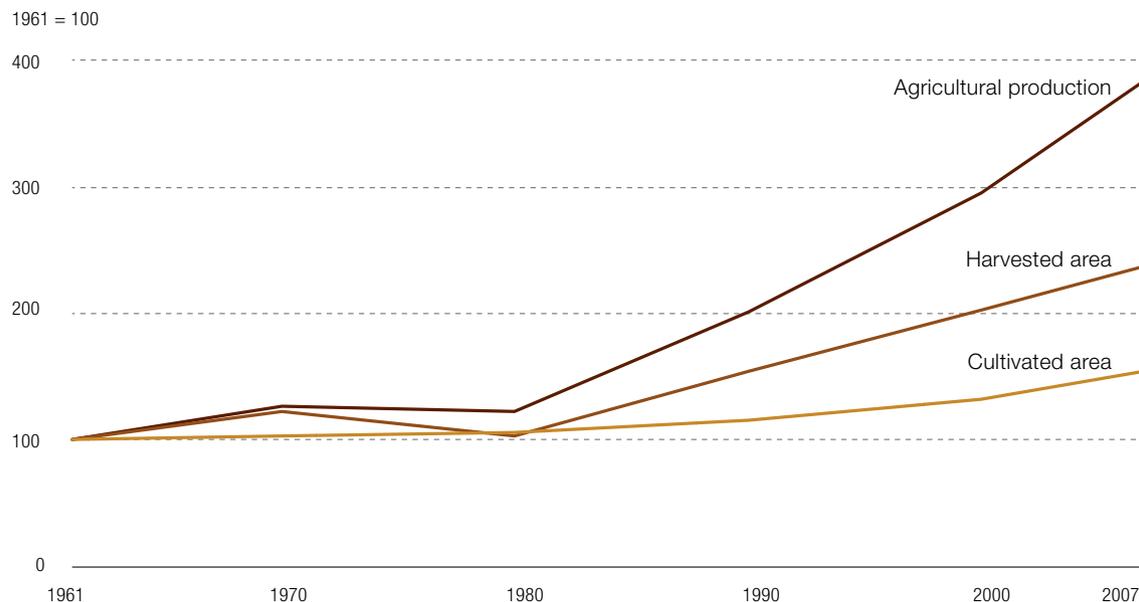
- Cultivated land amounting to over 60% of the total agricultural land potential: Benin, Cape Verde, Togo, Gambia and Burkina Faso;
- Cultivated land amounting to 35–60% of the total agricultural land potential:

Nigeria, Senegal, Sierra Leone, Ghana, Côte d'Ivoire and Niger;

- Cultivated land amounting to less than 35% of the total agricultural land potential: Guinea, Guinea Bissau, Mali, Liberia and Chad. Mauritania has the lowest share of agricultural land occupation with only 2%. This does not imply that these countries have large, easily exploitable land reserves for agriculture, even if some of the land is suitable for pastoral activities.

Figure 6.3

Trends in agricultural production (in kcal), cultivated area and harvested area



Sources: FAO 2012; SWAC/OECD 2012

The acceleration in area cultivated at the beginning of the 1980s corresponds to the take-off of agricultural production. Given the availability of land, extending the area cultivated was the most profitable strategy. This applied in particular to areas of low population density, which are often more distant from demand centres (the markets). In areas with a high level of agricultural land occupation, more intensive methods of production became increasingly widespread. This intensification is also emerging in the data (Figure 6.4).

The growth in cultivated area does not account for the entire growth in agricultural production. Cropping intensity, the frequency of harvests on a given area cultivated (calculated as the ratio between harvested area⁵ and cultivated area), has increased over this period as well (Figure 6.4). Cropping intensity increased from 65% in 1961 to almost 100% in 2007, which means that all cultivated areas are being harvested. This implies either a reduction in fallow time⁶ or an increase in successive cropping. The cultivation of fallow land and successive cropping should both be regarded as forms of agricultural intensification.

The growth in production is also the result of greater crop yield. Gains in yield have been particularly marked since 2000 and now account for 40% of production growth. Agricultural

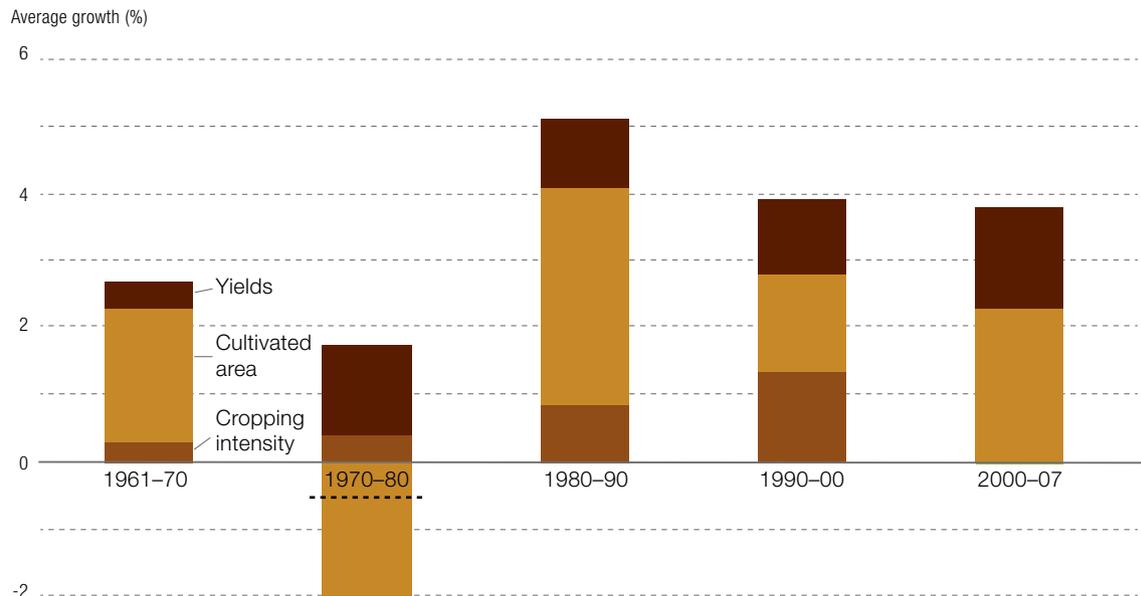
intensification is thus already under way. Intensification is occurring at all scales, on large farms and the smallest farms as well, but it is occurring in various forms. In the case of large farms, it is the combined result of the extension of land area and greater investment in equipment. In the case of small farms, it is primarily the result of greater input use.

The medium- to long-term perspectives

Land use should be viewed from various angles in response to increased food demand. Production increases can result from an extension of the land area cultivated, increases in cropping intensity and gains in yields or from a combination of all three.

What are the projections for the next 40 years? The various scenarios proposed by research centres depend on the underlying hypotheses. Global projections by the FAO hold that the majority of agricultural production increases will come from increases in yields, with only marginal increases in cultivated area. The underlying hypothesis is that available land reserves at the global level are scarce, while the potential to increase yields is considerable. IIASA estimates that in Africa, only 25% of the yield potential is currently being realised. In contrast, the “Agrimonde” scenario of INRA

Figure 6.4
Growth in production* by factor



* production in kcal
Source: SWAC/OECD 2012

and CIRAD expects that production increases will predominantly be the result of increases in cultivated area and that improvements in yields will be insignificant. Agrimonde believes the socio-economic constraints of family farms will prevent intensification and hence improvements in yields. The British Government Office for Science project on the future of food and farming (Foresight, 2011) draws similar conclusions.

Our scenario for West African land utilisation in 2050 is based on two main hypotheses concerning production and yield increases. Over the last decades, agricultural production and food consumption have increased faster than population growth. Regional per capita food availability, a proxy for food consumption, increased by 1.2% annually between 1980 and 2007. It is probable and desirable that this trend continue up until 2050. Therefore, we expect an increase in per capita food availability of 50% by 2050, or 1% per year. Assuming an identical food balance structure, this hypothesis implies an equal increase in per capita production (50%). Combined with our projections of a doubling in population between 2010 and 2050, this means that production must triple.

Given past trends, it is probable that both cultivated area and yields will continue to increase. Between 2000 and 2007, yields have

grown by 1.5% annually. In addition, an acceleration in yield growth is clearly emerging from the analyses of the past 30 years. Maintaining the rate of growth in yields until 2050 will lead to an absolute increase of 88%, which is far from reaching the maximum yield potential. At this level of yield, the cultivated area necessary to obtain the projected level of production will be around 175 million hectares. Cropping intensity is kept constant at 1, the level reached at the

« Production increases can result from an extension of the cultivated land area, increases in cropping intensity and gains in yields.

beginning of the 1990s. Under these assumptions, the maximum area cultivated in 2050 will be 175 million hectares, 70% of the agricultural land potential (255 million hectares).

The cultivated land area per farmer is declining while yields will continue to increase in rural areas with high human density and well connected to markets. The potential for increasing cultivated land area is predominantly found in areas with low and medium rural density. In these areas, from a process of concentration of land areas, a modern and mechanised agriculture could evolve. New challenges will also emerge which need to be anticipated and accompanied.

Towards increasingly large farms

Smallholder family farming (80% of farmers) has so far accounted for the major share of agricultural production. This model of production has successfully responded to the increasing demand due to the growth of the non-agricultural and agricultural populations. It has adapted to new requirements of demand and world production. In the medium-term, the general model of production is unlikely to be very different from one based on family farming, with a large range of farm sizes.

However, in the long-term, the transformation of production systems is likely to conform to trends observed elsewhere (in Asia, Latin America or Europe) and involve the growth of the size of landholdings and the resulting concentration of food production. This trans-

The agrarian transition is already advanced
in certain states of Nigeria.



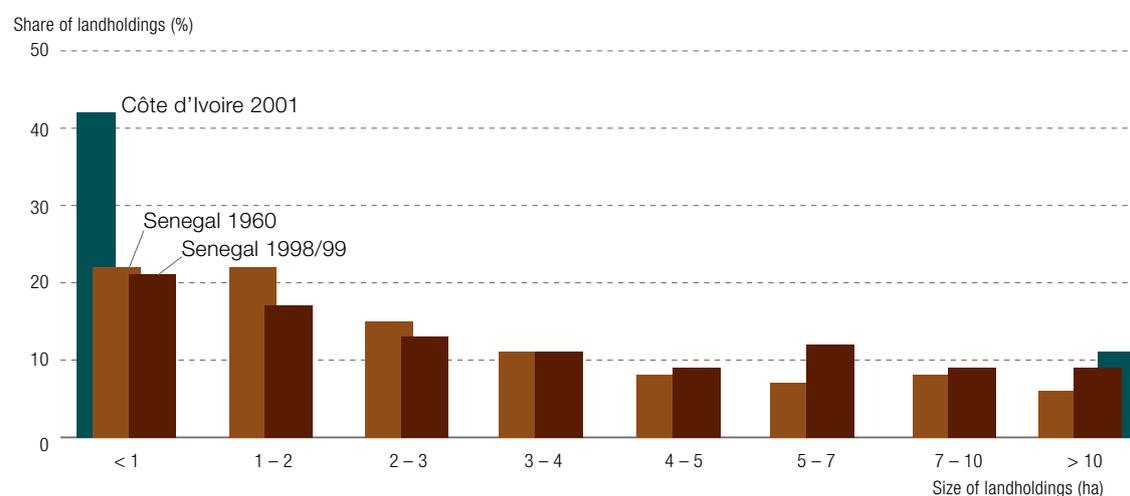
formation has already started in West Africa. It is a consequence of the necessary increase in agricultural labour productivity given the growth of the non-agricultural population (both urban and rural) and the stagnation of agricultural population. This growth in agricultural productivity requires major investment, which can be realised and amortised only by landholdings of a certain size. In the medium- and long-term, this agrarian transformation will develop gradually in a context in which small

farms will operate alongside large ones. In 1960, traditional farming was predominantly manual, and differences between farms were slight, with the exception of some cash-crop farms. Given the absence of mechanical equipment, farm size was a function of family size. The current situation is very different. In permanent crop farming (cocoa, coffee, rubber...) the use of wage labour allows for the accumulation of land, a trend that is also emerging in food-crop farming. The changes in the distribution of farm holdings by size in Senegal (with virtually no permanent crop farms) are illustrative (Figure 6.5).

In 1960, 58% of farms had landholdings smaller than 3 hectares, and these occupied 22% of the total cultivated area. By 1998, the shares of such farms had decreased to 51%, and they occupied only 16% of the total cultivated land. During the same period, the proportion of farms with landholdings of 10 hectares or more rose from 6 to 9%, and their share of the total land cultivated rose from 26 to 33%. There were almost no changes in the bottom quintile of farms. In Côte d'Ivoire, in 2001, the share of farms with holdings larger than 10 hectares was 11%, accounting for 52% of the total cultivated area. However, these figures do not show the stronger concentration in the top 1% and the top 0.1%. This concentration is set to become greater because of growing demand for marketed food surplus production and the need for higher productivity.

A form of capital, land is always likely to be more unequally distributed than revenues.

Figure 6.5
Distribution of landholding sizes, Senegal and Côte d'Ivoire



Sources: IPAR 2007; FAO 2001

Figure 6.6 is an illustration of a possible distribution of West African farm sizes in 2050, with an average farm size of 9 hectares (175 million hectares of cultivated land divided by 20 million farms with an average household size of 6–7 persons). This distribution is similar to Senegal’s in 1998, only moderately unequal (Gini coefficient⁷ of around 0.6). However, a more unequal distribution by 2050 would not be surprising.

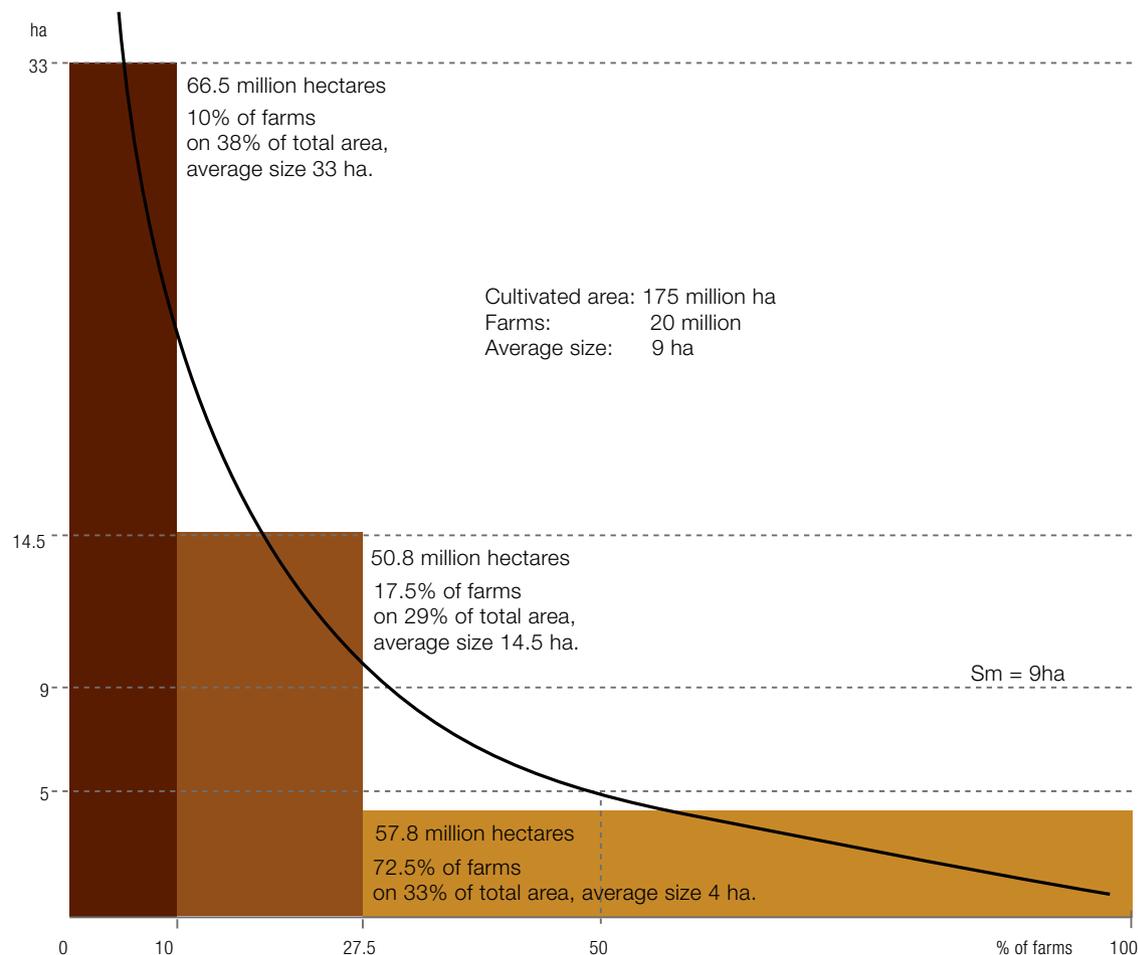
As mentioned earlier, the size of the agricultural population is due to level out between 2010 and 2050. The largest 10% of farms will have an average size of 33 hectares and account for 38% of the total area cultivated. At the opposite end of the distribution, 10 million farms, half of the total, will have landholdings of less than 5 hectares. This distribution also includes the appearance of very large and highly mechanised farms (not pictured due to scale). Such

a distribution is in no way incompatible with a family farming-based agriculture system – provided that family farming is not regarded as equivalent to manual farming and encouraged to specialise, mechanise and gradually intensify. This agrarian transition is already advanced in certain states of Nigeria. “The large majority of agricultural farms (80 to 90%) in Nigeria are small, barely mechanised family farms. They cohabit with large, well-equipped (70% of the 30 000 ECOWAS tractors are Nigerian) industrial farms. Their average size is around 50 hectares, with some landholdings above 1 000 hectares. [...] Many of these farms emerged at the time of the green revolution and the government programmes of the 1980s and 1990s” (Grain de Sel, 2010).

We have distinguished among three broad groups of agricultural farms. Small farms account for 72.5% of total farms, with an

Figure 6.6

Illustration of a distribution of landholdings by size, West Africa 2050



Source: SWAC/OECD 2012

average landholding size of 4 hectares. With urbanisation and the development of networks of cities and towns, the majority of these will be in areas that are well-connected to the market. Similar to today's urban and urban-proximity agriculture, these producers will increasingly specialise in higher-value products targeted at the market (vegetables/market gardening, poultry farming, etc.). The returns, both financially and in nutritional terms (energy and nutrients), on these farms will increase significantly, partially to offset the high cost of land in the areas close to urban centres. This process could lead to both higher incomes for producers and a more varied supply for consumers, two factors contributing to food security and resilience. Small, remote farms, however, will have less incentive to and greater difficulty in joining this process of specialisation, intensification and income generation.

Medium-sized landholdings will sustain the dynamic towards specialisation and intensification. Using credit and already accumulated assets, they will follow a strategy of expansion in terms of increasing landholdings and capturing new markets, including the regional market. On average, these farmers "have higher incomes per capita, higher levels of market engagement (including that for high-value perennials), higher use of inputs (especially fertilisers) and greater use of credit" (Chamberlin, 2008).

The biggest change over the next several decades will be the more widespread emergence of very large farms. These agribusinesses are attracted by the growth in domestic demand stemming from higher income levels and/or the increase in population and the volatility of global markets. This extensive agricultural production, often on farms of several thousand

hectares, will focus on staples, particularly cereals, aimed at processing industries (milling, brewing, etc.) and large retailers. These farms will predominantly develop in areas of low population density and on land that necessitates major investments in terms of irrigation and accessibility. Most of the capital, domestic or foreign, will come from sectors outside agriculture (trade, industry and finance). Although still very limited, such agribusinesses are beginning to emerge in some areas. In Nigeria, for instance, successful businesses have diversified into cereal production for breweries, fruit production, etc.⁸

A large share of the newly cultivated land area over the next 40 years will be accounted for by large farms, including the largest farms. The intensity of their production will not be comparable to the extensive production system of the past.

These more diverse facets of West African agriculture will need more specific and better targeted policies to cater to producers whose profile, challenges and constraints differ. For the small farms, policies could concentrate on accessibility (rural roads and infrastructure), information systems and education to facilitate specialisation and market access. For medium-sized landholdings, supporting measures could focus on opportunities for accumulation and expansion, making investments in mechanical equipment more profitable. The concentration and emergence of new farms should be accompanied via more precise legal (agricultural enterprise and land tenure rights) and institutional mechanisms (concessions, cooperatives, etc.), along with opportunities to access more capital to undertake the necessary investments.

Box 6.2

Reinvesting in territorially-based development strategies

Levels of rural poverty impose the need for massive investment in the public goods, such as infrastructure, training and innovation, market functioning and regional integration. The coherence of investments should be derived from integrated development strategies [...]. While there was a preference for sectoral approaches without much co-ordination for

a long time, there is now a need for novel territorially based participatory initiatives with real priorities for action. In this way, family-based farming established firmly in the territories can contribute fully to catalysing development.

Source: Hainzelin 2012

Furthermore, regardless of size, farms will have to be equipped to integrate into the increasingly complex value chains that are emerging as a result of market development.

The future of West African agriculture hinges on the ability to develop an integrated food industry.

Box 6.3

Land: taking into account the diversity of issues

West Africa is composed of a range of agro-ecological zones with very different characteristics; therefore, the objective of “intensification” cannot be applied uniformly across the region. Specifically, it is impossible to increase production volume per unit of land in the pastoral regions without risking the irreversible degradation of natural resources.

The diversity of production systems (in particular as concerns the available resources such as land, equipment, social capital, etc.) and the degree of market insertion within each zone have to be considered. The application of agricultural policy instruments and support schemes must take the needs and capacities of each type of farm operation into account.

Source: ECOWAS 2008

6.3 ANTICIPATING AND ACCOMPANYING TRANSFORMATIONS IN AGRICULTURAL SYSTEMS

Revitalising regional land co-operation

Between 1950 and the 2000s, large-scale (national or international) private investments in land were mainly in cash crops, particularly cacao, coffee and palm oil in humid coastal zones. More recently, however, a greater number of countries, including countries in the Sahel, have become concerned with investment in food crop production (particularly cereals) or in plants for biofuel production.

The implications of any such transactions, whether large- or small-scale, renting or long leases, on the part of national or international,⁹ private or public investors constitute a real concern for the countries involved and relate to issues of sustainable and responsible development. The challenge is to channel these investments through a legal framework that respects and involves all parties concerned. Few states possess legal mechanisms of this kind, particularly because land issues in West Africa often involve a compromise between customary law and business law in land ownership matters.

A code of conduct is needed for investors and host governments, as well as a set of

standards that comply with the obligations of international law and human rights conventions. Also required is a general set of provisions encouraging adherence to these principles. Supporting documents already exist, such as the “Framework and Guidelines on Land Policy in Africa” under the auspices of the African Union or the “Voluntary Guidelines on Responsible Governance of Tenure of Land and other Natural Resources” prepared on the initiative of the FAO. It is vital that the drafting of standards should be as inclusive as possible to ensure that they are accepted and effective. Other non-binding international mechanisms, such as the “OECD Policy Framework for Investment and Guidelines for Multinational Enterprises”, are implemented to promote private investment for development. Many organisations are strongly involved in this subject, such as the International Land Coalition¹⁰ or, at West African level, the ROPPA, whose position is “not to sell or lease land in order to be able to accommodate future population growth”.

One of the main regional challenges is that of clarifying the sometimes ambiguous and sometimes explicit¹¹ national legislation concerning land ownership for ECOWAS member states’

Box 6.4

The question of rural land rights in the face of the challenge of regional integration

Land rights questions are supremely political questions. [...] From the perspective of states, [...] each plot of land especially rural land, is primarily regarded as a portion of their national territory. [...] Seeking to understand who owns land and, above all, to change the social forces governing its appropriation (through land reforms) means instigating changes in the system of social organisation, the production system and relations with political power. For this reason, states are particularly jealous in protecting their sovereignty by determining their national land policy options. The ways forward for an institution such as the Union thus seem to be limited. [...]

Admittedly, the Union should not seek to take the place of states [...]. However [...], it is seemingly responsible for helping them to document and share their positive experiences and to learn from their reciprocal setbacks. Similarly, it is appropriate that the Union should assist member states in overcoming their difficulties in devising national land policies [...]. Finally, it appears vital for the Union to help states to bring their national land policies and legislation into line with the fundamental principles of the Union Treaty.

Source: UEMOA 2009

citizens. All ECOWAS member states signed the protocol on the free movement of goods and persons, conferring the rights of residence and establishment to ECOWAS citizens in all member countries. These concerns are incorporated into the regional agricultural policies. The APU specifically refers to the importance of cross-border management of shared resources, especially pastoral resources for transhumance. These land legislation adaptations are crucial for the future and can happen only through a renewed regional dialogue.

The CILSS is the organisation that has invested the most in analysing and drawing up land policies in West Africa. It was at its instigation that the ECOWAS Heads of State and Government approved the principle of the “discussion, negotiation and adoption of

ambitious aim because it means translating “into operational terms the principles of free movement of persons and goods and of the right of establishment, which is contained in the charters of the ECOWAS and UEMOA on land related issues” (CILSS, 2003). Establishing at the ECOWAS level, plus Mauritania and Chad, a regional observatory for analysing, monitoring and evaluating national land policies, as proposed by UEMOA, could be the mechanism the region needs to further the dialogue that could lead to the adoption of the charter (UEMOA, 2009).

At the regional level, in the long-term and subject to the necessary investments (infrastructure, equipment and training), it is reasonable to suppose that neither labour nor natural resources (land and water) are limiting factors in agricultural production and food security if the necessary adjustments can be made and if migration (intra- or inter-regional) is not prevented. Linking regional supply to regional demand implies the mobility both of people (short- and long-term) and goods.

Because the major agrarian changes described above will occur at various speeds, they will lead, more so than in the past, to new opportunities and significant intra-regional migration flows. In this respect, the regional dialogue on the rights and obligations of West African farmers in their community areas is crucial. This means further accelerating the

Linking regional supply to regional demand implies the mobility of both people (in the short- and long-term) and goods.



a common land policy instrument, such as a regional land charter, promoting investment security, upholding the rights of local communities and the management of the national interests of each state” in 2004.

This proposal for a charter is at a standstill. It is vital to return it to the agenda for discussion as quickly as possible because the process will inevitably be long. This is an

regional integration process and the development of a common agricultural market, the only viable answer to the regional needs. It also means preventing conflicts, which are among the dangers that threaten the agricultural progress West Africa is capable of, as well as humanitarian emergencies:

“It would appear that the internal and external mobility of the population has been key to African societies withstanding the social and political implosions of states that can be caused by such a powerful demographic shock, for which rulers are generally poorly prepared. In spite of the mistrust with which policy-makers regard such migratory flows, they seem to be a fundamental dynamic set to continue for some decades. West African governments must pay the closest possible attention to migration on this scale so that it receives appropriate consideration in policies for development and land policies. Given the economic crisis affecting the sub-region, migration flows within the UEMOA area must be properly managed to prevent destabilising political impacts within countries, heightened conflict situations between indigenous and migrant populations, and increased inter-state tension. At the same time, the opportunities for sub-regional development and economic growth underlying these forces of migration must be clearly recognised” (UEMOA, 2009).

Encouraging investment by agricultural producers

The take-off of West African agriculture that began in the middle of the 1980s is attributable to the dynamism and creativity of the region’s producers. Admittedly, they have benefited from the opening up of the market economy, but they have had to contend with an institutional and regulatory environment that is not geared towards the entrepreneurial modernisation of family farming. To prepare for the necessary transformations, particularly in terms of specialisation and the spread of soil regeneration techniques, as well as the use of inputs and mechanisation, this environment must be simplified and adapted to meet producer-specific requirements.

Ensuring land security is vital. Although its impact on agricultural investment is still debated, land registration and the acquisition of

title deeds is viewed by some authors (Myrdal, 1974) as the sole means of ensuring land security and thus stimulating investment in farming because customary ownership fails to provide the necessary security. Hardin (1968), in his work “The Tragedy of the Commons”, also argues that community land rights encourage the overuse of land and the deterioration of natural resources. Development partners have been highly influenced by this view.

However, in Ghana, Bugri (2008) shows that low agricultural productivity and environmental deterioration in the north-east region

« Land issues – similar to market connections – are a major obstacle for agricultural producers to integrate into the food market economy.

are not linked to land security but rather to other socio-economic factors. In Kenya, Place and Migot-Adholla (1998) note that even if legal land ownership offers greater security in terms of entitlement, it has no effect on agricultural production.

It would appear that investment in agricultural production depends mainly on socio-economic conditions, particularly on market incentives and the scarcity of land. Land security liable to stimulate intensification is not reflected solely in access to legal ownership. Lavigne-Delville (1998), with reference to Lawry, notes that “there is sometimes a tendency to attribute the fact that farmers fail to adopt technology or soil conservation methods to the conditions surrounding tenure [...]. Tenure reforms will not give rise to a higher level of investment if market conditions do not make doing so profitable”. As long as farmers willing to invest in response to market signals are hindered by land insecurity, land security in the broad sense and changes in agricultural systems are linked. The land tenure problem, similar to physical market connections (rural roads and trunk roads, as well as the functioning of the entire value chain) and access to information (prices, market opportunities), is a major obstacle for agricultural producers to integrate the food market economy and emerge from structural poverty.

The legal definition of the concept of agricultural business, in farming, livestock rearing, forestry and fish-farming, is also an important

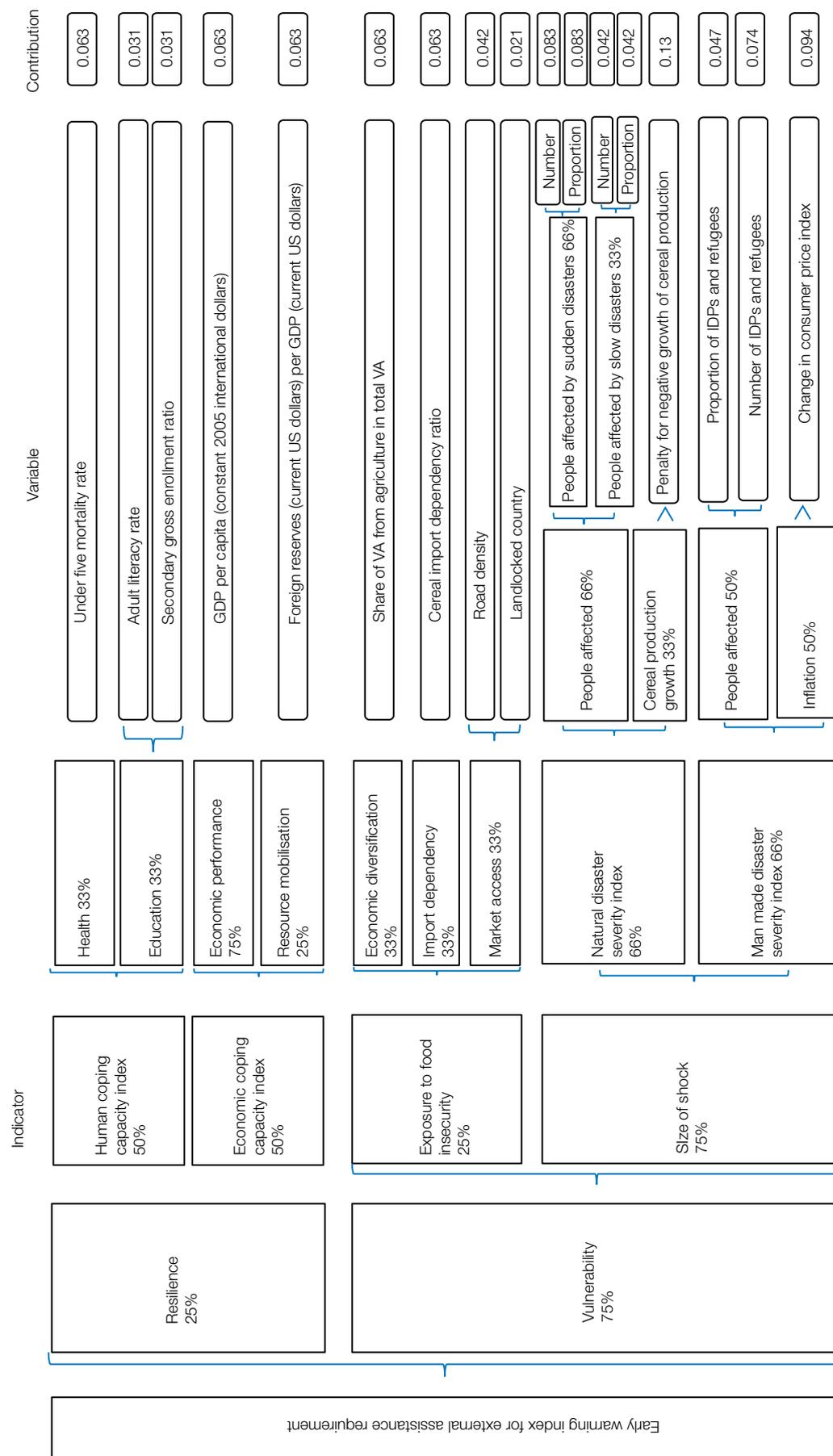
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Annexes

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ANNEX A VULNERABILITY INDEX (GIEWS/FAO)



ANNEX B MODÈLE UTILISÉ POUR L'ESTIMATION DE LA POPULATION AGRICOLE PA ET DU RATIO PNA/PA

* French version available only

La population agricole d'une agglomération de taille V (en milliers d'habitants) est supposée donnée par la relation :

$$\frac{PA(V)}{V} = \frac{1}{[1 + (\alpha V)]}$$

Cette relation qui dépend d'un paramètre α revient à admettre que la probabilité d'être agriculteur décroît avec la densité moyenne de l'agglomération, qui est elle-même fonction croissante de la population totale de cette agglomération.

Cette même relation peut s'écrire, pour l'agglomération de taille V¹ :

$$\frac{PNA}{PA} = \alpha V$$

Pour une agglomération de taille V, la relation proposée revient à admettre que le ratio PNA/PA est proportionnel à cette taille V, et dépend du paramètre α .

Pour déterminer ce paramètre α , on part de l'hypothèse que, pour une taille V donnée, le ratio PNA/PA est une fonction croissante du niveau de développement économique (et d'intégration à l'économie de marché), dont l'évolution du ratio U/R sera une approximation. Une façon simple de formaliser cette hypothèse est d'écrire que :

$$\alpha = \lambda \left[\left(\frac{U}{R} \right)^\beta \right]$$

A taille V donnée, β est l'élasticité du ratio PNA/PA par rapport à la variable U/R.

PA(V)/V, par agglomération de taille V, est désormais une fonction de deux paramètres : λ , permettant de comparer les diverses agglomérations de la distribution rang/taille à une date donnée, et β qui dépend du niveau de développement de l'économie de marché représenté par le ratio U/R.

Déterminer les paramètres λ et β

Pour déterminer la valeur du paramètre λ , le plus simple est de considérer le cas d'un pays

dont le niveau d'urbanisation est, à la date considérée, proche de 50 %, soit U/R=1. Dans ce cas, $\alpha = \lambda$, et

$$\frac{PNA}{PA} = \lambda V$$

Au regard des résultats des précédentes études menées au Secrétariat du CSAO (WALTIPS, ECOLOC), à la date où U/R=1, une ville d'environ 100 000 habitants (soit V=100) compterait environ 6 à 7 % de population agricole :

$$\frac{PNA}{P} = 0,06 \text{ à } 0,07$$

d'où,

$$\frac{(PA + PNA)}{PA} = 1 + \frac{PNA}{PA} = \frac{100}{6} \text{ à } \frac{100}{7}$$

et,

$$\frac{PNA}{PA} = 100 \times \lambda = 14 \text{ à } 16$$

On peut donc prendre pour λ la valeur moyenne $\lambda=0,15$. Un premier test de validité approximative de la loi proposée consisterait à vérifier si, dans ce même pays et à cette même date, les agglomérations « normales » de quelque 10 000 habitants (hors cas de villes à fonctions spécifiques) comptent bien quelque 40 % de population agricole. Un second test de validité approximative de cette loi serait de vérifier que l'on retrouve des proportions de population agricole proches des valeurs précédentes pour des agglomérations de ces mêmes tailles dans un autre pays à une date où le ratio U/R était aussi proche de la valeur 1.

En l'absence de données d'enquêtes spécifiques, nous ferons dans ce qui suit l'hypothèse – réaliste au regard des enquêtes WALTIPS et ECOLOC – que $\lambda=0,15$, valeur applicable à presque tous les pays de la région, à l'exception des pays enclavés sur lesquels nous reviendrons plus loin.

Une fois la valeur de λ fixée, il reste à déterminer la valeur du paramètre β . Comment

procéder, alors qu'il est encore plus difficile de reconstituer l'évolution passée du rapport PA/P de villes de taille donnée que d'évaluer la valeur de ce ratio à une date proche de la date actuelle et pour laquelle on peut disposer d'enquêtes convenables? La seule solution est de faire l'hypothèse que, pays par pays, le ratio moyen PNA/PA, non plus de telle ou telle taille d'agglomérations mais de l'ensemble de la distribution urbaine, soit PNAu/PAu, évolue en fonction du ratio U/R du pays considéré selon une loi comparable à celle suivie par les autres pays du monde.

L'étude de la centaine de pays «normaux» (hors cités-Etats et pays microscopiques) du monde entier montre que les ratios PNA/PA de ces pays suivaient approximativement la relation suivante :

$$\frac{PNA}{PA} = \alpha \left(\frac{U}{R}\right)^\gamma$$

avec γ de l'ordre de 1,1.

Cette «corrélation» est à la fois vague et imprécise, car ni U/R ni PNA/PA ne sont mesurés ni définis de la même façon selon les pays. Faut de mieux, nous retiendrons cette relation, déterminée pour une seule année donnée, en l'occurrence 1990, comme point de repère pour choisir la valeur du paramètre β .

Par itérations successives, pour l'ensemble des 17 pays d'Afrique de l'Ouest et pour la Côte d'Ivoire choisie à titre d'exemple, en donnant au paramètre β diverses valeurs plausibles et en retenant la valeur $\lambda=0,15$, nous obtenons que $\beta=0,8$ conduit pour chaque pays de la région à une corrélation entre les variables U/R et PNA/PA proche de celle constatée au niveau international.

Cas des pays enclavés

On a dit précédemment que, pour la majeure partie des pays de la région, il semble convenable de prendre la valeur du paramètre $\lambda=0,15$: dans ces conditions, une ville de 10000 habitants aurait environ 40 % de population agricole lorsque le niveau d'urbanisation est de 50 %. On peut toutefois penser que la croissance urbaine des pays enclavés : Mali, Burkina Faso, Niger et Tchad, s'est en partie «exportée» vers les pays voisins dont ils dépendent pour leurs échanges avec le reste du monde : autrement dit, ces pays sont sans doute sous-urbanisés, dans leurs frontières nationales, par rapport à l'état de leur économie, où la division du travail est plus avancée que ne le laisse supposer le rapport U/R. Pour tenir compte de ce facteur, nous proposons de retenir, pour ces pays enclavés une valeur du paramètre α un peu supérieure, par exemple $\lambda=0,17$, ce qui a pour effet de réduire d'environ un dixième la proportion de population agricole à taille comparable.

ANNEX C MÉTHODE D'ESTIMATION DES MISES EN MARCHÉ

* French version available only

Estimation des mises en marché au niveau régional

La démarche pour déterminer les mises en marché consiste, à partir de données extraites des bilans alimentaires de la FAO agrégées au niveau régional, à soustraire l'autoconsommation de la production. C'est ce surplus qui est commercialisé. Pour cela il convient d'estimer i) l'autoconsommation des producteurs et ii) la production alimentaire, c'est-à-dire la part de la production agricole – compte tenu de ses différentes utilisations – destinée à la seule alimentation humaine.

Estimation de la production alimentaire nette :

Tous les usages non destinés directement à l'alimentation humaine doivent être déduits afin d'isoler la part de la production agricole régionale, augmentée ou réduite des variations de stocks, susceptible de parvenir au consommateur final². En l'occurrence, la part

$$\text{Production alimentaire nette} = \text{Production agricole} - [\text{autres utilisations qu'alimentaires}] - [\% \text{ pertes imputables à ces autres utilisations qu'alimentaires}] - [\% \text{ pertes post-récolte observées au niveau de l'exploitation}]$$

Estimation de l'autoconsommation :

Une partie de cette production alimentaire est autoconsommée, une autre partie est mise en marché. L'autoconsommation est la part de la consommation des producteurs qui est prélevée sur la production. Pour l'estimer, nous utiliserons les chiffres de population agricole ([Chapitre 3](#)) et les données de consommation

de la production consacrée aux semences, à l'alimentation animale et aux industries de transformation, si elle peut circuler sur un marché, ne sera pas consommée en tant que telle. Elle ne participera pas directement aux circuits alimentaires. Par ailleurs, la part des pertes imputables à ces utilisations doit être également soustraite à la production agricole. En revanche, les pertes post-récolte en aval de l'exploitation – stockage, transport et distribution – doivent faire partie des mises en marché. Seules les pertes post-récolte observées au niveau de l'exploitation doivent être retirées. Gustavsson *et al.* (2011) ont permis d'estimer à environ 50 % la part des pertes totales en maïs qui circulent sur les marchés alimentaires.

Nous appelons « production alimentaire nette » la production agricole à laquelle sont soustraites l'alimentation animale, les semences et les activités de transformation, ainsi qu'une partie des pertes :

disponibles (Bricas *et al.*, 2009), en distinguant les milieux urbains et ruraux.

Nous disposons au niveau régional des niveaux de consommation en milieu urbain et, par différence par rapport aux disponibilités alimentaires totales (DA), de la consommation en milieu rural (Bricas *et al.*, 2009).

$$DA = \text{Cons} \times PT = \text{ConsU} \times PU + \text{ConsR} \times PR$$

où Cons est la consommation régionale³ moyenne par tête; ConsU, la consommation régionale urbaine moyenne par tête; ConsR, la consommation régionale rurale par tête; PT, PU et PR, les populations régionales,

respectivement totale, urbaine et rurale. En posant l'hypothèse que les habitudes alimentaires sont essentiellement déterminées par le milieu, les consommations des producteurs peuvent être estimées de sorte à ce que :

$$DA = \text{ConsU} \times \text{PAu} + \text{ConsU} \times \text{PNAu} + \text{ConsR} \times \text{PAR} + \text{ConsR} \times \text{PNAr}$$

Où PAu et PAR sont les populations agricoles régionales, respectivement urbaine et rurale;

PNAu et PNAr, les populations non agricoles régionales, urbaine et rurale.

Tableau C.1

Consommation et peuplement par strate et milieu

	Urbains PU	Ruraux PR	Total
PNA	ConsU x PNAu	ConsR x PNAr	ConsU x PNAu + ConsR x PNAr
PA	ConsU x PAu	ConsR x PAr	ConsU x PAu + ConsR x PAr
Total	ConsU x PU	ConsR x PR	Cons x PT

La consommation des producteurs est alors estimée par $[ConsU \times PAu + ConsR \times PAr]$. Une part variable, Ω , de cette consommation provient de la production et correspond à

l'autoconsommation. Le reste est assuré par un approvisionnement sur les marchés. En fonction des produits, la part achetée sur les marchés varie.

$$\text{Autoconsommation} = \Omega \times [ConsU \times PAu + ConsR \times PAr]$$

En ce qui concerne la filière maïs, il ressort qu'en moyenne un producteur consomme 26,7 kg de maïs par an. Par ailleurs, Haggblade *et al.* (2012) posent que la quasi-totalité de la consommation de maïs en milieu rural provient de la production de l'exploitation et uniquement 10 % des marchés. A partir de ces paramètres, nous établissons l'autoconsommation en maïs des producteurs à 90 % de leur consommation, soit 24,1 kg/tête.

Estimation des mises en marché régionales :

Une fois l'autoconsommation des producteurs soustraite à la production alimentaire nette, après ajustement pour les variations de stocks, les mises en marché (S) peuvent être estimées au niveau régional :

$$S = \text{Production alimentaire nette} \pm \text{Variation de stocks} - \text{Autoconsommation}$$

Ventilation des mises en marché au niveau sous-national

Il est ensuite possible de ventiler les mises en marché régionales par zone de surplus au niveau sous-national. La ventilation s'est faite, en appliquant la même méthode, par étape successive

du niveau régional au niveau national, puis du niveau national au niveau sous-national. Le niveau de découpage est fonction du degré d'information sous-national disponible. Plus précisément, les mises en marché sont distribuées, au niveau sous-national, à l'intérieur des zones de surplus établies par FEWS NET.

Soit les variables suivantes :

- S_i^1 – Mises en marché du produit i au niveau 1 (régional ou national);
- S_i^{2j} – Mises en marché du produit i pour le pays ou la division j au niveau 2 (national ou sous-national);
- $PROD_i^1$ – Production totale en produit i au niveau 1;
- $PROD_i^{2j}$ – Production totale en produit i pour le pays ou la division j au niveau 2;
- $AUTO_i^1$ – Autoconsommation totale en produit i au niveau 1;
- $AUTO_i^{2j}$ – Autoconsommation totale en produit i pour le pays ou la division j au niveau 2;
- PA_i^1 – Population agricole productrice de produit i au niveau 1;
- PA_i^{2j} – Population agricole productrice de produit i pour le pays ou la division j au niveau 2;
- $prod_i^1$ – Productivité (du travail) pour le produit i au niveau 1;
- $prod_i^{2j}$ – Productivité (du travail) pour le produit i pour le pays ou la division j au niveau 2;
- $auto_i^1$ – Autoconsommation par tête en produit i au niveau 1;
- $auto_i^{2j}$ – Autoconsommation par tête en produit i pour le pays ou la division j au niveau 2;
- $yield_i^1$ – Rendement (à l'hectare) pour le produit i au niveau 1;
- $yield_i^{2j}$ – Rendement (à l'hectare) pour le produit i pour le pays ou la division j au niveau 2;
- L_i^1 – Disponibilité en terre pour le produit i au niveau 1 (surfaces récoltées);
- L_i^{2j} – Disponibilité en terre pour le produit i pour le pays ou la division j au niveau 2 (surfaces récoltées);

Nous disposons de S_i^1 au niveau regional, calculé précédemment, et cherchons à estimer S_i^{2j} , au niveau national puis au niveau sous national, avec $S_i^1 = \sum_{j=1}^n S_i^{2j}$ et n le nombre de pays ou de divisions pour un pays.

Nous savons que :

$$\frac{S_i^{2j}}{S_i^1} = \frac{PROD_i^{2j} - AUTO_i^{2j}}{PROD_i^1 - AUTO_i^1} = \left[\frac{PROD_i^{2j}}{PROD_i^1} \right] \times \left[\frac{1 - \frac{AUTO_i^{2j}}{PROD_i^{2j}}}{1 - \frac{AUTO_i^1}{PROD_i^1}} \right]$$

Par ailleurs,

$$\frac{AUTO_i^{2j}}{PROD_i^{2j}} = \frac{\left[\frac{auto_i^{2j} \times PA_i^{2j}}{prod_i^{2j} \times PA_i^{2j}} \right]}{\left[\frac{auto_i^1 \times PA_i^1}{prod_i^1 \times PA_i^1} \right]} = \left[\frac{prod_i^1}{prod_i^{2j}} \right] \times \left[\frac{auto_i^{2j}}{auto_i^1} \right]$$

Enfin,

$$\left[\frac{prod_i^1}{prod_i^{2j}} \right] = \left[\frac{yield_i^1}{yield_i^{2j}} \right] \times \left[\frac{\frac{L_i^1}{PA_i^1}}{\frac{L_i^{2j}}{PA_i^{2j}}} \right]$$

Nous connaissons la valeur de $\frac{AUTO_i^1}{PROD_i^1}$ au niveau régional. La FAO fournit par ailleurs des informations pour $\frac{PROD_i^{2j}}{PROD_i^1}$ et $\frac{yield_i^1}{yield_i^{2j}}$ aux niveaux régional, national et sous-national.

A cet égard, il convient de préciser que la FAO fournit ces données, au niveau national, pour chaque année (FAOSTAT, 2012). Au niveau sous-national, ces informations ne sont pas disponibles pour chaque année (AGROMAP, 2012). Seuls les rapports entre niveau sous-national et national, pour l'année la plus récente, ont été conservés et rebasés sur l'année 2007⁴.

Pour déterminer précisément $\frac{S_i^{2j}}{S_i^1}$, manquent $\frac{\text{auto}_i^{2j}}{\text{auto}_i^1}$ et $\frac{\frac{L_i^1}{PA_i^1}}{\frac{L_i^2}{PA_i^2}}$.

Cependant, deux approximations peuvent être proposées pour chacune de ces deux inconnues. En ce qui concerne le rapport des niveaux d'autoconsommation par tête des producteurs du produit i , en l'occurrence de maïs, il peut être considéré proche de 1. Appliquée à chacune des filières, PA_i^1 correspond en effet à la population (qui dépend *exclusivement*) des producteurs *exclusifs* de produit i dans la région j . Ce concept est proche de celui de producteurs *équivalents temps-plein* – ou d'unité de travail annuelle (UTA)⁵. Pour cette population *théorique*, en l'occurrence exclusivement productrice de maïs, les niveaux d'autoconsommation par tête devraient être très proches d'une zone à l'autre et donc par rapport à la moyenne agrégée.

En ce qui concerne, le rapport des disponibilités en terre par producteur, la FAO fournit

des informations au niveau sous-national sur les terres récoltées. En revanche, les données de population agricole ne sont pas disponibles au niveau sous-national et par filière. Pour la ventilation du surplus régional au niveau national, les niveaux de disponibilités en terre par producteur, toute filière confondue, ont été utilisés. Cela revient à poser l'hypothèse que, si un pays est bien pourvu en terre, par producteur, par rapport à la moyenne régionale, il sera *proportionnellement* autant pour chacune des cultures⁶. Pour la ventilation du surplus national au niveau sous national, le paramètre a été fixé à 1. Cette contrainte pourra être en partie levée lorsque les variables de population agricole pourront être distribuées spatialement par pays.

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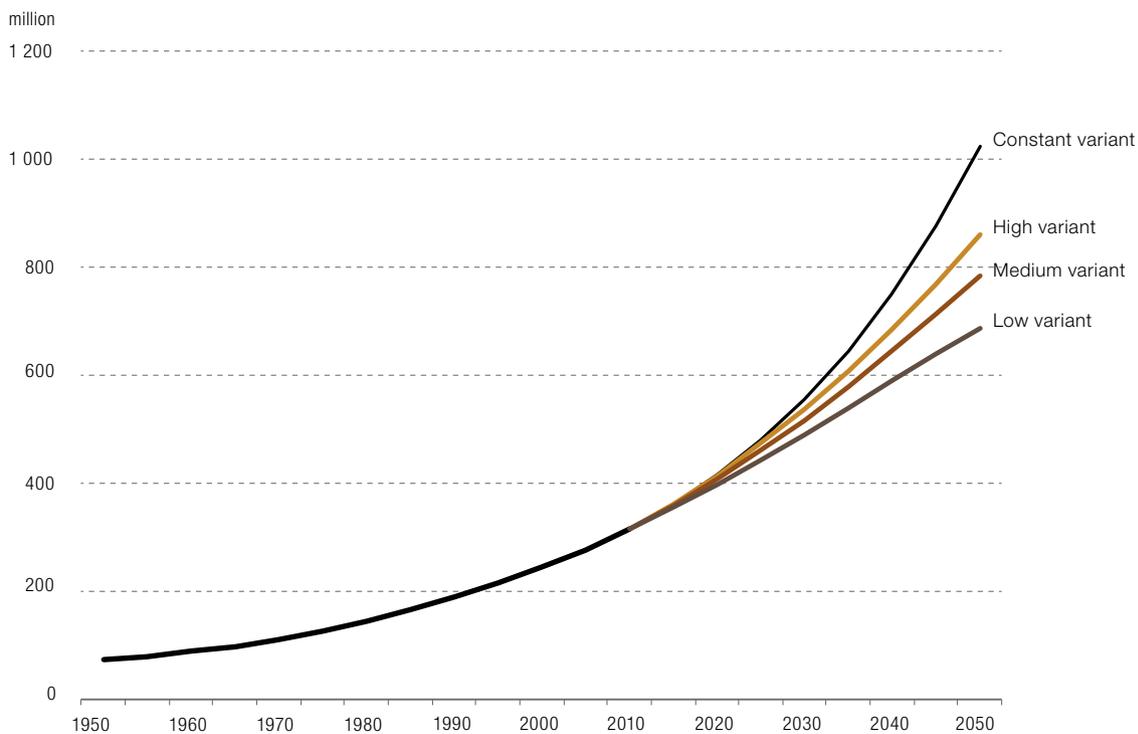
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NOTES

$$1 \quad \frac{PA}{V} = \frac{PA}{(PA+PNA)} = \frac{1}{[1+(\alpha V)]}$$

- 2 *Rappel: Un des objectifs de ce travail est la spatialisation des flux commerciaux par le rapprochement des zones et quantités de surplus, des bassins de demande. En l'occurrence, nous disposons d'information sur la consommation de maïs des ménages (et non sur la demande en maïs des industries de transformation, par exemple).*
- 3 *Rappel: Au niveau régional, les possibles erreurs sur la prise en compte des flux régionaux dans les bilans alimentaires s'annulent. Si, malgré les limites présentées plus haut, les autres variables des bilans alimentaires sont fiables et que les exportations et importations extra-régionales sont correctement enregistrées, les disponibilités alimentaires donnent alors une idée juste de la consommation alimentaire régionale.*
- 4 *Cela revient à poser l'hypothèse que si, par exemple, la province de Houet, au Burkina Faso, a produit 30% de la production nationale de maïs en 2004, elle a probablement produit également proche de 30% de la production nationale de maïs en 2007.*
- 5 *Travail agricole effectué par une personne employée à plein temps pendant une année.*
- 6 *Si un pays a des disponibilités en terre, par producteur, x fois plus importante par rapport à la moyenne régionale toute filière confondue, alors il dispose également de x fois plus de terre par producteur pour la culture y par rapport à la moyenne régionale pour cette culture.*

ANNEX D UNITED NATIONS POPULATION PROJECTIONS – WEST AFRICA



Sources: United Nations, WPP revisions 2010

Total population (in million)

Countries	1950	1960	1970	1980	1990	2000	2010	2020	2030	2040	2050
Benin	2.3	2.4	2.8	3.6	4.8	6.5	8.8	11.6	14.6	17.9	21.1
Burkina Faso	4.3	4.9	5.8	7.2	9.3	12.3	16.5	21	26.2	31.8	37.4
Cape Verde	0.2	0.2	0.3	0.3	0.3	0.4	0.5	0.5	0.5	0.5	0.5
Chad	2.4	3	3.7	4.6	6	8.2	11.2	13.8	16.6	19.3	21.5
Côte d'Ivoire	2.6	3.6	5.4	8.5	12.5	16.6	19.7	24.8	30.3	35.8	40.9
Gambia	0.3	0.4	0.5	0.6	1	1.3	1.7	2.2	2.7	3.1	3.5
Ghana	5	6.7	8.7	10.9	14.8	19.2	24.4	30.6	36.4	42.3	47.5
Guinea	3.1	3.5	4.2	4.4	5.8	8.3	10	12.9	16.1	19.6	22.9
Guinea Bissau	0.5	0.6	0.6	0.8	1	1.2	1.5	1.8	2.2	2.5	2.8
Liberia	0.9	1.1	1.4	1.9	2.1	2.8	4	5.2	6.5	7.9	9.3
Mali	4.6	5.2	6	7.2	8.7	11.3	15.4	19.5	24.1	29	33.7
Mauritania	0.7	0.9	1.1	1.5	2	2.6	3.5	4.1	4.7	5.2	5.6
Niger	2.5	3.2	4.4	5.9	7.8	10.9	15.5	19.7	24.4	29.3	34
Nigeria	37.1	45.2	55.9	71.5	90.2	109.4	132.7	161.4	195.4	232.4	268.6
Senegal	2.4	3	4.1	5.4	7.2	9.5	12.4	15.7	18.9	22.3	25.1
Sierra Leone	1.9	2.2	2.6	3.2	4	4.1	5.9	7.1	8.3	9.4	10.3
Togo	1.4	1.6	2.1	2.7	3.7	4.8	6	7.4	8.7	9.9	10.9
West Africa	72.2	87.9	109.6	140.3	181.2	229.6	289.7	359.2	436.5	518.1	595.7
ECOWAS	69.1	84.1	104.8	134.2	173.2	218.8	275.1	341.4	415.2	493.7	568.6
CILSS	20.9	25	30.6	38	49.1	66.2	88.2	111.2	136.3	162.6	187.1
UEMOA	20.6	24.7	31.3	41.4	55	73.2	95.9	121.6	149.3	178.5	205.9
Landlocked countries	13.8	16.3	19.9	24.9	31.8	42.7	58.6	74	91.2	109.4	126.6
Atlantic Coast	9.9	11.9	14.8	18.2	23.4	30.5	39.5	49.5	59.8	70.5	80.1
Gulf of Guinea Coast	48.4	59.6	75	97.2	126	156.4	191.7	235.8	285.4	338.3	389

Source 1: United Nations, WPP revisions 2010: for 1950–2010 except Nigeria

Source 2: SWAC/OECD 2012: 2010–2050 projections + 1950–2010 Nigeria

Total population – average annual growth rate (in %)

Countries	1950–1960	1960–1970	1970–1980	1980–1990	1990–2000	2000–2010	2010–2020	2020–2030	2030–2040	2040–2050	1950–2010	2010–2050
Benin	0.7	1.6	2.4	2.8	3.2	3.1	2.8	2.3	2.0	1.7	2.3	2.2
Burkina Faso	1.3	1.8	2.2	2.6	2.8	3.0	2.5	2.2	2.0	1.6	2.3	2.1
Cape Verde	1.7	2.7	0.9	1.5	2.3	1.3	0.4	0.3	0.0	-0.4	1.7	0.1
Chad	2.0	2.2	2.2	2.8	3.2	3.2	2.1	1.9	1.5	1.1	2.6	1.6
Côte d'Ivoire	3.3	4.1	4.6	3.9	2.9	1.8	2.3	2.0	1.7	1.3	3.4	1.8
Gambia	3.2	2.1	3.2	4.4	3.0	2.9	2.4	2.0	1.6	1.2	3.1	1.8
Ghana	3.1	2.6	2.3	3.1	2.6	2.4	2.3	1.8	1.5	1.2	2.7	1.7
Guinea	1.4	1.6	0.6	2.7	3.8	1.8	2.6	2.3	2.0	1.6	2.0	2.1
Guinea Bissau	1.4	0.2	3.3	2.0	2.0	2.0	1.9	1.7	1.5	1.2	1.8	1.6
Liberia	2.0	2.6	2.9	1.0	3.0	3.4	2.7	2.3	2.0	1.6	2.5	2.1
Mali	1.2	1.4	1.8	1.8	2.7	3.1	2.4	2.1	1.9	1.5	2.0	2.0
Mauritania	2.7	2.9	3.0	2.8	2.8	2.7	1.7	1.3	1.1	0.7	2.8	1.2
Niger	2.8	3.0	3.0	2.9	3.4	3.6	2.4	2.2	1.9	1.5	3.1	2.0
Nigeria	2.0	2.1	2.5	2.4	1.9	2.0	2.0	1.9	1.7	1.5	2.1	1.8
Senegal	2.3	3.0	2.8	3.0	2.8	2.7	2.3	1.9	1.6	1.2	2.8	1.8
Sierra Leone	1.4	1.7	2.0	2.3	0.4	3.5	1.9	1.5	1.3	0.9	1.9	1.4
Togo	1.2	2.9	2.4	3.2	2.7	2.3	2.1	1.7	1.3	1.0	2.5	1.5
West Africa	2.0	2.2	2.5	2.6	2.4	2.4	2.2	2.0	1.7	1.4	2.3	1.8
ECOWAS	2.0	2.2	2.5	2.6	2.4	2.3	2.2	2.0	1.7	1.4	2.3	1.8
CILSS	1.8	2.1	2.2	2.6	3.0	2.9	2.3	2.1	1.8	1.4	2.4	1.9
UEMOA	1.8	2.4	2.8	2.9	2.9	2.7	2.4	2.1	1.8	1.4	2.6	1.9
Landlocked countries	1.7	2.0	2.3	2.5	3.0	3.2	2.4	2.1	1.8	1.5	2.4	1.9
Atlantic Coast	1.8	2.2	2.1	2.6	2.7	2.6	2.3	1.9	1.7	1.3	2.3	1.8
Gulf of Guinea Coast	2.1	2.3	2.6	2.6	2.2	2.1	2.1	1.9	1.7	1.4	2.3	1.8

Source 1: United Nations, WPP revisions 2010: for 1950–2010 except Nigeria

Source 2: SWAC/OECD 2012: 2010–2050 projections + 1950–2010 Nigeria

Urban population (in million)

Countries	1950	1960	1970	1980	1990	2000	2010	2020	2030	2040	2050
Benin	0.1	0.3	0.6	1.3	2.0	3.0	4.4	6.4	8.7	11.4	14.8
Burkina Faso	0.1	0.2	0.4	0.9	1.7	2.9	5.0	7.8	11.2	15.6	21.7
Cape Verde	0.0	0.0	0.1	0.1	0.1	0.2	0.3	0.4	0.4	0.4	0.5
Chad	0.1	0.2	0.4	0.7	1.1	1.6	2.5	3.8	5.7	8.1	11.6
Côte d'Ivoire	0.2	0.5	1.4	3.0	5.2	7.7	10.8	15.0	19.8	25.0	31.6
Gambia	0.0	0.0	0.1	0.2	0.4	0.6	0.8	1.3	1.7	2.1	2.6
Ghana	0.6	1.4	2.5	3.4	4.9	8.0	12.0	17.4	22.9	28.5	35.6
Guinea	0.1	0.2	0.6	1.1	1.6	2.4	3.2	4.7	6.8	9.3	12.9
Guinea Bissau	0.0	0.0	0.1	0.2	0.3	0.4	0.6	0.9	1.1	1.5	1.8
Liberia	0.0	0.1	0.2	0.5	0.8	1.1	2.0	3.0	4.0	5.2	6.7
Mali	0.2	0.3	0.5	1.1	1.6	2.4	3.7	5.9	9.2	13.7	20.2
Mauritania	0.0	0.0	0.1	0.3	0.6	0.8	1.2	1.8	2.5	3.2	4.1
Niger	0.1	0.1	0.3	0.6	1.2	1.9	3.3	5.6	8.6	12.5	18.3
Nigeria	3.6	7.5	12.7	19.1	29.4	41.8	55.5	79.1	107.2	140.7	184.7
Senegal	0.4	0.7	1.3	2.2	3.3	4.6	6.5	9.0	11.4	13.9	17.1
Sierra Leone	0.1	0.2	0.4	0.7	1.0	1.4	2.2	3.2	4.2	5.3	6.6
Togo	0.1	0.2	0.6	1.0	1.6	2.3	3.6	4.9	6.0	7.1	8.3
West Africa	5.7	12.0	22.1	36.2	56.7	83.2	117.4	170.2	231.4	303.5	399.0
ECOWAS	5.6	11.8	21.7	35.2	55.0	80.8	113.7	164.6	223.2	292.1	383.3
CILSS	1.0	1.8	3.8	7.3	11.9	17.8	27.0	41.1	58.5	80.3	110.7
UEMOA	1.1	2.3	5.2	10.3	16.8	25.2	37.7	55.5	76.1	100.6	133.8
Landlocked countries	0.4	0.7	1.6	3.3	5.6	8.9	14.4	23.1	34.7	49.9	71.8
Atlantic Coast	0.7	1.3	2.9	5.2	8.0	11.5	16.8	24.2	32.0	40.8	52.2
Gulf of Guinea Coast	4.6	9.9	17.7	27.7	43.0	62.9	86.2	122.9	164.7	212.8	275.0

Source: SWAC/OECD 2012

Urban population – average annual growth rate (in %)

Countries	1950–1960	1960–1970	1970–1980	1980–1990	1990–2000	2000–2010	2010–2020	2020–2030	2030–2040	2040–2050	1950–2010	2010–2050
Benin	11.8	7.3	8.7	4.5	4.2	3.9	4.0	3.1	2.7	2.7	6.7	3.1
Burkina Faso	5.4	9.1	8.2	7.0	5.5	5.4	4.5	3.7	3.4	3.4	6.7	3.7
Cape Verde	6.1	4.8	4.0	5.3	5.3	3.2	2.5	1.1	0.5	0.5	4.8	1.2
Chad	9.7	7.5	6.3	4.4	4.3	4.6	4.4	4.0	3.6	3.6	6.1	3.9
Côte d'Ivoire	11.0	10.8	8.0	5.5	4.1	3.4	3.4	2.8	2.4	2.4	7.1	2.7
Gambia	1.0	7.7	9.1	7.5	5.0	3.7	4.4	2.7	2.2	2.2	5.6	2.9
Ghana	8.6	5.6	3.2	3.8	5.1	4.1	3.8	2.8	2.2	2.2	5.1	2.8
Guinea	6.3	10.8	5.6	4.2	3.8	2.9	4.1	3.6	3.3	3.3	5.6	3.6
Guinea Bissau	0.8	9.7	3.2	3.9	4.3	4.9	3.5	2.7	2.4	2.4	4.4	2.7
Liberia	13.3	12.0	7.2	4.5	3.9	6.0	3.9	3.0	2.6	2.6	7.8	3.0
Mali	4.9	7.3	7.5	4.1	4.0	4.3	4.9	4.6	4.0	4.0	5.3	4.4
Mauritania	n/a	20.5	13.9	7.2	3.0	4.0	4.1	3.1	2.6	2.6	N.D.	3.1
Niger	8.9	7.9	8.9	6.7	4.6	5.4	5.5	4.3	3.9	3.9	7.0	4.4
Nigeria	7.6	5.4	4.2	4.4	3.6	2.9	3.6	3.1	2.8	2.8	4.7	3.1
Senegal	6.9	6.0	5.8	3.9	3.3	3.6	3.3	2.4	2.0	2.0	4.9	2.5
Sierra Leone	5.9	6.8	5.9	3.5	3.8	4.8	3.7	2.8	2.3	2.3	5.1	2.8
Togo	6.7	10.7	5.2	4.6	4.1	4.3	3.4	2.0	1.6	1.6	5.9	2.2
West Africa	7.7	6.3	5.1	4.6	3.9	3.5	3.8	3.1	2.7	2.8	5.2	3.1
ECOWAS	7.7	6.3	5.0	4.5	3.9	3.5	3.8	3.1	2.7	2.8	5.1	3.1
CILSS	6.4	7.8	6.8	5.0	4.1	4.3	4.3	3.6	3.2	3.3	5.7	3.6
UEMOA	7.7	8.4	7.2	5.0	4.1	4.1	3.9	3.2	2.8	2.9	6.1	3.2
Landlocked countries	6.7	7.9	7.7	5.5	4.6	5.0	4.8	4.1	3.7	3.7	6.2	4.1
Atlantic Coast	6.5	7.9	6.2	4.4	3.7	3.9	3.7	2.8	2.5	2.5	5.4	2.9
Gulf of Guinea Coast	8.0	5.9	4.6	4.5	3.9	3.2	3.6	3.0	2.6	2.6	5.0	2.9

Source: SWAC/OECD 2012

Rural population (in million)

Countries	1950	1960	1970	1980	1990	2000	2010	2020	2030	2040	2050
Benin	2.2	2.1	2.3	2.3	2.8	3.6	4.5	5.2	5.9	6.5	6.3
Burkina Faso	4.2	4.7	5.4	6.3	7.6	9.4	11.5	13.3	15.0	16.2	15.8
Cape Verde	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.1
Chad	2.4	2.8	3.3	3.9	5.0	6.6	8.7	10.0	10.9	11.2	9.9
Côte d'Ivoire	2.5	3.1	4.0	5.5	7.3	8.9	9.0	9.8	10.4	10.8	9.3
Gambia	0.2	0.3	0.4	0.5	0.6	0.7	0.9	0.9	1.0	1.1	1.0
Ghana	4.4	5.3	6.2	7.6	9.9	11.1	12.4	13.2	13.5	13.7	11.9
Guinea	3.0	3.3	3.5	3.3	4.1	6.0	6.8	8.2	9.3	10.2	10.0
Guinea Bissau	0.5	0.5	0.5	0.7	0.8	0.9	0.9	0.9	1.0	1.0	1.0
Liberia	0.9	1.0	1.2	1.4	1.4	1.7	2.0	2.2	2.5	2.8	2.6
Mali	4.5	5.0	5.5	6.2	7.1	8.9	11.7	13.6	14.9	15.3	13.5
Mauritania	0.7	0.8	1.1	1.2	1.4	1.8	2.2	2.3	2.2	2.0	1.5
Niger	2.4	3.1	4.1	5.2	6.6	9.0	12.2	14.1	15.8	16.8	15.7
Nigeria	33.5	37.7	43.3	52.4	60.8	67.6	77.2	82.2	88.2	91.7	83.9
Senegal	2.1	2.3	2.8	3.2	4.0	4.9	6.0	6.7	7.6	8.3	8.1
Sierra Leone	1.8	2.0	2.2	2.5	3.0	2.8	3.7	3.9	4.1	4.1	3.7
Togo	1.3	1.4	1.5	1.7	2.1	2.5	2.5	2.4	2.7	2.9	2.6
West Africa	66.4	75.9	87.5	104.0	124.6	146.4	172.3	189.1	205.1	214.7	196.7
ECOWAS	63.4	72.3	83.1	98.9	118.2	138.0	161.3	176.8	192.0	201.5	185.4
CILSS	20.0	23.1	26.8	30.7	37.2	48.4	61.2	70.1	77.8	82.3	76.4
UEMOA	19.5	22.3	26.1	31.0	38.2	47.9	58.2	66.1	73.3	77.9	72.2
Landlocked countries	13.4	15.6	18.3	21.6	26.2	33.9	44.2	50.9	56.6	59.5	54.8
Atlantic Coast	9.2	10.6	11.9	13.0	15.4	19.0	22.6	25.3	27.8	29.6	27.9
Gulf of Guinea Coast	43.8	49.7	57.3	69.5	83.0	93.6	105.5	112.9	120.7	125.5	114.0

Source: SWAC/OECD 2012

Agricultural population (in million)

Countries	1950	1960	1970	1980	1990	2000	2010	2020	2030	2040	2050
Benin	2.2	2.1	2.2	2.2	2.5	3.0	3.7	4.0	4.0	4.0	4.0
Burkina Faso	4.1	4.6	5.3	6.1	7.1	8.6	10.2	11.4	11.7	11.6	11.6
Cape Verde	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.0	0.0
Chad	2.3	2.7	3.2	3.7	4.6	6.1	7.9	8.8	8.6	7.9	7.3
Côte d'Ivoire	2.4	3.0	3.7	4.8	6.2	7.3	7.1	7.4	6.8	6.3	5.8
Gambia	0.2	0.3	0.4	0.4	0.5	0.6	0.7	0.6	0.6	0.6	0.6
Ghana	4.3	5.1	5.8	6.9	8.8	9.4	10.1	10.0	9.0	8.2	7.5
Guinea	2.9	3.3	3.3	3.0	3.6	5.2	5.9	6.7	7.0	7.0	7.1
Guinea Bissau	0.4	0.5	0.4	0.6	0.7	0.7	0.7	0.8	0.7	0.7	0.7
Liberia	0.9	1.0	1.1	1.3	1.2	1.4	1.5	1.6	1.6	1.6	1.6
Mali	4.4	4.9	5.3	5.8	6.5	8.0	10.4	11.6	11.2	10.2	9.2
Mauritania	0.7	0.8	1.0	1.1	1.2	1.6	1.9	1.8	1.5	1.1	0.9
Niger	2.4	3.1	4.0	5.0	6.2	8.4	11.2	12.3	12.4	11.9	11.5
Nigeria	32.9	36.0	40.0	47.3	52.9	56.6	63.5	63.9	61.4	57.6	54.0
Senegal	1.9	2.1	2.5	2.6	3.1	3.9	4.5	4.8	5.0	5.1	5.2
Sierra Leone	1.7	1.9	2.1	2.3	2.7	2.4	3.1	3.1	2.9	2.7	2.4
Togo	1.3	1.3	1.5	1.6	1.9	2.1	1.9	1.8	1.8	1.7	1.7
West Africa	65.2	73.1	82.0	94.9	109.8	125.6	144.5	150.8	146.2	138.2	130.9
ECOWAS	62.2	69.6	77.8	90.1	104.0	117.8	134.7	140.2	136.1	129.2	122.8
CILSS	19.6	22.6	25.6	28.5	33.7	43.3	53.6	58.9	58.8	56.2	53.9
UEMOA	19.1	21.8	24.9	28.7	34.2	42.0	49.8	54.1	53.6	51.5	49.6
Landlocked countries	13.3	15.3	17.8	20.6	24.4	31.1	39.7	44.1	43.9	41.6	39.5
Atlantic Coast	9.0	10.2	11.1	11.5	13.2	16.0	18.5	19.5	19.3	18.8	18.4
Gulf of Guinea Coast	43.0	47.6	53.2	62.8	72.3	78.5	86.3	87.1	83.0	77.8	73.0

Source: SWAC/OECD 2012

Level of urbanisation (in %)

Countries	1950	1960	1970	1980	1990	2000	2010	2020	2030	2040	2050
Benin	4	11	19	35	41	46	49	55	60	64	70
Burkina Faso	2	3	7	12	19	24	30	37	43	49	58
Cape Verde	10	15	18	25	36	48	58	72	78	83	90
Chad	3	6	10	15	17	19	22	28	34	42	54
Côte d'Ivoire	7	14	26	36	41	47	55	60	65	70	77
Gambia	11	9	16	27	37	45	48	58	63	66	73
Ghana	12	21	28	31	33	42	49	57	63	67	75
Guinea	4	6	15	25	28	28	32	37	42	48	56
Guinea Bissau	9	8	21	21	25	31	41	48	53	58	65
Liberia	3	7	17	26	36	40	51	57	62	65	72
Mali	3	5	9	15	19	21	24	30	38	47	60
Mauritania	0	2	7	20	31	31	35	44	53	61	74
Niger	2	4	6	11	16	18	21	28	35	43	54
Nigeria	10	17	23	27	33	38	42	49	55	61	69
Senegal	15	23	31	41	45	48	52	57	60	63	68
Sierra Leone	6	9	15	22	24	34	38	45	51	56	64
Togo	8	14	28	37	42	48	59	67	69	71	76
West Africa	8	14	20	26	31	36	41	47	53	59	67
ECOWAS	8	14	21	26	32	37	41	48	54	59	67
CILSS	5	7	12	19	24	27	31	37	43	49	59
UEMOA	5	9	17	25	31	34	39	46	51	56	65
Landlocked countries	3	5	8	13	18	21	25	31	38	46	57
Atlantic Coast	7	11	19	29	34	38	43	49	54	58	65
Gulf of Guinea Coast	10	17	24	29	34	40	45	52	58	63	71

Source: SWAC/OECD 2012

Ratio non-agricultural population / agricultural population

Countries	1950	1960	1970	1980	1990	2000	2010	2020	2030	2040	2050
Benin	0.0	0.2	0.3	0.6	0.9	1.1	1.4	1.9	2.7	3.5	4.2
Burkina Faso	0.0	0.1	0.1	0.2	0.3	0.4	0.6	0.9	1.2	1.7	2.2
Cape Verde	0.1	0.2	0.3	0.5	0.7	1.2	2.0	4.0	7.2	11.3	16.8
Chad	0.0	0.1	0.2	0.2	0.3	0.3	0.4	0.6	0.9	1.4	1.9
Côte d'Ivoire	0.1	0.2	0.5	0.8	1.0	1.3	1.8	2.3	3.4	4.7	6.1
Gambia	0.2	0.2	0.3	0.5	0.9	1.3	1.5	2.4	3.3	4.3	5.3
Ghana	0.2	0.3	0.5	0.6	0.7	1.0	1.4	2.0	3.0	4.1	5.3
Guinea	0.0	0.1	0.2	0.5	0.6	0.6	0.7	0.9	1.3	1.8	2.3
Guinea Bissau	0.2	0.2	0.4	0.3	0.5	0.7	1.0	1.4	2.0	2.6	3.2
Liberia	0.0	0.1	0.3	0.5	0.8	1.0	1.6	2.3	3.1	4.1	4.9
Mali	0.0	0.1	0.1	0.3	0.3	0.4	0.5	0.7	1.2	1.9	2.7
Mauritania	0.0	0.0	0.1	0.3	0.7	0.7	0.8	1.3	2.2	3.6	5.5
Niger	0.0	0.1	0.1	0.2	0.3	0.3	0.4	0.6	1.0	1.5	2.0
Nigeria	0.1	0.3	0.4	0.5	0.7	0.9	1.1	1.5	2.2	3.0	4.0
Senegal	0.3	0.4	0.7	1.1	1.3	1.5	1.7	2.3	2.8	3.4	3.8
Sierra Leone	0.1	0.1	0.2	0.4	0.5	0.7	0.9	1.3	1.8	2.5	3.2
Togo	0.1	0.2	0.4	0.7	0.9	1.3	2.1	3.1	4.0	4.7	5.4
West Africa	0.1	0.2	0.3	0.5	0.6	0.8	1.0	1.4	2.0	2.7	3.6
ECOWAS	0.1	0.2	0.3	0.5	0.7	0.9	1.0	1.4	2.0	2.8	3.6
CILSS	0.1	0.1	0.2	0.3	0.5	0.5	0.6	0.9	1.3	1.9	2.5
UEMOA	0.1	0.1	0.3	0.4	0.6	0.7	0.9	1.2	1.8	2.5	3.1
Landlocked countries	0.0	0.1	0.1	0.2	0.3	0.4	0.5	0.7	1.1	1.6	2.2
Atlantic Coast	0.1	0.2	0.3	0.6	0.8	0.9	1.1	1.5	2.1	2.7	3.4
Gulf of Guinea Coast	0.1	0.3	0.4	0.5	0.7	1.0	1.2	1.7	2.4	3.3	4.3

Source: SWAC/OECD 2012

Agricultural production (10¹² Kcal)

Countries	1961	1970	1980	1990	2000	2007
Benin	2.7	3.5	3.9	5.5	10.5	11.5
Burkina Faso	3.3	4.7	5.2	8.0	10.4	14.9
Cape Verde	0.1	0.0	0.1	0.1	0.2	0.1
Chad	3.7	3.7	3.5	4.4	6.8	9.3
Côte d'Ivoire	3.9	7.3	12.8	18.0	21.5	23.5
Gambia	0.8	1.0	0.5	0.8	1.4	1.0
Ghana	7.1	9.1	8.3	10.8	25.2	30.2
Guinea	3.2	3.8	4.6	5.8	9.5	13.1
Guinea Bissau	0.8	0.6	0.8	1.0	1.5	1.8
Liberia	0.8	1.1	1.5	1.4	1.7	2.0
Mali	4.8	5.3	5.6	8.9	10.4	17.2
Mauritania	0.6	0.7	0.6	0.8	1.2	1.4
Niger	4.1	4.8	6.8	7.1	8.5	15.9
Nigeria	55.8	71.9	59.7	118.0	174.7	230.1
Senegal	6.5	6.3	5.5	7.7	9.8	6.3
Sierra Leone	1.8	2.4	2.5	2.8	2.0	4.9
Togo	1.7	2.3	2.4	3.4	4.8	5.5
West Africa	101.6	128.6	124.2	204.5	299.9	388.7
ECOWAS	97.3	124.2	120.1	199.4	292.0	378.1
CILSS	27.9	30.9	33.1	44.6	59.6	80.9
UEMOA	27.7	34.8	42.9	59.6	77.3	96.7
Landlocked countries	15.9	18.4	21.1	28.3	36.1	57.2
Atlantic Coast	14.6	16.0	16.0	20.4	27.2	30.6
Gulf of Guinea Coast	71.1	94.1	87.1	155.8	236.7	300.9

Source: SWAC/OECD 2012 (based on FAOSTAT)

Agricultural productivity (10⁶ Kcal)

Countries	1961	1970	1980	1990	2000	2007
Benin	1.3	1.6	1.8	2.2	3.4	3.2
Burkina Faso	0.7	0.9	0.9	1.1	1.2	1.5
Cape Verde	0.5	0.2	0.5	0.6	0.8	0.6
Chad	1.3	1.2	1.0	0.9	1.1	1.2
Côte d'Ivoire	1.3	2.0	2.7	2.9	2.9	3.2
Gambia	2.6	2.9	1.2	1.6	2.5	1.5
Ghana	1.4	1.6	1.2	1.2	2.7	3.0
Guinea	1.0	1.1	1.5	1.6	1.8	2.3
Guinea Bissau	1.5	1.4	1.2	1.5	2.0	2.4
Liberia	0.8	1.0	1.1	1.2	1.2	1.4
Mali	1.0	1.0	1.0	1.4	1.3	1.8
Mauritania	0.7	0.7	0.5	0.6	0.8	0.7
Niger	1.3	1.2	1.4	1.1	1.0	1.5
Nigeria	1.5	1.8	1.3	2.2	3.1	3.7
Senegal	3.0	2.5	2.1	2.5	2.5	1.5
Sierra Leone	0.9	1.1	1.1	1.0	0.8	1.6
Togo	1.2	1.6	1.5	1.8	2.3	2.7
West Africa	1.4	1.6	1.3	1.9	2.4	2.8
ECOWAS	1.4	1.6	1.3	1.9	2.5	2.9
CILSS	1.2	1.2	1.2	1.3	1.4	1.6
UEMOA	1.3	1.4	1.5	1.7	1.8	2.0
Landlocked countries	1.0	1.0	1.0	1.2	1.2	1.5
Atlantic Coast	1.4	1.4	1.4	1.5	1.7	1.7
Gulf of Guinea Coast	1.5	1.8	1.4	2.2	3.0	3.6

Source: SWAC/OECD 2012 (based on FAOSTAT)

Share of imports in food availability (in %)

Countries	1961	1970	1980	1990	2000	2007
Benin	3.5	4.9	8.6	21.2	11.4	39.6
Burkina Faso	4.1	6.4	11.2	7.8	13.7	10.1
Cape Verde	43.8	69.0	134.2	103.9	104.7	123.3
Chad	2.5	5.4	1.9	6.0	4.4	9.7
Côte d'Ivoire	12.3	19.2	24.7	22.5	21.5	26.6
Gambia	17.8	24.0	61.9	63.5	97.0	133.7
Ghana	15.9	17.2	14.6	15.0	14.2	29.6
Guinea	5.8	7.3	16.2	22.2	21.4	27.9
Guinea Bissau	7.2	23.7	20.1	25.1	38.2	34.4
Liberia	17.0	23.2	29.3	21.4	50.5	45.3
Mali	7.3	9.1	10.1	7.1	11.1	18.7
Mauritania	30.6	36.1	60.6	53.9	75.2	79.2
Niger	1.5	3.0	8.2	10.1	15.3	13.1
Nigeria	2.6	3.9	24.9	4.8	12.3	15.1
Senegal	36.3	51.2	45.6	51.2	48.9	73.5
Sierra Leone	12.1	23.5	21.1	23.2	23.6	19.1
Togo	3.0	8.2	12.8	21.3	14.2	21.1
West Africa	7.0	10.1	22.4	12.4	16.6	22.0
ECOWAS	6.9	10.0	22.5	12.0	16.2	21.7
CILSS	11.3	15.6	20.4	20.9	24.3	29.9
UEMOA	11.2	16.1	19.4	19.7	20.1	27.4
Landlocked countries	4.2	6.3	8.5	7.9	11.8	13.0
Atlantic Coast	19.9	28.8	34.1	37.3	43.1	53.7
Gulf of Guinea Coast	4.9	7.2	23.0	8.7	13.4	19.0

Source: SWAC/OECD 2012 (based on FAOSTAT)

Average annual growth rate of agricultural production per capita (in %)

Countries	1961–1970	1970–1980	1980–1990	1990–2000	2000–2007	1980–2007	1961–2007
Benin	1.4	-1.4	0.7	3.4	-1.8	1.0	0.6
Burkina Faso	2.0	-1.2	1.7	-0.1	2.2	1.2	0.8
Cape Verde	-11.9	10.8	0.2	0.4	-6.5	-1.5	-1.1
Chad	-2.1	-2.5	-0.7	1.3	1.2	0.5	-0.7
Côte d'Ivoire	3.1	1.1	-0.4	-1.1	-0.4	-0.7	0.5
Gambia	0.6	-10.0	0.7	2.4	-7.5	-0.8	-2.6
Ghana	0.3	-3.2	-0.3	6.0	0.2	2.1	0.6
Guinea	0.3	1.3	-0.3	1.1	3.0	1.1	1.0
Guinea Bissau	-3.0	-0.7	1.3	1.4	1.3	1.3	0.0
Liberia	0.8	0.1	-1.6	-0.9	-0.3	-1.0	-0.4
Mali	-0.4	-1.3	3.0	-1.1	4.1	1.7	0.7
Mauritania	-1.2	-4.9	0.1	1.8	-1.2	0.4	-1.1
Niger	-1.1	0.5	-2.4	-1.6	5.7	-0.1	-0.1
Nigeria	0.7	-4.2	4.6	2.0	2.0	3.0	0.9
Senegal	-3.3	-4.0	0.4	-0.3	-8.6	-2.2	-2.8
Sierra Leone	1.7	-1.5	-1.3	-3.8	9.5	0.4	0.2
Togo	0.4	-1.9	0.3	0.7	-0.4	0.3	-0.2
West Africa	0.4	-2.8	2.5	1.5	1.4	1.8	0.5
ECOWAS	0.5	-2.8	2.5	1.5	1.4	1.9	0.6
CILSS	-0.9	-1.5	0.4	-0.1	1.5	0.5	-0.2
UEMOA	0.1	-0.7	0.4	-0.3	0.5	0.2	0.0
Landlocked countries	-0.3	-0.9	0.5	-0.5	3.5	0.9	0.2
Atlantic Coast	-1.1	-2.0	-0.1	0.2	-0.9	-0.2	-0.8
Gulf of Guinea Coast	0.8	-3.3	3.3	2.0	1.4	2.3	0.8

Source: SWAC/OECD 2012 (based on FAOSTAT)

Glossary

Dietary energy requirement: The amount of dietary energy required by an individual to maintain body functions, health and normal activity.

Dietary energy supply/consumption: Food available for human consumption, expressed in kilocalories per person per day. At the country level, it is calculated as the food remaining for human use after deduction of all non-food consumption (exports, animal feed, industrial use, seed and wastage).

Food security: A situation in which all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life.

Stunting: Low height for one's age, reflecting a sustained past episode or episodes of undernutrition.

Undernourishment (or chronic hunger): The state of persons whose food intake regularly provides less than their minimum energy requirements.

Undernutrition: The result of undernourishment, poor absorption and/or poor biological use of nutrients consumed.

Vulnerability to food insecurity: The presence of factors that place people at risk of becoming food insecure or malnourished (or increasingly so if they already are), including those factors that affect their ability to cope.

Wasting: Low weight for one's height, generally the result of weight loss associated with a recent period of starvation or disease.

Settlement, Market and Food Security

Settlement dynamics have been reshaping West Africa's social and economic geography. These spatial transformations – high urbanisation and economic concentration – favour the development of market-oriented agriculture.

With the population of West Africa set to double by 2050, agricultural production systems will undergo far-reaching transformations. To support these transformations, policies need to be spatially targeted, improve availability of market information and broaden the field of food security to policy domains beyond agriculture. They need to rely on homogeneous and reliable data – not available at present – particularly for key variables such as non-agricultural and agricultural population, marketed production and regional trade.

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Chapter 6. The future of agricultural systems

SMART (Statistical, Mapping and Regional Analysis Tool) complements the report and is available on line (www.oecd.org/swac, www.westafricagateway.org/smart).

Consult this publication on line at <http://dx.doi.org/10.1787/9789264187443-en>.

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