

A NEW EMERGING RURAL WORLD

An Overview of Rural Change
in Africa

2nd edition



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This atlas on rural change in Africa, for this second edition, revised and enlarged, was prepared at the request of the NEPAD Agency and under the overall coordination and guidance of Ibrahim Assane Mayaki, NEPAD Agency CEO, Estherine Lisinge Fotabong, Programme Implementation and Coordination Director.

It is part of the partnership between Cirad and NEPAD and benefited from the financial support of NEPAD, AFD and Cirad. Conceived to inform research and discussions during the Second Africa Rural Development Forum (ARDF) held in Yaoundé, Cameroun, from 8 to 10 September 2016, it contributes to the work of the NEPAD Rural Futures programme.

The completion of the atlas has involved 52 authors whose detailed list is provided on page 73. It was coordinated by Denis Pesche, Bruno Losch and Jacques Imbernon. Any errors or omissions are the responsibility of Cirad alone.

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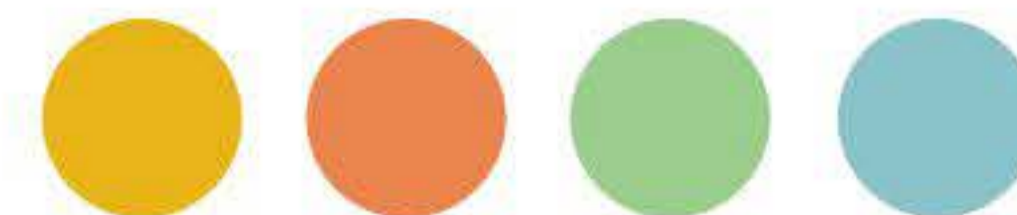
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FOREWORD



The second edition of the Atlas "A New Emerging Rural World" is being published in the specific context of a general decline in commodity prices and a slowdown in growth in Africa, after our economies failed to ensure the equitable sharing of the benefits of growth registered in the years in which Africa's growth rate was one of the highest in the world.

The downward trend in commodity prices may be a constraint, but it is also an opportunity in the sense that public and private stakeholders will have to be more creative and innovative in order to unlock new sources of endogenous growth, wealth and inclusive employment with greater spillover effects for the region's economies.

Today, the challenge is to identify new tools for sustainable economic growth, this time based on principles of inclusion and equity, while maintaining a steady growth rate. Meeting these conditions will enable African economies to cope with a population that is still booming and with the ever-growing number of young people looking for education, training and jobs. These challenges are set against a backdrop of climate change and resource depletion, calling for the use of production techniques that are tailored to environmental challenges.

The principles of inclusion and equity imply adopting spatial and territorial approaches and policies that ensure rural areas benefit from the same developments and initiatives as urban areas; that responsible investments are made in rural areas; and that women and young people have access to the factors of production, especially training, land, water, finance, renewable energy, markets and income that reflects the fruits of their labour.

Renewing public policies on the basis of local development would help to tackle the root causes by providing appropriate solutions to ensure people settle and remain in their areas of origin. The development of local authorities should be based on their specific characteristics, their ecosystems, their cultural heritage and their know-how combined with technological innovation and learning, especially for young people and women.

Although a healthy dose of social measures for the rural sector is a precondition for its development – as was and is still the case in the developed countries –, the fact remains that far-reaching market-based solutions need to be implemented simultaneously. The progressive transition from solidarity systems to mixed market systems will help to stimulate investment and the development of structural activities capable of laying the foundations for this much-needed change.

The governance of our natural resources and the financial resources they generate are the cornerstone of our structural change; they require appropriate solutions at the global, regional, national and local levels.

Over the years, this Atlas, which will gradually evolve into a collaborative project, will serve as a reference tool enabling us to monitor progress towards these goals and to take control of our path to achieving Agenda 2063. It is therefore a perfect addition to the toolkit the NEPAD Agency will use in its role as a think tank and an evaluator of the implementation of the African Union's rural transformation policies.

Dr Ibrahim Assane Mayaki

Chief Executive Officer, NEPAD Agency

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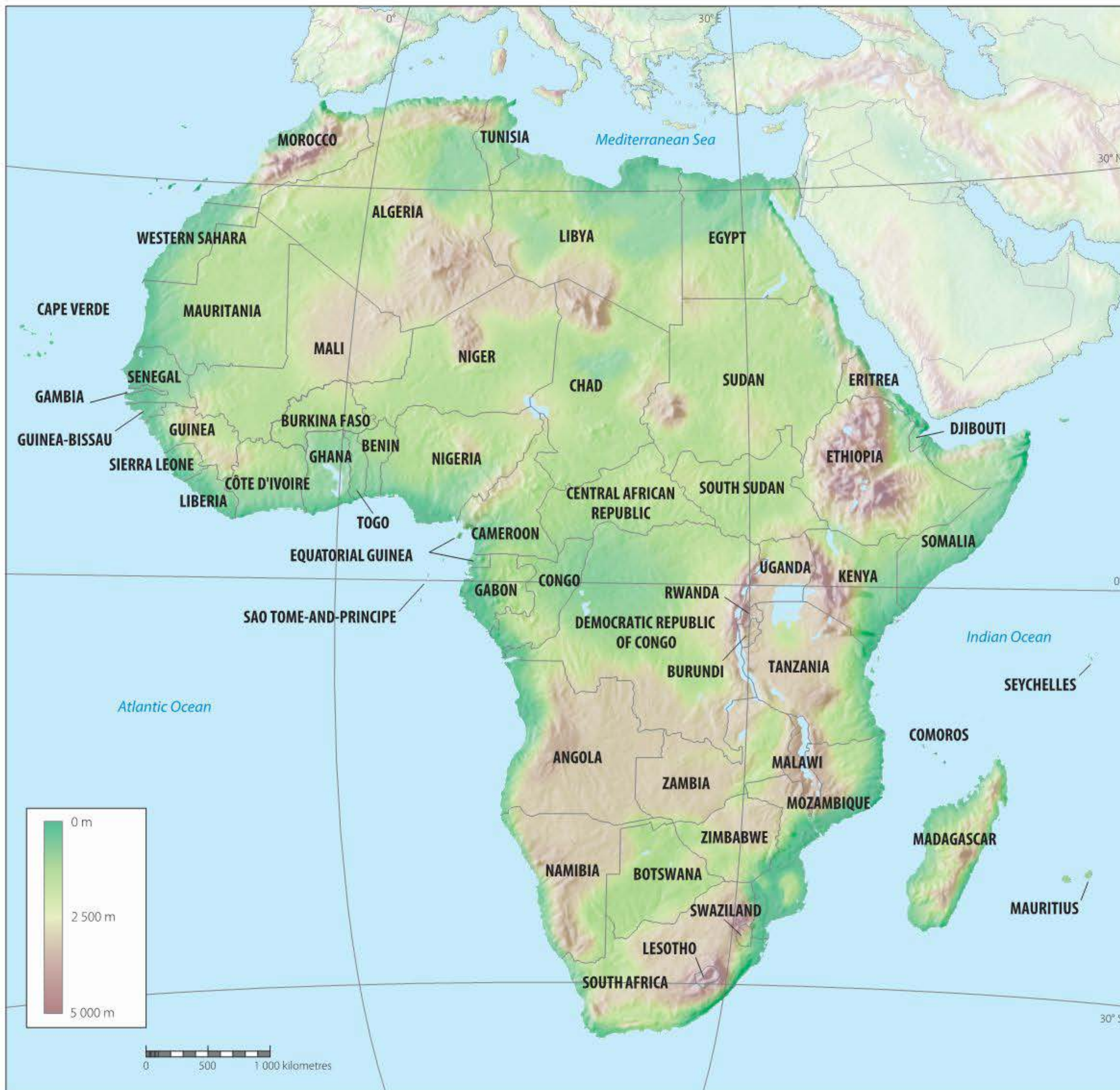


INTRODUCTION

*Bruno Losch
Denis Pesche
Géraud Magrin
Jacques Imbernon*

M1. African States

Source JPL-NASA, 2014



REGAINING CONTROL OF TERRITORIAL DEVELOPMENT

Against the backdrop of globalisation with tensions running high, while our planet struggles against climate change and the depletion of non-renewable resources, Africa is faced with the challenge of inventing original development models. These models need to address the considerable requirements generated by improvements in the standard of living, population growth and economic diversification, without reproducing traditional growth models that are no longer sustainable. This challenge is central to the African Union's Agenda 2063 for the structural transformation of the continent. It implies mobilising all territorial resources available, in both urban and rural areas, in order to make full use of the range of existing spatial dynamics.

• Enhancing territorial dynamics

After two decades of structural adjustment policies and their consequences, Africa has entered a new phase of change over the last 15 years: continued demographic and urban transition, sustained economic growth driven by an expanding domestic market, rising commodity prices and growth in foreign investment. Although the recent situation marked by conflicts and a slowdown in growth linked to falling mining and oil product prices calls for caution, these changes have moved the continent forward from the risk of deadlock to the hope of emergence.

These dynamics could give the impression that according to past transitions observed in other continents, the rural world is doomed to gradual decline in favour of rapidly expanding cities, supported by a solid industrialisation process. A careful examination of changes in African economies and societies, however, reveals a far more complex, diverse picture, with major differences across the countries and regions of the continent.

First, the population boom, with the arrival of 1.35 billion more people by 2050, will not be confined to the cities, which will continue to grow rapidly, without reaching the pace observed over the last 25 years. The population should remain predominantly rural until the 2040s, and population density in rural areas will continue to increase, with 350 million new people by 2050. Africa will also be the only part of the world where the rural population will continue to expand beyond that date. Next, for the time being, urban economies are not following the industry-based development model observed elsewhere. African cities are largely built on commercial and administrative income and are characterised by the scale of informal employment, which is often low-skilled, in trade, services and very small craft and building enterprises.

However, increasing population density in Africa is also shaping territories due to ever closer linkages between cities, rural areas and the small towns connected to them. The unprecedented scale of circulations – of products, people and ideas – facilitates the emergence of new territorial dynamics based on the mobilisation of resources of different origins, encouraging innovation and contributing to spatial reshaping.

On the one hand, the rapid development of telephony, the – still tentative – progress of access to energy and the construction of major transport and irrigation infrastructure all vastly increase the attractiveness of some regions, sometimes to the detriment of others. The growth of mining activities and local and foreign investors' interest in the most fertile agricultural land are often presented as new leverage for development. Because of the concentration of capital they imply, the variety of stakeholders they mobilise, the different decision-making levels they involve and their ambivalent impacts on the development of their host regions, these activities illustrate the complexity of the processes underway.

The other side to rural change, which is not as visible being more fragmented and less publicised, is driven by the efforts of rural families to combine their multiple activities, which straddle urban and rural areas and are sometimes supported by remittances, and to sustain places that may be remote. The growing audience of farmers' organisations gives greater visibility to these actions, which often build on the dynamism of local, national and cross-border markets associating farmers, small traders, and entrepreneurs engaged in agricultural and food product processing, who all feed the cities and generate the vast majority of current jobs. The examples of the Ouagadougou-Accra and Nairobi-Kampala corridors, the Senegal River Valley and the Lake Chad region illustrate this intensity of linkages between urban and rural areas. These linkages are reshaping the economic geography with the emergence of new development centres, beyond the outward-looking agricultural or mining export sectors that have until now been associated with economic modernity in Africa.

Between hope, tension and conflict, linked in particular to use of and access to natural resources, there is a growing chorus of voices stressing the importance of including these territorial dynamics in discussions underway on development models. The extent of needs connected with sustainable improvements in the standard of living implies striking a balance between economic performance, equitable wealth redistribution and respect for the environment. Although Africa's increasing integration in the global economy continues to provide numerous opportunities, the vagaries of international markets also imply effectively mobilising the breadth of the African domestic market and developing the resources provided by territorial dynamics.

• Avoiding the excesses and risks of metropolisation

Only a small number of countries situated at both ends of the continent have so far truly initiated their structural change, with more diversified, wealthier economies that are supported by territorially balanced urbanisation with a high density of economic activity and more effective integration in the global economy. Elsewhere, economic changes paint a mixed picture, in which structural elements still override recent dynamics. Agriculture remains the bedrock of activity for a predominantly rural population and urbanisation is continuing, mainly in favour of the capitals, based on an informal sector that makes it difficult to finance the infrastructure needed and to shift the balance to other cities and rural areas. Integration in the global economy remains fragile, with exports of primary commodities that undergo little or no processing (mining, forestry and export agriculture).

These activities, and especially those in the mining sector, inflate growth in absolute terms and, in some countries, stimulate investment dynamics. However, they rarely have any real spillover

effects, create few jobs and are of little benefit to the majority of the population. They stimulate growth in the biggest cities through investment in property and public works, which often leads to neglect of urbanisation from the below, that of small towns, and of agriculture, by fostering the apparently easier option of food models based on imported products.

These dynamics accentuate the metropolisation movement, which further reinforces the territorial imbalances inherited from the colonial period – where the capital was usually the port of export – that were amplified after independence. For political reasons, the states have largely focused on their capitals to the detriment of small and medium-sized cities. These cities have grown in size due to population growth, but without benefitting from public investment in infrastructure and services, thereby increasing the appeal of the big city and enhancing population differences. Today, there are considerable threshold effects between the biggest city and the secondary towns in many countries, and the growing demands linked to this urban macrocephaly are an obstacle to the overall regional development. The situation is heightened by the horizontal, often poorly controlled nature of urban development, which magnifies network costs (highways, transport, water, sanitation and electricity) and the burden on public finances.

Because of this metropolisation, which is reflected in the progressive extension of large-scale conurbations that are increasingly difficult to manage, the public authorities are paying more attention to urban matters, to the detriment of "rural affairs". This trend is encouraged by the new economic geography rationale, which sees agglomeration economies as a key driver of growth, whereas the concentration of activities and people provides only very limited leverage where low value-added activities are involved and people are poor.

The challenge is therefore to restore balance between regions, which requires support for rural dynamics and for the development of secondary towns. Failing this, there is a major risk of further rural depopulation and large-scale migration towards the most populated urban areas – with heightened economic, social, environmental and political tensions – and the simultaneous development of spatially marginalised areas with no prospects for the people living there. In the absence of significant compensatory financing, government withdrawal and neglect of entire regions are an open door to long-term instability. The areas of influence won over the last 10 years by Al Qaeda in the Islamic Maghreb and Boko Haram in the Sudano-Sahelian region, or by the older Lord's Resistance Army in Uganda and its northern and western neighbours, stand as a strong reminder of this harsh reality.

• **Fostering activity and employment through territorial development**

Avoiding dangerous dual strategies that assume areas of investment and growth on the one hand and areas of decline on the other, while meeting the needs of structural change, implies getting off the beaten track of "business as usual" and the traditional view of public policies.

This change is all the more necessary given that Africa is facing a surge in its working age population, which will become the main source of growth in the global workforce. Over the next 15 years, 440 million young people will reach working age. This massive influx of young working-age people is an exceptional opportunity for the dynamism of African economies, provided that the level of training is enhanced and that the economic and institutional environment is conducive to

investment.

Meeting this challenge implies moving away from an excessively segmented, centralised approach to public policies. Despite progress in regional policies and decentralisation, most policy and public investment decisions are still made by states and their sectoral administrations, which are disinclined to take account of the diversity and complexity of territorial issues. The statistical segmentation of rural and urban areas, whose boundaries are increasingly blurred by densification and lifestyle changes, as well as that of public action between sectors and fields of activity, makes it difficult to identify existing economic, social and spatial dynamics and their support.

There is no sectoral silver bullet – like industrialisation, which is often put forward – that would tackle the scale of the continent's needs. There is, however, an urgent need to reinvest in multi-sectoral, place-based sustainable development strategies that help to build on assets and to take into account the constraints inherent in the development of the different regions.

This "re-territorialisation" of public policies calls for the implementation of participatory approaches, stronger local authorities and concerted regulations between different levels of governance, as well as reinvestment in infrastructure and services in rural towns and small and medium-sized cities. It could help to revitalise local development processes and to create jobs through the densification of rural-urban linkages and better support for initiatives. By simultaneously planning the development of agriculture and that of small towns from a territorialised approach based on the idea of supply and employment basins, the renewal of public policies is one of the key drivers of structural change in Africa.

**Bruno Losch, Denis Pesche,
Géraud Magrin et Jacques Imbernon**



STRUCTURAL DYNAMICS

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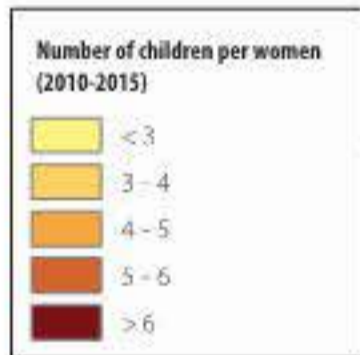
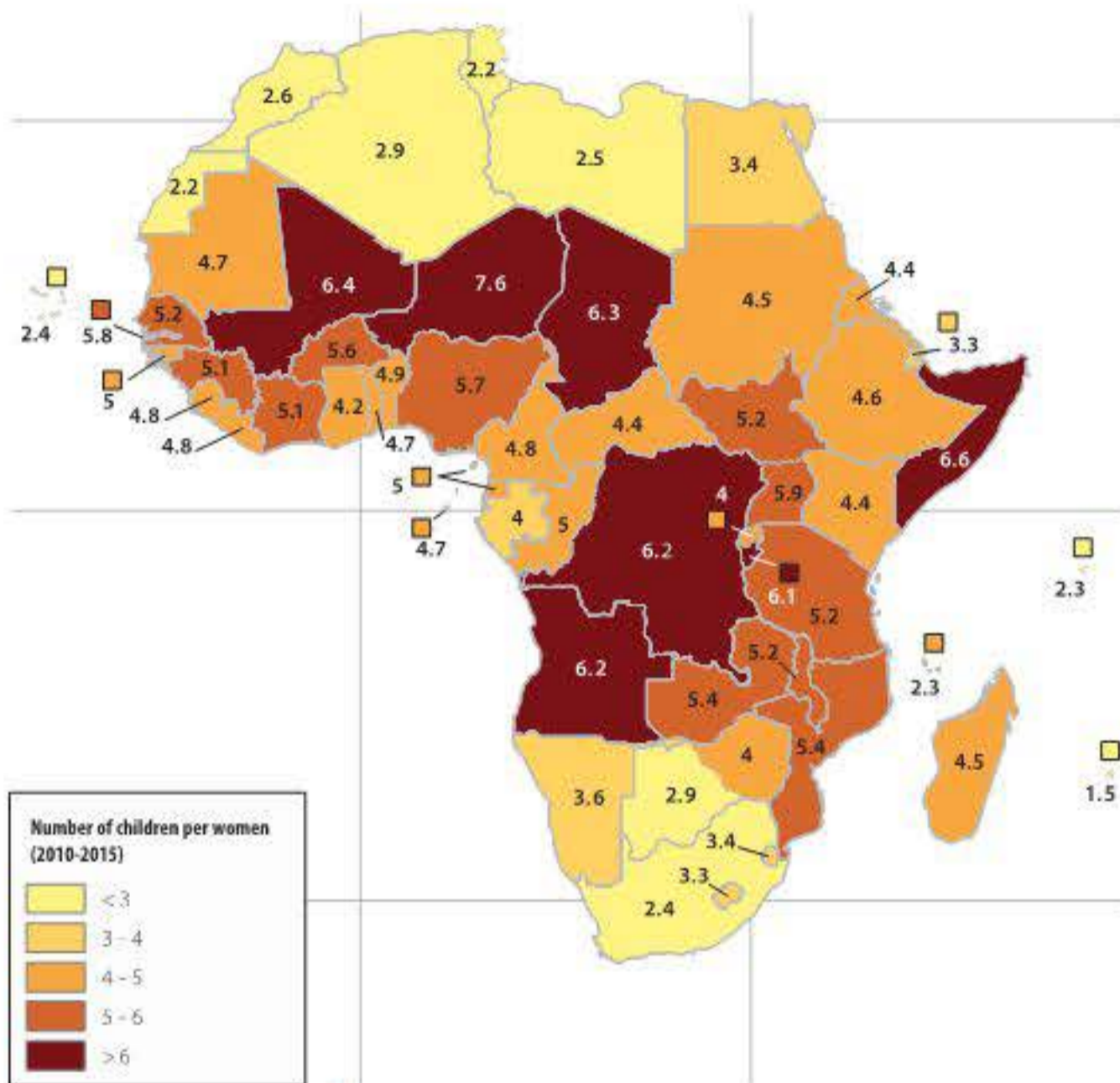
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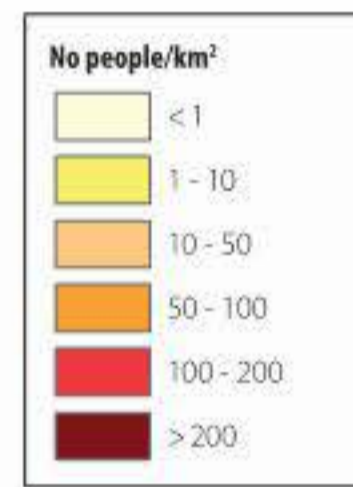
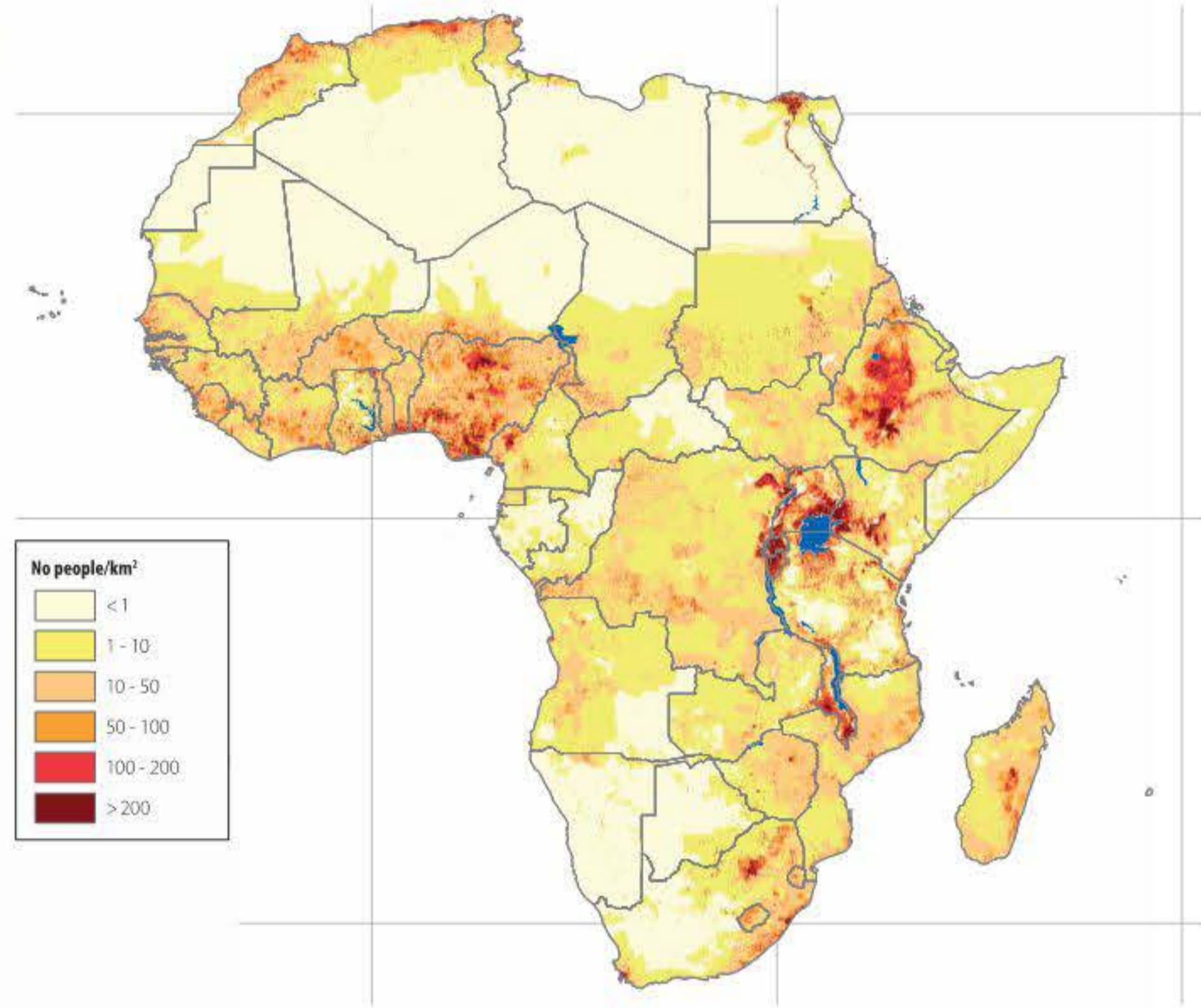
M2. Fertility rate (average 2010-2015)

Source WPP 2015



M4. Population density in 2010

Source Worldpop 2013



M3. Urban and rural population ratio in 2015

Source WUP 2014

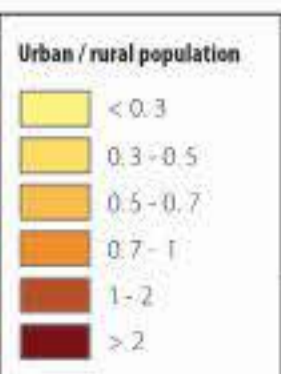
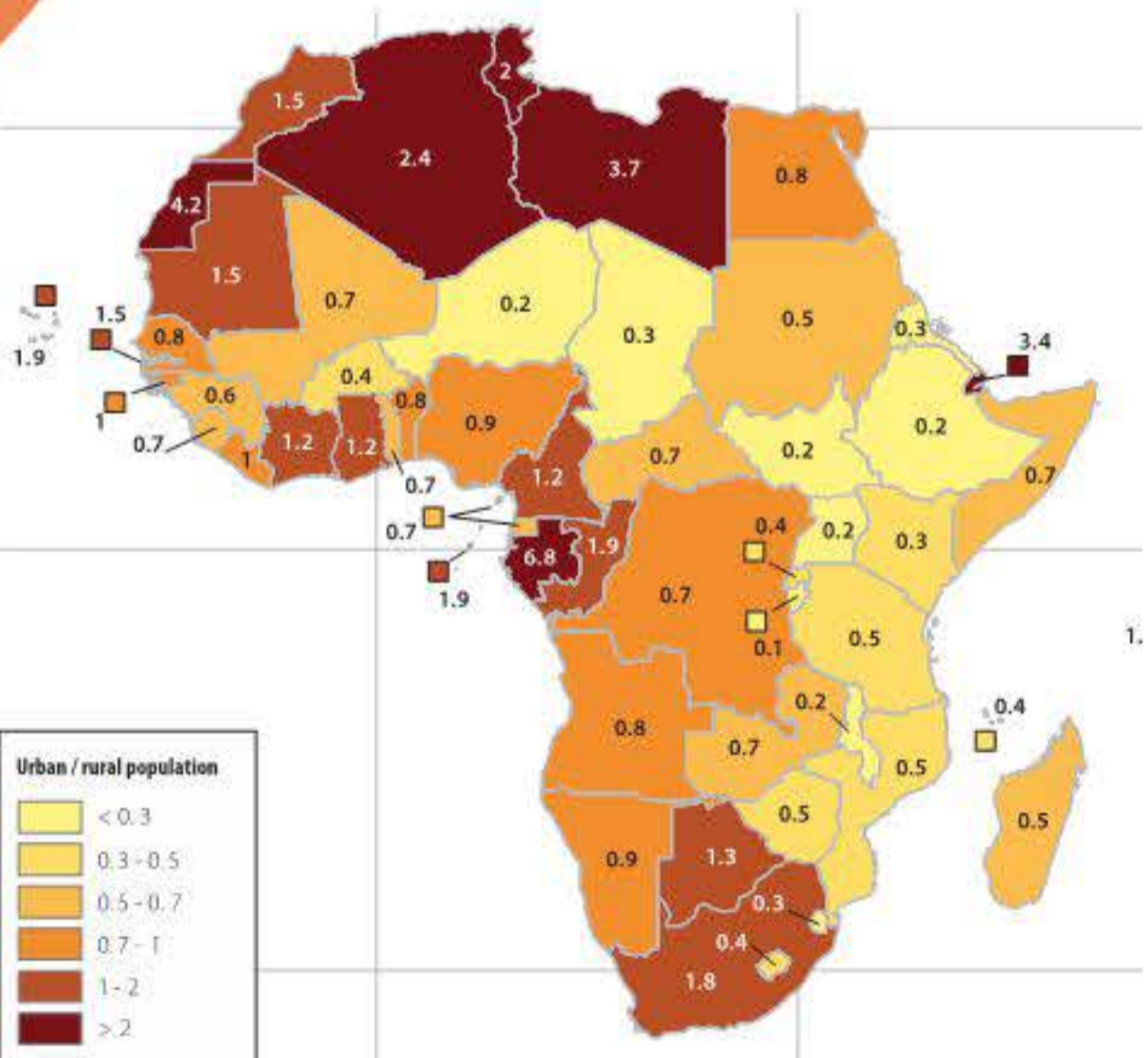


Fig. 1. Evolution of rural population by regions and countries (1950-2050)

Source WUP 2014

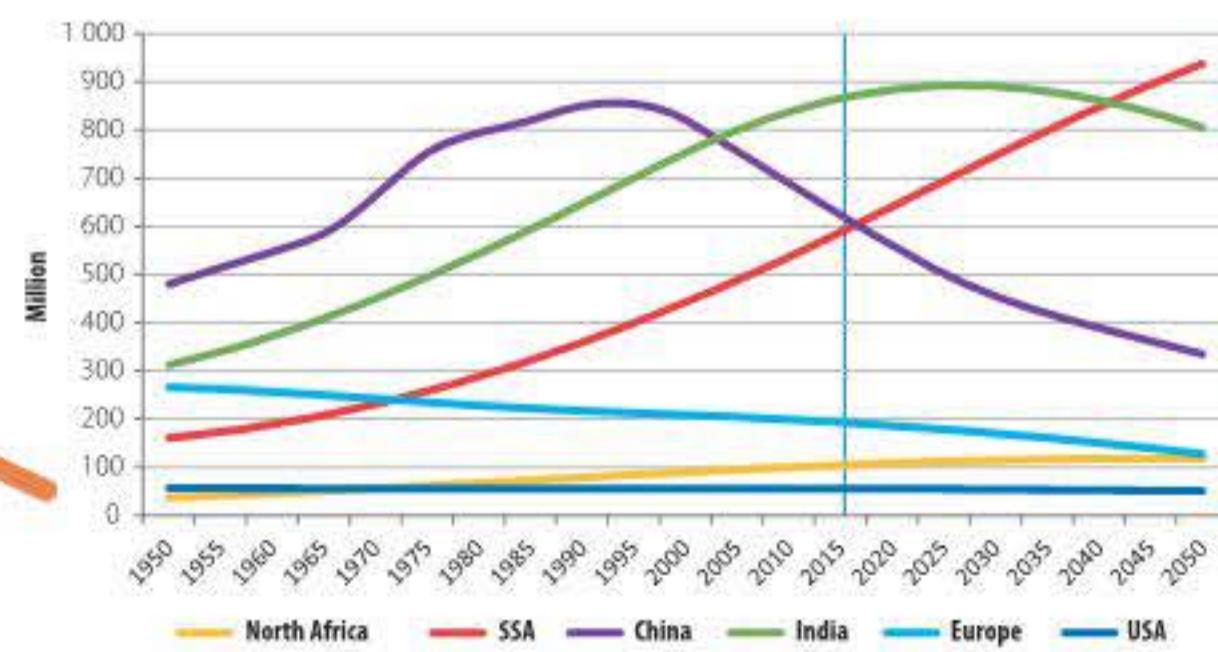
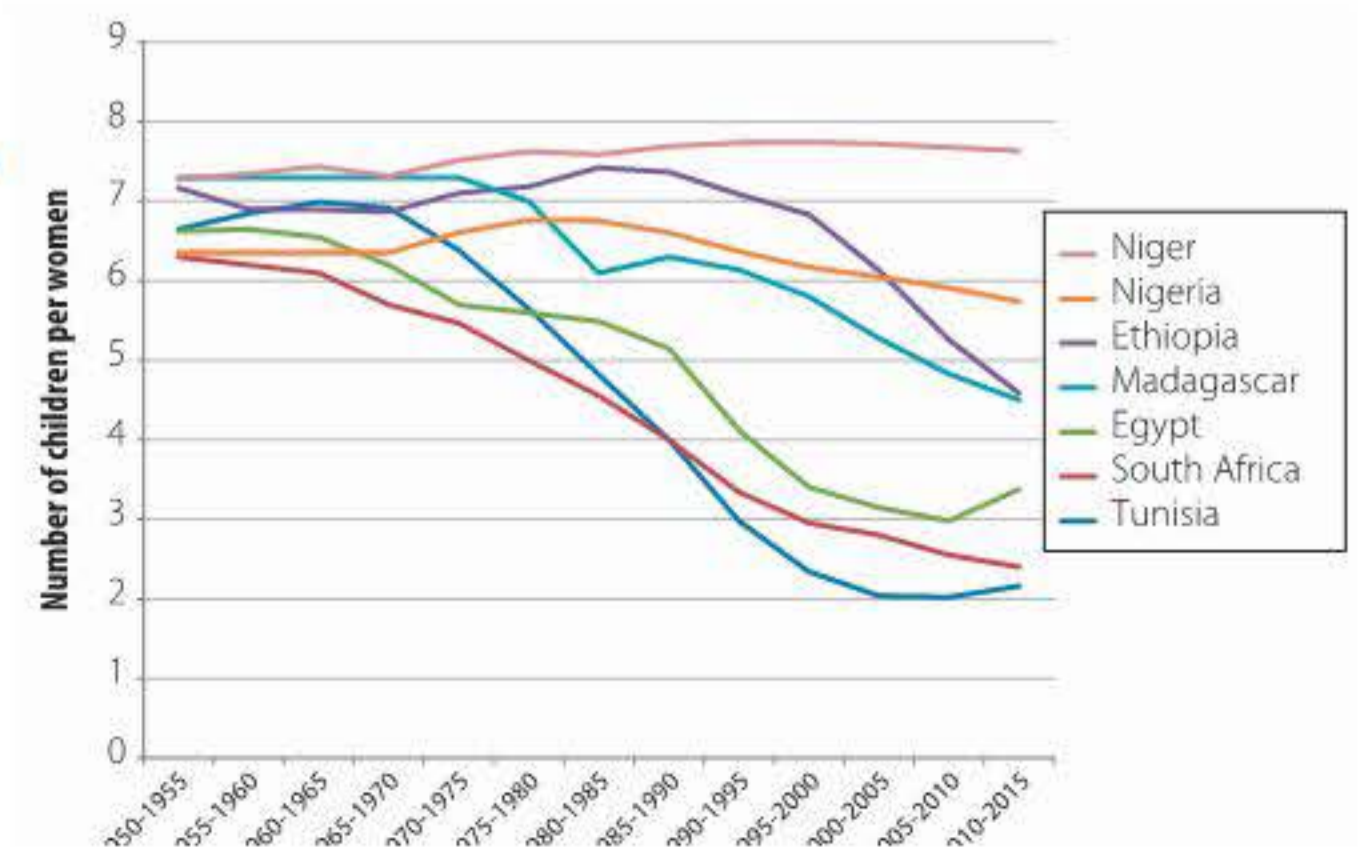


Fig. 2. Evolution of fertility rates (1950-2015)

Source WPP 2015



RURAL AND URBAN DENSIFICATION CONTINUES

The African continent is vast with an unequally distributed population. It has experienced high population growth over the last 50 years, which has corrected its former demographic deficit. If current dynamics continue, the results will be population densification, with serious implications for the relationship between people and natural resources, and changes to territorial configurations.

• The exceptional scale of the population boom in Africa

The African continent is the last region in the world to have begun its demographic transition. Unlike in Asia, where demographic change was rapid, this transition is slower than expected – United Nations projections are regularly revised upwards –, and is accompanied by an exceptional population boom: the population is expected to reach almost 2.5 billion people in 2050 (compared to 1.2 billion in 2015). This growth will result in a complete reversal of relative demographic weights: in 2050, Africa will have three and a half times as many people as Europe, whereas the European population was twice that of Africa in 1950.

This growth is explained by better public health and continued high fertility rates resulting in an average annual growth rate of around 2.5% (compared to 1% in Asia). These average aggregate values clearly hide considerable differences between North Africa and Southern Africa, where the number of children per woman has dropped to less than 3, and the rest of sub-Saharan Africa, where this figure often still stands at between 4 and 5. Diversity is also

seen within West, East and Central Africa, and is highly correlated with the rate of urbanisation, with regions or countries where the number of children per woman is still more than 6 (the Central Sahel, DR Congo and Angola).

Sub-Saharan Africa is about to undergo demographic change on an unprecedented scale. While its population increased over the last 40 years in proportions equivalent to those of China or India, growth over the next 40 years will be more than twice as high (1.4 billion more people instead of 650 million), whereas the population of China will decline and that of India will increase by only 400 million people.

• A slow shift from rural to urban

These population dynamics will accompany the progressive shift from rural to urban. Urbanisation in Africa has skyrocketed, with a ten-fold increase in the number of city dwellers since the 1950s, but it remains low in comparison with the global average, with the exception of the Mediterranean coasts and the mining regions of South Africa. The urban boom of the 1950s to 1970s (with annual growth rates close to 7%) was followed by more moderate urban growth, which has stabilised at around 4% per year since the 1980s, as a consequence of the structural crisis. This trend has not been altered by the economic recovery of the 2000s.

The countryside thus maintains its demographic lead over the cities and the urban/rural ratio remains at less than 1, with the exception of North Africa, South Africa and several coastal

countries in the Gulf of Guinea. Although the relative importance of cities will continue to increase, providing more and more opportunities for rural producers (the urban/rural ratio will rise from 0.6 on average today to 1.2 in 2050), the population in the countryside will continue to grow in absolute terms. This is a second African exception, since the rural population is projected to include 350 million more people by 2050 and to carry on expanding after this date, contrary to the rest of the world.

• A new population pattern

The demographic surge is reshaping population distribution. This has long been marked by low average population densities and contrasts between highly populated regions and largely uninhabited areas, as a result of interconnected environmental and historical factors. Low-density areas often reflect the arid environment, such as the Namib Kalahari, the Horn of Africa and especially the Sahara. They also correspond to the great equatorial forest of the Congo basin. The older areas of settlement are situated in fertile zones, such as the Nile Valley or the highlands of the Great Lakes, Ethiopia and western Cameroon, and in environments that have historically provided protection, such as the mountains of North Africa and the mangroves of West Africa. The agricultural export and mining regions that sprang up in the late 19th century also established large urban and rural populations.

The continent's average population density has risen from 3.3 people per km² in 1900 to 7.5 in 1950 and 39.3 in 2015. For the last 50 years, high density areas have become more so, while the agricultural frontiers have pushed into regions that were once sparsely populated (Madagascar, south-western Côte d'Ivoire, and northern Cameroon). Some urban centres in the Sahara are even growing through the control of mining activities and

migration, despite an unstable geopolitical environment. The few cases of rural decline (inland Gabon, Algerian Kabylia) are the exception.

These dynamics are putting increasing pressure on natural resources: extensive long fallow agriculture systems based on family user rights are being called into question. Tensions are growing between uses and users of land and water (agriculture, livestock farming, urbanisation and mining). To address climate uncertainty linked to global changes and to the need to step up agricultural productivity, the use of water resources is increasing. Shortages are sometimes a threat, as in North Africa. Deforestation is affecting biodiversity while eroding the environmental capital.

With population densification, the boundaries between rural and urban areas are blurring. They are witnessing the emergence of new territories on the outskirts of major cities and roads linking regional capitals via strings of secondary towns. This is exemplified by spatial dynamics between the coast of the Gulf of Guinea and the Sudanian zone, or in the eastern part of the Great Lakes region. Large-scale intra- and inter-regional migrations are to be expected as a result of this exceptional population growth, as well as spatial inequalities in terms of development that are likely to grow in the absence of support policies.

Bruno Losch and Géraud Magrin

M5. Working population engaged in agriculture in 2013

Source: FAOSTAT 2015 (see note page 69)

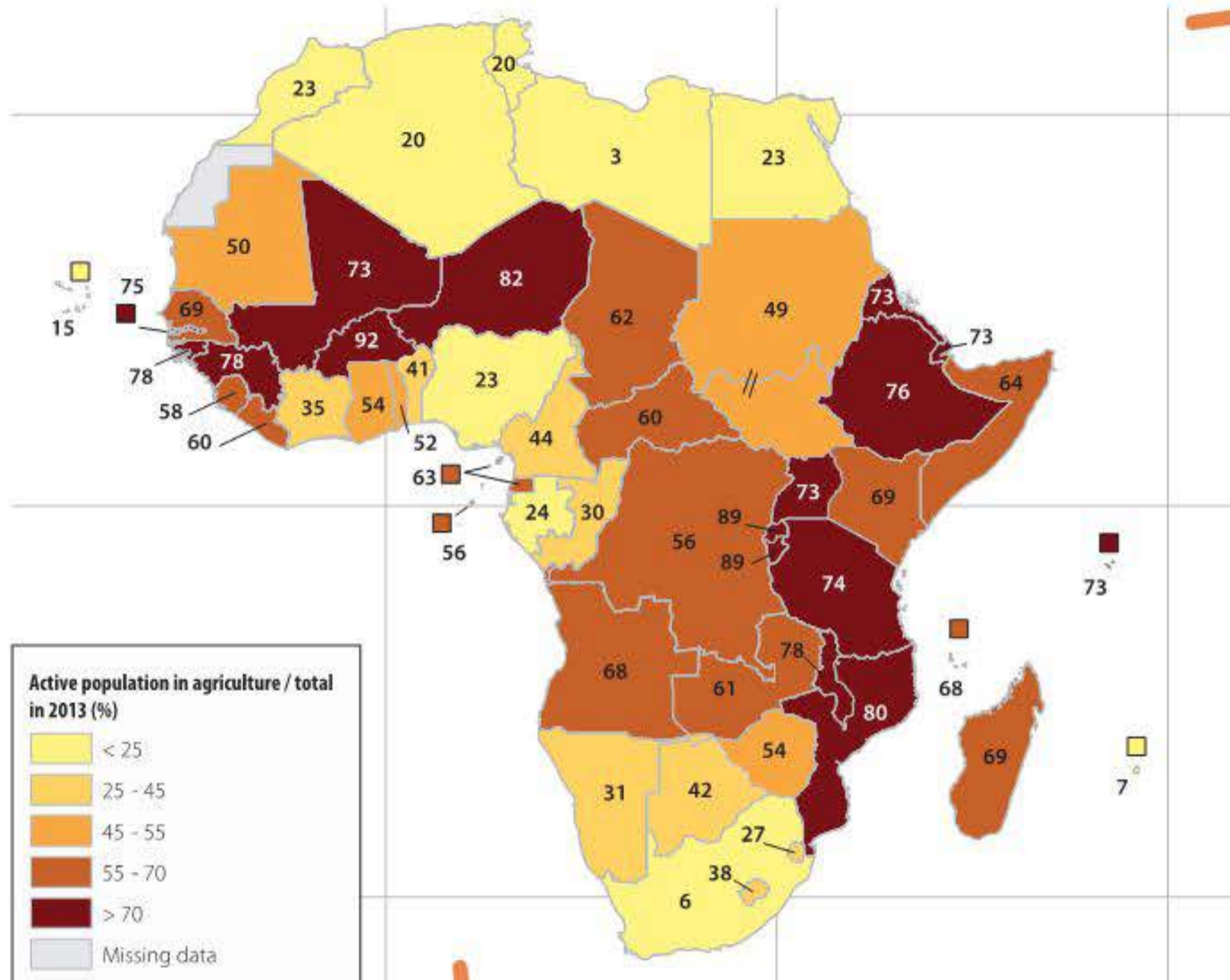
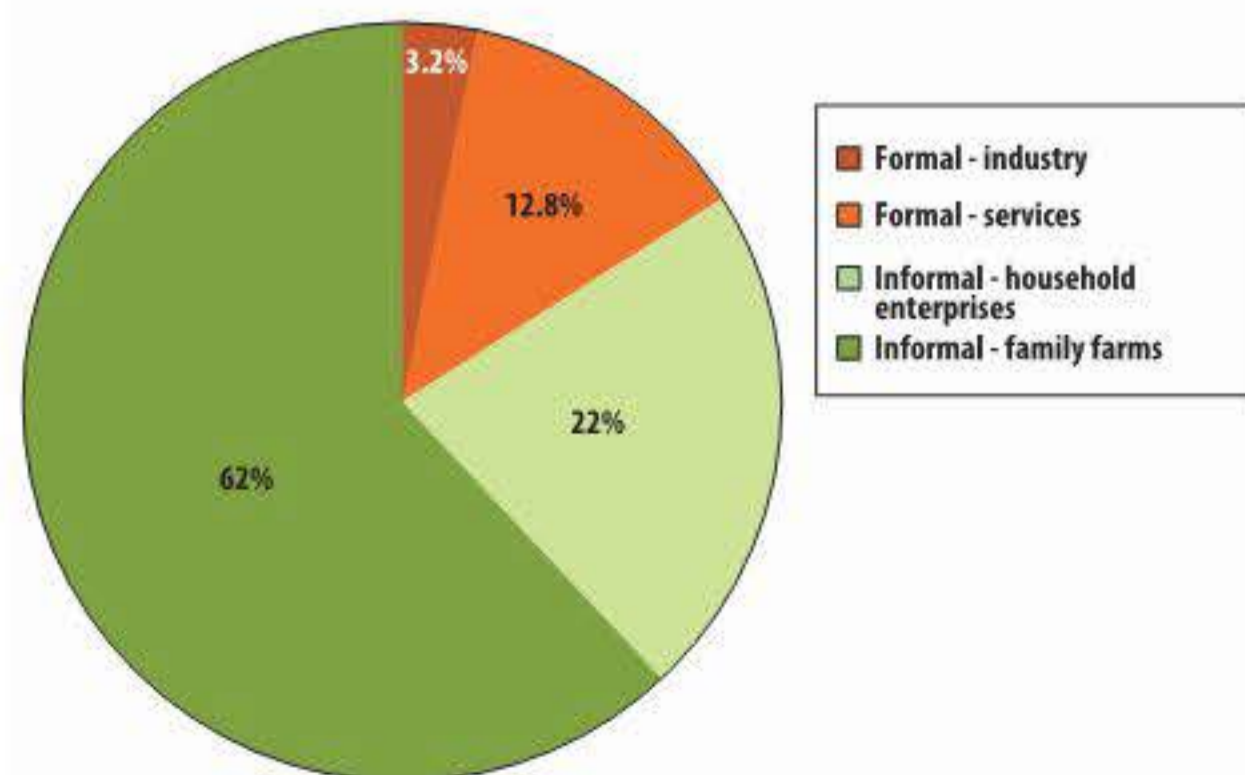


Fig. 3. Structure of employment in Sub-Saharan Africa in 2014

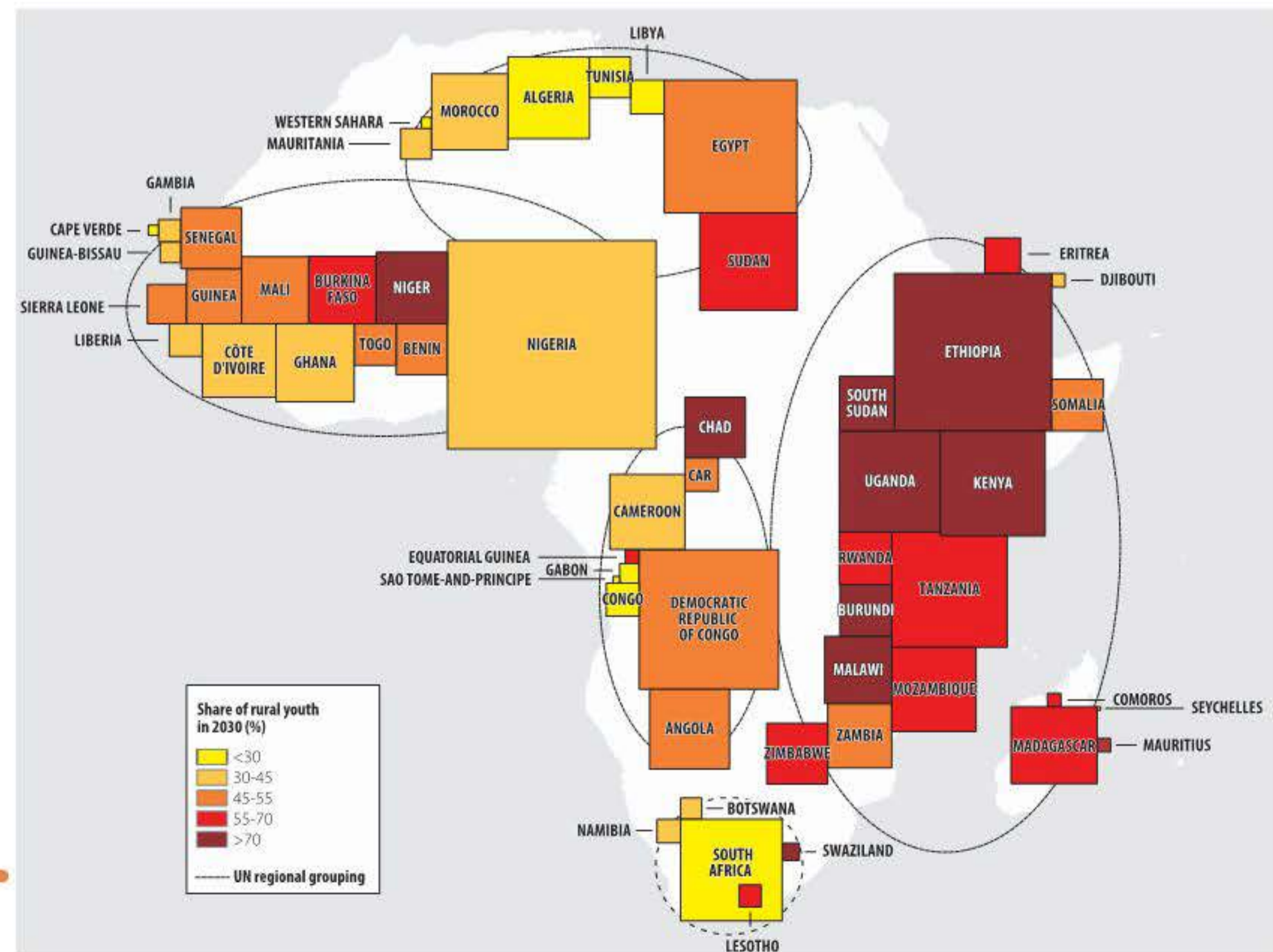
Source: Filmer et Fox (2014)



M6. Number of young newcomers on the labour market between 2015 and 2030

Representation proportionnal to the number of new labour market entrants

Source: WPP 2015, WUP 2014 (see note page 69)



YOUTH EMPLOYMENT: A CHALLENGE FOR THE CONTINENT

The working age population in Africa is young and growing in size, constituting a key asset for the development of the continent. But it is also a major challenge, as the massive influx of young people into unstructured labour markets is causing serious problems. This challenge calls for proactive public policies focusing on training and support for labour-intensive sectors.

• Towards the demographic dividend in Africa

One of the main consequences of the demographic transition underway – both population growth and changes in the age structure – is the dramatic surge in the working age population (people aged 15 to 64). According to United Nations projections, by 2050, it will increase by 875 million people, and will account for almost 70% of growth in the global workforce. Over the same period, the working age population will shrink in Europe (-90 million people) and especially in China (-215 million people).

This growth in absolute terms will be accompanied by a declining age dependency ratio. With one working age person for every dependent person in the 1980s and 1990s, at the height of structural adjustment (while China had two working age persons for every dependent person), Africa was crippled in terms of its saving, investment and consumption potential. The dependency burden linked to high fertility rates compromised the development of productive capacities, income growth and improvements in the standard of living.

The continent will thus be in a position to gradually "reap" its demographic dividend – the unique period in population dynamics when the working age population and the dependent population are respectively at their highest and lowest levels –, since the ratio should reach 1.6 in 2050 and plateau at 1.8 in the 2070s. This dividend will nevertheless be smaller than in East Asia (China currently has a ratio of 2.5) due to continued relatively high fertility and the extension of life expectancy.

However, this dividend will only be effective if economic conditions enable full use of the additional labour force. If job opportunities are lacking, working age population growth could rapidly become a burden that generates social and political tension. The "Arab Springs" served as a reminder of the risks inherent in a young population with no prospects.

• Young people at the core of the employment challenge

The scale of demand for jobs for young people clearly reveals the extent of the problem. Today, across the whole of Africa, more than 20 million young people (aged between 15 and 24) are looking for their first jobs or for income-generating activities. This annual cohort will rapidly increase to reach 33 million in 2030. With a 15-year horizon, this figure is not a projection: this future workforce is already born.

By 2030, a total of 440 million young men and women will need to find an activity to support themselves and their families. This is equivalent to the current population of the United

States and Mexico. Of course, the distribution of these young people between the countries of the continent reflects differences in the size and age structure of the population, and the Nigerian economy will need to absorb the highest numbers (70 million), followed by Ethiopia, DRC and Egypt.

• What are the job opportunities for young people?

Labour absorption capacities depend on the structure of activity within economies, on available resources, physical and human capital and growth dynamics. At present, the continent is still marked by its high level of agricultural activity. The exceptions to this are North Africa, the Gulf of Guinea oil-producing countries and South Africa. Informal activities – in other words those that are unregulated and unreported – are predominant and are concentrated in family farming and very small businesses in the craft, trade and building sectors. Employment in formal services and industry is generally very limited. As a result, pay is low and jobs offer little or no social protection.

In order to absorb their cohorts of young people, the African economies will need to diversify and to develop labour-intensive sectors. This shift calls for appropriate public policies focusing first on training, which should be vocational and must respond to needs, and next on the development of infrastructure and services (communications, transport, energy, financial sector) that facilitate investment and the emergence of new activities.

The whole continent, and in particular sub-Saharan Africa, has considerable capacity for growth linked to this burgeoning labour force and also to the extent of physical resources still available. Developing these capacities will depend on technical choices that are conducive to employment, in other words that

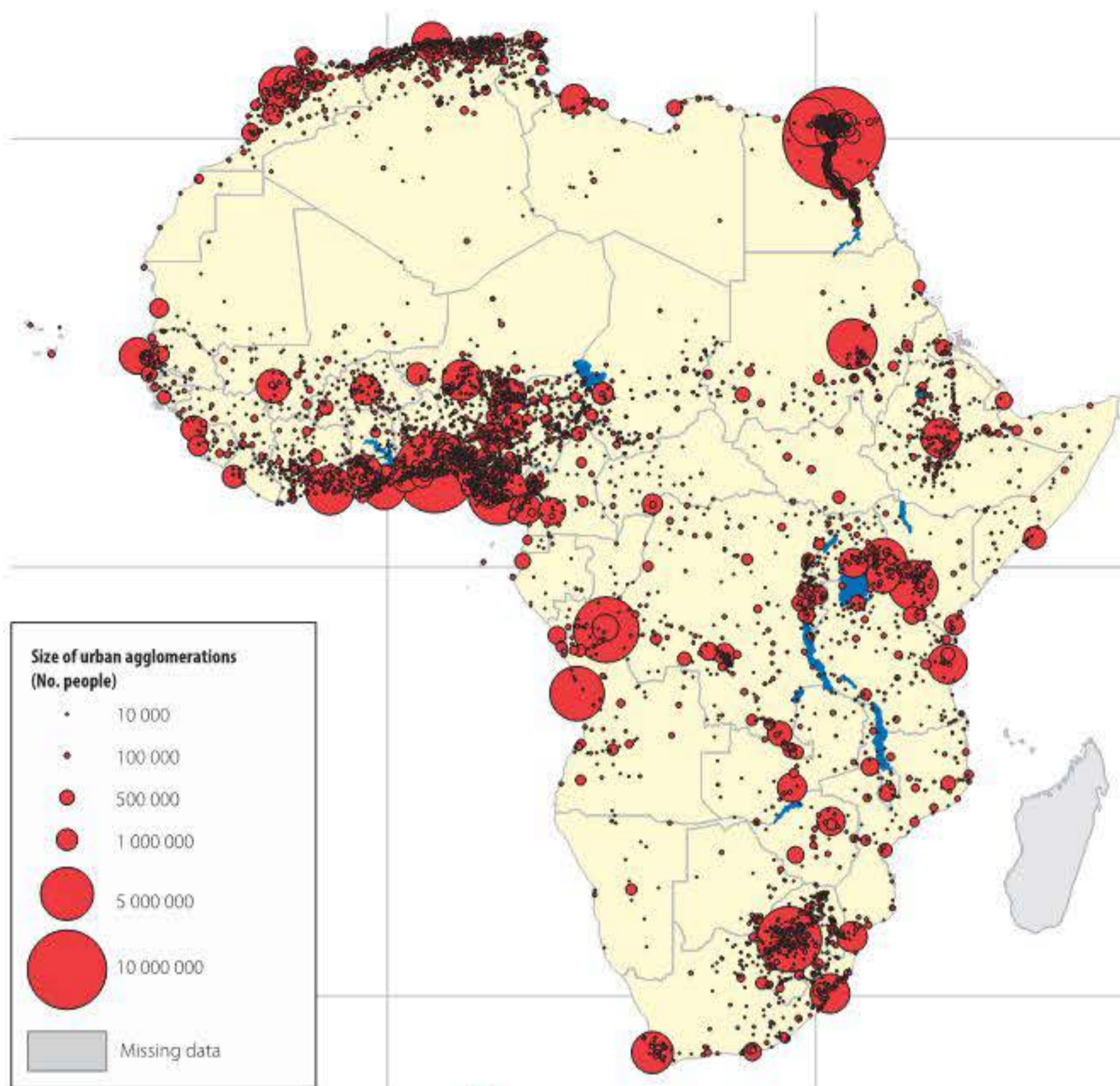
prioritise labour over capital (mechanisation, automation) while ensuring decent working conditions (related to arduous work, pay, and protection). These strengths can be directed at meeting demand from the global economy and especially from the booming African internal market, which will have an additional 1.3 billion people by 2050.

However, although the African economies have begun to diversify, it is clear that the structure of activity will not change radically in the short or medium term, and that the industrial and high value-added service sectors will not provide the hundreds of millions of jobs required by 2030. Agricultural activities and very small businesses will inevitably have a key role to play and the public authorities will need to take account of their potential for development, modernisation and innovation. This calls for appropriate policies on credit, information and technical support, but also on more secure economic and institutional environments. Moreover, it implies improving the poor working conditions and status of young workers, which are one of the reasons young people shun this type of activity, especially in rural areas. Finally, it requires greater recognition of agriculture and skilled crafts in the media, at school and from policy makers, which is a prerequisite for meeting the challenge of youth employment.

Bruno Losch

M7. Population of urban agglomerations of over 10,000 inhabitants

Source: eGeopolis 2016



M8. Urban population centres within 100km radius

Source: eGeopolis 2016

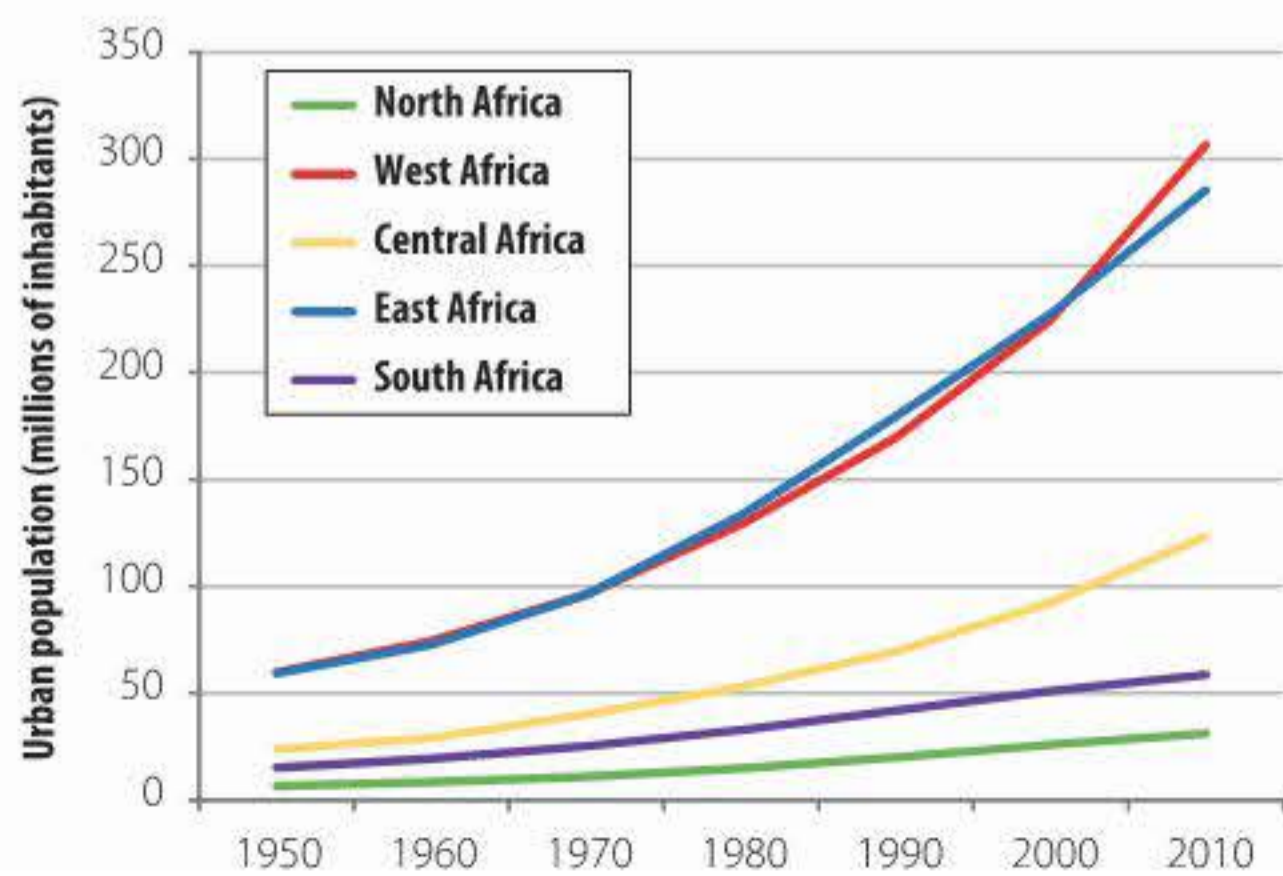
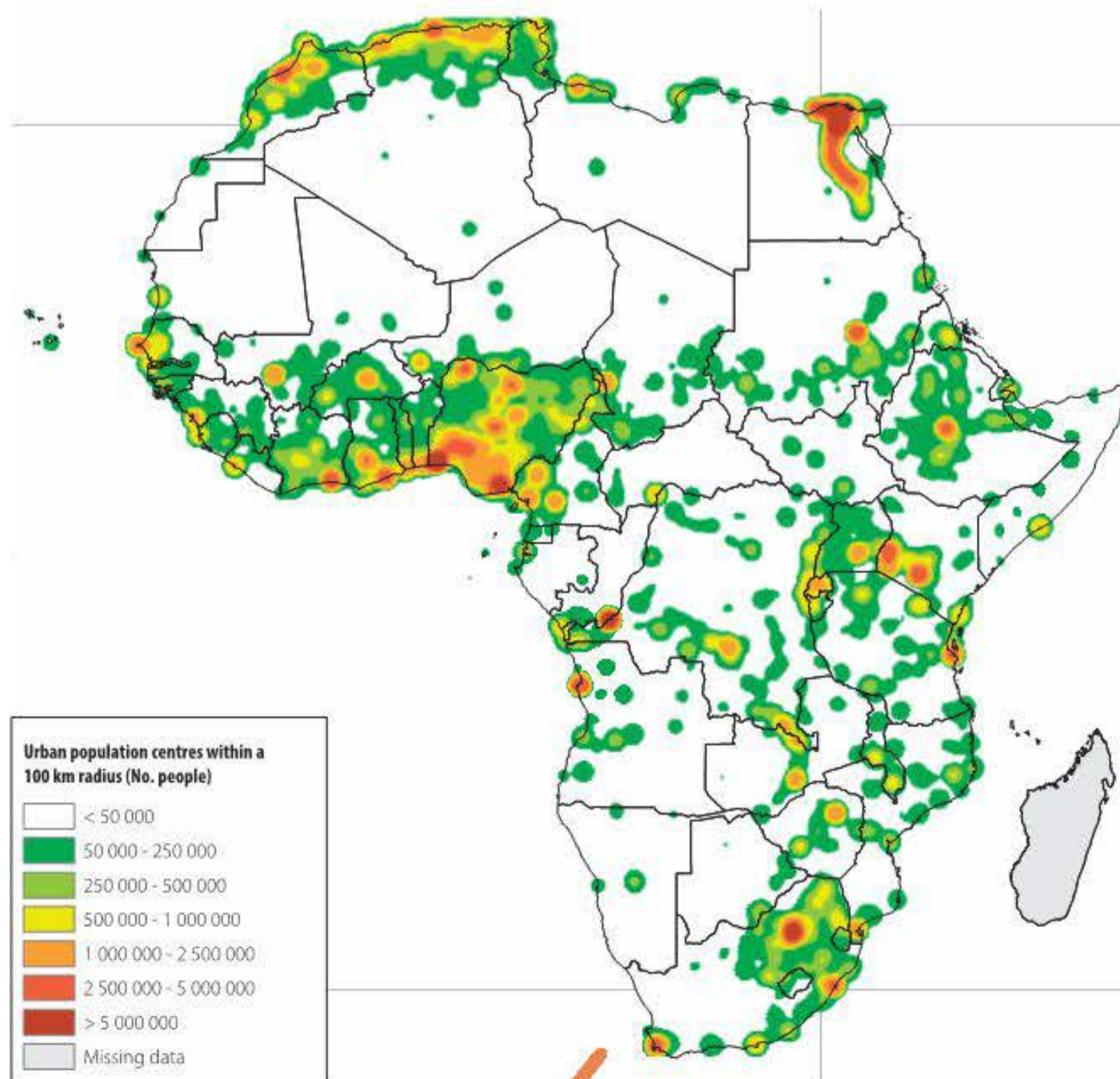


Fig. 4. Urban population growth by regions (1950-2050)

According to the regional division of the United Nations

Source: eGeopolis 2016



MEGACITIES AND ARCHIPELAGOS: AN EMERGING URBAN FRAMEWORK

The extraordinary urban growth that characterises the whole of Africa is producing dense networks of towns that constitute urban archipelagos. But the limitations of intermediate urbanisation, despite the emergence of small towns in rural areas, are hampering territorial development and the diversification of local economies.

• The emergence of vast urban clusters

Huge urban clusters are developing on the African continent. In the Nile Valley in Egypt, Cairo, with a population of almost 15.7 million people in 2010, is the biggest metropolitan area on the continent. On the Mediterranean coast, a highly urbanised coastal strip stretches from Tripoli in Libya (1.9) to Agadir in Morocco (0.8) and includes several large cities: Algiers (3), Rabat (1.8), and Tunis (1). In West Africa, urban population density is high from the Gulf of Guinea coast to the Sahel region. Nigeria is still by far the most urbanised country, with the major cities of Lagos (10.5), Onitsha (6.3), Kano (3.1) and Ibadan (2.4). Large cities are located throughout the rest of the region: Abidjan (4.3) in Côte d'Ivoire, Accra (3.6) and Kumasi (2.2) in Ghana, Bamako in Mali (2.3) and Dakar in Senegal (2.6). In the Ethiopian Highlands, a dense urban network has developed around the capital Addis Ababa (3). In the Great Lakes region, Kampala in Uganda (1.7) and Nairobi in Kenya (4.4) are large cities that are connected via networks of small and medium-sized towns and regional capitals resulting in a conurbation in western Kenya with 3.9 million people on the border with Uganda. In the northern part of South Africa and in

the extreme south of Mozambique, an urban network has developed around Johannesburg (7.2), stretching towards Bloemfontein in the interior of the country and to Durban (3) and Maputo (1.9) on the coast.

In addition to these dense urban clusters, corridors of urbanisation are emerging between Lake Chad and the Ethiopian Highlands, along the Bantu line between the borders of Cameroon and Nigeria and the Great Lakes, as well as along the railway line and roads leading to the mining regions of the Copperbelt, from Pointe-Noire in the Republic of the Congo to Lubumbashi in DRC, crossing Zambia and Zimbabwe before reaching the Indian Ocean at Beira in Mozambique. Finally, more isolated large cities such as Cape Town in South Africa (3.3), Luanda in Angola (5.2) and Khartoum in Sudan (4.5) result in polarisation in their surrounding regions.

• Between macrocephaly and multipolar frameworks

Urban networks are strongly marked by their past. Precolonial urban frameworks were developed by large urban civilisations turning their back on the coasts, without the constraints of state boundaries. North Africa developed its urban network within the Mediterranean trade area (Arabs, Ottomans, Persians, etc.). The urban systems from the colonial period then adopted a "comb-like" structure oriented perpendicular to the coasts, with a main town that was most often a railway terminus and a port for exports, which subsequently became the capital. Nowadays, urban networks have become so dense that this spatial

structure is less and less clear. Current trends are marked by the proliferation of thousands of small settlements that emerge from the large rural towns under the pressure of population growth, the densification of road networks and the tightening of state administrative procedures.

Africa has a wide range of different urban frameworks, for which the hierarchy of cities and the degree of concentration is assessed according to the index of primacy. In North Africa, urban frameworks are relatively balanced, with the exception of the megacity of Cairo. Two contrasting types of urban frameworks are seen in sub-Saharan Africa.

First, the network is polarised or even crushed by a large city inherited from the colonial period, which has often become the state capital (Liberia, Togo, Côte d'Ivoire, Mali, Mauritania; Angola, Central African Republic; Burundi, Eritrea, Ethiopia, etc.).

Second, the national urban network is dominated by several large cities originating in the urban frameworks inherited from the past. Ghana, Burkina Faso, Cape Verde and Cameroon have bicephalous urban systems. Elsewhere, two or three large cities dominate the country (Equatorial Guinea, Chad, Congo; Kenya, Malawi, South Africa). Nigeria stands out for having one of the lowest indexes of primacy (1.7) due to the presence of Onitsha and Kano. In all cases, macrocephaly is reflected in national urban systems by a relative lack of medium-sized towns.

• Bottom-up urbanisation and connected urban archipelagos

Far from being contradictory, the dynamics of large cities and small towns are in fact connected since a large proportion of small settlements proliferate on the outskirts of cities. This

trend results in an urban network organised in archipelagos benefitting from the increasing importance of major roads, as seen in the Gulf of Guinea, throughout Nigeria, the Ethiopian Highlands, the Nairobi-Kampala corridor, the Great Lakes and South Africa.

Emerging Africa is currently one of large cities that are connected to global urban networks. But this connection will only drive development if it is accompanied by a rebalancing of urban frameworks. The limitations of intermediate urbanisation remain a major obstacle to the densification of urban-rural linkages, the essence of rural economic diversification. This "reappropriation of territories" in response to a metropolisation process that has become difficult to manage is the key to a new development model. The future development of urban networks will therefore depend on the densification of rural areas that are the scene of in situ, emerging urbanisation processes capable of providing states and regional entities with a robust urban framework and domestic economy, as long as public policies take into account the reality on the ground and not just the capital cities.

GLOSSARY

Urban framework: all hierarchically organised cities and their areas of influence within a given territory.

The index of primacy: calculated by dividing the population size of the rank 1 city by that of the rank 2 city.

Megacity: a very large metropolitan area with several million inhabitants. The UN set the population threshold at 10 million people (Cairo and Lagos for Africa).

Macrocephaly: the excessive size of one or several cities at the top of the urban hierarchy in a given territory.

**Cathy Chatel, Jacques Imbernon,
François Moriconi-Ebrard**

M9. Migration of populations by countries and regions in 2015

Source: UN 2015 and CERI 2013

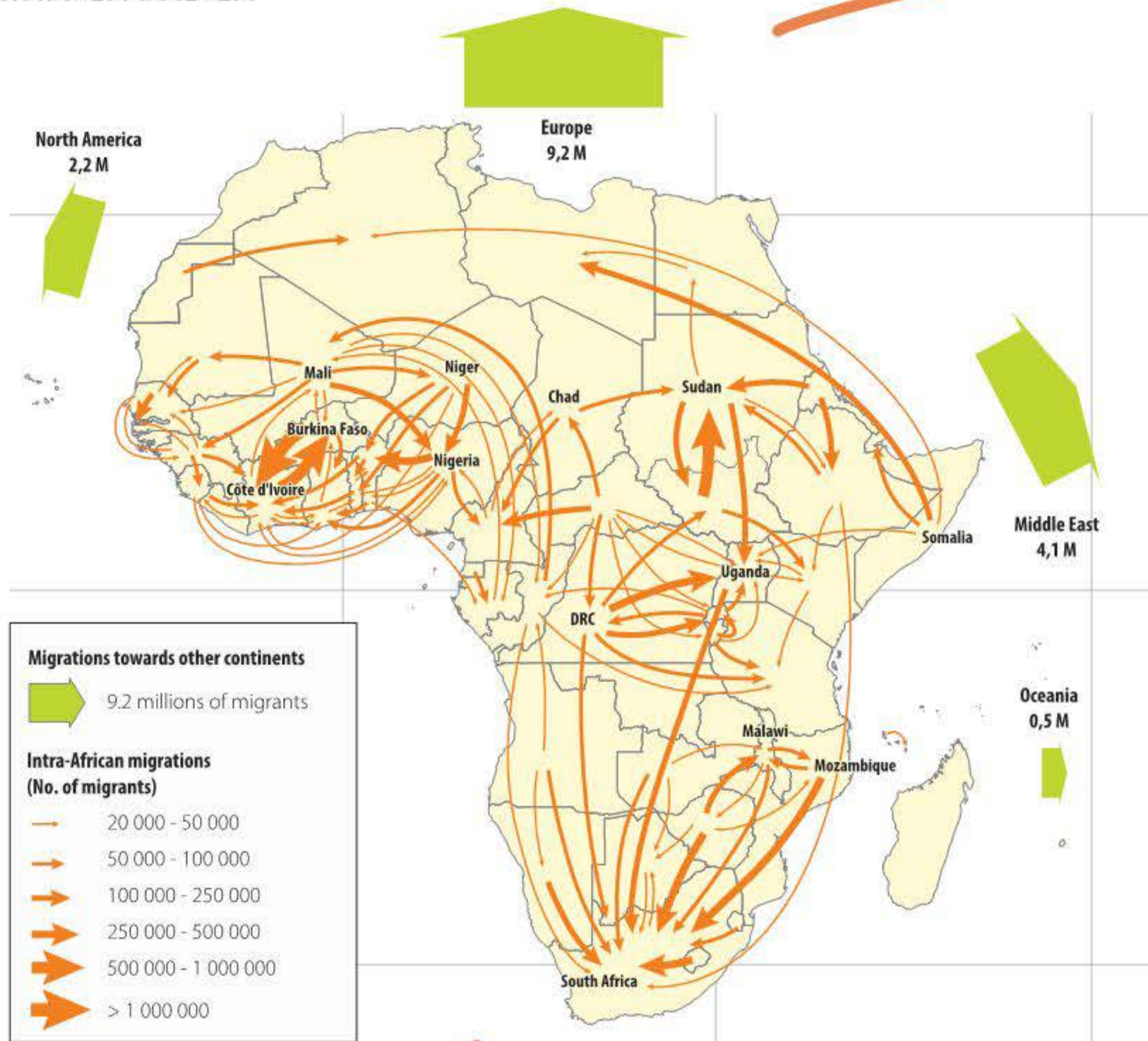


Fig. 6. African countries with the largest number of international migrants in 2015

Source: UN 2015

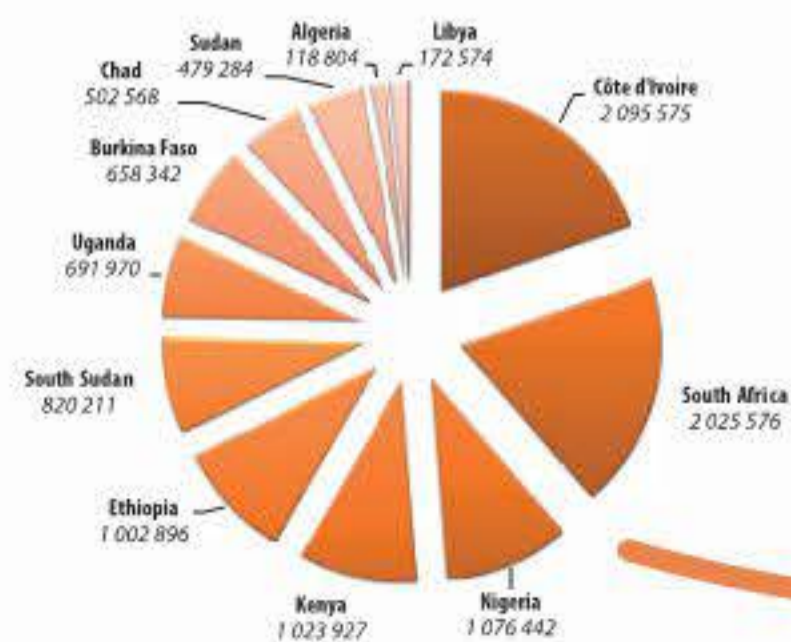
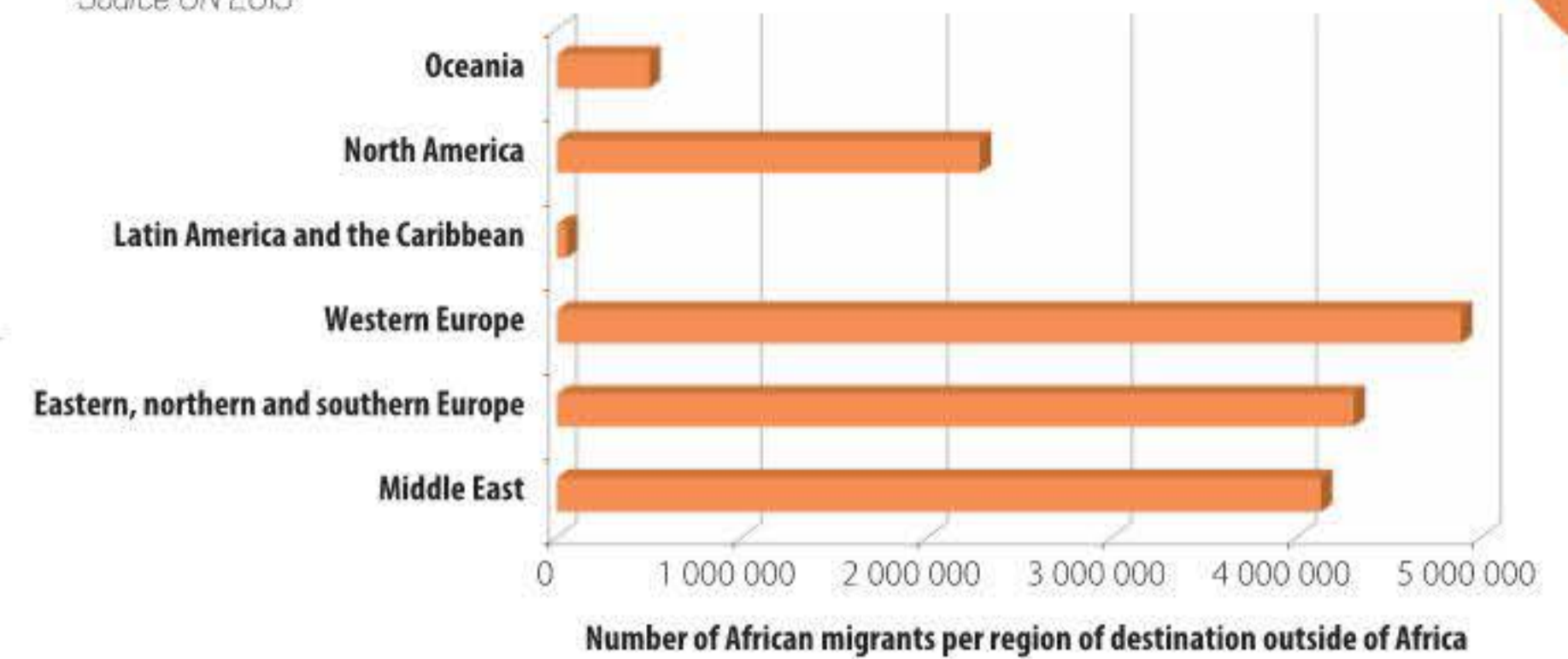


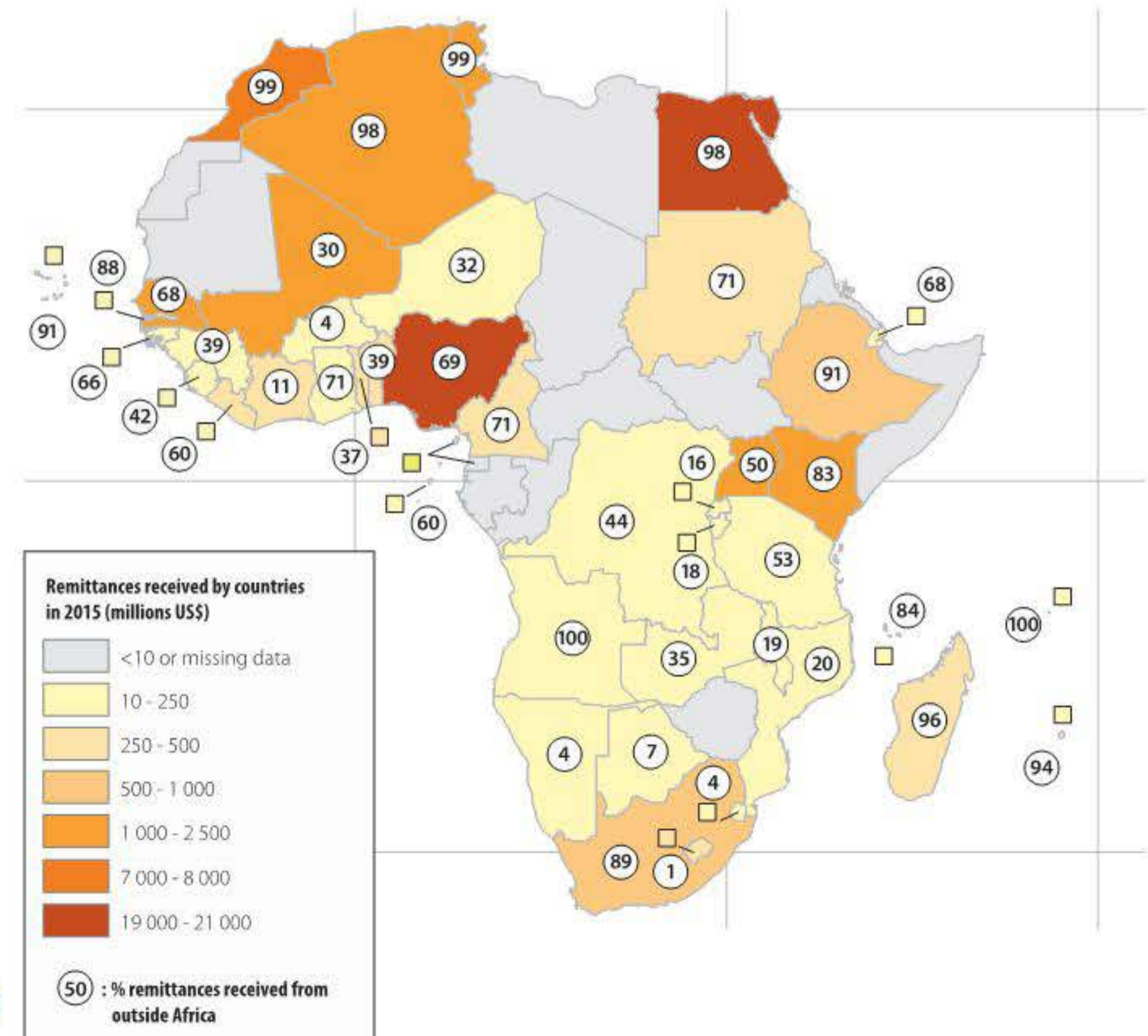
Fig. 5. African emigration outside the continent in 2015

Source: UN 2015



M10. Internal and external remittances to Africa by 2015

Source: UN 2015



MIGRATION DYNAMICS: CONTRASTED PATTERNS, DIVERSITY AND POTENTIAL

A large share of African international migrations occurs in Africa. Remittances are significant for many countries and their amount is directly related to the destination country of migrants. Further new migration dynamics reshape national spaces and craft a new emerging African rurality. Migrations must be considered as an integral part of development policies

- **Most international migration occurs within the continent**

Total international African migration is largely motivated by the search for economic opportunities, and also by insecurity and conflicts, as well as environmental and natural causes such as recurrent floods and droughts. In 2015, nearly 33 million Africans were living outside their home country but more than one out of every two international migrants migrated within Africa. This overall figure masks however sharp differences: while North Africans migrate outside the continent (90%), mostly to Europe (45%) and the Middle East (35%), Sub-Saharan Africans move first within Africa (nearly 75%) and to neighboring countries. West Africa, East Africa and, to a lesser extent, Southern Africa are the most dynamic regions in terms of sending and receiving countries, with Côte d'Ivoire, South Africa, Nigeria, Kenya and Ethiopia being the top 5 receiving ones.

International data neither capture the increasing undocumented migration nor the significant dynamics of circular or non-residential migrations between countries. Intra-African migrations are partly facilitated by free circulation regimes linked to regional economic com-

munities, albeit Southern Africa stands out as a region without a formal migration governance regime. African migrations are also linked to the porous nature of borders that facilitate movement of people and informal cross-border trade. Overall, the high level of circulations result from the expansion over time of kin and family networks, boosted by improved infrastructure, ICTs and communication networks. These migrations create new functional spaces at the regional level whose limits result from social and economic networks.

International African migrants are also the youngest in the world, with a median age of 29 compared with 39 globally. This specific pattern reflects the continent's demo-economic features: its fast growing population and the related needs for employment in a context where opportunities do not meet the scale of the demand. This is particularly the case in cities characterized by the importance of the informal sector in providing low-income jobs. A better life elsewhere is therefore an alternative supported by information networks.

- **Returns to international migration strongly depend on the destination**

International migrations have a strong impact, both on national economies and local livelihoods, through the remittances sent back home. In 2015, Africa countries received an estimated amount of \$64 billion from abroad (11% of the global remittances). 83% came from the rest of the world (\$53 billion) and 17% from within the continent (\$11 billion). This sharp difference in returns to migration

contrasts with the distribution of African migrants within and outside Africa (about 50 to 50%). A basic ratio suggests that migration outside the continent provides incomes that are over five times higher than between African countries (\$3900 to \$700 per migrant) – reflecting a difference in wages between high and upper middle income economies and low income countries.

Most remittances from outside Africa flow into North Africa (49%), where international transfers count for nearly all the total amount, and into West Africa (41%). Major receiving countries are Nigeria, Egypt, and Morocco. The United Kingdom is the top remitter to SSA followed by France, and Saudi Arabia to North Africa. A couple of Sub-Sahara African countries also mostly specialize in migrations from outside Africa (South Africa, Kenya, and Ethiopia).

West Africa received the highest intra-African remittances (79%), with Nigeria receiving the most (around 60%). Most of these remittances to West Africa were intra-regional (plus Cameroon). This feature is similar in the other regions with the major remitters sending transfers within the region. These regional patterns, the high cross-borders movements and informal channel remittances suggest that the amounts of intra-African remittances are certainly underestimated, both in cash remittances and in the form of goods (in many cases transfers in kind represent a significant part of solidarity between and within families).

Mainstreaming migration into the development agenda could greatly maximize the potential and impact of remittances for development. The Post-2015 Agenda should help to channel migrant resources into development finance – through diaspora bonds, recruitment and transfer cost reduction, new technologies (e-transfers). However, households' remittances are private savings and should in any

case be considered as a substitute to government commitment and public contribution to development.

- **Domestic migrations contribute to the shaping of new territorial dynamics**

Beyond international dynamics, renewed and diversified migration patterns have thrived over the last decades between capital cities, small and regional towns and their rural hinterlands. These circular dynamics testify to the blurred limits between rural and urban livelihoods, and the importance of rural-urban linkages that characterize the emerging African new rurality. The static categories of "rural" and "urban" no longer capture the mixed lifestyles and socio-economic behaviors related to intensifying rural-urban relations.

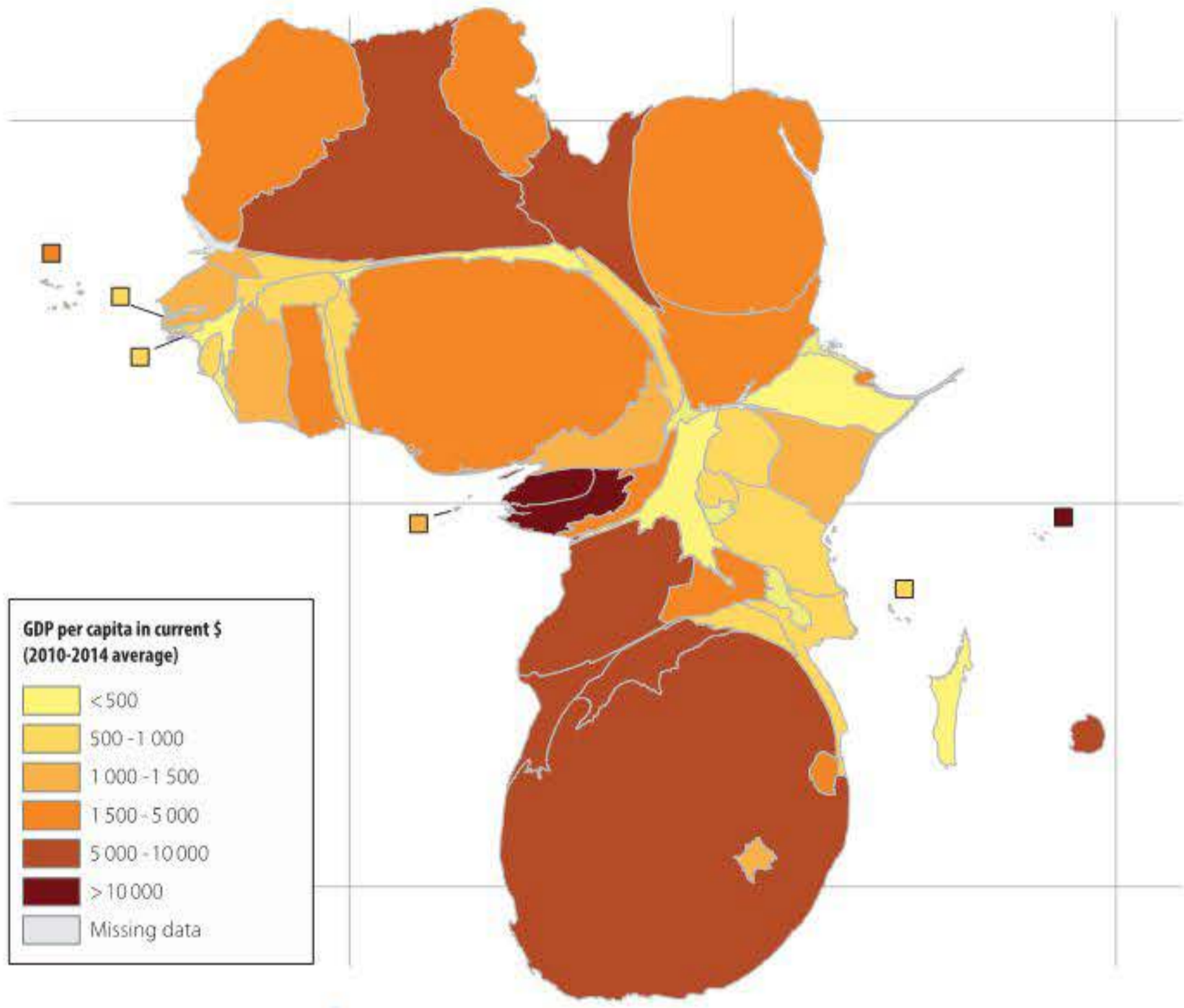
Existing migrations support the diversification of households' livelihoods and the access to employment opportunities. They strengthen the role of small towns and intermediate cities and local and regional dynamics. This new territorial reality shaped by migrations must be a matter of concern for public policies, to facilitate a better match of interventions with local needs and the improvement of existing synergies.

Sara Mercandalli and Christopher C. Nshimbi

M11. GDP by country (2010-2014)

Representation proportional to the total value of GDP, average 2010-2014

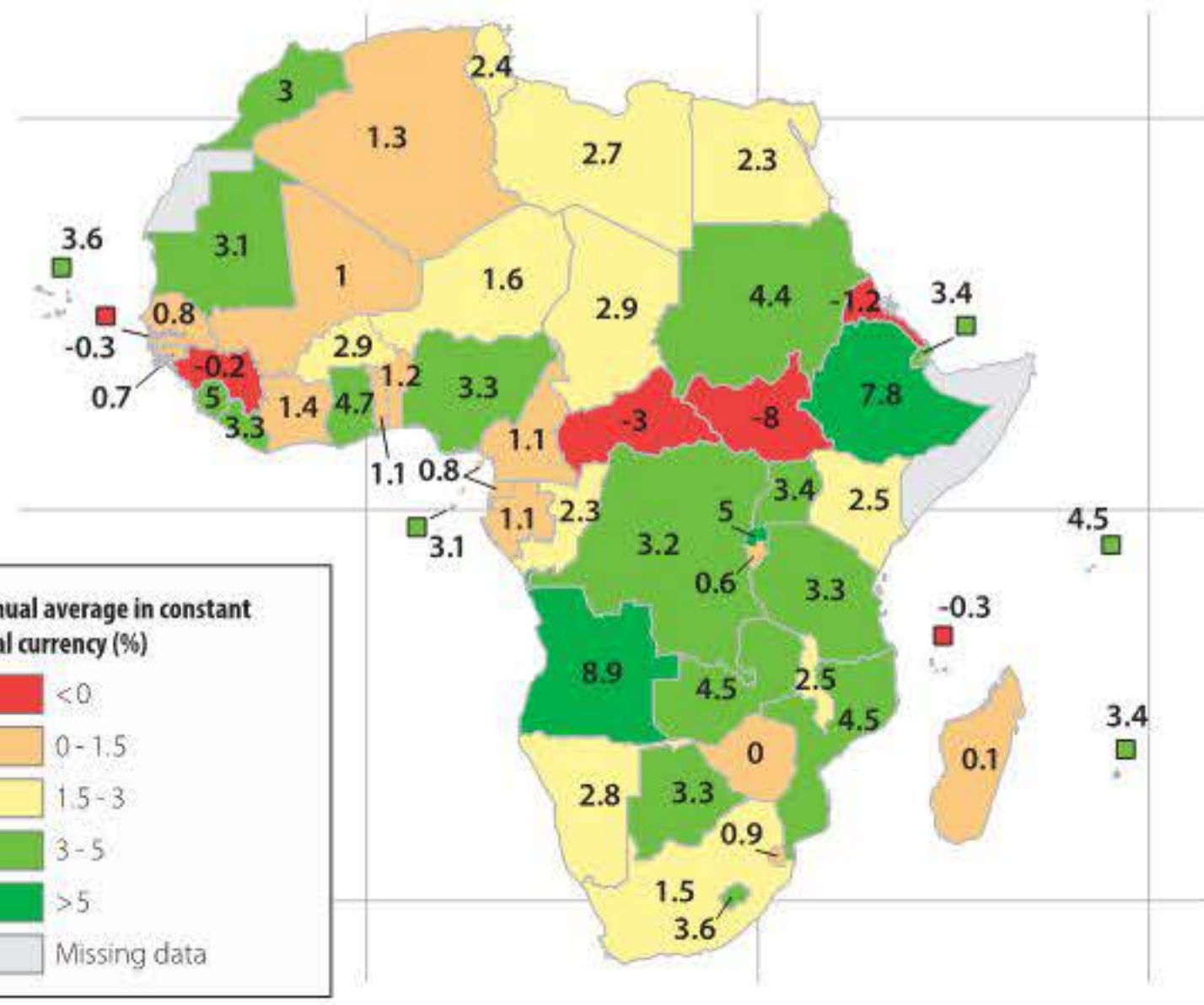
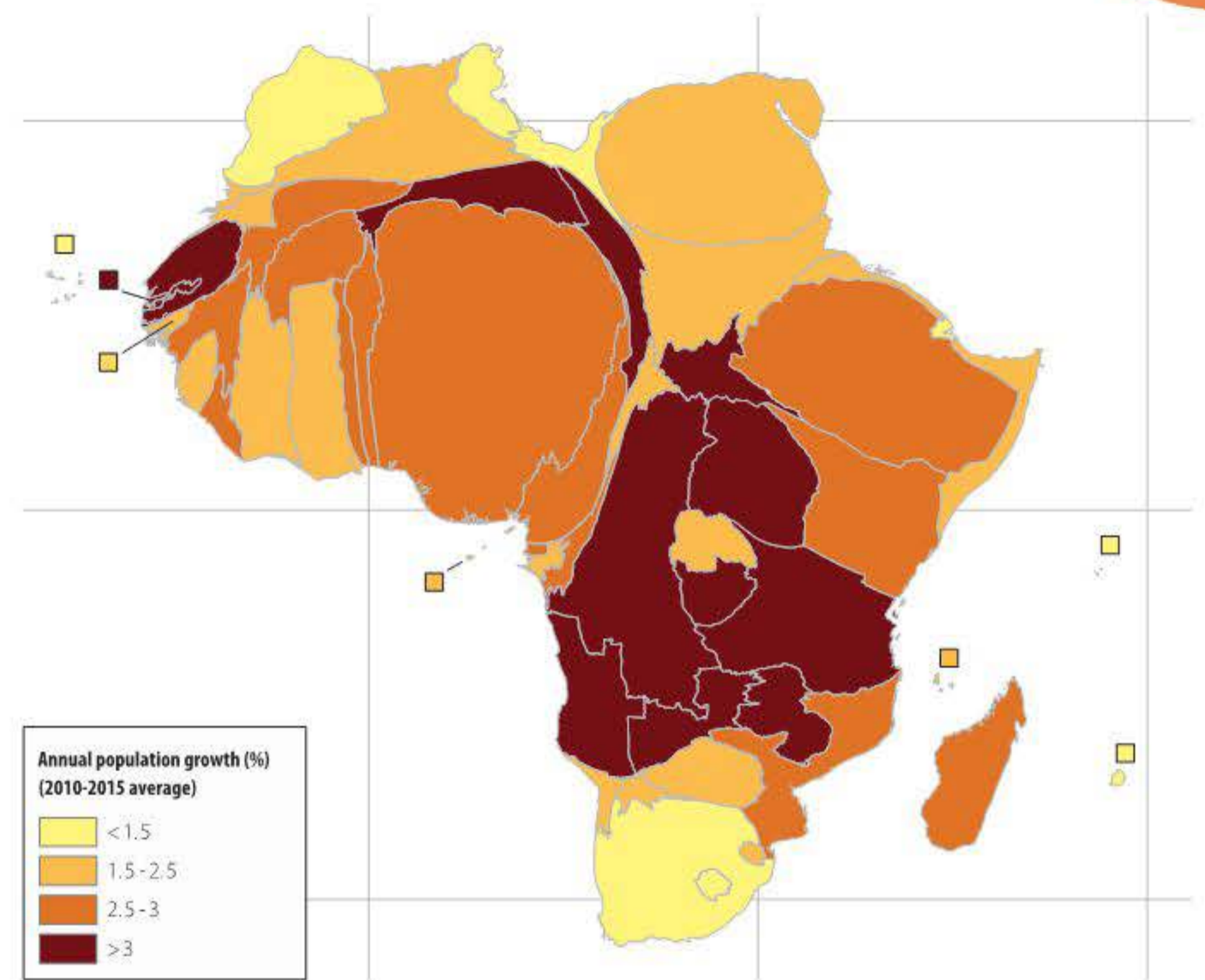
Source: WDI (see note page 69)



M12. Population by country in 2015

Representation proportional to population size in 2015

Source: WPP 2015 (see note page 69)



M13. Average growth of GDP per capita (2005-2014)

Source: WDI

OPTIONS FOR ECONOMIC TRANSITION: FROM SECTORAL APPROACHES TO THE TERRITORIAL MODEL

Despite recent yet fragile economic growth, structural change in Africa has been slow and the continent is faced with the need for more inclusive and sustainable growth. This challenge implies rethinking development strategies and adopting multi-sectoral and place-based approaches.

• Africa's diversity

Since the beginning of the century, Africa has been marked by high economic growth that was not affected by the financial crisis of 2008-2009, which impacted the other parts of the world. This growth was driven by the expansion of domestic demand linked to slow improvements in the standard of living and to population growth, but also by the export boom and the rise in prices of the continent's abundant commodities. This trend is however changing because of the slowdown in growth in Asia and in global demand for mining and oil products.

This observation nevertheless masks a variety of regional and national situations. Over and above the political crises that have affected or are still affecting several countries, with major impacts on their domestic growth, different trajectories of structural change are observed in Africa. First, it is important to distinguish the two extremities of the continent – the five North African countries and South Africa –, which have annual per capita income of between USD 3 000 and 7 000, diversified economies, high levels of urbanisation and low population growth (between 1.5 and 2.5% per year). Next, "middle Africa" – sub-Saharan

Africa minus South Africa – has 38 countries out of 48 where annual per capita income is less than USD 1 500, where economies are predominantly based on agricultural and mining activities (which exceed 40% of GDP in 25 countries, whereas the manufacturing sector only exceeds 15% in seven countries), and finally where the population is still largely rural with a population growth rate of more than 2.5% year (and more than 3% in 12 countries).

Thus, although sub-Saharan Africa accounts for 75% of the African population, it corresponds to only 45% of the continent's GDP. This very specific situation is the result of the sub-continent's late integration into the global economy, of a restrictive colonial rule causing territorial fragmentation that was enhanced after independence, and of recent, rentier urbanisation relying on administration and raw materials. Sub-Saharan Africa is marked by urbanisation without industrialisation, an exceptional situation in the economic history of the world. Despite these common characteristics, some countries that have no mining activities (especially in East Africa) have succeeded in initiating their economic diversification with an increase in exports of higher value-added products.

• Options for more inclusive and sustainable growth

More than ever, the challenge now is to build momentum for growth that will provide decent jobs for the 440 million young people who will enter the job market over the next 15 years,

while taking into account adaptation to climate change and the need for natural resource management.

Several sectoral options are being discussed in order to identify the best potential for growth. Industrial development, which has traditionally been a major source of jobs in other parts of the world, remains the reference. New possibilities exist, especially with light industrialisation in some segments of global value chains and rising labour costs in Asia. But there are still many structural obstacles (infrastructure, skills, services) to meeting this challenge in the medium term.

Agriculture remains a priority sector since it still employs the majority of workers. Its development provides well-known leverage which, through the steady increase in agricultural income, enables growth in rural demand and the gradual diversification of activities. The agricultural development model adopted is crucial here, at the risk of favouring capitalistic options based on large, highly mechanised farms, to the detriment of more labour-intensive approaches based on family farming. Increasing agricultural income remains a key issue that requires proactive public policies.

The shift towards a service economy, "leap-frogging" industrialisation, is under discussion. But this option will struggle to meet demand for jobs in sectors that are themselves subject to international competition. Green growth, based on low-carbon technologies, using more labour and developing environmental services, could be another alternative, but the specifics have yet to be defined.

• Mobilising territorial resources

More than ever, the scale of the challenge implies reinvesting in effective development strategies that take into account the sectoral and geographic distribution of activities and

people, and that build on existing development potential at the local, national and regional levels. It is unlikely that the option of export-based development, to which the Asian model owes its success, would be replicable in the new international context.

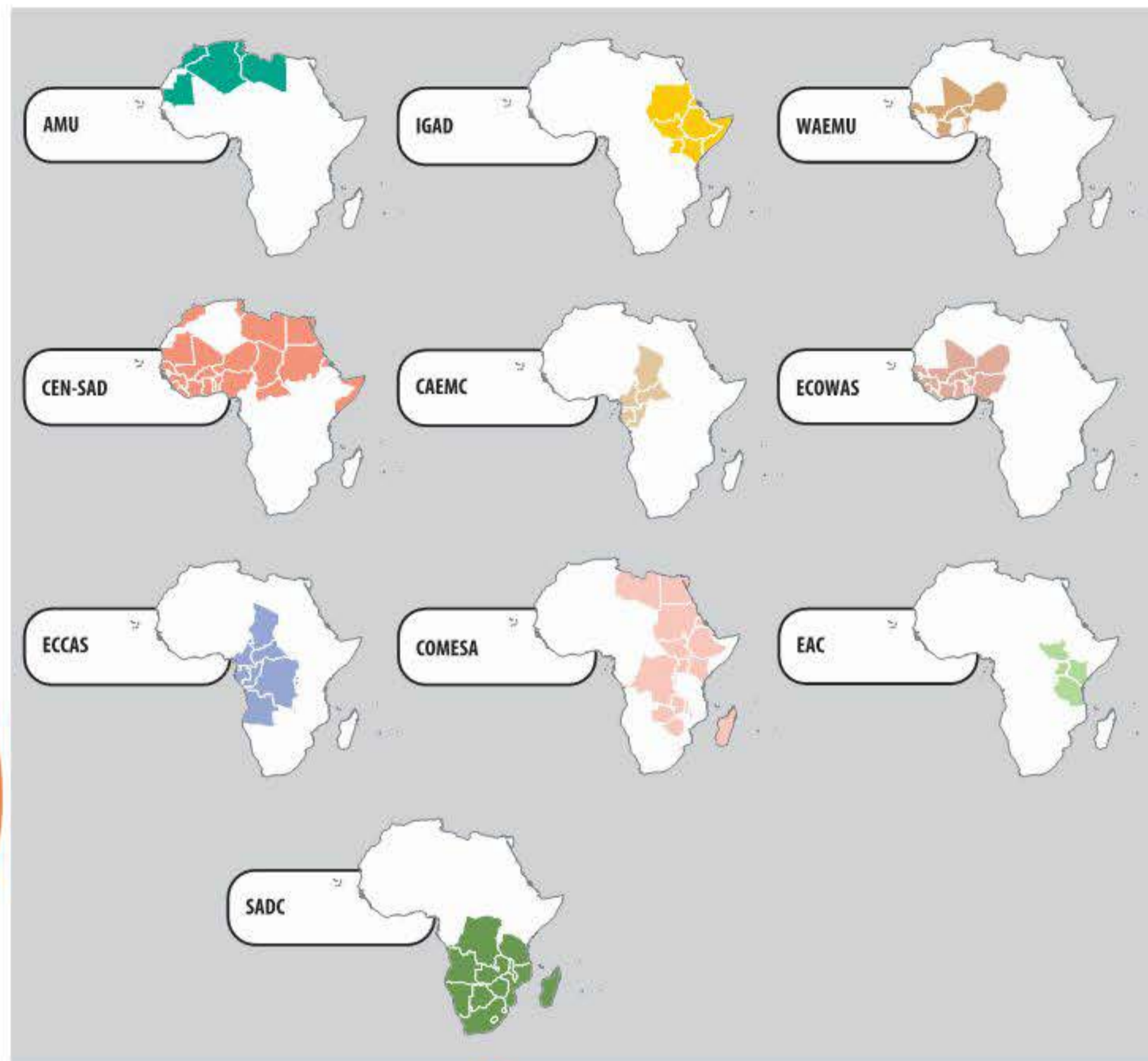
This change of perspective implies moving away from the excessive segmentation of public policies, with their fragmented sectoral objectives, in order to unlock the potential for territorial development: better understanding the assets and identifying and removing obstacles based on concerted analyses resulting in strategies for action.

In particular, this approach implies reducing the territorial asymmetries inherited from the past, with urban structure imbalances in favour of capitals, where small and medium-sized towns are unable to act as a real driving force due to a lack of infrastructure and services. Investment in public goods at this level of the urban structure could potentially unlock local dynamics, strengthen the linkages between urban and rural areas required for diversification, and develop the very specific resources to each territory.

Bruno Losch

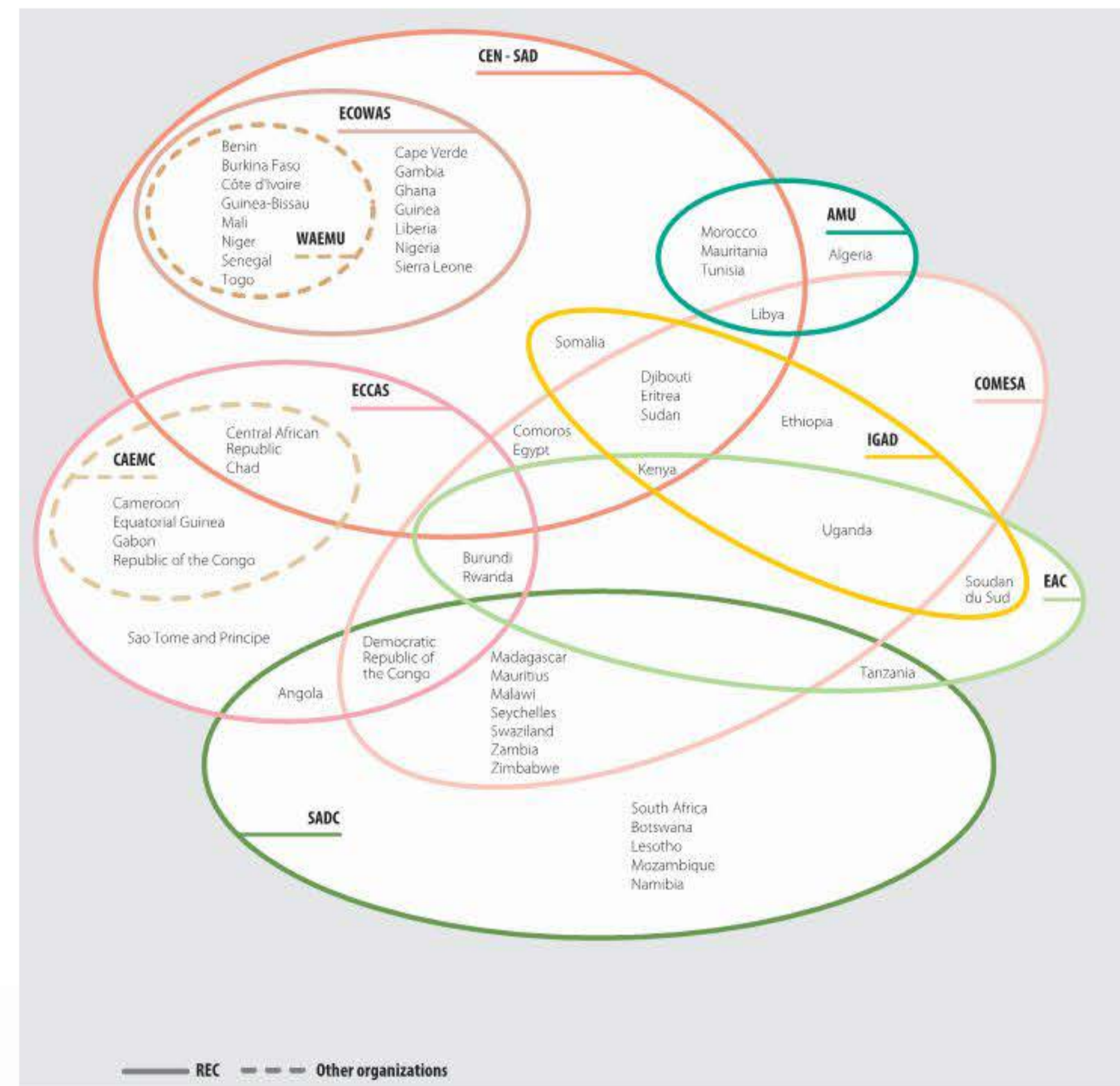
M14. Regional organisations in Africa and countries members

Source: auteur



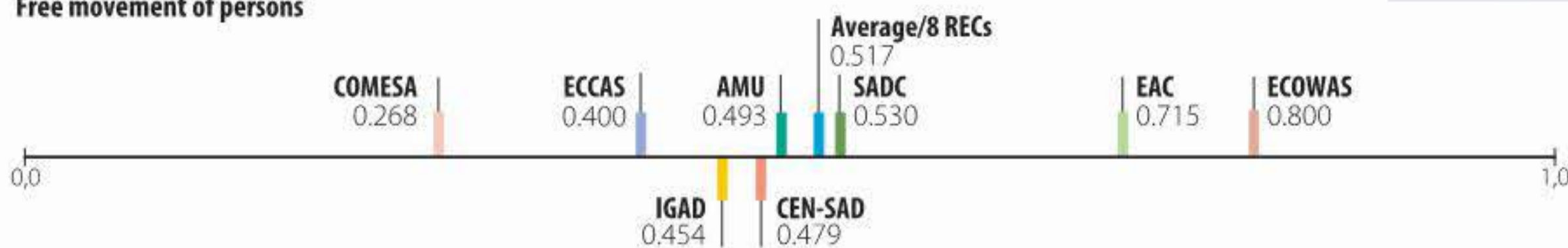
M15. Overlaps between the regional organisations in Africa

Source: auteur



Mean score per REC

Free movement of persons



Trade integration

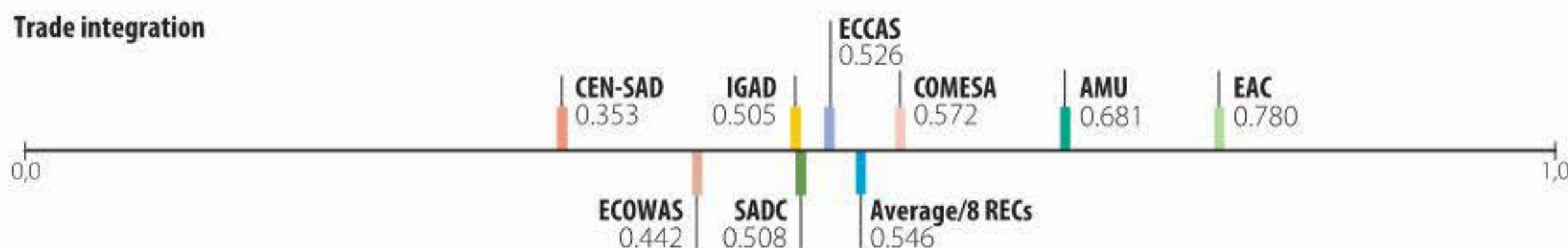


Fig. 7. Average scores for the free movement of people and the trade integration

Source: BAD, 2016 (see note page 69)

REGIONAL ORGANISATIONS IN AFRICA: OVERLAP, COLLABORATION AND ACTION

For Africa, with its 1.15 billion inhabitants in 2015, a market of 54 countries and a young, rapidly growing population, the opportunities are great. But the continent's transformation and development must be inclusive and African regional organisations have a key role to play in integrating the different regions into the process of change.

• New places for public policy making?

The regional integration process is generally economically and politically motivated. Against the backdrop of globalisation, the states are seeking to increase their influence in international negotiations. The complexity of development processes and environmental issues, their cross-border nature and the increase in tensions and conflicts are also driving the states to cooperate within the regional areas under construction. African integration gained momentum in 2002, when the Organisation of African Unity (OAU) became the African Union (AU). But there are many regional organisations in Africa that form a complex and dynamic architecture. These organisations overlap and some countries are members of several of them, such as the Democratic Republic of the Congo, which belongs to ECCAS, COMESA and SADC, or Uganda, which belongs to COMESA, IGAD and EAC. This complexity sometimes hampers coordination initiatives, since each organisation applies different standards and controls, as with UEMOA and ECOWAS.

Today, the African Union's integration strategy is based on the use of Regional Economic

Communities (RECs) as "milestones" leading to the creation of a single continental trade bloc. However, although the Abuja Treaty provides for the creation of five RECs corresponding to the five regions initially recognised by the OAU, there are still eight RECs at present.

Few regional organisations truly benefit from the transfer of sovereignty: this is the case, but still very partially, for COMESA and UEMOA. SADC and ECOWAS are playing an increasingly important role in terms of peace and security. ECOWAS and EAC have introduced a community passport to facilitate the movement of people and to build a regional identity.

Some smaller regional organisations, which include a number of states for a specific problem, have made real progress in terms of coordination, such as the Organisation pour la mise en valeur du fleuve Sénégal (OMVS – Senegal River development organisation) for water management. In addition to these regional treaties, informal cross-border integration zones are being created in Africa. An economic zone is being developed around Nigeria, with cross-border trade, especially in food products. The Sikasso-Khorogo-Bobo Dioulasso zone, which straddles three countries but has cultural unity, is contributing to informal integration. And large-scale transnational urban basins are taking shape, such as the one in the Gulf of Guinea, which stretches from Abidjan in Côte d'Ivoire to Port Harcourt in Nigeria.

• Progress in regional integration

In order to evaluate progress made in terms of regional integration, the African Union

Commission examines 16 indicators reflecting the Africa Regional Integration Index in five key fields: trade integration, productive integration, regional infrastructure, the free movement of people, and financial and macroeconomic integration. The examples of financial and macroeconomic integration and the free movement of people show that, depending on the criterion selected, the gaps between regional economic areas vary in terms of performance.

To strengthen Africa's position in a context of globalisation, continental organisations have been created under the OAU and later the AU. The establishment of NEPAD in 2001 reflects the continent's political will to follow "a path of sustainable growth and development, and, at the same time, to participate actively in the world economy and body politic".

• Agriculture and rural areas: leverage for integration

Some regional organisations have developed specific policies for the agricultural sector: this is the case of the UEMOA Agricultural Policy (UAP) in 2002 and of ECOWAS with ECOWAP in 2005. NEPAD, with the Comprehensive Africa Agriculture Development Programme (CAADP), is continuing these coordination efforts on agricultural and rural policies. Recognising that the majority of Africans live in rural areas, NEPAD's "Rural Futures" programme seeks to boost action in sectors that drive growth: infrastructure, human resources, agriculture, environment, culture, science and technology. On the assumption of an increase in productivity and in agricultural production through market integration, these agricultural and rural policy frameworks increasingly take into account the importance of territories, with decentralisation and greater stakeholder involvement in natural resource management. Rural areas in Africa and their small towns are

undoubtedly a basis for quieter development than the growth of large cities, but also a sounder one for the African continent..

ECOWAS – Economic Community of West African States

CEMAC – Communauté économique et monétaire des Etats de l'Afrique Centrale (Monetary and Economic Community of Central Africa)

CEN-SAD – Communauté des États sahélo-sahariens (Community of Sahel-Saharan States)

COMESA – Common Market for Eastern and Southern Africa

EAC – East African Community / Communauté est-africaine

IGAD – Intergovernmental Authority on Development

NEPAD – New Partnership for Africa's Development

SADC – Southern African Development Community

AU – African Union

UEMOA – Union économique et monétaire Ouest Africaine (West African Economic and Monetary Union)

UMA – Union du Maghreb arabe (Arab Maghreb Union)

Jacques Imbernon, Denis Pesche

M16. Decentralisation : official documents and means

Source CGLU Afrique, Cities Alliance, 2015 (see box and note page 69)

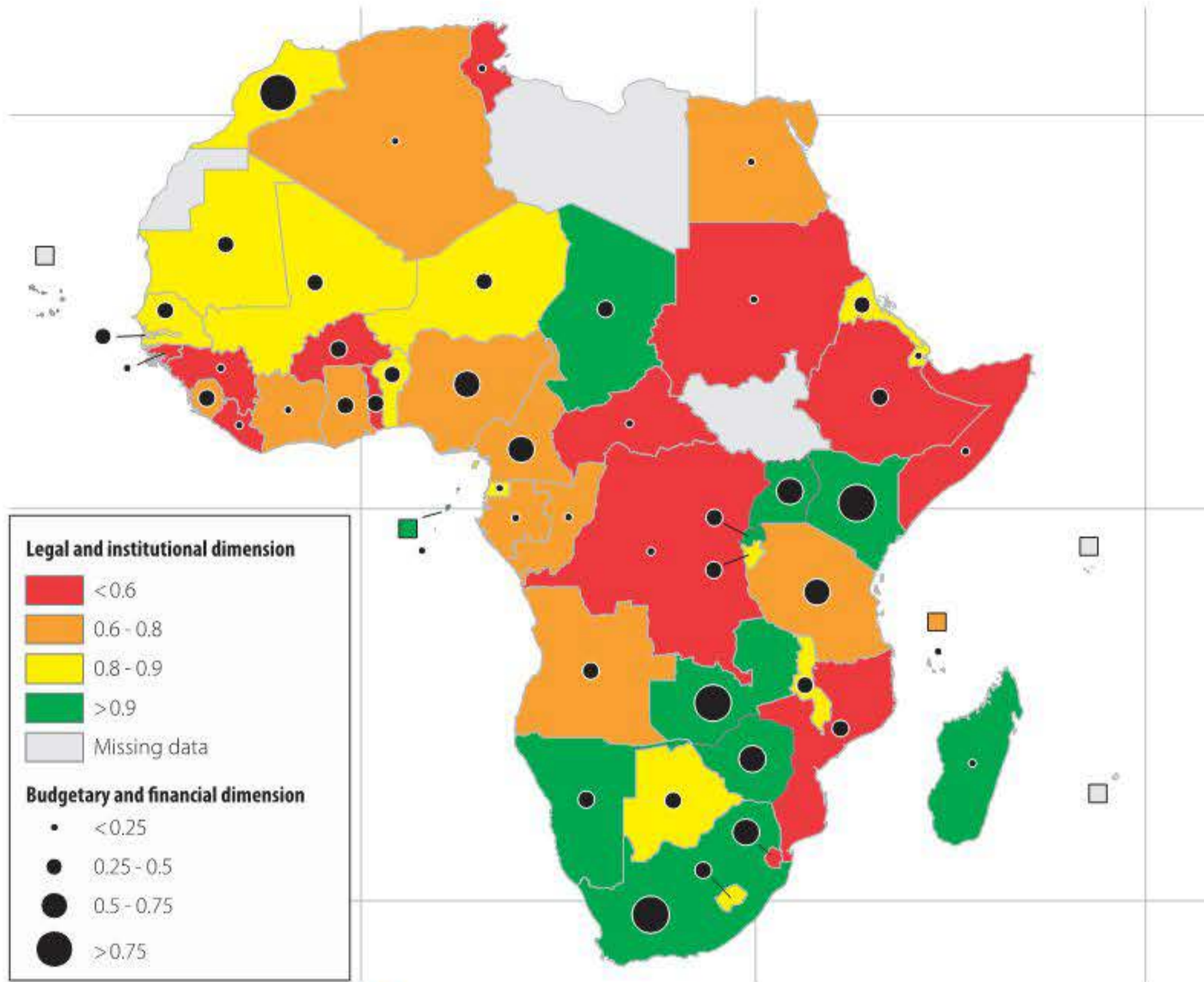
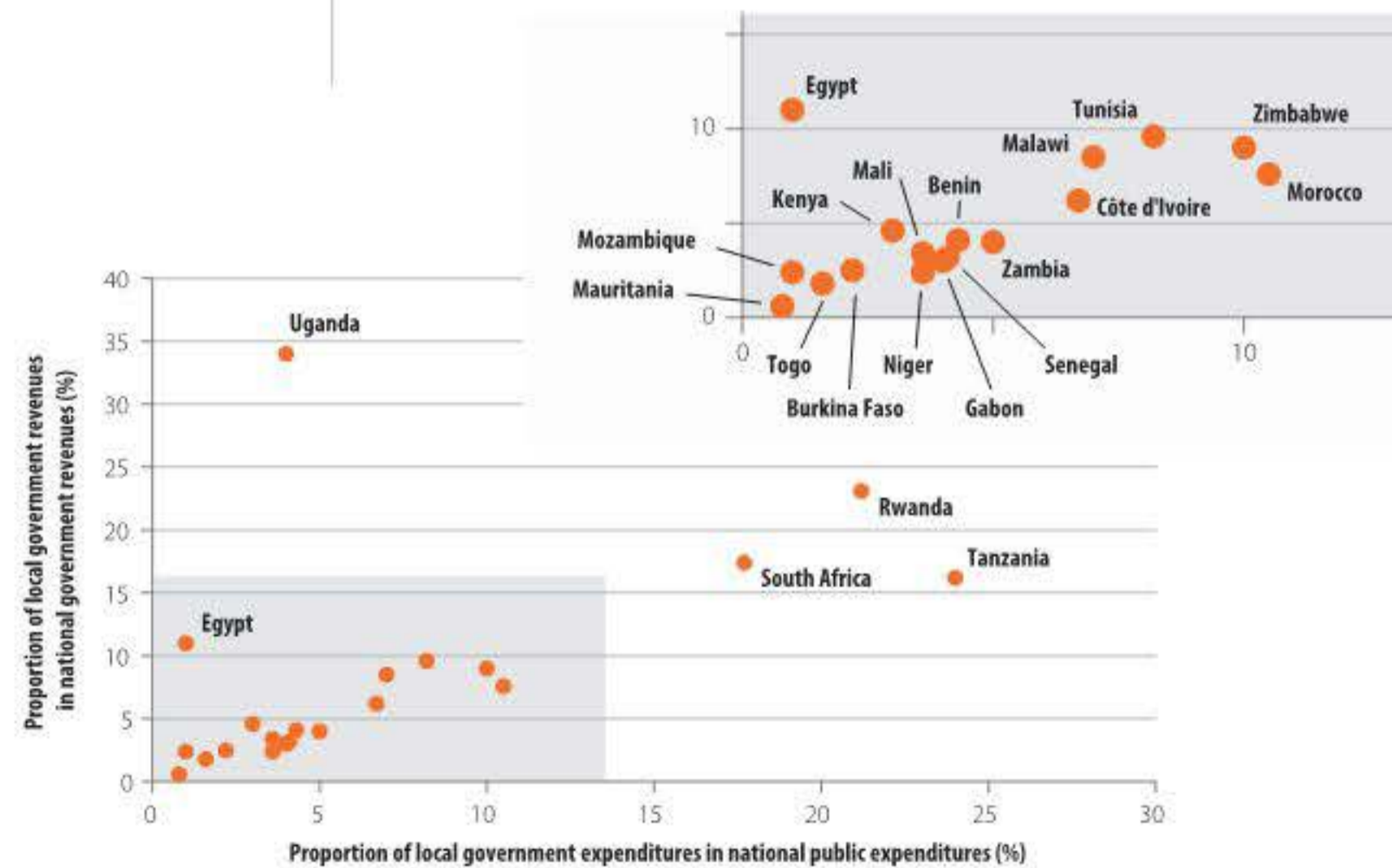
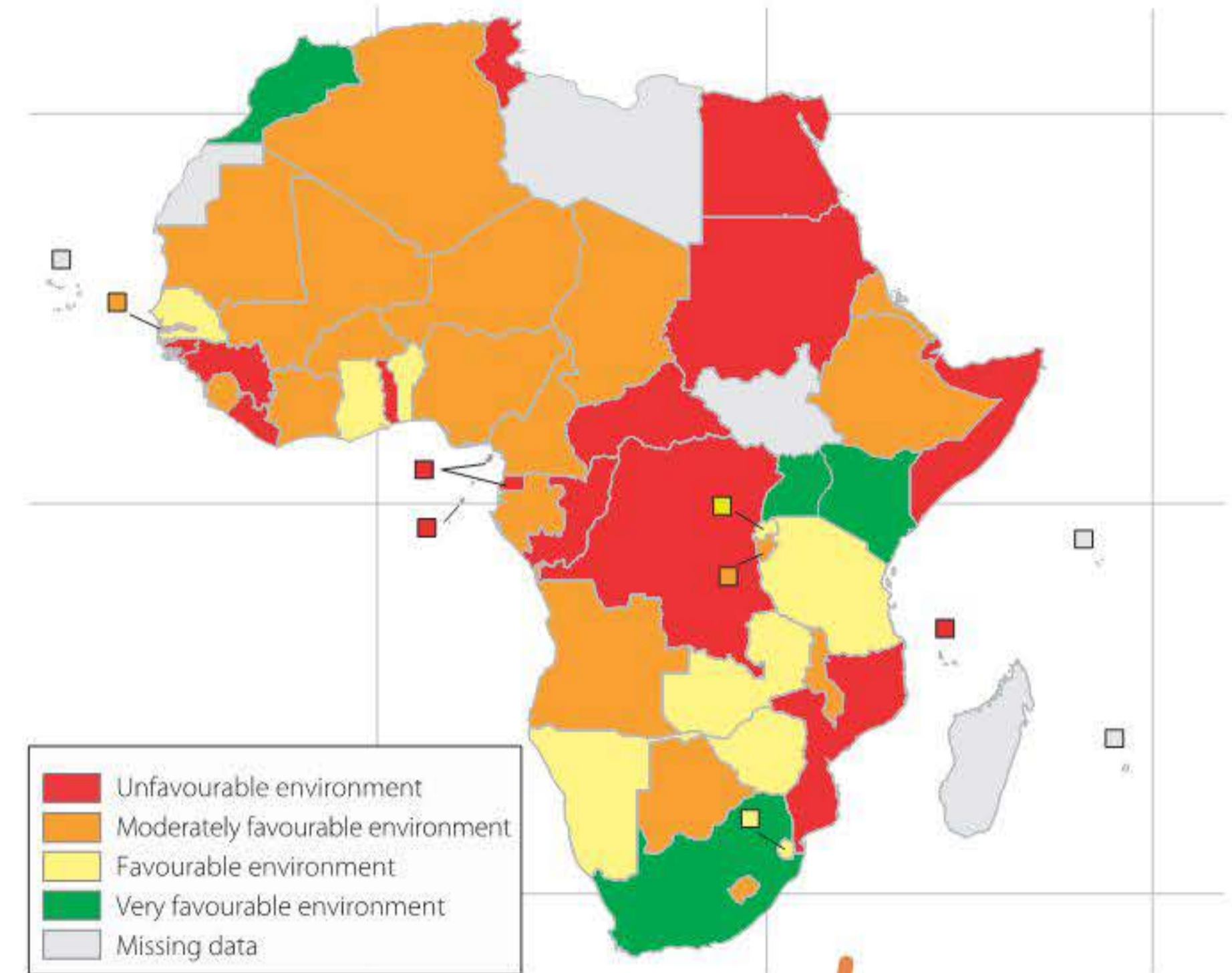


Fig. 8. Finance and local budgets

Source OCDE 2015

M17. Institutional environment of local governments

Source CGLU Afrique, Cities Alliance, 2015 (see box and note page 69)



DECENTRALISATION IN AFRICA: AN OPPORTUNITY FOR RURAL AREAS?

In Africa, as in the rest of the world, decentralisation is a key element of the institutional and political reforms undertaken since the 1990s. The decentralisation process is only just beginning to materialise in terms of the financial and budgetary autonomy of the local authorities. However, decentralisation remains promising for rural areas with authorities that have considerable governance potential for rebalancing investment, ensuring regional equity and managing tension and crises linked to resources.

• Decentralisation: a relatively recent process

With the establishment of local political and administrative authorities, each with their own powers and led by local officials, decentralisation is associated with the idea of better governance. By stimulating local development and bringing together policy makers and citizens, it holds the promise of new legitimacy for public action, which has been undermined by the structural adjustment policies of the 1980s and 1990s. Moreover, it is supposed to have a positive effect on stability, development and democracy. For rural areas in particular, decentralisation may foster better articulation between urban and rural territories, by building on mobility and trade between rural villages and intermediate towns, helping to boost the local economy through greater proximity between private initiatives, social dynamics and local decision-makers.

Many different factors are important in explaining the diversity of decentralisation dynamics depending on the country: the colonial legacy, institutional federalism, or the political

party system. The reality of decentralisation also depends on the quality of the devolution of the state and its administration or of the general functioning of the state in the case of a federal system: in both cases, the articulation between the local and central authorities is a decisive factor in planning the future of these rural territories. The combined analysis of several criteria makes it possible to examine the legal reality of decentralisation, but also its financial reality.

Local taxation is a good indicator of decentralisation and of the role actually played by the local authorities in the development of their territory. The share of local revenue and expenditure in global public expenditure clearly illustrates the fact that, with the exception of a few countries (Tanzania, South Africa, Uganda, Rwanda), decentralisation remains tentative and relatively ineffective. The local authorities rarely have the budgetary autonomy that would enable them to set up their own taxation system and they are generally very restricted in their expenditure, remaining largely under the supervision of central states. Consequently, the impression of greater decentralisation in some East African countries suggested by the maps should be balanced against the fact that the local authorities have limited powers in comparison with some French-speaking West African countries.

With decentralisation, the government of a country generally operates on three levels: central, regional and local. In rural areas, the regions (or provinces) sometimes have powers in terms of agricultural or rural policies. The local authorities are playing an increasingly important role in the field of natural resource management,

even if, for problematic issues such as property rights, the status of land and access to land, the central authorities continue to play a decisive role in large-scale land allocations.

• Decentralisation: an opportunity to be consolidated

Decentralisation is often perceived and presented as being able to play an important role in improving the living conditions of rural populations, through better access to basic services (health, education), but also through productive investment and rural infrastructure capable of boosting the local economy (roads, warehouses, local markets). It implies greater involvement of local people in their own development, which often varies according to the nature of the political regime.

Paradoxically, by giving powers to the local authorities for natural resource management and in particular for land tenure, decentralisation may contribute to "locally centralising" powers that were previously exercised by the villages or customary authorities. It is not unusual to find that decentralisation has increased the influence of several powerful local stakeholders, often officials, without opening up opportunities for people to participate in local affairs.

Today, almost all countries have a legal and constitutional framework for decentralisation and the challenge is to strengthen the existing local authorities to enable them to stimulate innovative governance that facilitates territorial development. Another challenge is to improve synergies between economic and social dynamics, the local authorities and the different state components (ministries and administrations) acting in the territory. But the increasing mobility of products, information and people makes governance structures more complex.

Decentralisation dynamics are also part of change processes concerning the role of the state and the increasing role played by regional economic organisations. The progress of decentralisation, supported by local social dynamics, territorial cohesion and socio-economic development, may provide a response to growing tension surrounding the use of resources, and may even make it possible to anticipate or prevent potential conflicts linked to the demographic and political restructuring underway in Africa.

The institutional environment of towns and local authorities is evaluated based on criteria concerning five fields – local governance, local capacities, financial autonomy, local efficiency and national institutional environment. The first map provides a representation of the formal progress of decentralisation by combining this progress in legal and constitutional terms (3 criteria) with the "reality" of decentralisation in terms of financial autonomy (2 criteria). The second map illustrates the favourable or unfavourable nature of the institutional environment of the local authorities based on the total marks obtained for each of the 10 criteria (CGLU, Cities Alliance, 2015)..

Denis Pesche and Amadou Diop



RURALITY, ACTIVITIES, RESOURCES

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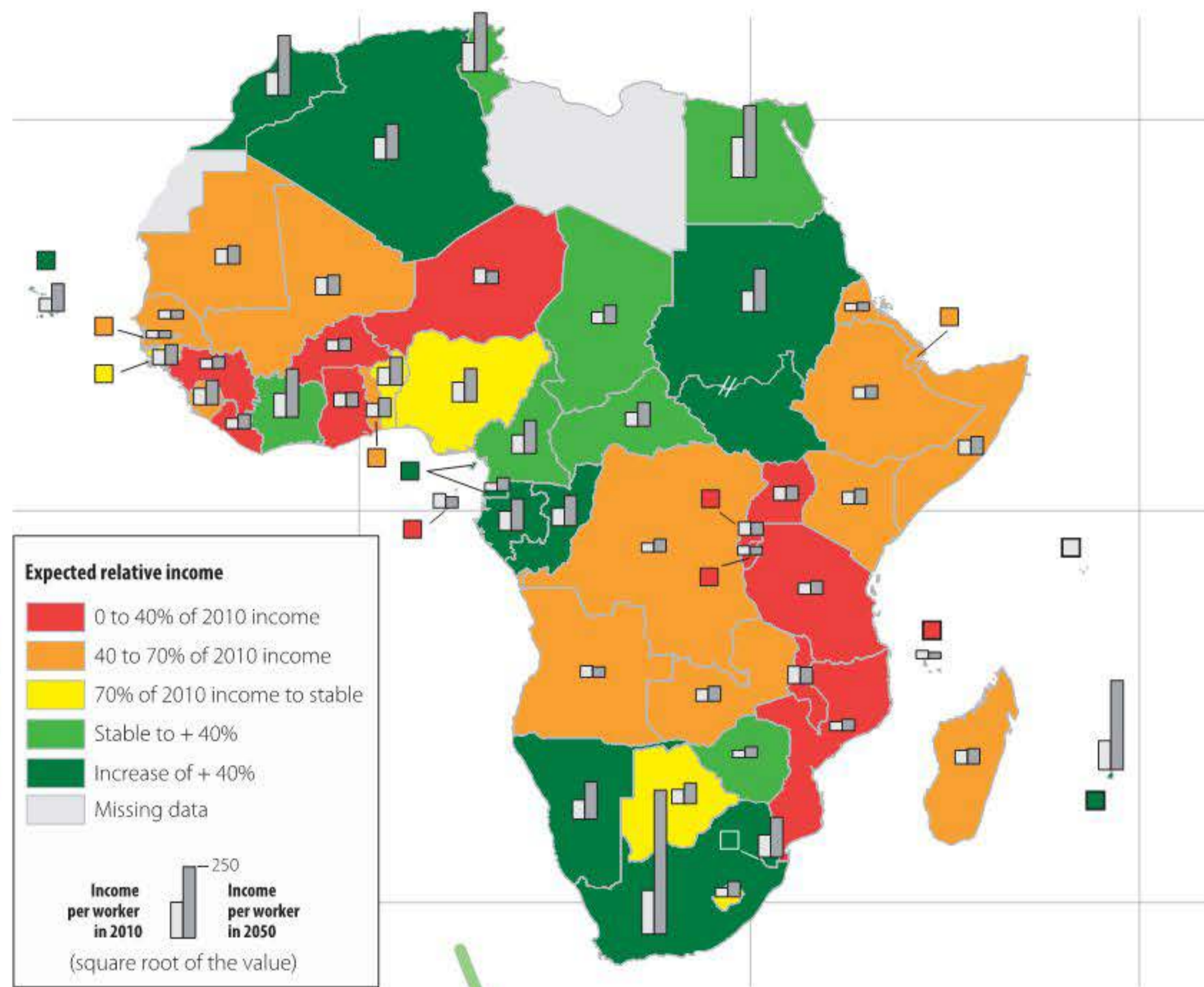
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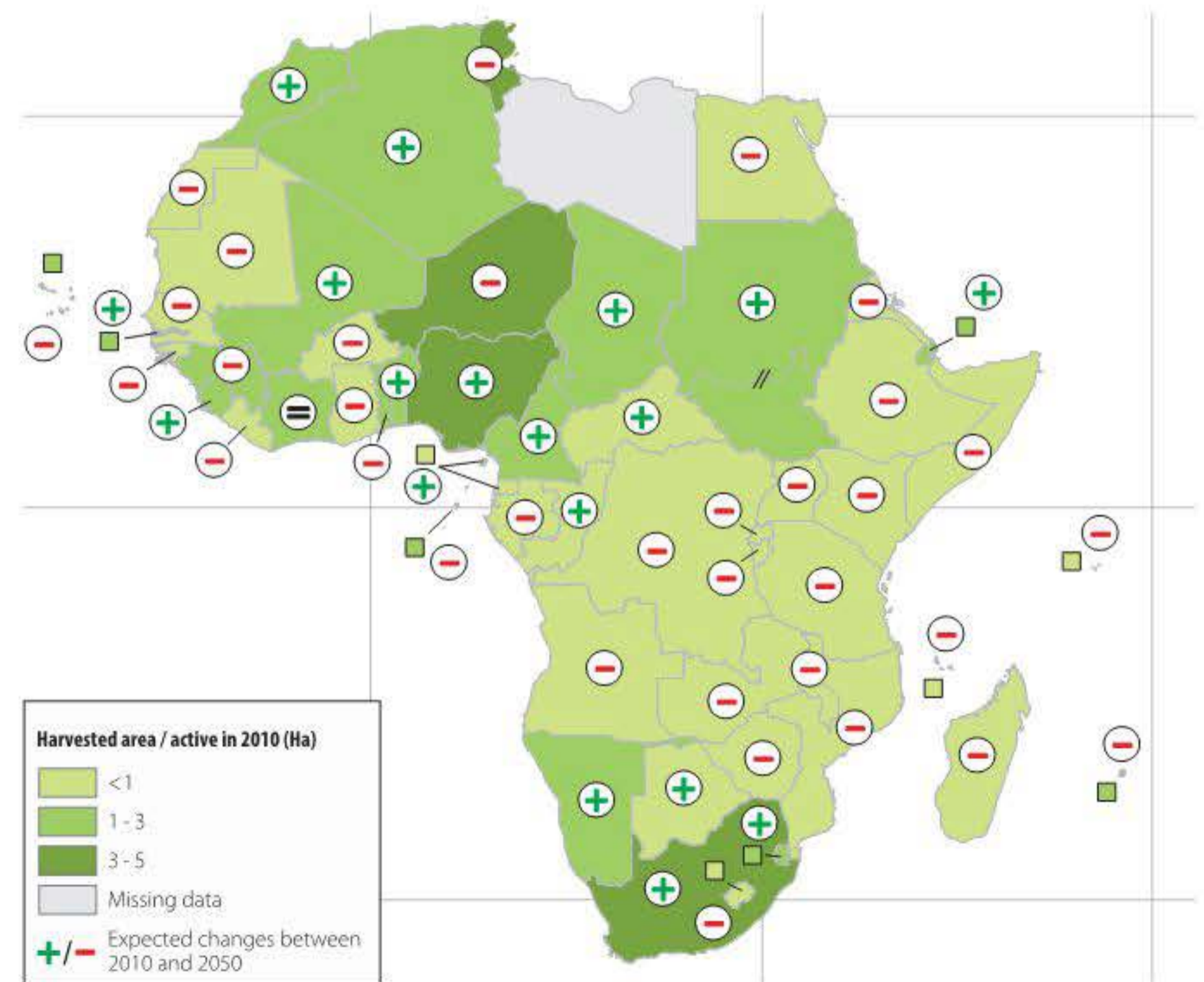
M18. Evolution of agricultural income between 2010 and 2050

Source: author



M19. Harvested area /worker in 2010 and 2050 projections

Source: author



WHICH PATHWAYS FOR AGRICULTURE BY 2050?

By 2050, some African countries will be able to leverage growth in their economies to bolster agricultural production through support policies, while others will have to resort to applying social measures to the sector in order to maintain stability and territorial balances.

• Agriculture and structural change

The agriculture and food sector is often held up as an example of an activity that will be capable of absorbing surplus labour in the future and becoming a major contributor to national wealth. This position implies that structural change – characterised by a decrease in the share of farming in employment and global wealth – could be deferred for several decades, or that Africa could take a different development path to the traditional trajectory of change.

Leveraging the agri-food sector also assumes that farmers will be able to make a decent living from their activity, yet access to land will become increasingly difficult as a result of high population growth and climate change could reduce the potential for higher yields. There are more and more obstacles to aligning farm income with other sectors of activity. However, income gaps between sectors have as much impact as disparities in access to social infrastructure when it comes to determining migration dynamics, especially between rural and urban areas, and they can thus contribute to territorial imbalances.

• Productivity gains offset by the rapidly growing labour force

Optimistic projections for 2050 based on “potentially cultivable land” anticipate a possible 80% increase in cropped areas in Africa relative to 2010. According to this hypothesis and with an estimated 330 million more people entering the agricultural labour force, land available per farm worker could fall from slightly more than 1 ha on average to around 0.7 ha. In some countries, pressure for land could result in land per worker being more than halved.

Under these conditions, leveraging agriculture implies ensuring ample scope for increasing yields or cropping intensity. Irrigation potential is certainly high, but climate change will affect the productivity of land and marginal land will also be used for cropland expansion. By applying green revolution solutions to areas currently cultivated, or adopting more intensive technology packages for less productive land, we obtain similar labour productivity projections of around 4 200 dollars in purchasing power parity per worker/ year by 2050, or an increase of 40% in relation to the 3 000 dollars per worker/year in 2010. This outlook seems encouraging at first sight and would mean agriculture could contribute to stabilising balances between economic sectors. But anticipated changes in national economies must also be taken into account, as this growth corresponds to an increase of only 0.9% of annual income, which is low. It also masks some major disparities: in 27 countries, farm income would more than double, in nine it would decrease, and 16 countries would find themselves

somewhere in between. In the most critical cases, migratory pressures, risks of shortages and poverty could dramatically increase.

• Different trajectories requiring differentiated treatment

Income convergence between the agricultural sector and the rest of the economy will be very unequal. In a quarter of African countries, gaps between farm income and global income varied by a factor of 1 to 4 or more in 2010. According to our projections, this gap could concern twice as many countries by 2050. However, the number of countries with farm income levels higher than 75% of all workers' income would remain stable (12). In a small number of advanced transition countries, or countries that have yet to maximise their agricultural potential, the situation of farmers could even improve in relation to the rest of society, provided that there is an enabling institutional environment. But when income gaps coincide with a reduction in the absolute value of agricultural income, we can expect serious difficulties ensuring the agricultural sector plays its expected role as a provider of employment and a regulator of migration movements and rural depopulation.

The historical path of the most developed countries combines income convergence and agricultural population decline. Some countries in the more advanced stages of demographic transition and economic diversification could follow this path. For a minority of intermediate countries where population growth has begun to slow, or where pressure for land is relatively low, we project more favourable paths for the agricultural sector with income convergence, in spite of a growing agricultural population. Finally, the majority of countries are on a worrying course towards income divergence between sectors, while the number of farmers will increase. For some of these countries, global economic growth and

average income growth will put the agricultural population at the bottom of the league.

It will therefore be necessary to define specific measures to support farming populations that should be made possible by the global increase in purchasing power. This would provide the flexibility required to stimulate agricultural market growth, to the benefit of producers, especially through an increase in the consumption of higher value-added products (fruit and vegetables, animal products). This context would also be more conducive to the implementation of more ambitious agricultural price policies. However, for many countries, only social measures will enable farmers and their families to maintain an acceptable standard of living. This approach will determine social stability and territorial balances.

Benoit Faivre-Dupaigre



M20. Share of agricultural exports in total exports (average 2012-2014)

Source: Comtrade 2015

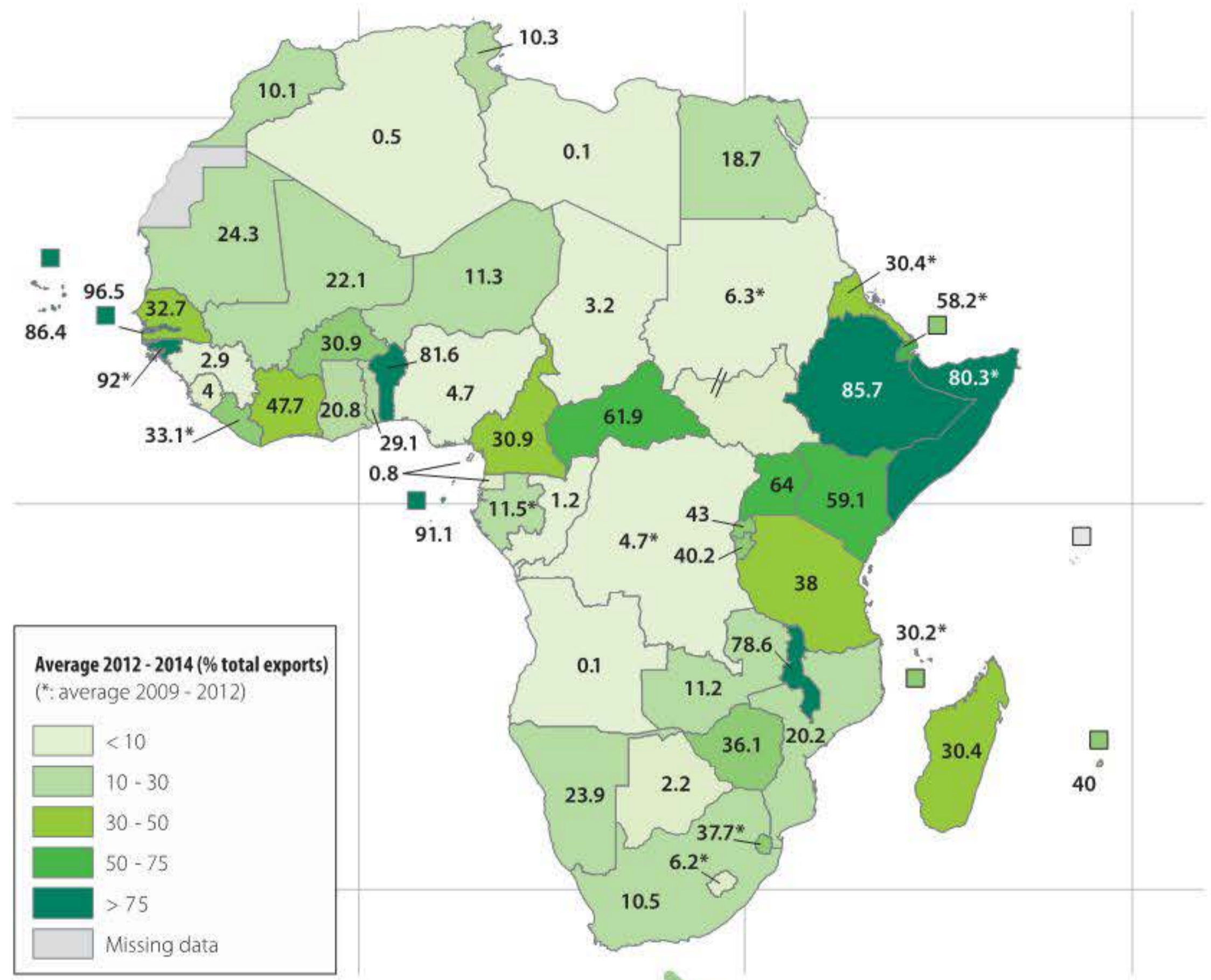
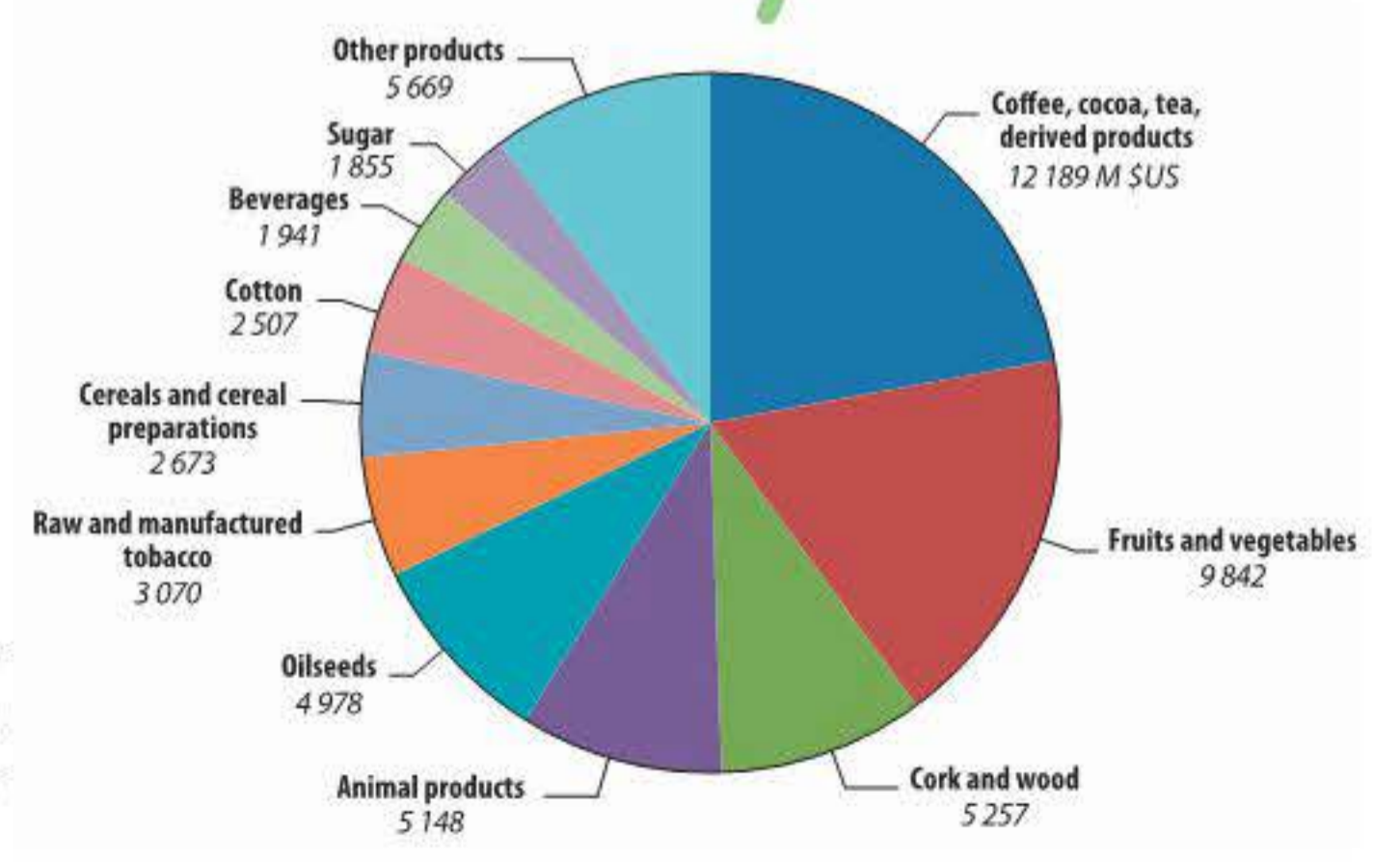
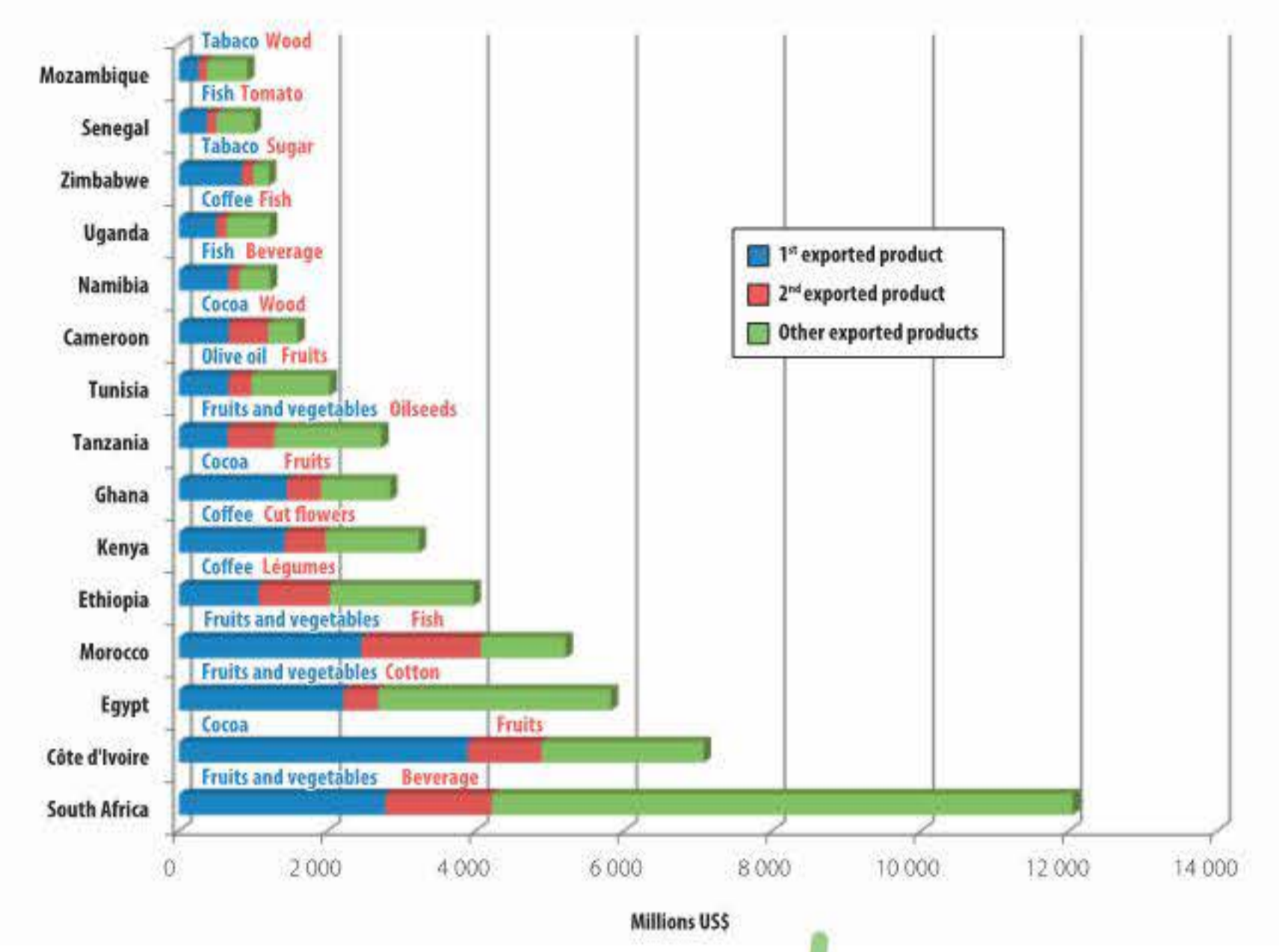


Fig. 10. : Share of the main groups of products in total agricultural exports in 2014

Source: Comtrade 2015

Fig. 9. Major agricultural exporting countries in 2014

Source: Comtrade 2015



AGRICULTURAL EXPORTS: MIXED RESULTS WELL BELOW THEIR POTENTIAL

Exports of agricultural products now account for only 13% of all African exports, a long way behind those of oil, gas and ore. They are nevertheless critical for a number of countries, where they exceed 50% of total export value. Heavy dependence on two or three products is the rule in many countries and a source of weakness. The low level of processing for these products remains a challenge at a time when trade partners are diversifying.

• Major differences between countries

After an overall decrease since 2000 (when it stood at 20%), the share of agricultural products in total African exports of goods and services now seems to have stabilised at between 10 and 15%, with variations according to the mining boom, and even seems to be gaining some ground. The sharp fall in non-agricultural commodity prices over the last two years will undoubtedly enhance the role of these exports in trade.

The average values nevertheless mask considerable disparities within Africa, ranging from less than 1% to more than 80% of exports depending on the country. In the oil producing countries, agricultural products are marginalised or even virtually absent from exports. At the other end of the spectrum, agricultural products account for the majority of exports in around 15 countries, especially in East Africa, but also in Malawi, Benin and the Central African Republic.

Africa still makes a limited contribution to international agricultural markets (3.8%) and has not recovered its market share of the 1960s. The contributions of the different African countries differ greatly: the 10 largest exporters account for three quarters of all agricultural exports. The leaders are South Africa, Côte d'Ivoire, Egypt and Morocco, which all belong to different sub-regions. The heavy dependence on a limited number of products is another key characteristic of the structure of African exports. For most countries, 50 to 75% of exports are concentrated on two types of products. Cocoa accounts for 65% of agricultural exports in Côte d'Ivoire and 50% of those in Ghana. Half of all Egyptian exports are based on fruits, vegetables and cotton, and 78% of Moroccan exports are based on fruits, vegetables and fishery products. This concentration of exports on just a few products is often inherited from the imperial self-sufficiency policies of the European colonialist countries in the first half of the 20th century, which targeted a small number of products including coffee, cocoa and tea, oilseeds and fruits. This historical specialisation is surprisingly enduring, although it has not prevented the emergence of new exports (vegetables, flowers and fishery products).

• A slight reduction in the coffee-cocoa-fruit specialisation

The structure of agricultural exports (2012-2014) by product type is still dominated by the "tropical beverages" category, in other words

coffee, cocoa and tea, as well as by fruits and vegetables, each category accounting for 20% of total agricultural exports; but the relative importance of these products is diminishing, as they represented 26% and 21% respectively for the 2009-2011 period. The balance has shifted in favour of animal products (basically fishery), timber, and oilseeds.

Fruits and vegetables slightly exceeded tropical beverages in terms of agricultural exports. The traditional sectors are bananas and pineapples in the tropical zones and citrus fruits in the Mediterranean region. But exports of fresh vegetables or fruits, such as mangos and papayas, are rapidly developing. The whole continent is concerned by these fruits and vegetables, which are usually a high value-added sector.

Cocoa, which alone accounts for two thirds of the tropical beverages group, is highly concentrated in the Gulf of Guinea countries (Côte d'Ivoire is the world's number one producer and Ghana is vying with Indonesia for second place, followed by Nigeria and Cameroon). Although it is making some progress, as in Côte d'Ivoire, local processing is still a very weak point. African coffee production has been progressively marginalised in countries such as Kenya, Côte d'Ivoire and Angola. Tea exports are mostly from Kenya, which is one of the global market leaders, ahead of Vietnam, Sri Lanka and China.

Oilseeds, a traditional African export sector along with groundnuts, sesame and oil palms, declined in the 1990s, before benefiting in the last 10 years from growing demand from the emerging Asian countries (China and India in particular), mostly for palm oil, whose production has been revived (Nigeria, Côte d'Ivoire, Central Africa), especially with Asian investors. New export sectors are also being established, such as sesame in Ethiopia and cashews in Côte d'Ivoire, which has become the world's

leading exporter of raw cashew nuts. Africa provides almost half of all raw nut production, but loses out on kernel exports to Asian producer countries (India and Vietnam), which are also importers. Olive oil is also being revived in Tunisia and Morocco, driven by new demand.

• The dilution of the European market

African agricultural exports traditionally had Europe as their main market, reflecting their heavy dependence on the pathway resulting from the colonial period. More than half of all African agricultural exports still went to the European Union in the early 2000s; but this proportion has been steadily declining since then, falling to 37% in 2010 and to 34% in 2014.

Africa is diversifying its trade partners, especially towards the emerging Asian countries. African agricultural exports to China and India, which were almost non-existent in 2000, have increased sharply in the last 15 years with an average growth rate of 17% and 13% respectively. The Chinese market accounted for 3.9% of African agricultural exports in 2014, and the Indian market 3.6%, and their relative importance should continue to grow in the coming years.

Intra-African trade in food products (cereals, tubers, animal products) should play an increasingly important role in exports, driven by population growth and urban expansion in Africa. Once again, there is considerable potential here for agri-food processing.

Vincent Ribier

M21. Land acquisitions and Chinese agricultural demonstration centres

Source: Landmatrix, Mofcom, Cirad 2015

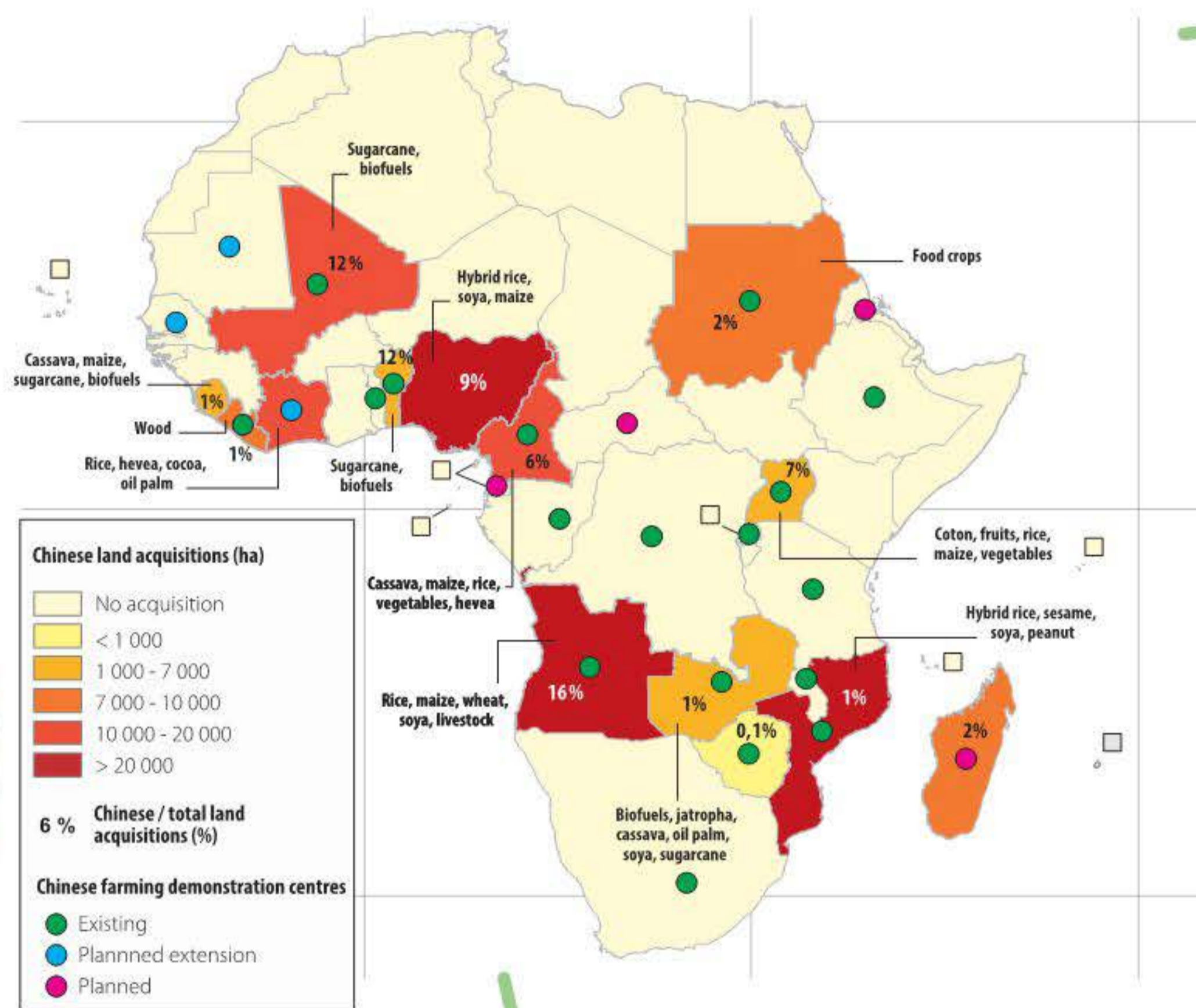
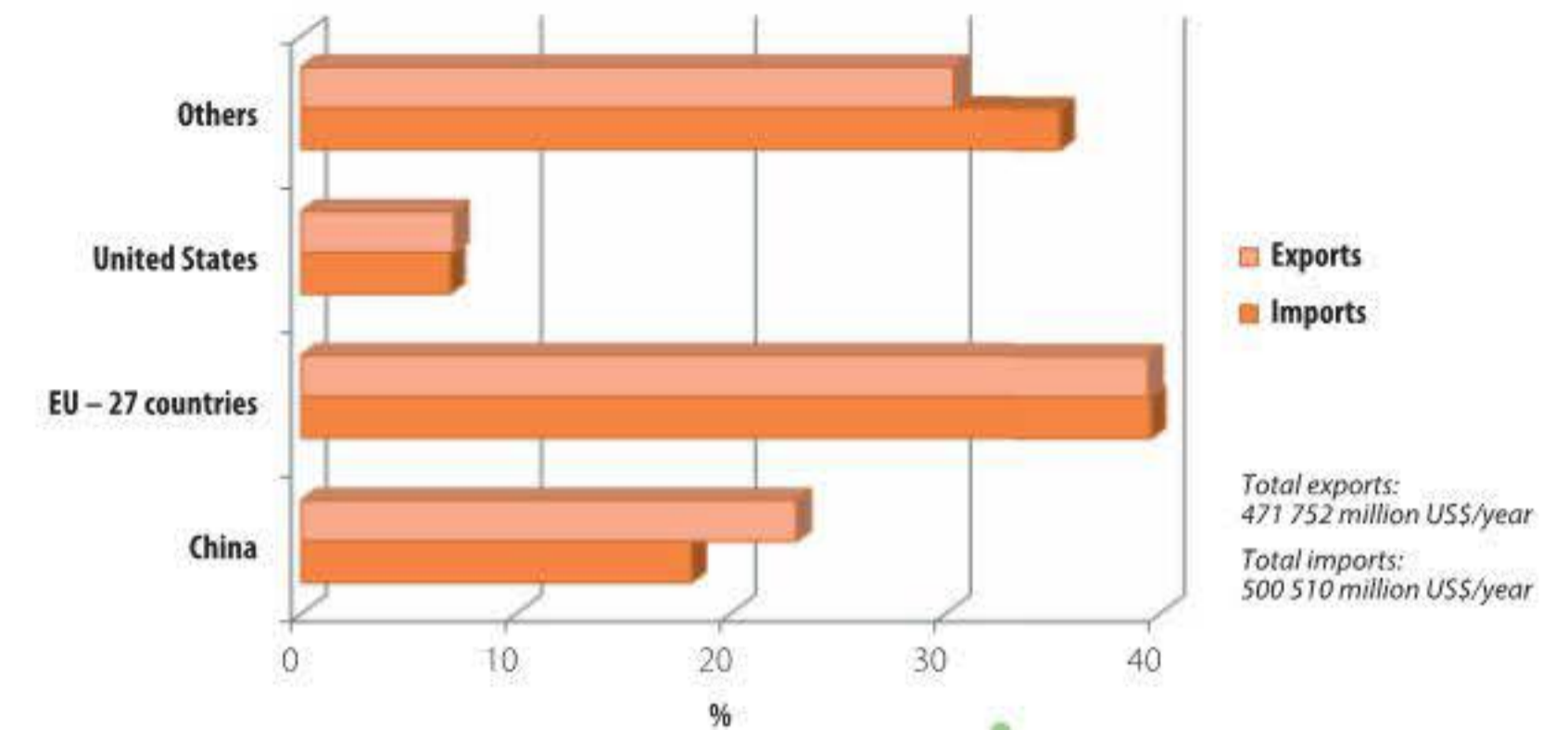


Fig. 11. Amounts of imports and exports with the rest of the world (average 2012-2014)

Source: Comtrade 2015



M22. Chinese foreign direct investment in Africa

Source: Cruce et Mofcom 2015

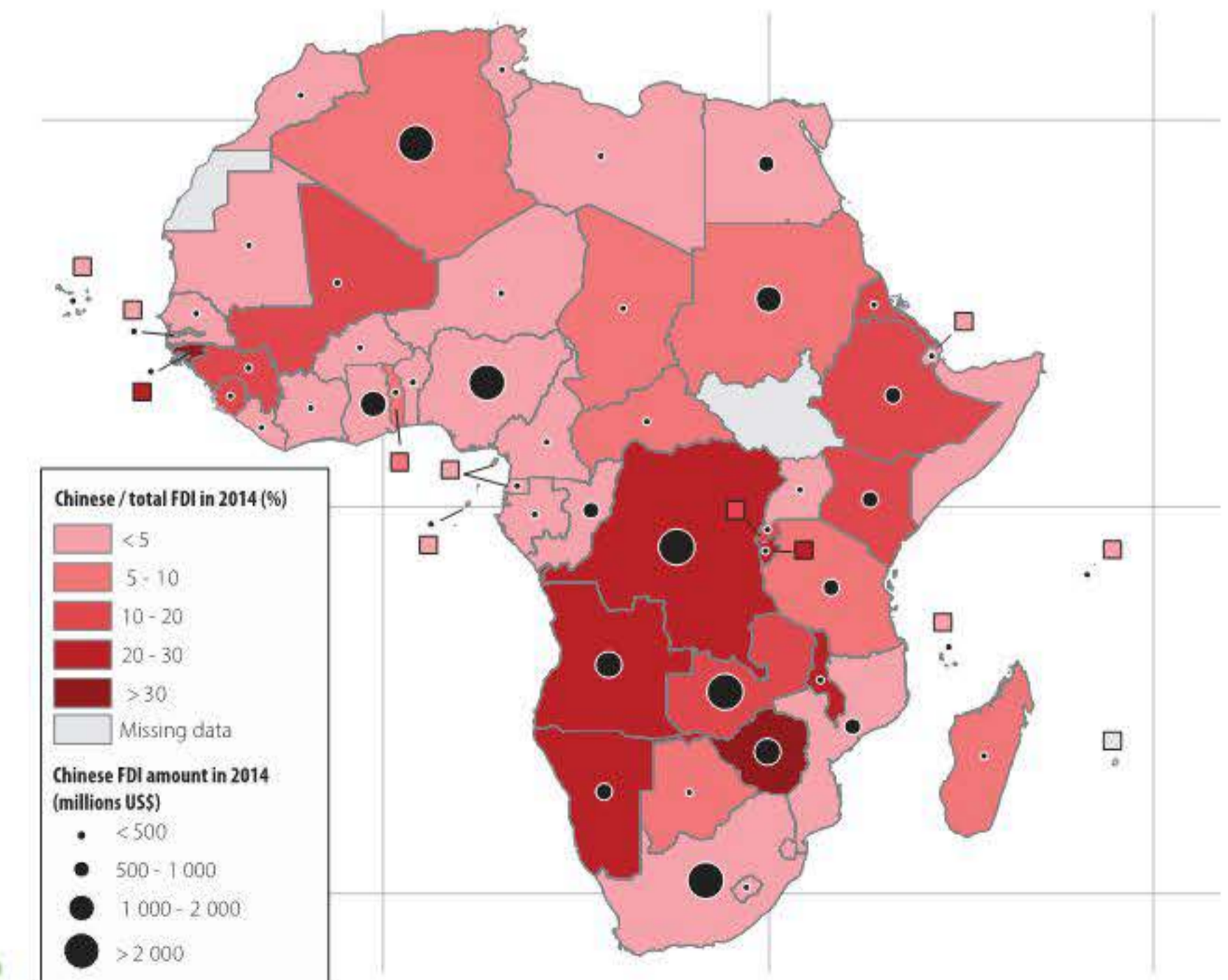
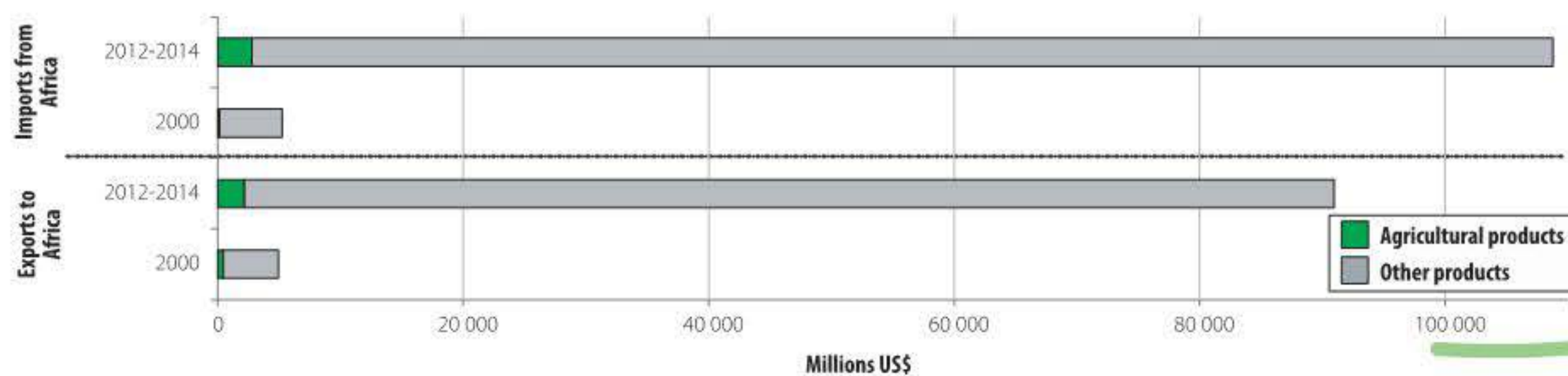


Fig. 12. China-Africa trade relations in 2000 and 2012-2014

Source: COMTRADE 2015



THE PRESENCE OF CHINA IN AFRICA: A ROLE IN FUTURE AGRICULTURE

Contrary to the much-publicized idea of all-out activism, especially in terms of land acquisitions, the presence of China in Africa is multifaceted and should be put into perspective. Agricultural investments remain limited and target only a small number of countries, but agriculture is gradually becoming a priority for China-Africa cooperation.

• A modest investor with a strong presence

Among the emerging powers (Brazil and India, in particular) present in Africa, China holds a unique position in terms of cooperation policies, combining assistance programmes, direct investment, project development and rapid trade expansion. These multifaceted interventions include not only those of large national or provincial public enterprises, the Ministry of Commerce (MOFCOM) in particular, and the major banks (including EXIMbank and the China Africa Development Fund - CADF), but also those of small private entrepreneurs.

Chinese foreign direct investment (FDI) remains relatively low: it accounts for only 3% of total Chinese FDI (70% of which is in Asia), although it is significant in some countries. The vast majority of this FDI is made in the construction and infrastructure sectors, with agriculture remaining marginal. But a diversification is being seen towards the agricultural sector, with equity participation in national companies, such as in the cocoa sector by China National Cereals, Oils and Foodstuffs Corp (COFCO) in Côte d'Ivoire, in the rubber

sector by Sinochem in Cameroon, or in the biofuels sector by Complant in several West African countries.

However, although FDI amounts are small, the turnkey projects conducted and services provided by Chinese companies are growing in importance, especially for infrastructure (construction industry, hydro-agricultural schemes): their turnover far exceeds the volume of FDI in most countries, especially in Algeria, Angola, Ethiopia and Egypt.

Land acquisitions by Chinese companies concern only a small number of countries and total just over 120 000 ha, which puts China very far behind the economic or institutional stakeholders from the OECD or Gulf countries. Most of these large-scale acquisitions are aimed at the production of rubber, cassava (for starch), sugarcane and, to a lesser extent, oil palms. For other agricultural products, contracts with local producers are preferred. These are aimed at domestic or regional markets for rice, vegetables and fish farming, but also at the Chinese market. This is the case for wine growing in South Africa and especially for cotton: more and more Chinese companies are buying a large share of the production from West Africa and Mozambique.

• A key role in trade

Trade between Africa and China increased substantially over the 2000-2014 period. Total imports and exports stood at almost USD 210 billion in 2014, a level that nevertheless remains far below the amount recorded for all 27 European Union countries (at just over USD

360 billion). Since 2015, the slowdown of the Chinese economy is impacting on African exports to China, especially for mining products, but these nevertheless account for almost a quarter of the total value of exports. While South Africa and Angola account for more than 70% of Chinese imports, exports towards Africa are for better distributed, although South Africa and Nigeria constitute around 40% of total trade flows. The structure of trade between China and Africa is very similar to that of Europe or the United States: China mainly exports machines and manufactured consumer goods, textiles, chemicals and metals; and it chiefly imports fuels and ores. The role of agriculture is small and accounts for only 2 to 3% of total trade. The main Chinese exports are cotton and processed wood, tomatoes and green tea (as well as tractors). Almost 50% of these products are sent to Benin, Togo and Nigeria, which act as "bridgeheads". Chinese imports mostly concern timber and raw cotton, sesame, tobacco and wool. South Africa and Zimbabwe supply almost a quarter of these flows.

• A special role for agriculture

Despite the above indicators that provide perspective on China's position in Africa in general, and in the agricultural sector in particular, agriculture "paradoxically" remains a priority for Chinese policy. This sector is placed "at the top of the agenda", as confirmed during the Forum on China-Africa Cooperation, which was held in Johannesburg in December 2015.

The main instrument for China-Africa cooperation in the agricultural sector is the establishment of agricultural demonstration centres. These centres, which are relatively small in size (100 ha at most), are aimed at agricultural experimentation (especially for improved irrigated rice seed imported from China) and technology extension. They are currently being

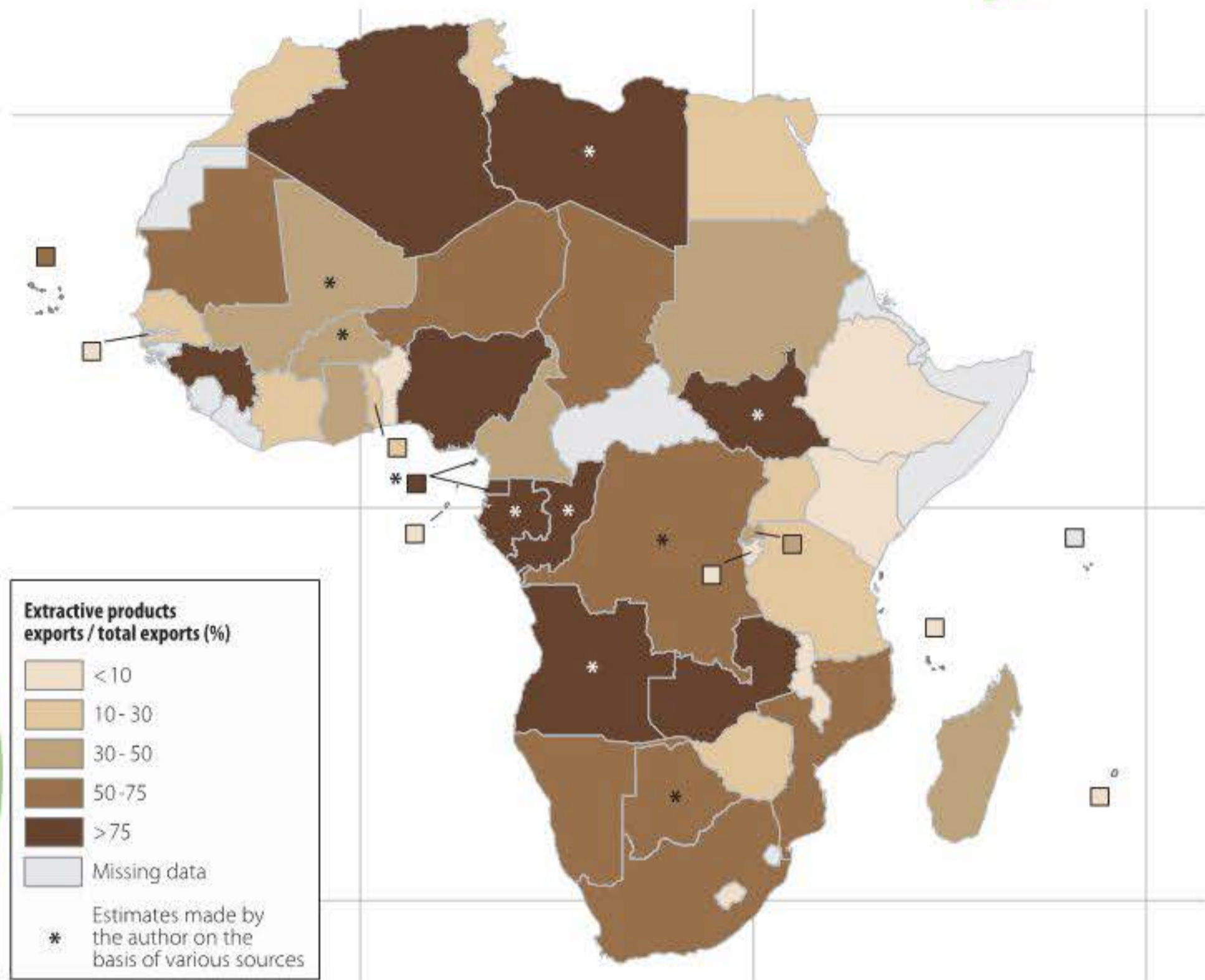
developed and provide different levels of support to the national and regional agricultural research centres. This policy is accompanied by investment in the agri-food sectors and the revival of food crop production.

This support for the food production sector has a strategic goal, since it is aimed at preventing any food crisis in Africa from impacting on international market prices for commodities, especially rice, given that China is still dependent on the world market to meet its domestic demand. This food security objective is a key component of China's policy and of its contribution to the security of the African continent. The FOCAC has, for example, announced a USD 60 billion programme for the 2016-2018 period aimed at "helping" Chinese companies to establish themselves in Africa. Although most of the specific projects are not yet known, this kind of boost will inevitably influence the dynamics of change in the agricultural sector and rural areas.

Jean-Jacques Gabas

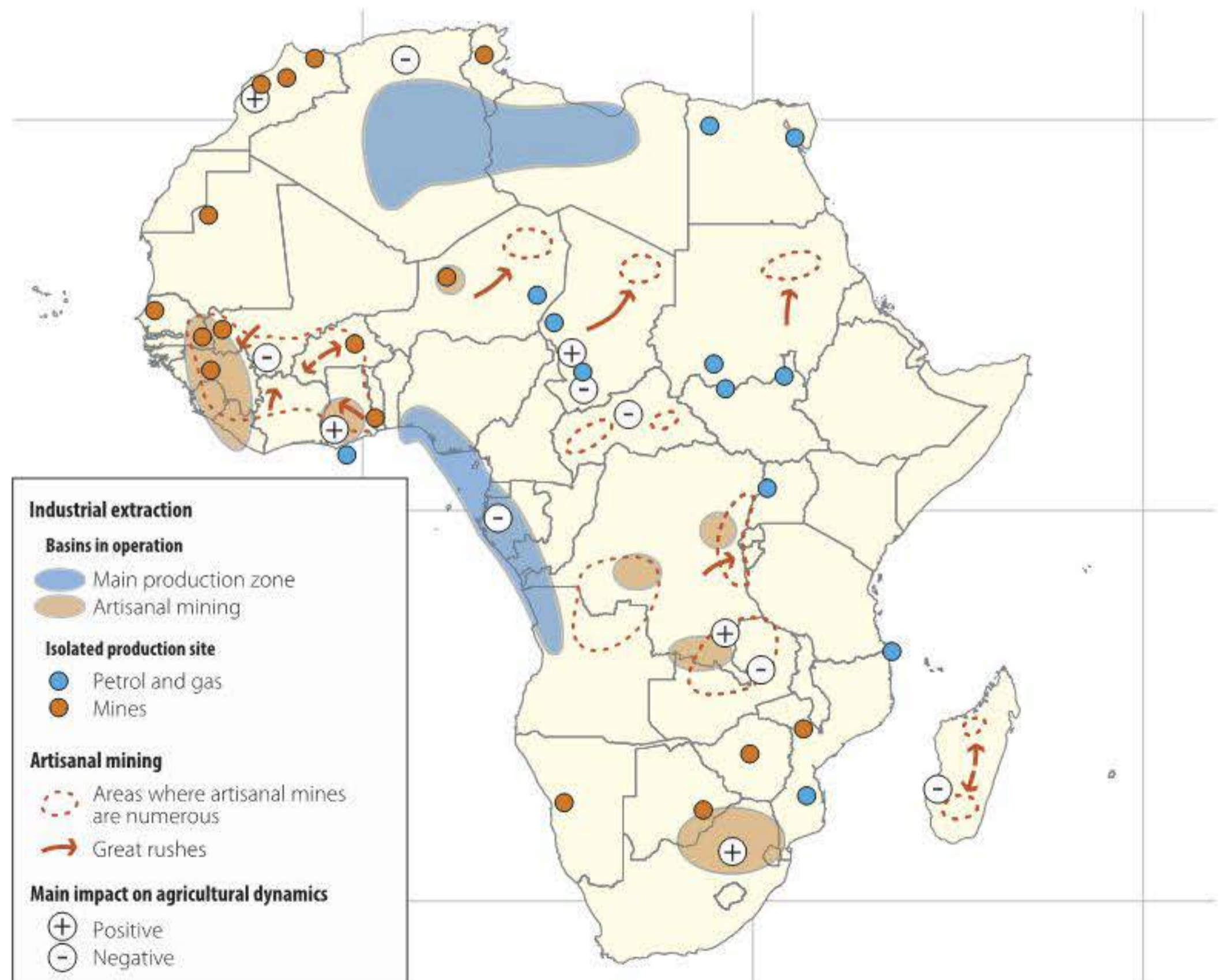
M23. Share of mining in exports by country

Source: Estimates by the Author (see note page 69)



M24. Extractive activities and rural dynamics

Source: Adapted from Magnin 2013 and Atlas Jeune Afrique 2015



MINING ACTIVITIES: NEW DYNAMICS AND RURAL IMPACTS

The mining boom in Africa from 2000 to 2015 has contributed to the economic growth of the continent. The exploitation of mineral resources (ores, hydrocarbons) has two facets, divided between industrial activities that are a major source of revenue for states and an artisanal sector that is a massive provider of jobs. But questions are being asked about the effects of these activities on development, especially in rural areas. New regulations are not enough to correct their adverse impacts. Integrating mining into territorial development remains a challenge.

• Mining booms and rural areas

The current expansion of mining is part of a long historical process. The image of Africa's economic extraversion, exports of mineral raw materials follow boom and bust cycles that impact on rural areas. Gold mining in West Africa and its international trade date back to ancient times. In the Middle Ages, it laid the foundations for the kingdoms of Ghana and Mali: gold panning was a dry season activity conducted there to supplement farming. Industrial mining emerged in the late 19th century in South Africa and in the Copperbelt, where veritable mining regions (gold, copper, cobalt) and urban centres were established, requiring the organisation of interregional flows of food supplies. In the 1950s-1960s, mining investment increased substantially in response to global demand: hydrocarbons from the Gulf of Guinea and the Sahara, bauxite from Guinea, phosphates from Tunisia, Morocco, Senegal and Togo; iron from Mauritania and Liberia; uranium from Niger and Namibia, and gold from Ghana, etc.

After 20 years of lethargy, global growth driven by China has produced a new boom: the traditional mining basins are expanding and new ones are emerging (oil in Sudan, Chad, Niger, and Uganda; gold in Mali and Burkina Faso). Artisanal mining rushes are drawing in tens of thousands of miners (coltan and cassiterite in the Kivu region; sapphires in Madagascar; gold in Burkina Faso and Mali, and in Saharan Niger, Sudan and Chad). These rushes are explained by the price of minerals and technology improvements, which make mining more profitable.

This phase is producing different rural configurations: the nature of the activities concerned determines their impacts and labour requirements: industrial or artisanal; and whether they require major infrastructure (bulk commodities such as iron) or not (high value, low weight minerals: gold, diamonds). The characteristics of the areas in which projects are implemented are also important: whether or not they are densely populated, and whether or not they are in peripheral locations, etc.

• The rural side to the "resource curse"

Mining activities are emblematic of the "resource curse", the idea that in states with weak institutions, resource exploitation is accompanied by macroeconomic and political failures. Although this notion should be qualified, the adverse impacts in question are manifold, especially in rural areas. Thus, "Dutch disease" refers to the tendency of a new mining sector to penalise existing productive activities such as agriculture, especially by drawing in the factors of production (labour, capital). Reve-

nue from mining also creates an "urban bias": a preference for investment in (urban) infrastructure and public services, and subsidies for food imports to the detriment of local farmers (Algeria, Nigeria). In the territories concerned, industrial mines operate as enclaves with no spillover effects in the surrounding area.

At the local level of rural societies, industrial projects and gold panning have serious impacts: the consumption of farmland and pastures; the destruction of landscapes (excavations, waste heaps); the diversion of agricultural labour; inflation or even food crises that are accentuated by poor access to sites; health and environmental risks linked to the use of dangerous products (cyanide, mercury); educational wastage; a crisis of values; and tension between locals and migrants for jobs, which always fall far short of expectations in industrial mines and are inaccessible to low-skilled local workers. At the end of the cycle, the sudden cessation of activities means an inexorable slide into poverty for the towns concerned (Guinea, Zambia, DRC), highlighting their inherent dependence on these activities.

• The challenges of territorial development in mining contexts

However, mining activities also contribute to economic diversification and to the integration of rural territories. They distribute revenue: employment in this modern sector is limited, but salaries are relatively high; the artisanal sector is a major provider of jobs, but income is low and very unreliable. In Burkina Faso, a recent producer of gold, eight industrial mines provided 20 000 direct jobs in 2015, whereas artisanal gold panning employed 1 to 2 million people. Everywhere, the active phases of mining cycles boost the rural economy through numerous services (shops, banks, crafts, restaurants, bars, etc.). Local procurement by

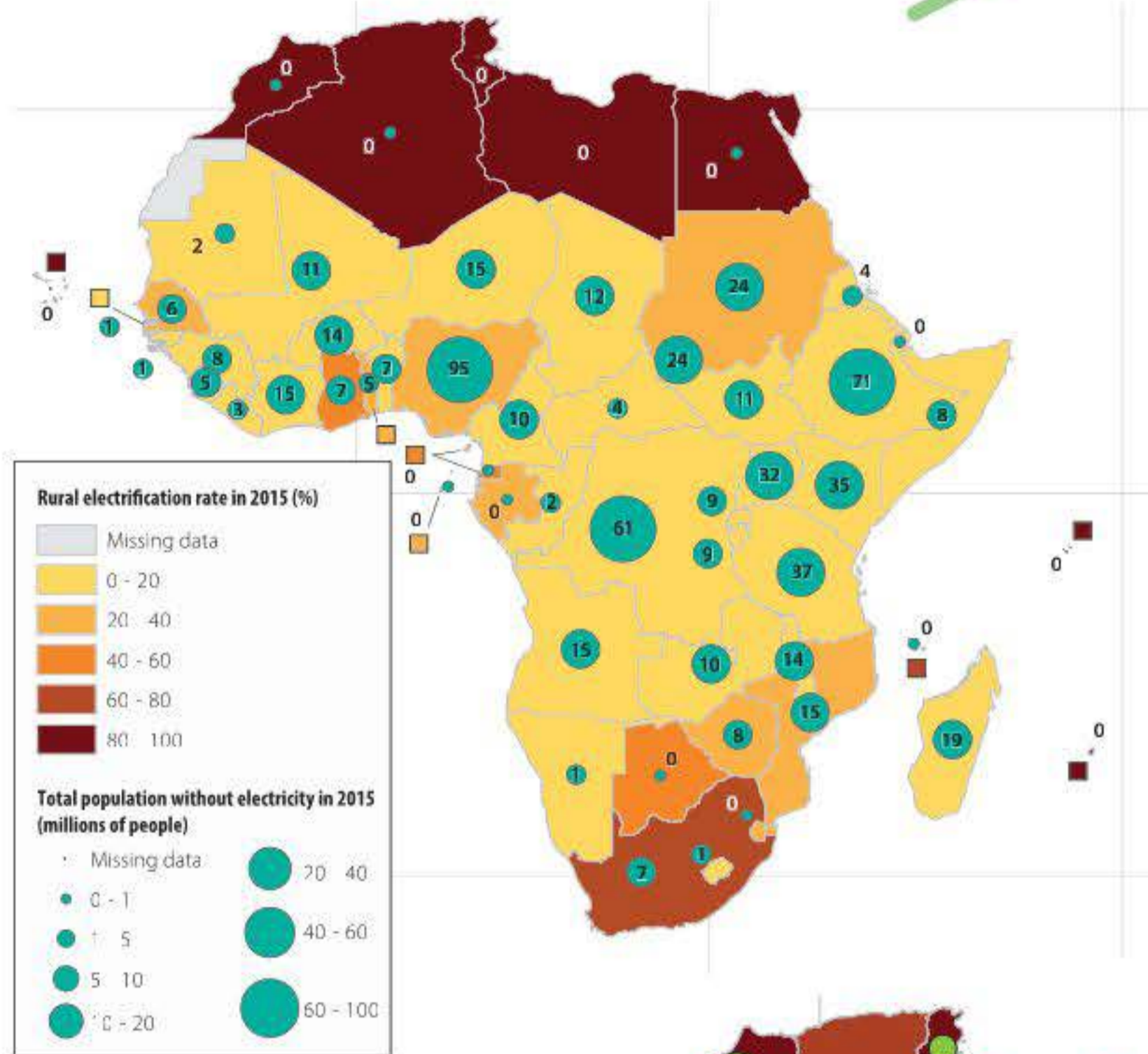
mining companies, which is still limited, sometimes has structural effects – to the point of developing a gold mining cluster in Accra, Ghana. Mining booms also help to integrate some peripheral regions into national territories through infrastructure, transport, flows of information and the dreams that go with them (western Mali, eastern Senegal; oil from Agadem in Niger).

In the 2000s, the wave of regulations on mining revenue was extended to the local impacts of these activities and to improving linkages with the territories. Environmental and social impact studies, the "prior and informed consent" required for projects financed by the World Bank since 2011, and "local content" (obligations for foreign companies in terms of procurement, subcontracting and national employment) are just some of the tools used by NGOs and local people to improve the damage/benefits balance. Compensation and resettlement mechanisms are gradually being improved, even if they have difficulty taking account of the evolution of impacts over time. Beyond the sporadic good will of one operator or another, the integration of mining activities into the public planning of territorial development by the state and local authorities is a major challenge.

Géraud Magrin and
Mouhamadou Lamine Diallo

M25. People's access to electricity in 2013

Source: IEA, World Energy Outlook 2015



M26. Light of the cities at night

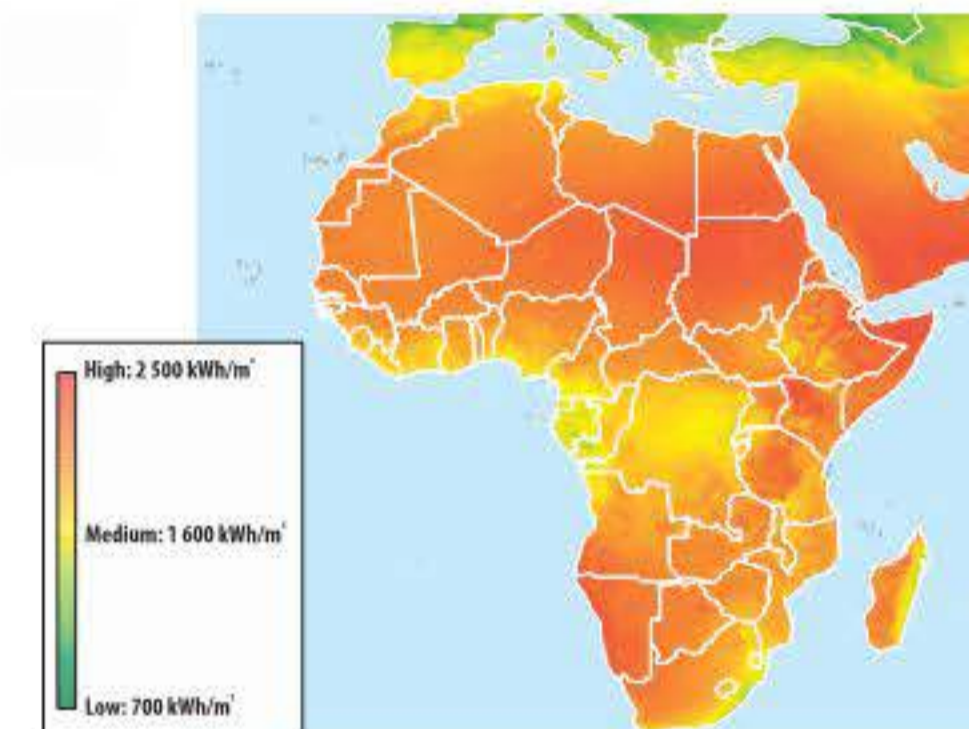
Source: Ginkgomaps



M27. Global solar radiation

Annual average in kWh/m²

Source: PVGIS - JRC 2001-2008



M28. Subscriptions to mobile phone services in 2014

Source: WDI 2015

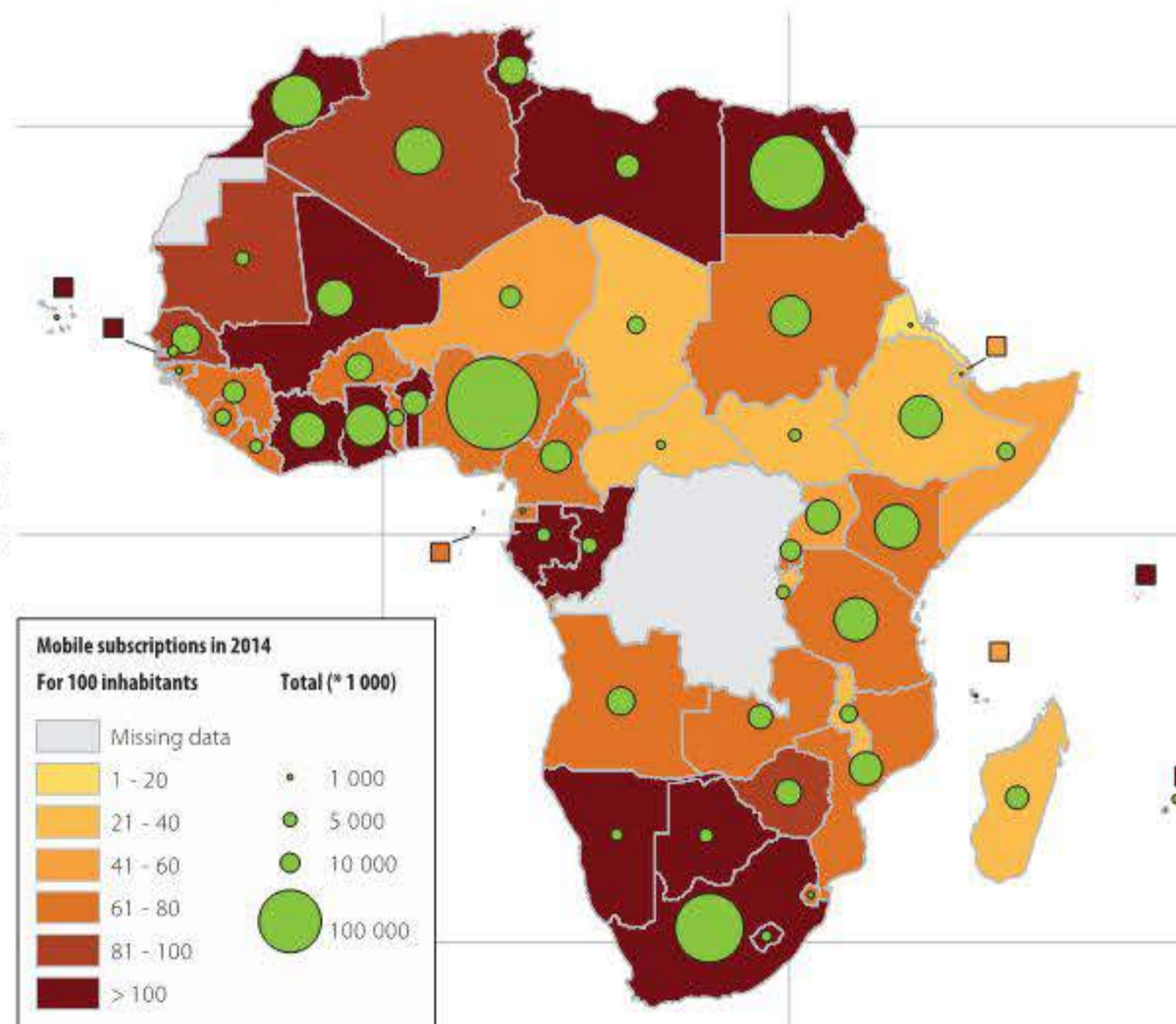
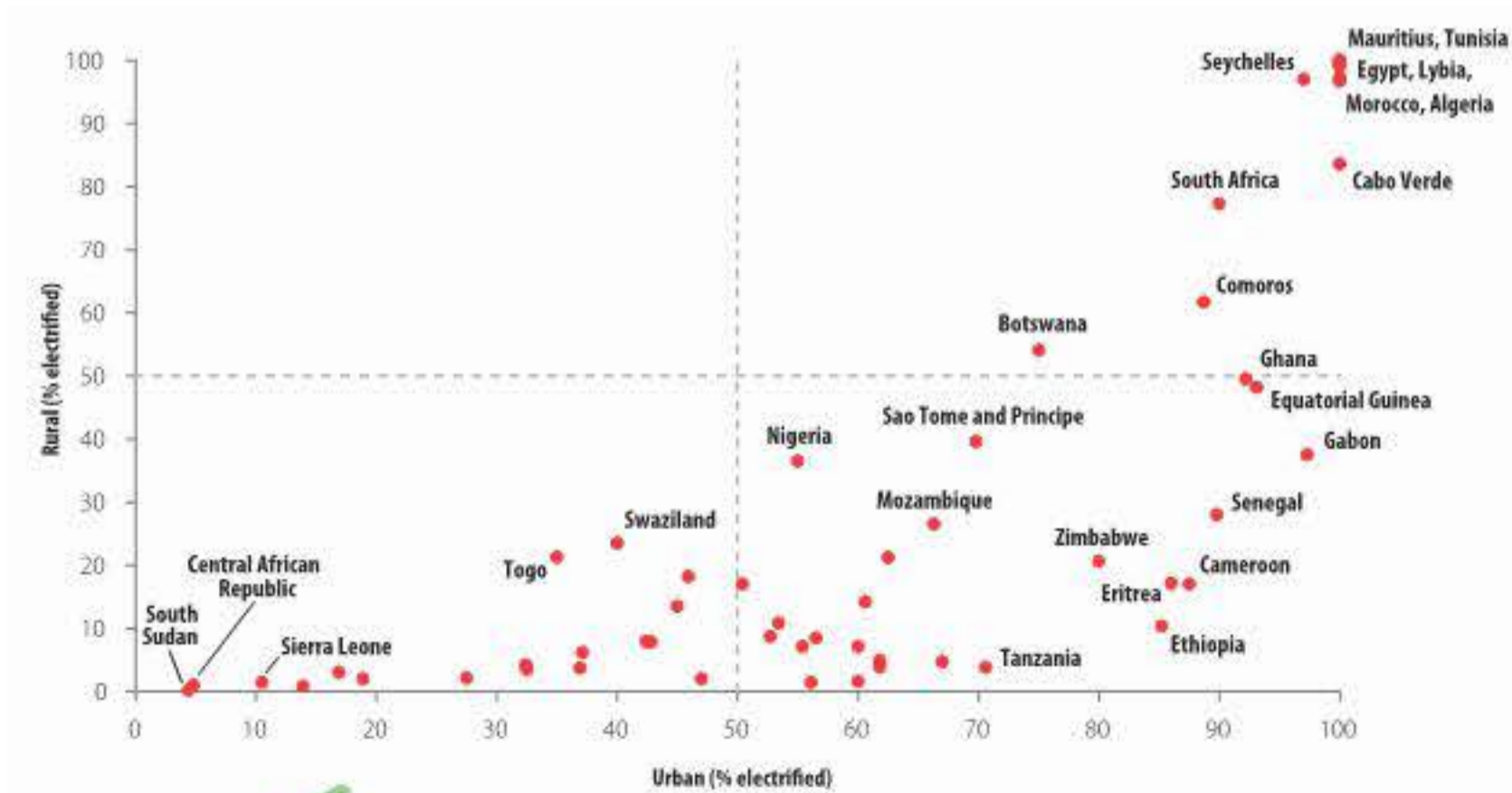


Figure 13. Urban and rural electrification. Rate of connection to the grid in 2013

Source: IEA, World Energy Outlook 2015



PHOTOVOLTAICS AND MOBILE TELEPHONY: DECENTRALISED TECHNOLOGIES SUITABLE FOR RURAL AREAS

Africa – especially sub-Saharan Africa – is lagging behind when it comes to connection to energy and telephone networks, but this could be an advantage enabling it to directly adopt local, adaptable and innovative solutions. The continent could thus become a vanguard in terms of future energy transitions and decentralised services. Mobile telephony is breaking the isolation of rural communities and the development of solar energy will facilitate the diversification of local economies.

• Electricity: major grey areas primarily concern rural populations

Africa is the continent with the lowest electrification rates in the world and access to electricity is an obstacle to its development. But this observation characterises sub-Saharan Africa: while 99% of people in North Africa had mains electricity in 2013, this rate stood at only 32% (634 million people) in sub-Saharan Africa. In eight countries, the rate of access to electricity stands at less than 10%, with particularly critical situations in South Sudan, the Central African Republic and Chad. However, in terms of the number of people without electricity, the greatest challenges are in Nigeria (96 million), Ethiopia (71 million) and DRC (61 million).

Current investments in power grids are not enough to counter the effect of population growth. In recent years, the rate of connection has increased by only 2.3% per year compared

to 2.7% for population growth. Grey areas still exist and the number of people without electricity is increasing. Whatever the country, it is always rural communities that have the lowest levels of access to electricity. In sub-Saharan Africa, the rate of connection for rural populations stands at only 17%, compared to 59% for urban populations. 17 countries even have a rate of connection of less than 5% (South Sudan, the Central African Republic and Chad, as already mentioned, but also Sierra Leone and Burkina Faso). There is an energy divide between urban and rural areas in Africa.

• Africa, a future paragon of photovoltaic energy?

Rural demand for electricity is spatially dispersed and relatively low in terms of power. A rural African person consumes between 165 and 600 kWh per year, compared to around 1 420 kWh for urban dwellers and 6 000 kWh for Europeans. Consequently, catching up is a challenge while rural electrification through connection to the national grid remains complex and costly due to the low population densities still observed in many regions.

However, there is an extensive, abundant energy resource in Africa: solar energy. Sunlight is estimated at between 1 600 and 2 500 kWh/m², which is far more than for any other continent. In order to capitalise on this energy resource, photovoltaic systems (PVS) can now be used to produce electricity in even the most remote regions, and the potential for development is huge.

Through the deployment of off-grid micro-systems and autonomous microgrids, solar energy can play a key role in rural electrification. More and more experiments are being conducted with villages that are fully equipping themselves (Senegal, Mali) and the distribution of domestic photovoltaic kits (Uganda). South Africa and Morocco are the countries that have installed the largest number of PVS in recent years, with the implementation of proactive public policies (including the creation of solar power stations, as in southern Morocco).

But between Morocco and South Africa there is a whole continent and a plethora of energy policies for which "good practice" on solar energy should be shared. Africa's lag in terms of electrification in comparison with the other continents could even be a unique opportunity to adopt a different model, one that is decentralised and sustainable, thereby meeting the needs of millions of rural people while leading the way towards a possible energy transition.

• Mobile telephony: connecting rural people in Africa

Africa has become an Eldorado for mobile phones. While fixed line penetration is very low – at less than 10% on average – mobile phone services are booming. The total number of subscriptions to these services in 2014 was estimated at 920 million, compared to 578 million in 2010, 151 million in 2005 and 15 million in 2000. This spectacular growth is partially biased by competition between operators, which results in multiple individual subscriptions to optimise tariffs.

There are, however, considerable differences between countries and a divide currently exists between the countries of North and Southern Africa, where the number of subscriptions exceeds the number of people, and the other countries of the continent. Some countries in

West and Central Africa nevertheless also have subscription rates of more than 100%. East Africa is less well-connected, but is rapidly catching up.

In rural areas, the development of mobile telephony is facilitating trade between producers and sellers on local markets, access to services (health, transport), the functioning of family networks and population mobility. It is breaking the economic isolation of rural people, but it also has the potential to radically transform rural economies with the development of new, innovative information and advisory services, in particular for agriculture (information on prices, rainfall or farming techniques), and especially of financial services. Mobile phone companies are joining forces with the banking system – or even developing their own financial services – to provide options for credit, payments and transfers, even in isolated areas with highly dispersed populations. In this respect, Africa is a leader, and particularly the countries of East Africa, with the provision of services that have not yet taken off in many OECD countries. This catch up is accompanied by a leap forward in terms of innovation.

Jacques Imbernon

M29. Total Number of deals in Africa

Source Landmatrix, 2016

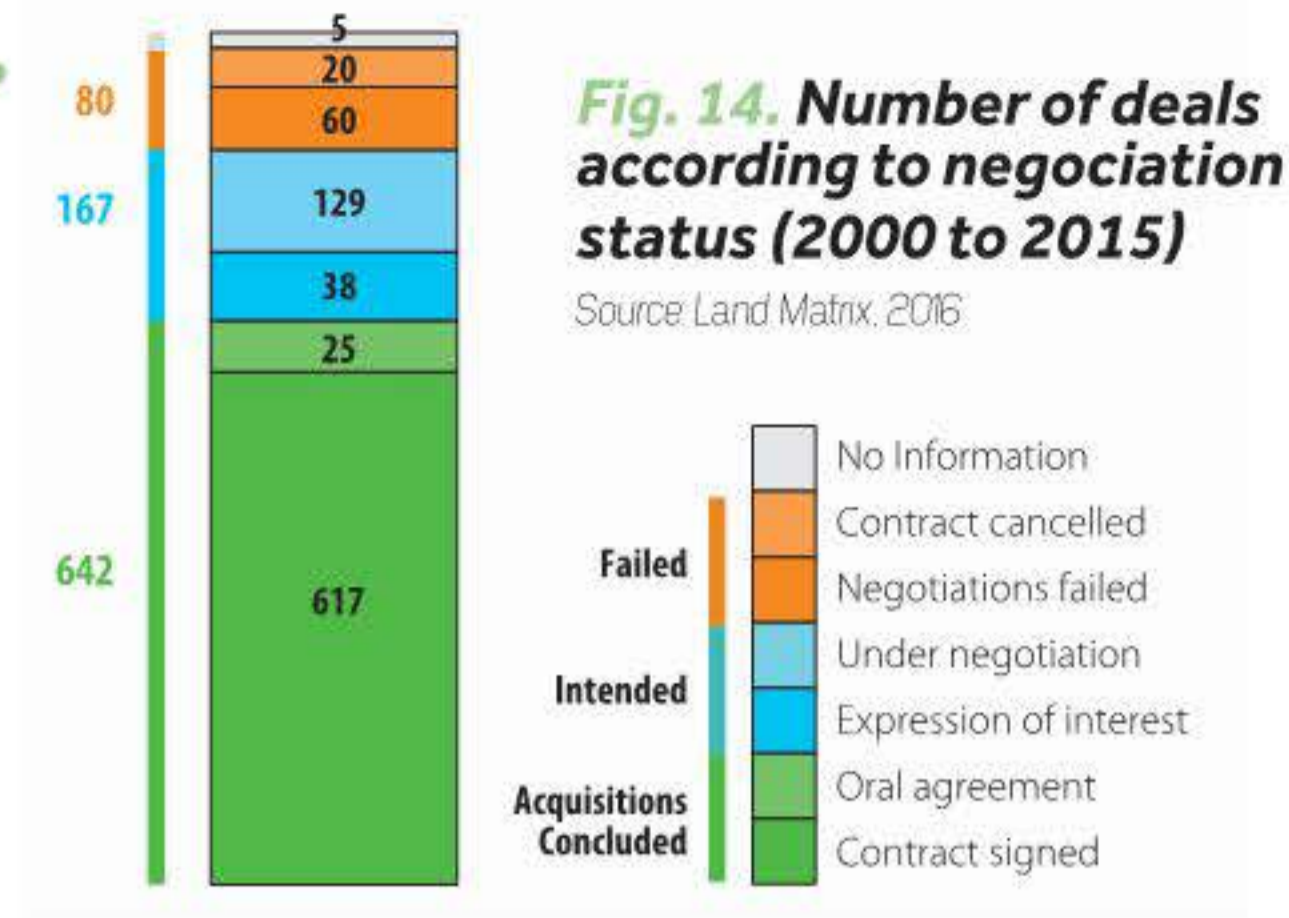
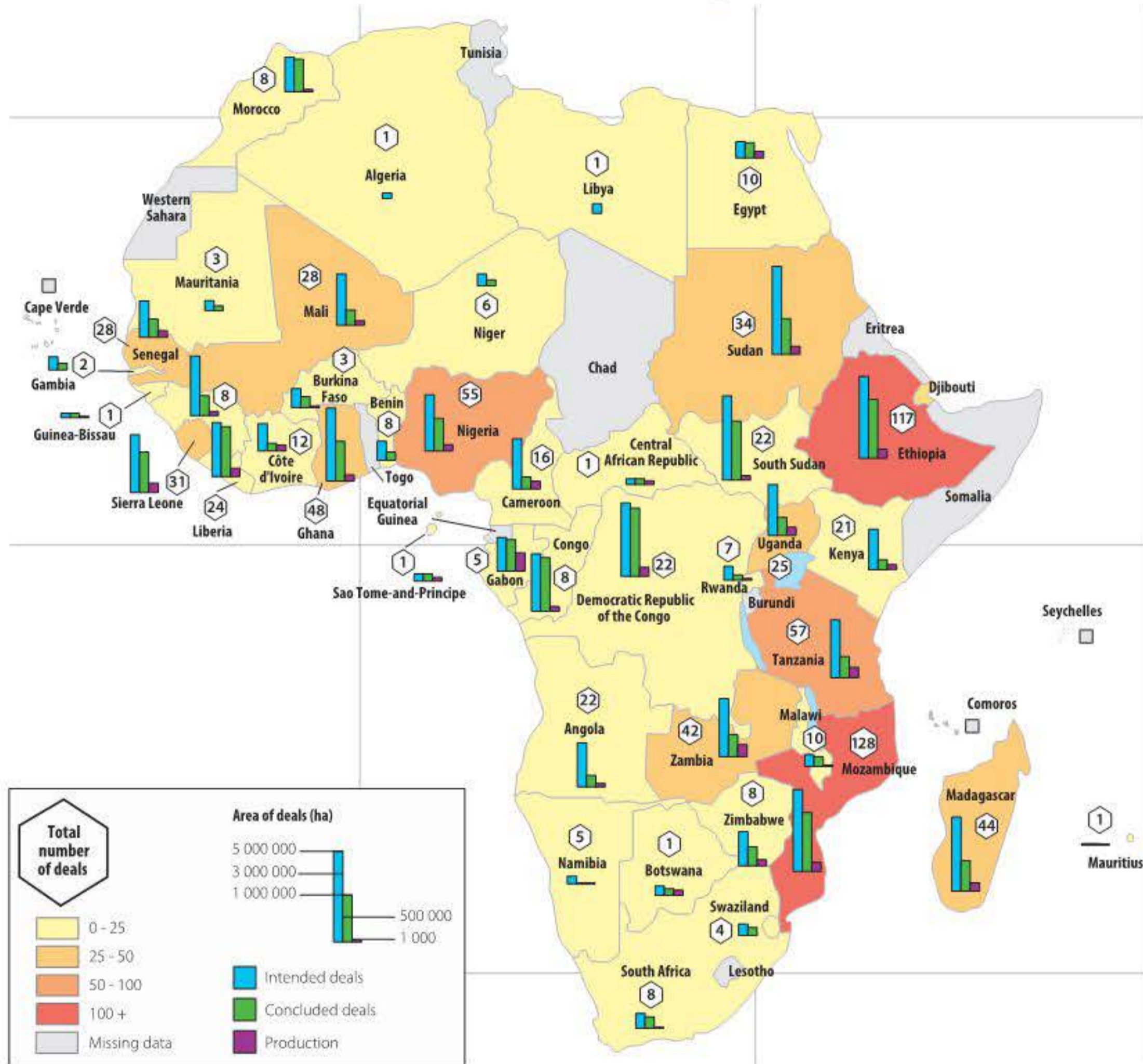


Fig. 15. Main investor countries' (% of all concluded deals)

Source Land Matrix 2016

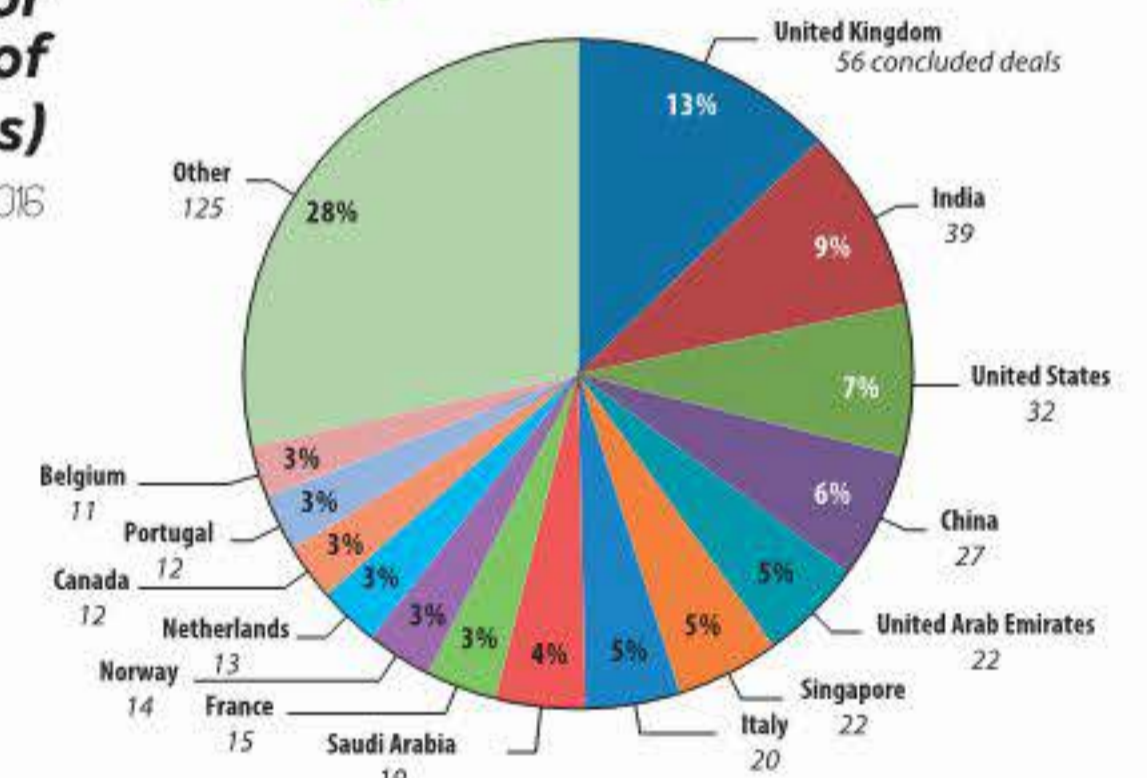
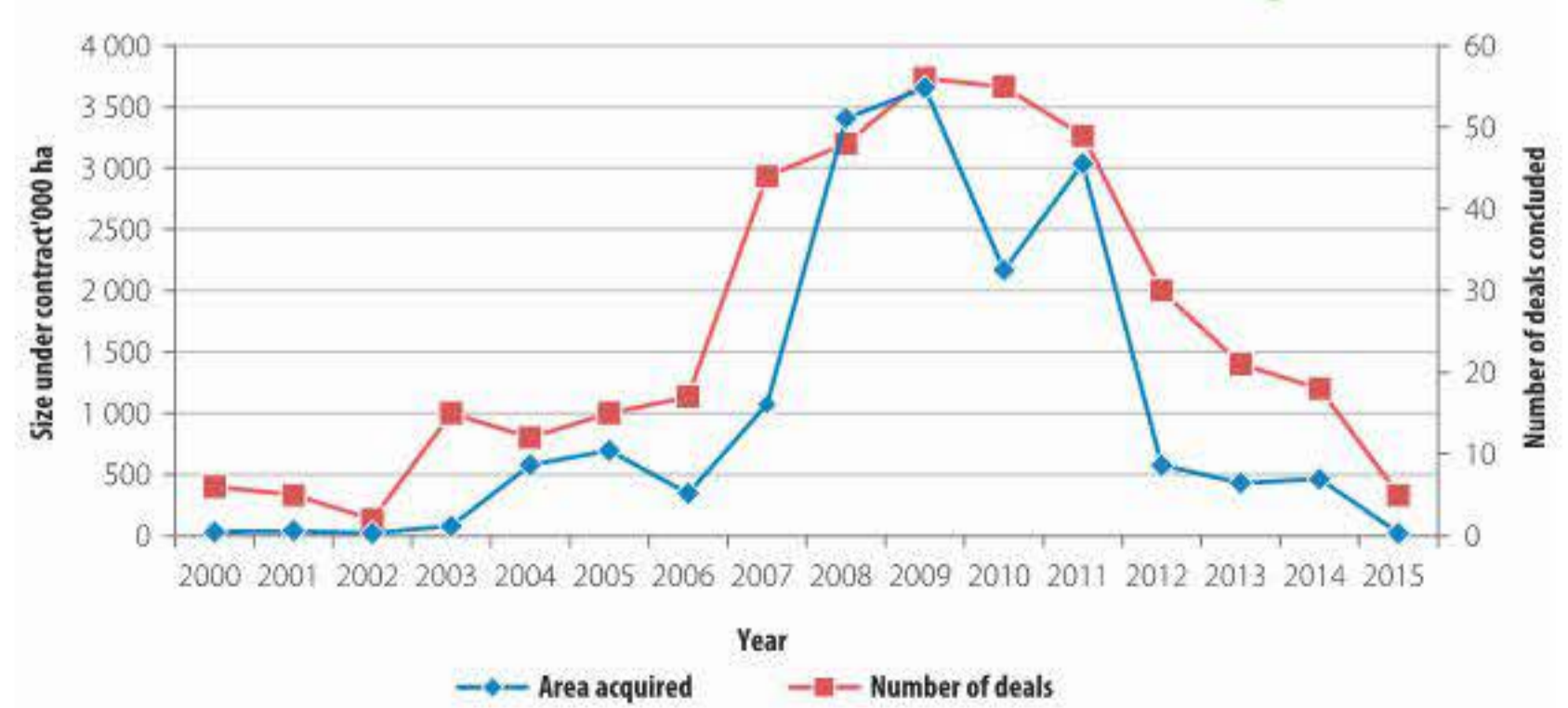


Fig. 16. Number of contracts and area acquired per year

Source Landmatrix, 2016



TRENDS IN LARGE-SCALE LAND ACQUISITIONS IN AFRICA

Africa has seen a significant increase in large-scale land acquisitions (LSLA). Although LSLAs have since slowed down and their impact on production remains limited, they provide evidence of long-term trends of growing commercial interest in land. Investment by domestic actors receives less media attention, but is growing in importance.

• Africa – The main target for investors

Large-scale land acquisitions (LSLA) are the result of a global, ongoing phenomenon, which has accelerated since 2000. The multiplication of acquisitions has several converging roots, which, besides the long-term trends of population growth and dietary changes, include: agricultural commodity price fluctuations, incentives to produce biofuels (crude oil prices and EU policies), and pre- and post-crisis new financial rationales to include land in the diversification of asset portfolios. As such, not all investments are dedicated to food production, with a large number focusing on biofuel production and other crops characterised by increasing demand (such as rubber and cotton).

Africa is by far the most targeted continent where deals for agricultural purposes are concerned. According to the Land Matrix, it accounts for 642 concluded LSLA deals initiated since the year 2000, covering an area of nearly 23 923 007 hectares (equivalent to Kenya's agricultural land area). The top 10 African target countries concentrate half of all listed land deals worldwide.

This focus on Africa is strongly related to the host countries' agricultural and pro-invest-

ment policies. Numerous African governments consider these large-scale investments as a way to diversify their sources of funding in a context of decreasing development aid, to generate new income, and to modernise their agricultural sector (in response to the loss of confidence in small-scale family-based structures and to the misreading of their real capacities). This focus on Africa also results from the continent's reputation, often seen as fertile and water-rich with large tracts of underutilised land.

• Competition over land and conflicts

The most targeted regions, often characterised by high fertility and water access, are, however, also those with the most developed infrastructure and are often the areas most intensively used by local people. This observation therefore challenges the image of LSLAs as a development tool. It also highlights land use competition and potential and actual conflicts over land.

"Empty" lands are indeed rare in Africa. The diverse and complex local land tenure systems are often poorly understood and are not taken into consideration by national law, host governments and, subsequently, by external investors, which may potentially lead to conflicting forms of appropriation. Reactions to LSLAs at the local and national levels vary, from open conflicts with strong opposition in Senegal, Mozambique and more recently in Ethiopia, to "smooth" implementation processes in Zambia and Malawi.

• Great expectations? Land ownership changes without rapid changes in land production

Investors are (initially) seen by local communities and state representatives as developers: in regions with few or even no public services, expectations in terms of benefits are high and the numerous direct and indirect financial promises are welcomed.

However, even though interest in land remains high and LSLAs are ongoing, very few deals are actually implemented. Of the 642 deals concluded, only 199 are operational, with just 4% of the land contracted actually cultivated (representing only 1 000 470 ha).

In addition, for those projects that are implemented, information regarding the actual types of investment remains extremely limited: little is known about the level of mechanisation, the number of jobs created or the development of outgrower schemes with local farmers, and this questions the real impacts of LSLAs on local development.

• A number of large foreign stakeholders and an increase in domestic investors

The Western countries are still the main investors in land in Africa: the UK is the leading investor in the continent in terms of the number of cases considered. The emerging economies are also very present. This is the case of the BRICS countries (except for Russia), especially Brazil, South Africa, and China (although the latter, contrary to popular belief, is not the main player), other Asian countries (Singapore) and Middle Eastern countries – which are more active in the northern and eastern parts of the continent due to their geographic and cultural proximity. Whereas the Western countries are expanding their markets and economic influence in the food

and agricultural sector, Asian and Middle Eastern investors, from countries rich in capital but with limited natural resources, are aiming to secure their national food requirements.

But LSLAs are not only a phenomenon led by foreign investors. The growing commercial interest in land has triggered domestic dynamics, with host country governments, local administrations, ruling classes and local entrepreneurs acting as partners, intermediaries and also stakeholders and direct beneficiaries. However, very little quantifiable data and information is available regarding the involvement of domestic actors in the rush for land on the continent. This information is necessary in order to reflect on the agricultural models to be promoted for sustainable and inclusive development in Africa.

MONITORING LARGE-SCALE LAND ACQUISITION

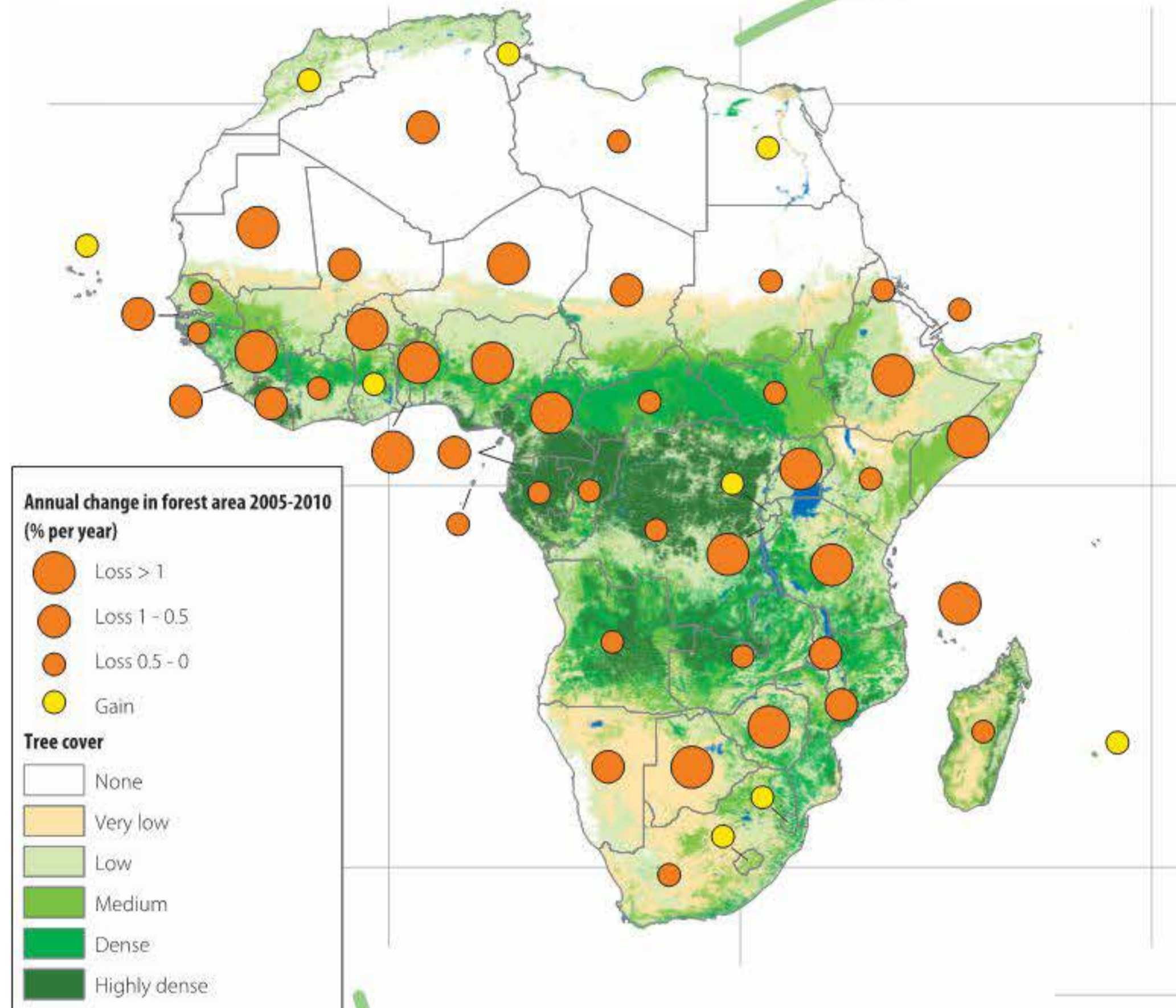
The data presented here is based on the Land Matrix, which may only reflect partial information; it is nevertheless a good basis to achieve a better understanding of the phenomenon, to formulate hypotheses and to develop initial analyses.

(see note page 69 for details on the parameters of monitoring).

Ward Anseeuw, Perrine Burnod, Jérémy Bourgoin, Ikageng Maluleke, Saliou Niassy

M30. Tree cover and deforestation

Source ESA 2010 and FAO 2010



M31. Standing wood stock and production

Source FAO 2014

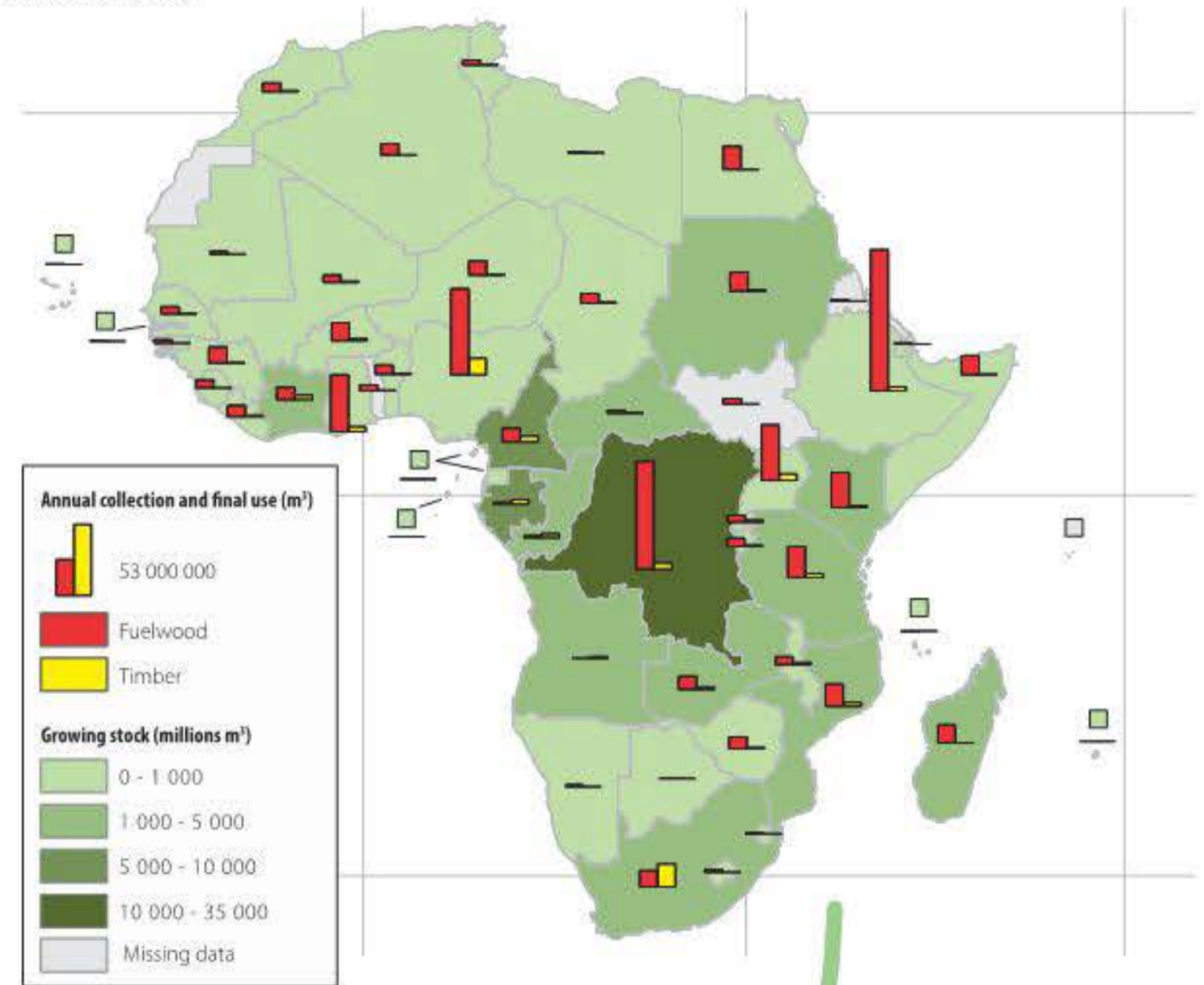
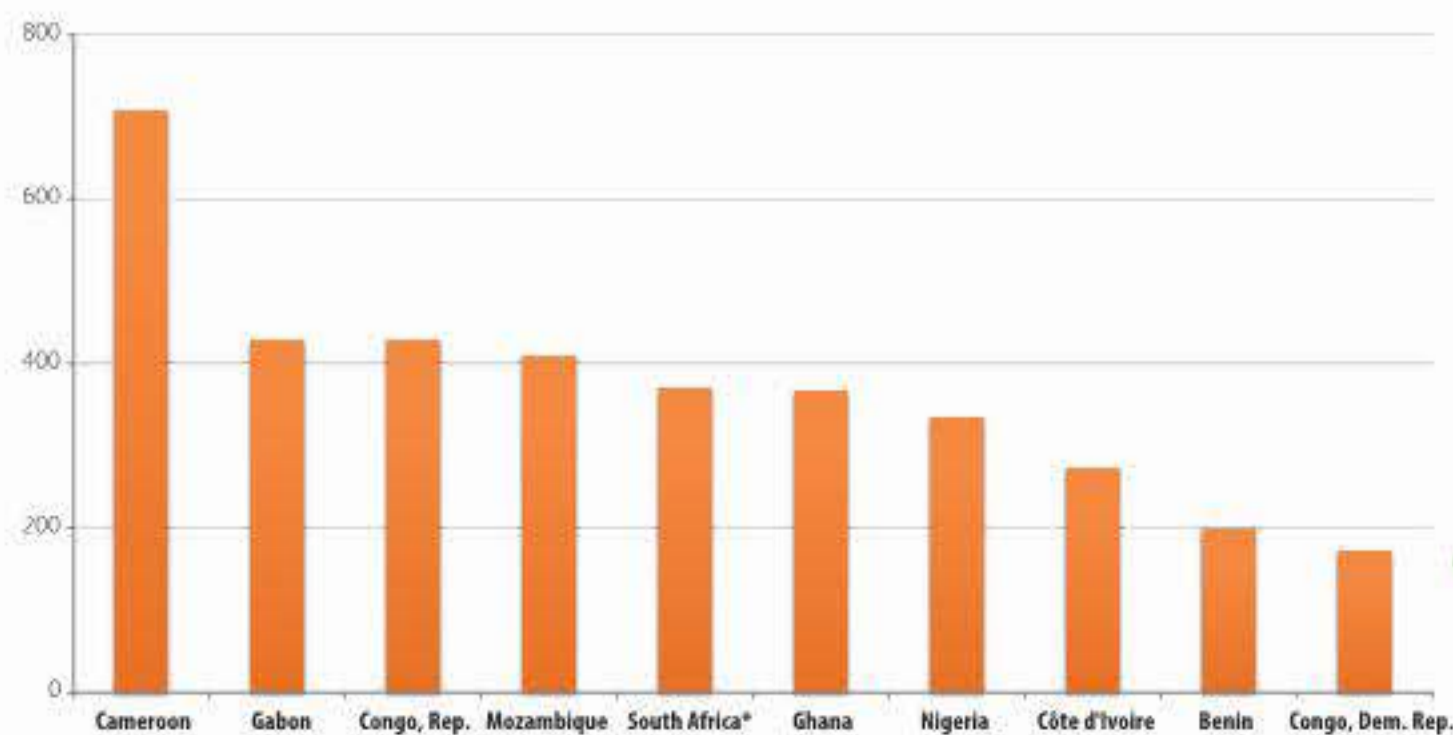


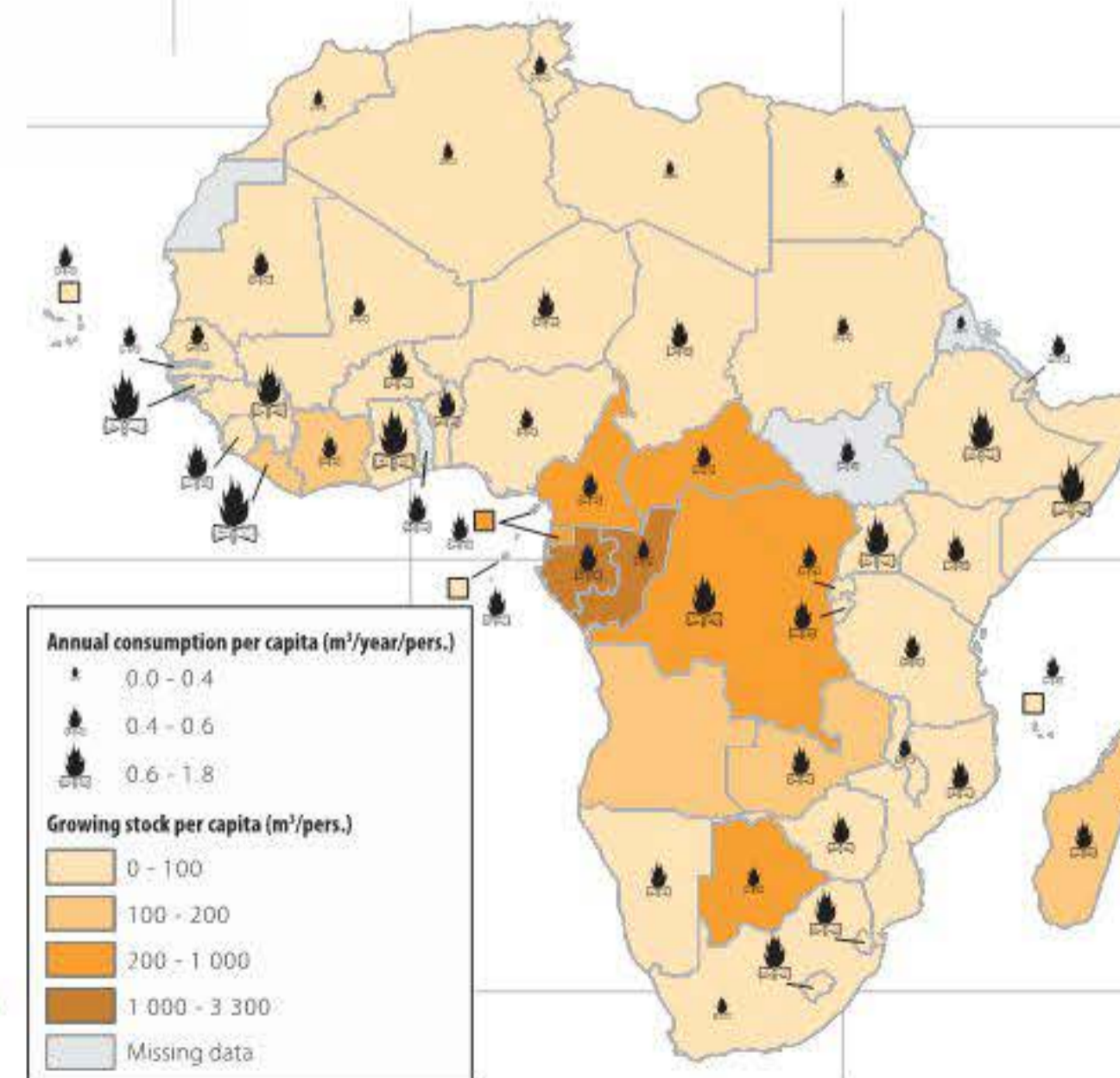
Fig. 17. Major exporters of wood

Source OIBT COMTRADE, 2016



M32. Fuelwood consumption and standing wood stock per capita

Source FAO 2014



WOOD: A KEY RESOURCE FOR ECONOMIC DEVELOPMENT

With population growth and urban development, African demand for wood is growing steadily. Most of the countries of Africa are facing a major challenge: reconciling their economic development, which often implies deforestation, with the maintenance of tree canopy cover, which provides resources and basic services for rural and urban populations.

- **A resource that is still abundant but rapid deforestation in densely populated areas**

Trees – and forests – are key components of African territories and often provide essential resources for rural households. Trees are present in almost all plant formations found on the continent, from the wooded savannas of the Sahel or the spiny forests of Madagascar to the dense rainforests of the Congo Basin, the mountain forests of Guinea and East Africa, and the dry forests (Miombo) of Southern and East Africa. Trees are also present in traditional cropping systems: in permanent fields in West Africa (tree parks), in complex agroforestry systems based on cacao and coffee trees in Central and East Africa, and in all shifting cultivation fallows.

The second largest tropical forest area in the world after the Amazon is in Africa: the Congo Basin forests span more than 200 million ha. African forests and savannas represent around 1 billion ha. In sub-Saharan Africa, they account for around 45% of the total land area. In per capita terms, forest area stands at 1 ha/person on average, compared to a global average of 0.8 ha/person, placing Africa ahead of

Europe (excluding the Russian Federation) and Asia in terms of per capita forest resources.

Deforestation is nevertheless affecting Africa, like all the other continents. From 2000 to 2010, Africa lost 34 million ha of forest at a relatively stable annual rate of -0.5% per year. This rate nevertheless varies considerably from one region to another and, contrary to popular belief, is higher in the dry regions of West and East Africa (1% per year) than in the great forest basin of Central Africa (0.2% per year). Thus, for the last 25 years, West Africa has been losing an average of 1 million ha of forest per year and East Africa 1.8 million ha, compared to 0.5 million ha in Central Africa. Deforestation is primarily due to agricultural expansion and to firewood gathering, which are more extensive in highly populated regions (the Rift Valley, the Soudano-Guinean zone) than in the "empty" parts of the Congo Basin.

- **Wood, a multi-purpose resource**

Wood has many uses in urban and rural areas. As bundles or charcoal, it is used to cook food; as logs, it is used to heat homes; and as planks, poles or beams, it is used to build houses and to make furniture.

Energy remains by far the main use of wood. Wood is the principal source of energy for rural households throughout sub-Saharan Africa and an important energy resource for isolated rural populations in North Africa. 750 million Africans depend on wood for cooking and heating, or around 70% of the population of the continent. Fuelwood is also used by

rural tradespeople (bakers, blacksmiths) and by farmers (smoking and drying food products, drying tea and tobacco). Average individual consumption is around 1.5 kg of wood/person/day. This figure varies considerably from one country to another according to eating habits, household size and access to wood resources.

Wood is also used to build rural and urban homes (frames, posts, joinery) and to make furniture (tables, chairs, beds). According to the country and the type of construction, each household uses an average of between 0.5 m³ and 6 m³ of wood for its home.

- **Dynamic wood sectors that provide jobs and income**

Logging and trade in timber are key economic activities for the African countries and their populations. International trade in lumber, mainly towards China and India, is an important source of foreign currency for the countries of the Gulf of Guinea and of Central and East Africa (Cameroon, CAR, Mozambique). But this formal trade represents only a fraction of total flows. More than 80% of all timber produced is sold on domestic markets.

Whether for energy or for construction, the production, processing and sale of timber are mainly conducted through local, informal channels involving millions of operators. African fuelwood production employs more than 13 million people and the industrial and artisanal lumber industry probably as many again. City supply chains are booming and new cross-border circuits are emerging from countries with abundant resources (Cameroon, CAR, DRC) towards regions with more limited resources (North Africa, the Sahel countries). These informal sectors appear only rarely in national accounts, but they generate turnovers estimated in billions of US dollars.

- **A major challenge: reconciling tree canopy cover and economic development**

With population growth, urban development, the emergence of a middle class demanding capital goods and the lack of alternative domestic energies, wood requirements are steadily increasing. A major challenge for most African countries is to ensure their economic development while preserving the essential ecosystem services provided by wooded areas to populations.

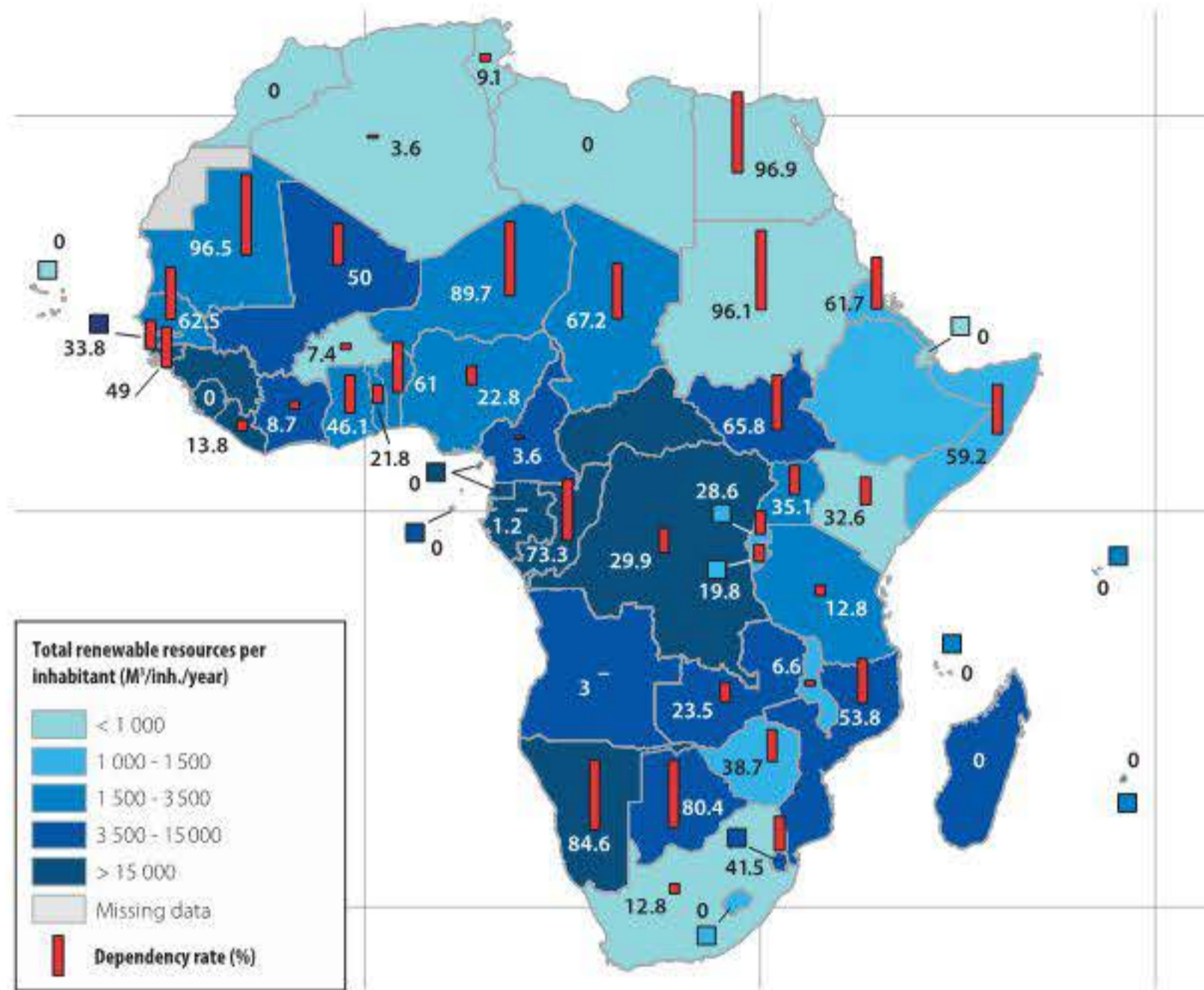
The response to this challenge requires public policies that, on the one hand, recognise informal lumber and fuelwood sectors as opportunities for local development that should be professionalised, monitored and more effectively supported and, on the other hand, integrate the preservation of ecologically functional and economically productive tree canopy cover into territorial planning policies.

Laurent Gazull

M33. Total availability and dependence on water resources

(See note page 69)

Source: FAO Aquastat 2016



M34. Water consumption and use and transboundary watersheds

Source: FAO Aquastat, FAO Corporate Document Repository

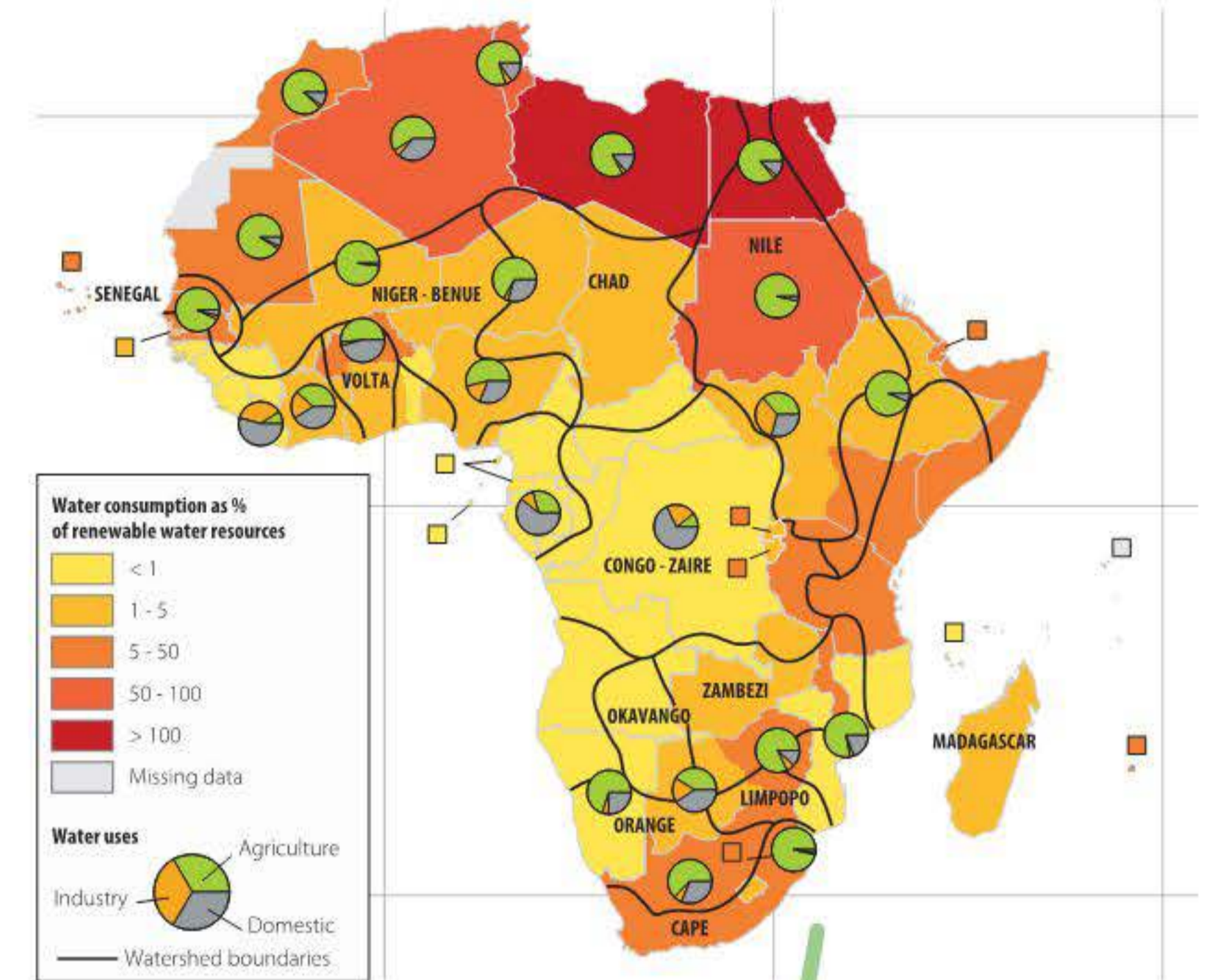
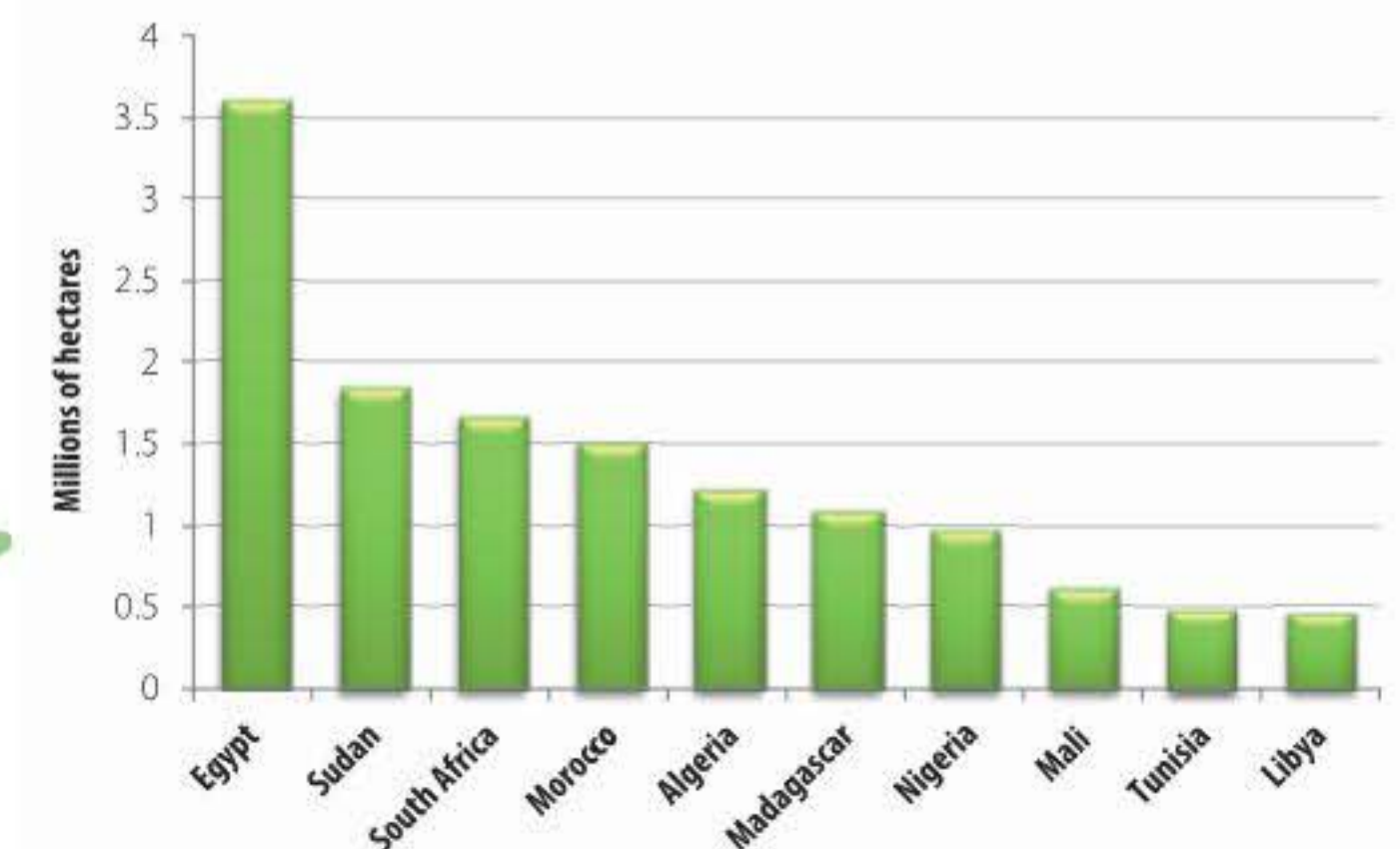


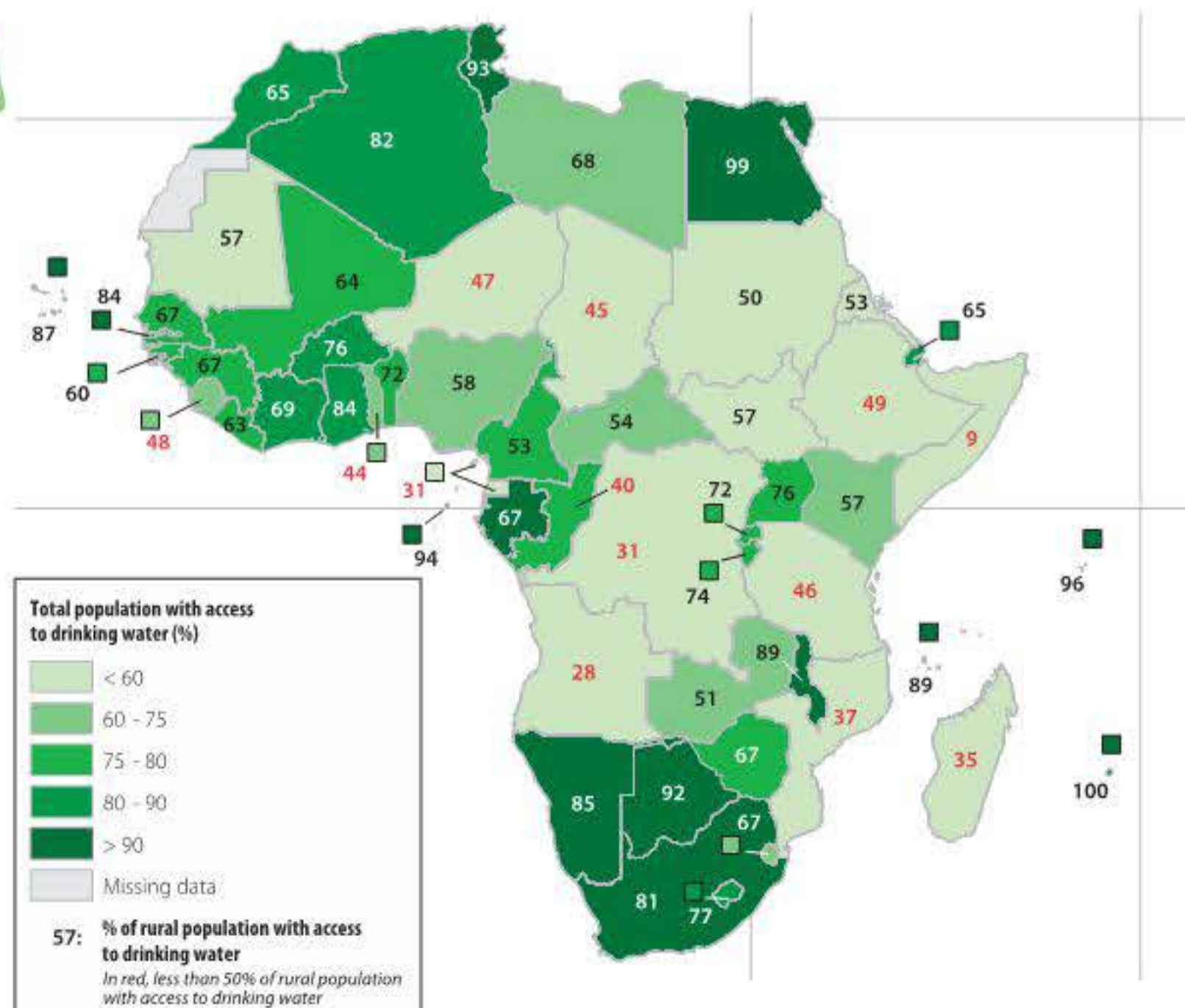
Fig. 18. Main countries of irrigation

Source: FAO Aquastat 2016



M35. Access to drinking water

Source: FAO Aquastat 2016



BLUE GOLD AND ITS CHALLENGES: WATER STRESS IN AFRICA

There are many challenges related to water in Africa: providing safe drinking water for all; developing food production without depleting water resources; and implementing water- and energy-saving irrigation techniques, among others. These challenges can only be met by mobilising human, financial and technical resources in order to make the necessary investments and to maintain them over time.

• Uneven distribution of water resources

Africa has many different types of climate and a wide range of population densities. This results in major differences in total per capita water availability. Another important parameter is the dependency ratio, which expresses the percentage of renewable water resources originating outside the country: this ratio is high on average (60% or more) and peaks (≈ 80%) in countries such as the Republic of the Congo, Botswana and Namibia; but the most spectacular ratios are seen in Egypt and Sudan, where they reach nearly 100%, highlighting the fact that these countries are almost entirely dependent on water from large rivers entering from upstream countries.

Surface water is not available everywhere all year round. Outside the equatorial zone, most watercourses are seasonal and dams are needed to regulate them. Water comes primarily from large rivers and only the land immediately adjacent to these rivers can be easily irrigated. Making better use of water in order to irrigate

more land implies large water infrastructure projects and the major constraints inherent in the management of vast irrigated areas.

• Water consumption marked by agricultural uses

Arid and semi-arid countries consume a significant proportion of their renewable water resources. Egypt and Libya epitomise this, consuming respectively all and six times more than their available water, which is only possible in Libya through massive pumping of non-renewable groundwater. Most of the water consumed is used for irrigation. Water distribution between household, industrial and agricultural uses differs greatly in humid regions, which have very little irrigated agriculture.

The North African countries alone consume half of all water used on the continent. If we include Nigeria, South Africa, Sudan and Madagascar, we see that just nine of the 53 African countries account for a total of 80% of all water consumed on the continent.

Many of the countries that have developed irrigation are also those that have to import water on a massive scale in order to meet their dietary needs. This dependence drives them to further extend and intensify their irrigated agriculture, at the risk of creating water crises. To tap into new water resources, they resort to pumping from aquifers, but at a rate significantly higher than their recharge rate (almost zero in the Sahara). This produces energy requirements and lowers the water table, thereby threatening the future of these aquifers. In order to protect water resources,

water-saving irrigation techniques are being developed, such as drip irrigation in North Africa, which may be subsidised.

• Potential conflicts

Some countries are major agricultural water users and depend on other upstream countries. There is already tension over water use and new disagreements could emerge in response to economic dynamics and policy choices, but also and perhaps especially as a result of ongoing climate change that could reduce water availability and increase evaporation, depending on the country.

This tension is supposed to be managed by international treaties and river basin organisations such as the Nile Basin Initiative. But in 2013, the construction of the Renaissance Dam in Ethiopia led to Egypt's withdrawal from the basin organisation and the escalation of tensions. An Egypt-Sudan-Ethiopia agreement signed in 2015 helped to relieve pressure, but there is still a latent divide between water "supplier" and "consumer" countries.

The conjunction of a resource shared by several countries and a high level of resource use in one of these countries is a major risk factor for the emergence of water conflicts: in addition to the Nile, this situation could also occur for the Senegal, Niger and Limpopo rivers and their riparian countries.

• Poor access to safe water in rural areas

According to the World Health Organization, the minimum water requirement to meet basic human needs (drinking, cooking and personal hygiene) is 25 litres per capita per day. But higher quantities (50 l/capita/day) are needed to also cover the other basic needs (laundry and household hygiene). However, more than half of African countries consume on average less than 50 l/capita/day for domestic uses, and a quarter

consume less than 25 l.

Access to safe drinking water for African people is equally alarming: in many countries, 40% of the population has a round-trip of more than 30 minutes to the nearest source of drinking water (the UNICEF reference standard). The situation is even worse in the countryside, where up to 80% of people have no access to safe water.

Paradoxically, the countries with the largest water resources are among those with the lowest levels of drinking water coverage, especially in rural areas. Conversely, the North African countries and some Southern African countries, where far less water is available, have almost 100% drinking water coverage. Large water resources do not therefore necessarily imply that people actually have access to these resources.

To provide rural populations with access to drinking water, investment is needed in infrastructure and organisations, and effective, sustainable governance is required. More generally, better water resource management implies major investments in order to both improve water supply and to manage demand. At river basin level, many countries are making considerable efforts to set up basin agencies and, more locally, user associations with the goal of achieving decentralised water governance. Water management at the most appropriate local level should guarantee greater efficiency, equity and local stakeholder involvement in decision-making.

Stefano Farolfi, Jean-Yves Jamin



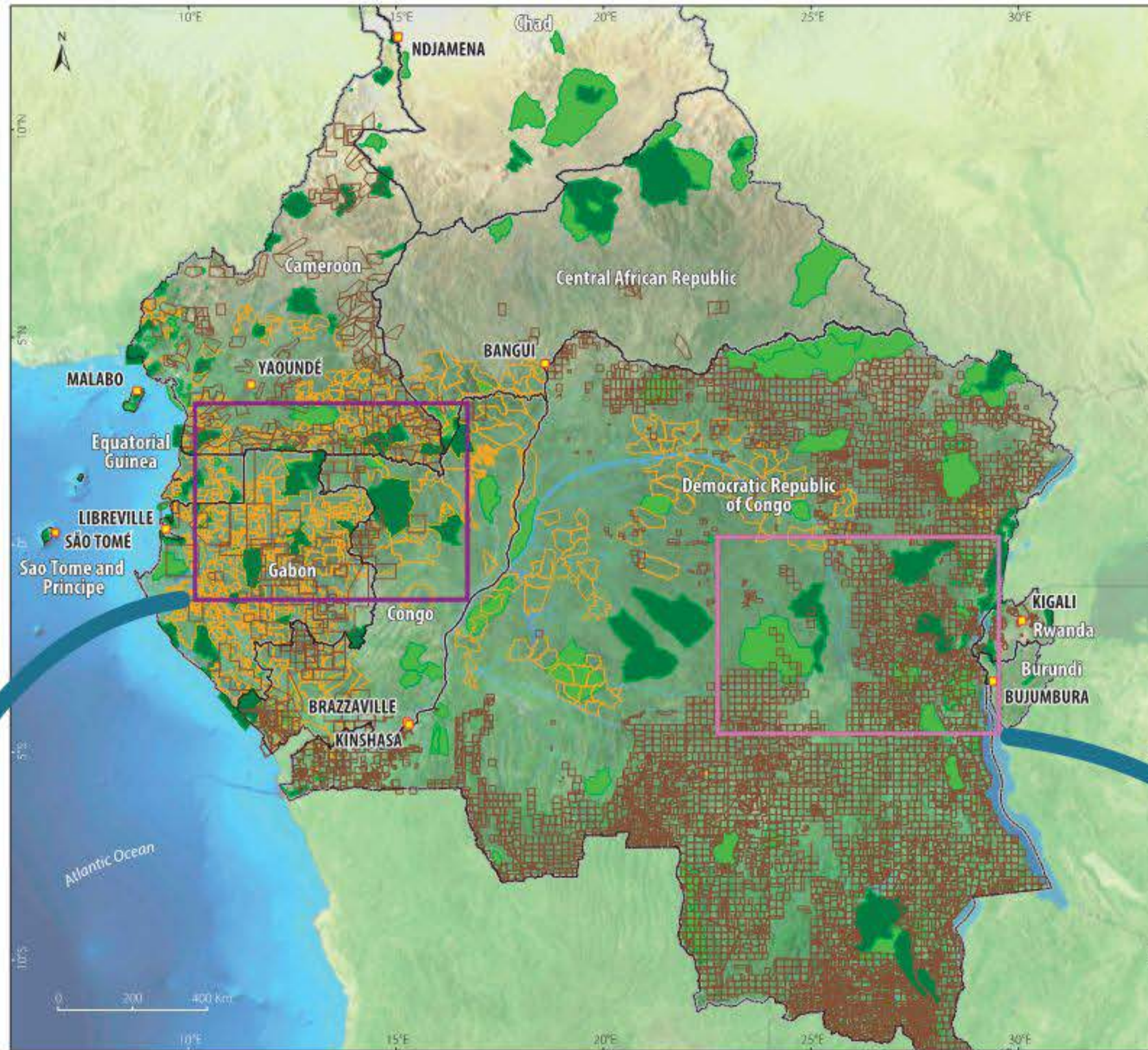
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M36. Land use conflicts in the Congo Basin

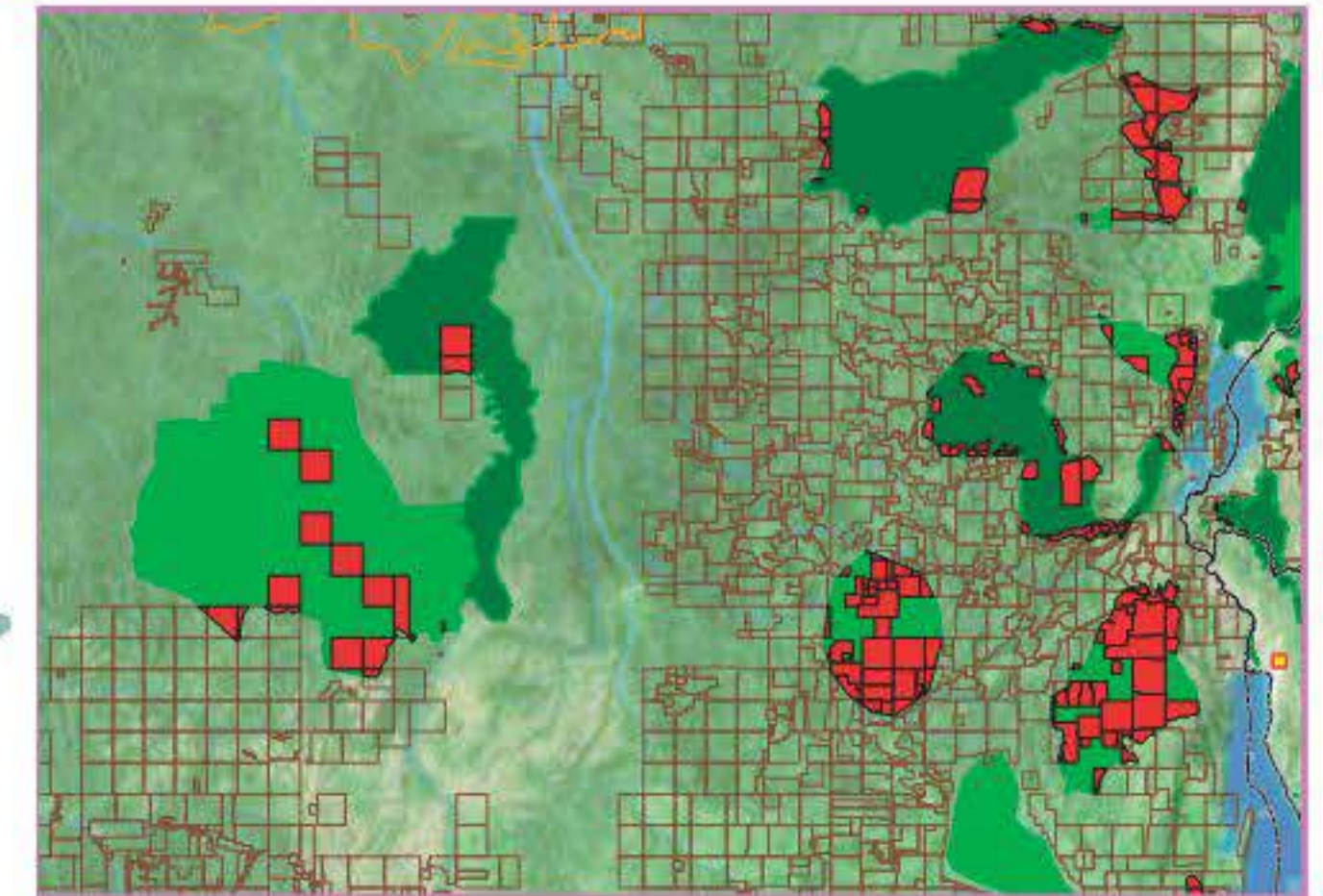
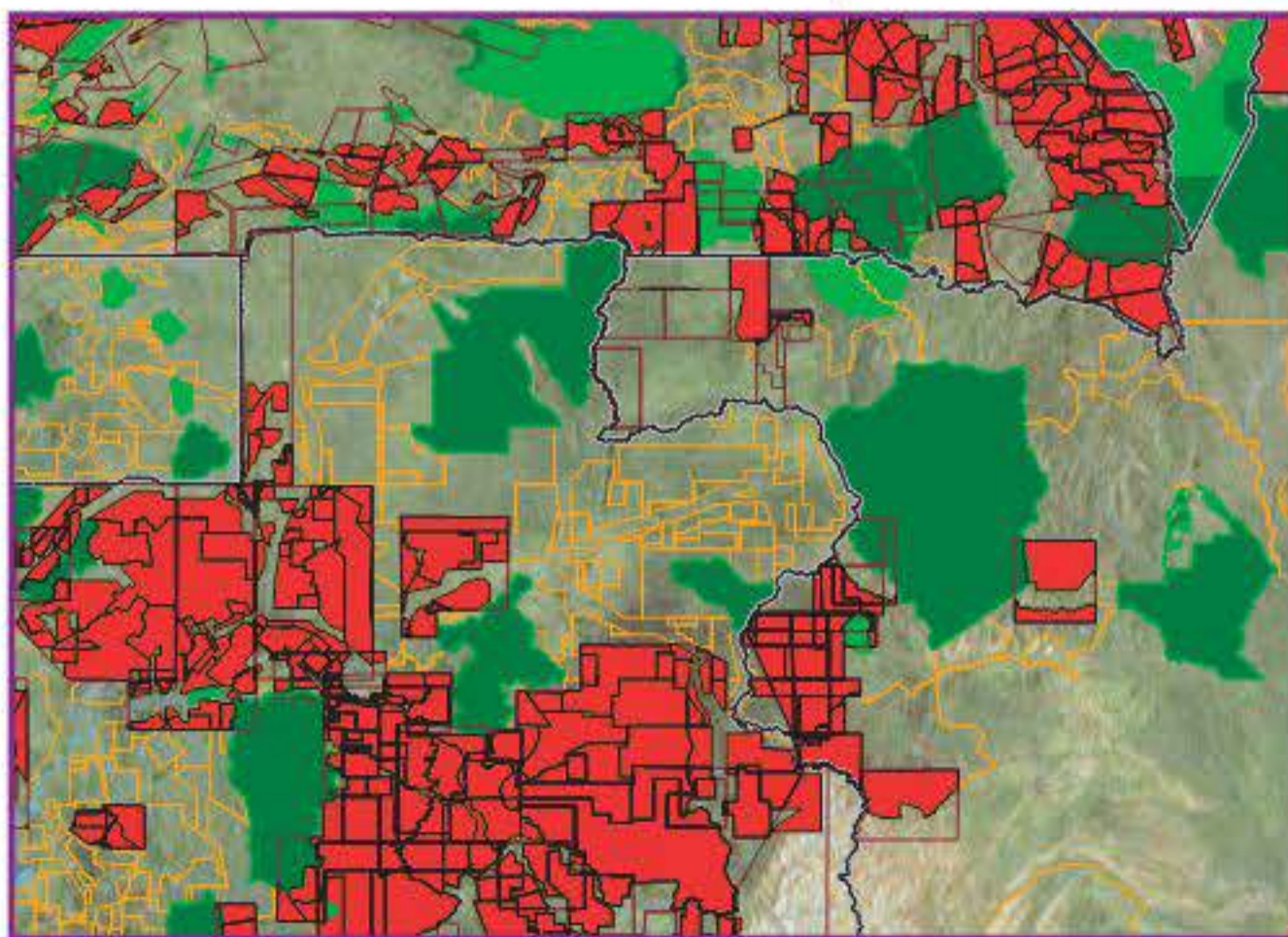
Source OFAC



3

M37. Overlap between logging concession and mining rights

M38. Overlap between mining claims and protected areas



WHICH REGULATIONS FOR LAND-USE CONFLICTS IN RURAL PARTS OF THE CONGO BASIN?

The dense forests of the Congo Basin are still relatively unaffected by human activities. However, the socio-economic emergence strategies of the countries of the region are likely to radically change this situation by increasing land-use conflicts. Forestry and protected areas have to some extent been in conflict in the past, yet new sources of tension are emerging with the expansion of mining and agro-industry. These different uses of resources will require intersectoral land-use planning.

• A rural setting that is often marginalised

The dense rainforests of Central Africa are the world's second largest forest area. With the exception of some very active corridors, the main deforestation fronts are still situated at the periphery of the forest block. In its western half, people are largely concentrated in towns and along roads, and vast tracts of forest remain very sparsely populated (Gabon, Congo, south-eastern Cameroon). However, in the DRC, the socio-economic and security situation has resulted in rural populations moving further afield, even into the forests, and a large part of Cameroon and the Albertine Rift are now seriously impacted by human activities.

In a general context marked by the fragility of economic development and by insecurity, rural people rely essentially on slash and burn agriculture and hunting for their livelihoods. Fuelwood gathering (firewood and charcoal) accounts for more than 80% of all wood har-

vested. Consequently, deforestation and more generally the degradation of natural resources remain limited. This situation could radically change in the coming years with the proliferation of industrial logging, agriculture and mining projects.

• The "anarchic" exploitation of natural resources

For several decades, industrial logging for timber – historically the only industry present in rural parts of the Congo Basin – has produced little deforestation but more significant forest degradation, especially due to the opening of forest tracks encouraging agricultural development. In the virtual absence of state intervention, this logging industry has supported some rural socio-economic development and the emergence of small rural communities.

Although few other industries exploit natural resources due to the geopolitical situation and the lack of infrastructure, mining and agricultural plantation projects are likely to disrupt the environmental, social and economic conditions of these rural areas. Indeed, these new activities are land-intensive and can dramatically alter the local socio-economic environment. Allocation and land-use conflicts are already growing.

Over the last 20 years, logging has become far more extensive in the region, sometimes resulting in land-use conflicts with pre-existing or newly created protected areas, due to a lack of consultation between the various government departments, and with the rural

communities. Some of these conflicts are currently being resolved thanks to a dialogue between the stakeholders concerned, with the support of donors involved in programmes encouraging sustainable logging and forest certification, the strengthening of protected area networks and community-based natural resource management. However, new sources of conflict are emerging, especially with the mining sector, for which exploration and mining permits are awarded without any real consultation with the other sectors.

• The need for integrated development policies for rural areas

Despite some past attempts at land-use planning in southern Cameroon and in several provinces of the DRC, no sustainable land-use policy has yet been implemented in Central Africa, whether at the national or regional level. Only Gabon seems to be working in this direction. However, the REDD+* strategies that the states wish to apply and, more broadly, the goal of planning sustainable development that takes into account territorial inequalities and rural poverty, require intersectoral planning of land-allocation and land-use changes.

With the expansion of the agro-industrial and mining sectors, land uses are in danger of overlapping in rural areas, requiring the establishment of clear management rules between the different users, and the implementation of

land-use policies. The Commission of Central African Forests (COMIFAC), which brings together the ministers responsible for forests from all over Central Africa, is conducting regional discussions on natural resources. It could act as a catalyst for the intersectoral planning of land-use in the Congo Basin.

OBSERVATOIRE DES FORÊTS D'AFRIQUE CENTRALE (OFAC - CENTRAL AFRICAN FOREST OBSERVATORY)

Under the umbrella of COMIFAC, and with the support of German cooperation and the European Union, OFAC is creating a regional atlas on land-use in 10 Central African countries in order to support them in the design of their integrated land-use strategies. This interactive atlas is already helping to identify overlapping land uses, which are often sources of potential conflicts. The provision of this atlas to the sectoral administrations and information updates by these administrations provide the different stakeholders with a shared, up-to-date reference on land-use, which fosters the transparency of information and a common vision of territorial development.

<http://www.observatoire-comifac.net>

Charles Doumenge, Quentin Jungers, Claire Halleux, Lyna Bélanger, Paul Scholte

* REDD (Reducing Emissions from Deforestation and Forest Degradation) is an initiative launched in 2008 and coordinated by the UN. Its aim is to mitigate global warming caused by greenhouse gas emissions produced by the degradation, destruction and fragmentation of forests. The addition of «+» illustrates the inclusion of the increase in carbon stocks, through appropriate silvicultural practices or plantations, for example. Its principle is to compensate developing and emerging countries by means of contributions from industrialised countries, either through a market or a fund.

M39. Dynamics of agricultural areas in the Senegal River delta

Source SAED 2012, GeoSénégal 2015, GeoDiff 2016

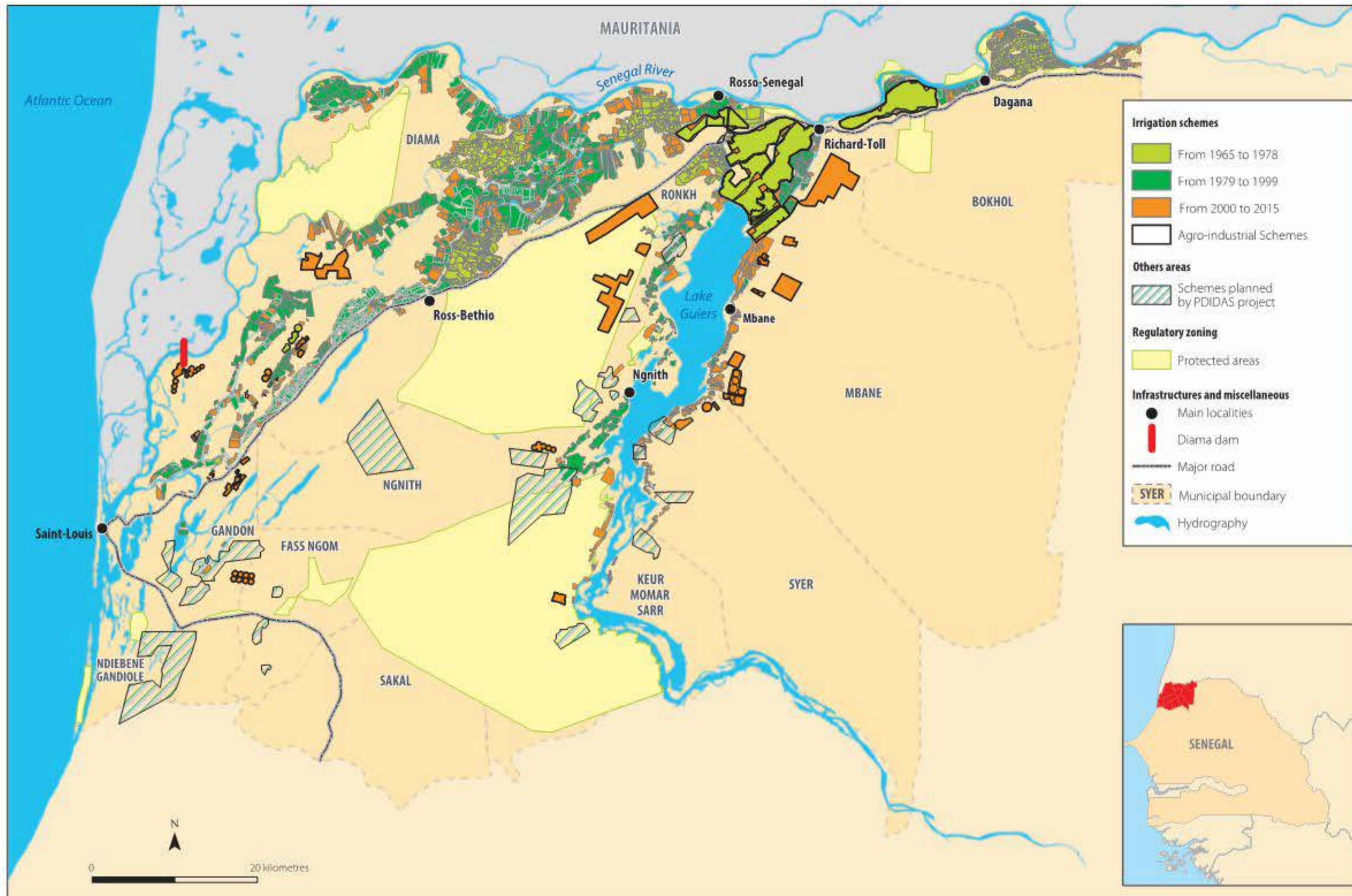
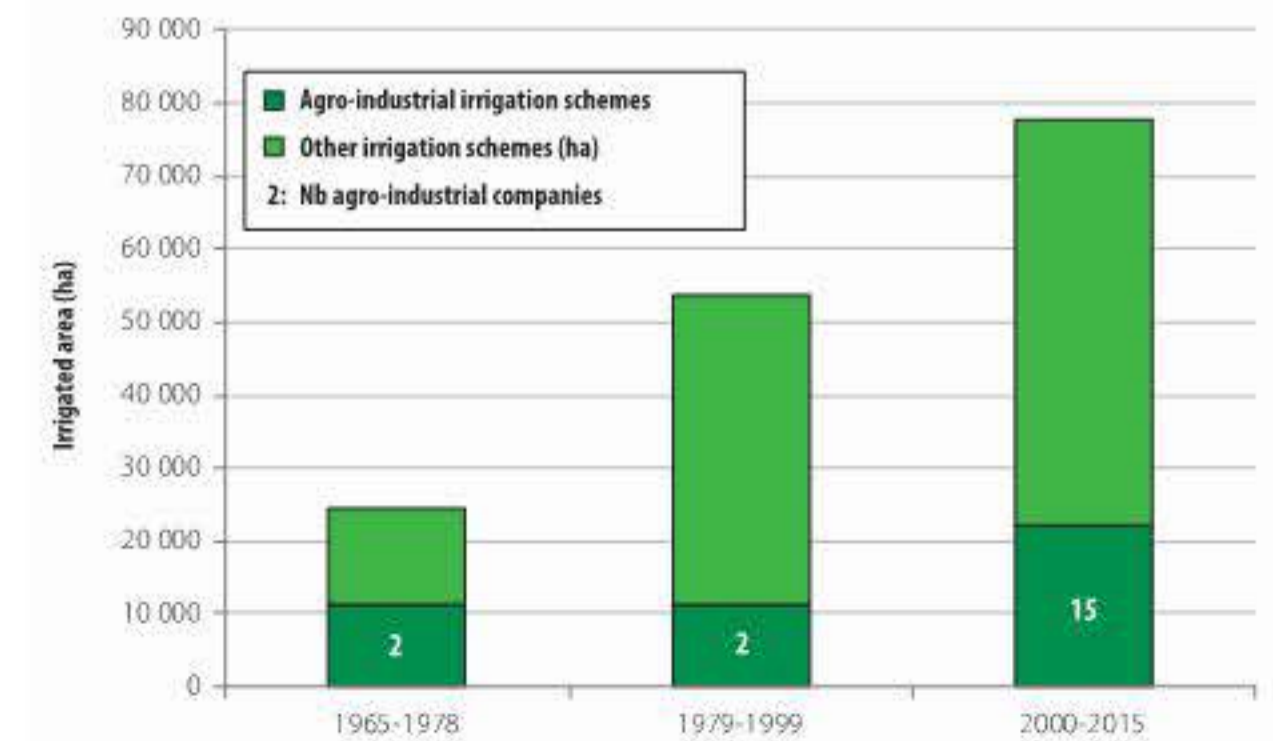


Fig. 19. Extension of irrigation schemes in the Senegal river delta (1965-2015)

Source SAED



THE AGRICULTURAL DEVELOPMENT MODEL FOR THE SENEGAL RIVER DELTA

For more than 50 years, the Senegal River delta and Lake Guiers area has seen constant growth in hydro-agricultural developments. Today, the goals of food sovereignty and economic growth assigned to the agricultural sector by the government are being put forward to justify the arrival of agro-industrial investors, raising questions about the future of the region.

• Agricultural intensification based on water management

The Senegal River valley is one of the main agricultural regions in Senegal, with irrigation potential of almost 240 000 ha. Within this area, the delta and Lake Guiers zone (with its agricultural potential of 115 200 ha) is characterised by a number of challenges concerning the use of land and water resources by agriculture (whether irrigated, flood recession or rainfed), pastoralism, fishing, tourism and the general population (water supply to part of the capital city, Dakar). The marked intensification of agricultural activities observed today is being questioned from the perspective of its impacts in terms of land use and practice changes.

Efforts to intensify agricultural production began when the country gained independence in 1960 with the creation of major water schemes, mainly focusing on rice production, and based on the first projects of the 1950s near Richard Toll. In 1965, the SAED (Société d'Aménagement et d'Exploitation des Terres du Delta du Fleuve Sénégal et des Vallées du Fleuve

Sénégal et de la Falémé – Senegal River Delta Development and Exploitation Company) was tasked with developing the management and maintenance of water schemes and water supplies, as well as with land management in these pioneer zones. Almost 25 000 ha of irrigated land had thus been developed by 1978: 13 500 ha of public schemes and 11 500 ha of foreign private agro-industrial schemes.

From 1979, under the impact of the structural adjustment plans, the withdrawal of the state led to a reduction in SAED assignments in farm advisory services and the management of structural schemes. Local producers, organised in unions, were tasked with developing their farms and managing water use. The development of private schemes was facilitated by simplified access to land managed by the rural communities created in 1980 (further to the decentralisation bill of 1972). Consequently, between 1979 and 2000, almost 29 000 ha of private hydro-agricultural schemes were added.

The government continued to support the modernisation of family farming and private entrepreneurship until the mid-2000s. However, the food price crisis of 2008 resulted in a shift in agricultural policy, which now focused on the supposed spillover effects of agro-industries. Thanks to various incentive mechanisms, around 25 500 ha of land were thus irrigated between 2000 and 2015, almost 11 000 ha of which were developed by foreign agro-industries.

• Agro-industry and family farming: competition or synergies?

In the 1980s, the development of private irrigated land was facilitated by improvements in water regulation (thanks to the construction of the anti-salt dam at Diama near the mouth of the river in 1986 and the Manantali dam further upstream in Mali in 1989), by the decentralisation of land management, and by access to credit with the creation of the Caisse Nationale de Crédit Agricole du Sénégal bank (1985). Today, the extension of private irrigated land is continuing with the growing presence of agro-industries that are investing in water schemes (from 2.5 to 4 million FCFA/ha depending on the irrigation method chosen). Projects are being developed in areas previously reserved for livestock farming and are backed by the political will to promote agribusiness, the modernisation of family farming and the agri-food sector. To support this agricultural model, land and decentralisation reforms are aimed at improving land tenure security for investors. The World Bank is accompanying this change through the Senegal Sustainable and Inclusive Agribusiness Development Project (PDIDAS), the goal of which is to promote growth and employment in this part of the river with an increase in private productive investment. In 2015, the project had already pre-identified more than 18 000 ha of land that could be suitable for future investors or for the expansion of agro-industries already present.

In this context, many questions are being asked about the social and economic impacts of this agro-industrial development, especially regarding the role of pastoral activities, the conditions for access to land for family farmers and the consequences of new investments on their production and yields. More generally, the nature of interactions between family farmers and agro-industries is at stake. Will agro-industry have

spillover effects on the delta area, improving the living conditions of local people? What will the future be like for pastoral areas where land-use conflicts are already a source of tension? In spite of the existence of regulatory zoning, these areas are shrinking under the effect of the expansion of irrigated agriculture and of agri-business contract farming. The areas allocated to agro-industries are now forcing pastoralists to find new, less diverse rangelands, thereby adding to friction with family farmers.

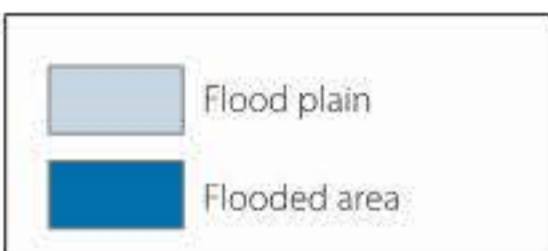
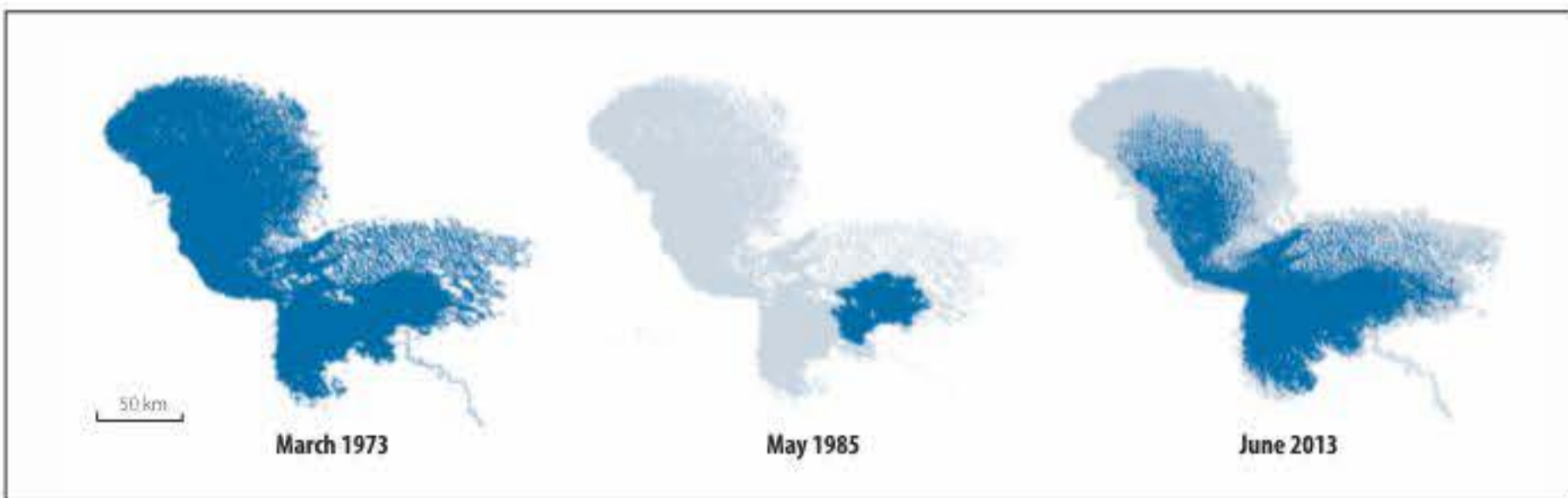
This model of agricultural intensification and opening up to agro-industrial investments is potentially divisive given the high rural densities, the size of the agricultural population and the large number of young workers looking for places to settle. Although the choice of the neoliberal development model is supported at the political level, local actors supported by civil society are questioning its social and environmental impacts in areas that were previously reserved for pastoral and agro-pastoral practices.

The future of the delta will depend on the capacity of actors to anticipate and develop change scenarios, to organise the coexistence of the different types of activities, and to find synergies between them in order to ensure sustainable territorial development for a rapidly growing population.

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Djibril Diop, Amandine Adamczewski,
Djiby Dia, Labaly Touré

M40. Flooded areas of Lake Chad between 1973 and 2013

Source: NASA



M41. Poles and trade flows around Lake Chad

Source: author, 2016

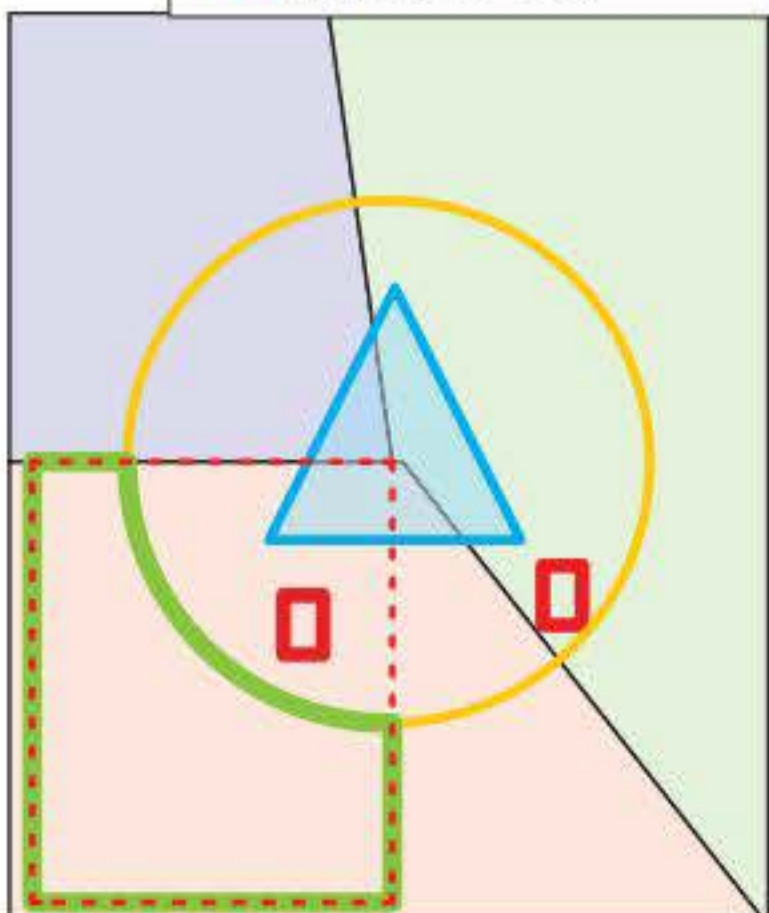
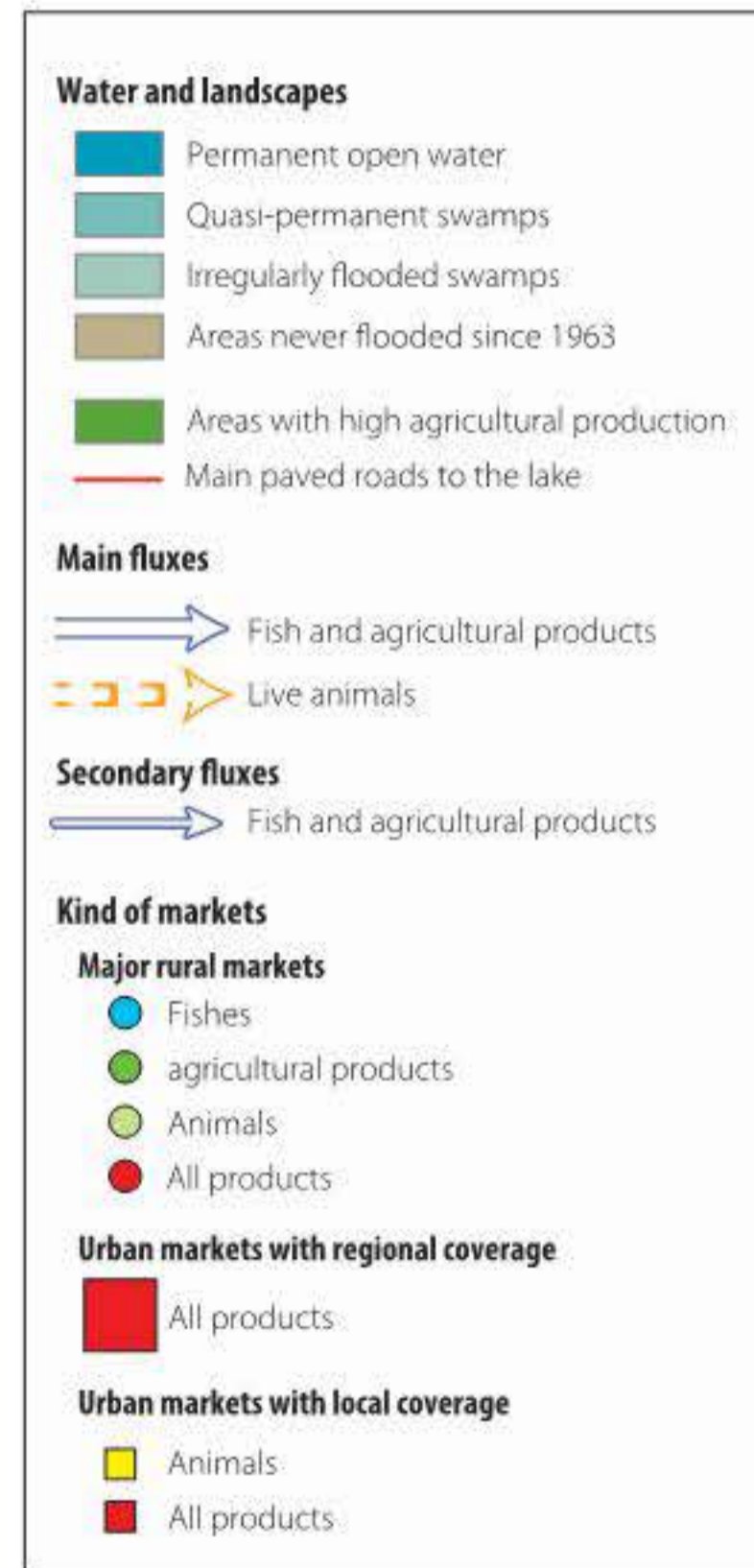
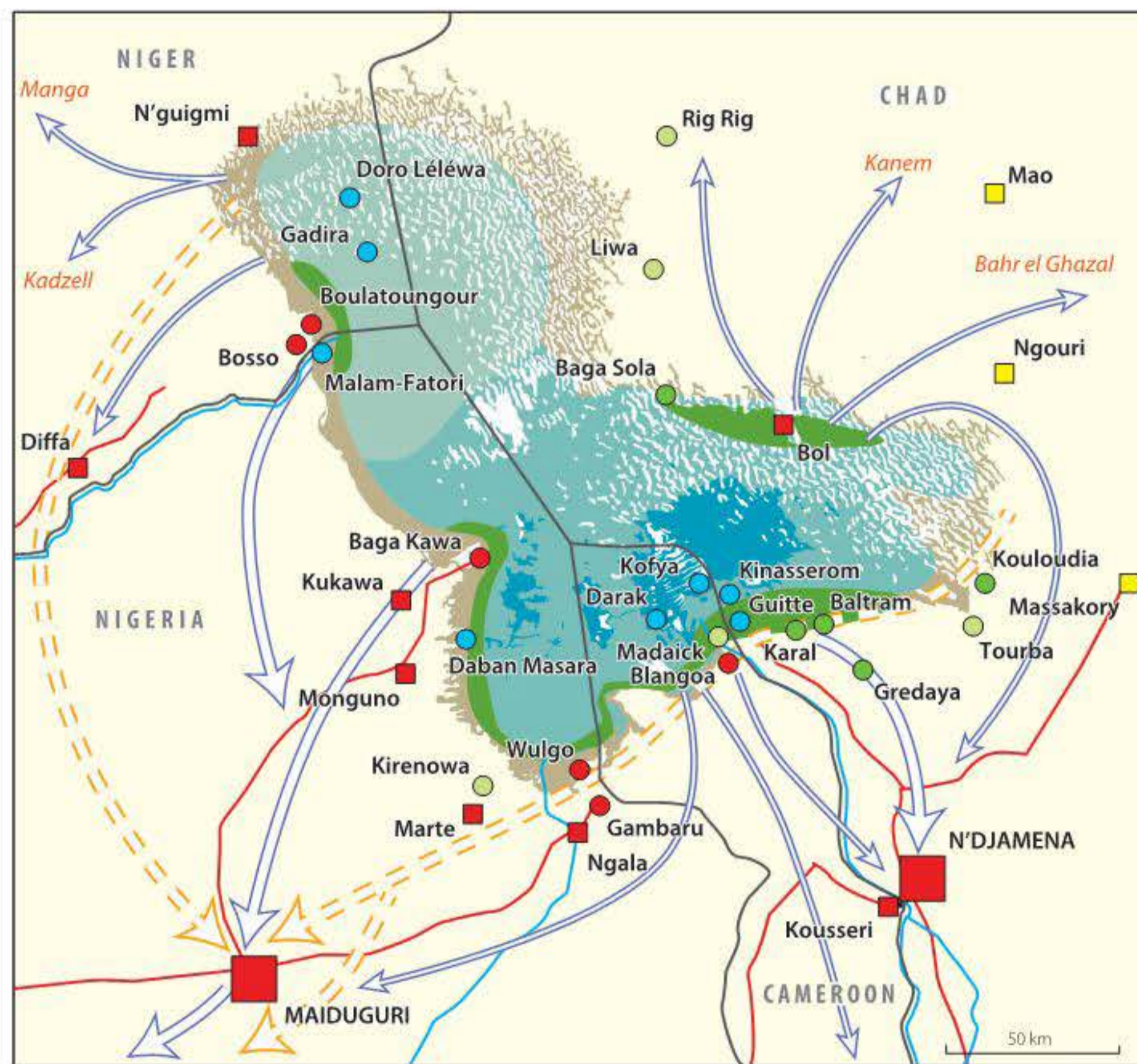


Fig. 20. Modelling the geographical area of Lake Chad (chorematic diagram)

Source: author 2016



LAKE CHAD: A MULTITUDE OF CHALLENGES

In 2016, Lake Chad is in the eye of the storm of Boko Haram terrorist attacks. These attacks are obscuring the threat of its possible disappearance, which has – wrongly so far – been the main focus of concerns about the lake for many years. This unique lake, which straddles four countries (Cameroon, Chad, Niger and Nigeria), is emblematic of the potential for territorial development based on wetland agriculture. An African rural sustainable development model could emerge on its shores.

• From the myth of disappearance to unrecognised prosperity

The droughts of the 1970s and 1980s reignited fears about the disappearance of Lake Chad. The idea that the surface area of the lake has decreased from 25 000 km² in 1969 to 2 000 km² today due to human water use and climate change took up the greater part of the development agenda until recently. However, for the last 25 years, this idea has been at odds with the realities of the lake, which has made it difficult to design and implement public policies.

Lake Chad has a high natural variability: it is very shallow (three meters at most) and subject to high evaporation; its surface area reflects rainfall in its basin. The sources of its two main tributaries, the Chari and Logone rivers (85% of inflow), are located in the Sudanian zone. High rainfall in the 1950s and 1960s produced a Medium Lake Chad, with a single body of water covering 25 000 km². Since the drought in 1973 it has been known as Small Lake Chad, with two

basins (southern and northern) separated by a shoal and surrounded by marshlands. If the inflow from the Chari that feeds the southern basin is insufficient, the northern basin remains dry. This is then known as the Dry Small Lake Chad, a situation observed several times between 1973 and 1991, but not since then. Since 1991, the average flooded area is 10 000 km² (+/- 4 000). The past failure of large-scale irrigation projects in the basin explains the low level of human water use: 2-3 km³ for 18-20 km³ average inflow.

The Small Lake nevertheless displays great economic dynamism. Its natural resources (fish, water, land and floodplain grazing marshes) have attracted many migrants from different origins who have been affected by drought. The lakeside communities (2 million people in 2014) have adapted to the variability of the environment through mobility (to follow resources), multi-activity (associating farming, fishing and livestock rearing, depending on the water level, ethnic specialities and resources available) and multifunctionality (the same area of land may sometimes be used for three different activities over the course of a year). Successive endogenous innovations have resulted in a substantial increase in agricultural productivity. These family farming systems create value-added (per worker and at the territorial level) and far more jobs than those provided by modern farms specialising in cereals in Africa. Through regular food exports (cereals, vegetables, fish and cattle), they contribute to food security in a hinterland with 13 million people polarised by N'Djamena and Maiduguri.

• Insecurities

This situation does not preclude vulnerability, which concerns water first of all. Although there is no doubt about global warming, the IPCC models do not yet give any reliable forecast of rainfall changes in this part of Africa. What is certain is that the population of the Chad Basin is going to increase substantially: from 51 million people in 2016 to 130 million in 2050. If per capita water use doubles to meet new food and urban requirements, water withdrawals upstream will reach nearly 10 km³ annually. However, if inflow to the lake is less than 15 km³, the northern basin will not be fed. Since the 2000s, the revival of irrigation in the basin, both public and private, has demonstrated the dangers of inefficient, uncoordinated water resource management. The project for water transfer from the Ubangi River to Lake Chad, which was first conceived in the late 1980s and adopted by the Lake Chad Basin Commission (LCBC) in 2014, makes sense in the face of these long-term prospects. It nevertheless raises a number of questions (impacts, financial viability, geopolitics) that make its implementation improbable.

The main threat currently facing Lake Chad is violence. The Boko Haram insurgency began in 2009 in Maiduguri, Nigeria, due to local political causes. It then gradually spread through rural parts of the Borno region and Lake Chad in 2013-2014. Villages have been razed, and tens of thousands of people have fled to the lake's shores in neighbouring countries. The crisis highlights and exacerbates tension linked to poverty in the Lake Chad Basin, which has one of the highest population growth rates in the world. In Lake Chad, growing tension over land had become difficult to manage in a context of decentralisation conducive to partisan manipulation. The large numbers of young islanders joining Boko Haram has been interpreted as an attempt to repel the

migrants who were threatening their access to resources. The Lake Chad "oasis" is in danger.

• A laboratory for territorial development?

But the worst-case scenario may never happen, and Lake Chad could also serve as a framework for new territorial development policies. The Lake Chad Development and Climate Resilience Action Plan presented in December 2015 by the LCBC at COP21 in Paris, with the support of the World Bank, establishes some possible guidelines for this framework. The challenge is to reconcile respect for environmental balances and contributions to food security and employment. Increasing resilience in the immediate term implies ensuring development: providing public goods (roads, water, education, electricity) and supporting productive sectors, but also increasing the security of land rights, based on principles of inclusive democratic citizenship.

The goal would thus be to articulate support for agriculture and for spatial management (by increasing the resilience of family farms to environmental variability), regional integration (based on the management of trade and shared water resources) and territorial development (through the equipment of secondary poles helping to create jobs and value based on rural production, while balancing the urban network). Lake Chad provides the resources – both natural and human – for an innovative development model. Meeting the political and institutional conditions for its implementation remains a challenge.

Géraud Magrin



M42. Changes in population density between 1993 and 2030

Source Instat 2013 and projections from Sourisseau et al. 2016

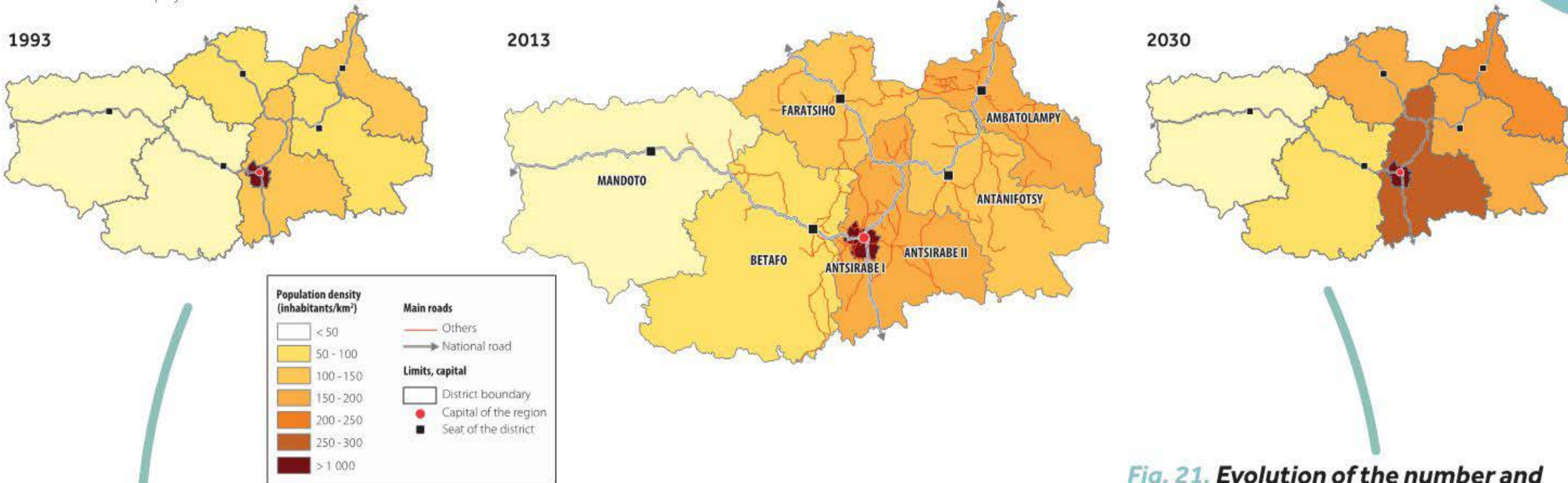
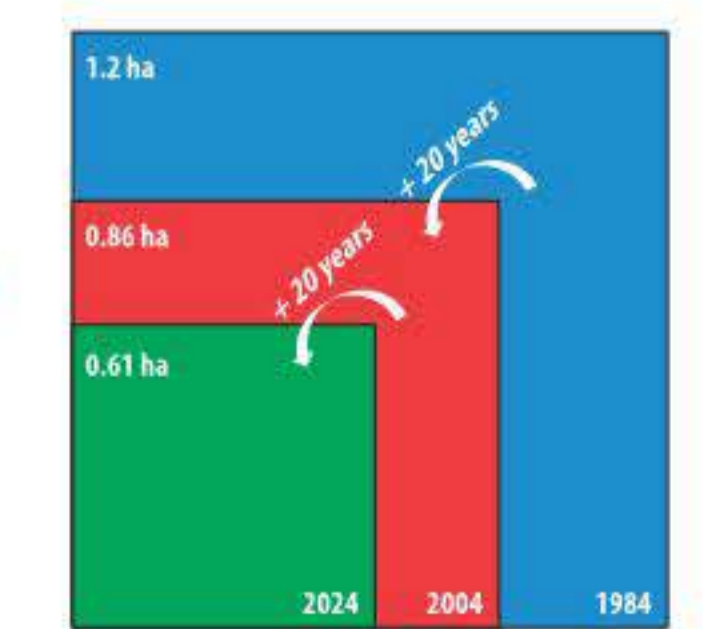
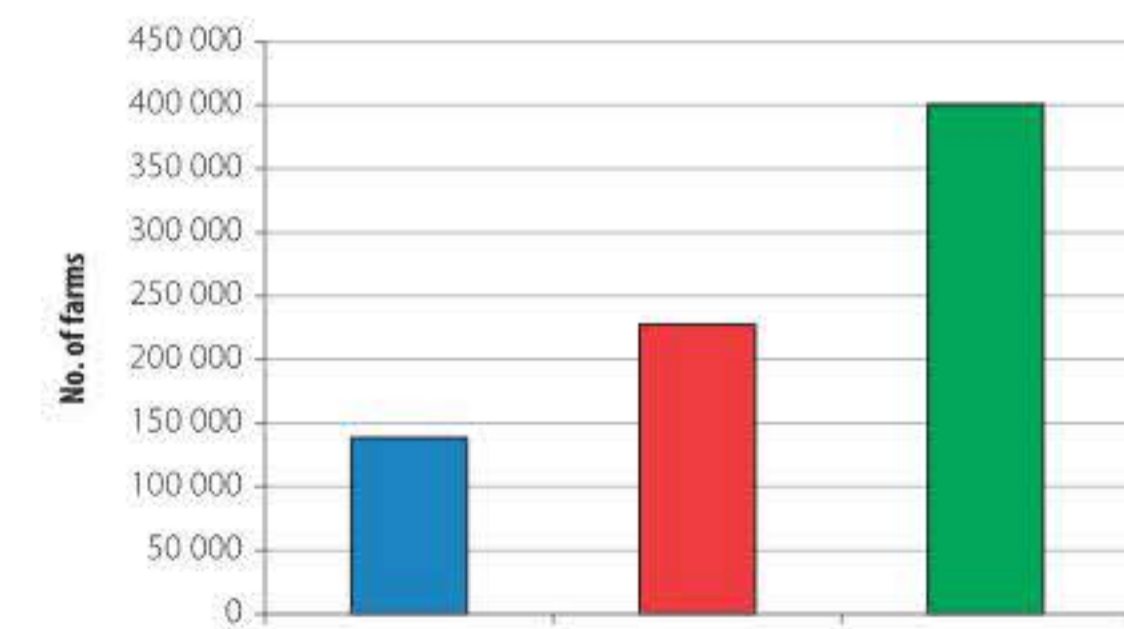
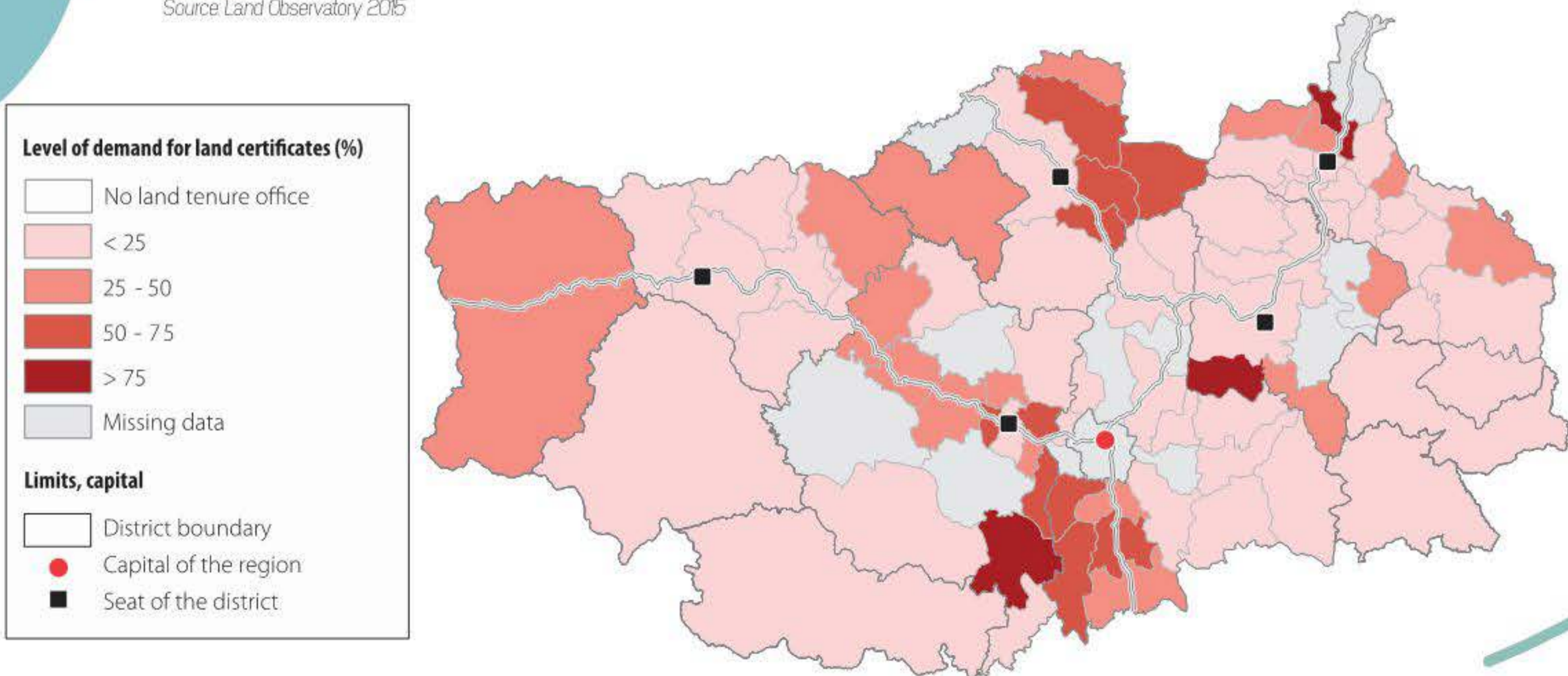


Fig. 21. Evolution of the number and area of farms between 1984 and 2024

Source MAEP 2007 and projections from Sourisseau et al. 2016

M43. Requests for land certificates by municipality (% of households)

Source Land Observatory 2015



THE ILLUSION OF ABUNDANCE: AGRICULTURAL LAND ISSUES IN THE VAKINANKARATRA REGION IN MADAGASCAR

High population growth is putting additional pressure on agricultural land and exacerbating the challenge of access to land for many people. Beyond the technical successes of decentralised land management, territorial approaches need to be consolidated in order to enable the implementation of assessments and concerted action plans.

• The paradox: smaller farms and an abundance of land

In Madagascar, of the 40 million ha (Mha) of agricultural land, only 3.5 Mha are cultivated and 10 Mha are cultivable. Despite this potential, average farm sizes, which are already very small, are getting smaller. By extending the trends observed in the last two agricultural censuses (1984 and 2004), the average size of farms could be halved over the next 40 years, falling from 1.2 ha in 1984 to 0.61 ha in 2024. The extension of agricultural land should help to remove land constraints on family farms, but to understand the real room for manoeuvre, it is necessary to move up to the regional level in order to conduct a detailed territorial assessment and to implement a forward-looking exercise more consistent with local realities and perceptions.

The Vakinankaratra region, one of the most populated and economically dynamic parts of the large island, provides a better understanding

of the gap between the land potential announced and the areas actually cultivated. In this region, as at the national level, agricultural population growth is high and is following the same pattern as demographic growth. The secondary and tertiary sectors, driven by the beginning of industrial development in the regional capital Antsirabe, are incapable of significantly absorbing the workforce from the younger generations. The majority of the population (86% of the labour force in 2012) still depend on agriculture for their livelihood, including people in urban areas. Consequently, even with a reduction in population growth, the number of farms would continue to grow and is expected to almost triple in the next 40 years.

• More and more farms, but little growth in cultivated areas

The very low growth rate for cultivated areas (0.9% per year over the 1984-2004 period at the national level) raises questions about the reality of access to land. Potential reserves of land are far away from where people currently live and situated in harsh environments: supply and demand for land rarely coincide. The western part of the region (the Betafo and Mando-to districts), which was the agricultural frontier in the 1970s, no longer seems to play this role. Infra-regional disparities in terms of population distribution, but also of infrastructure, services and quality of life, are very high: they are

the result of long-standing conflicts between precolonial kingdoms and then of colonial rule, but also of the prevalence of malaria and insecurity; and they are growing as time goes by. In 1993, population densities by district ranged from fewer than 20 people/km² to more than 100. If effective changes are not made, especially in terms of migration, this gap could widen by 2024. In the most populated areas, it is impossible to access new land through clearing because of a situation of saturation, serving as a reminder that uncultivated land is rarely free from rights and usage.

However, in order to absorb agricultural population growth by 2024 without reducing current average farm size, the cultivated area at the regional level needs to be increased by 95 000 ha. Without any readjustment, it should thus cover almost a third of the territory in the most densely populated districts (>200 people/km²)!

Since the 1980s, farms have been compensating for the reduction in their land, livestock and equipment by the intensification of labour (disappearance of fallows, double cropping, and optimisation of organic fertilisers). Despite this, the growing disparities between the prices of manufactured goods and those of agricultural goods, combined with political crises and climate shocks, are keeping most rural families in poverty. In these conditions, it is difficult for households to purchase and/or improve land of lower agricultural quality or to establish a new farm in a remote location.

• The challenge of access to land: the need for a global vision

Between 2005 and 2015, the land reform was based on increasing land security through the legal recognition of customary rights to cultivated land and the granting of new competences to local municipalities. In the Vakinankaratra

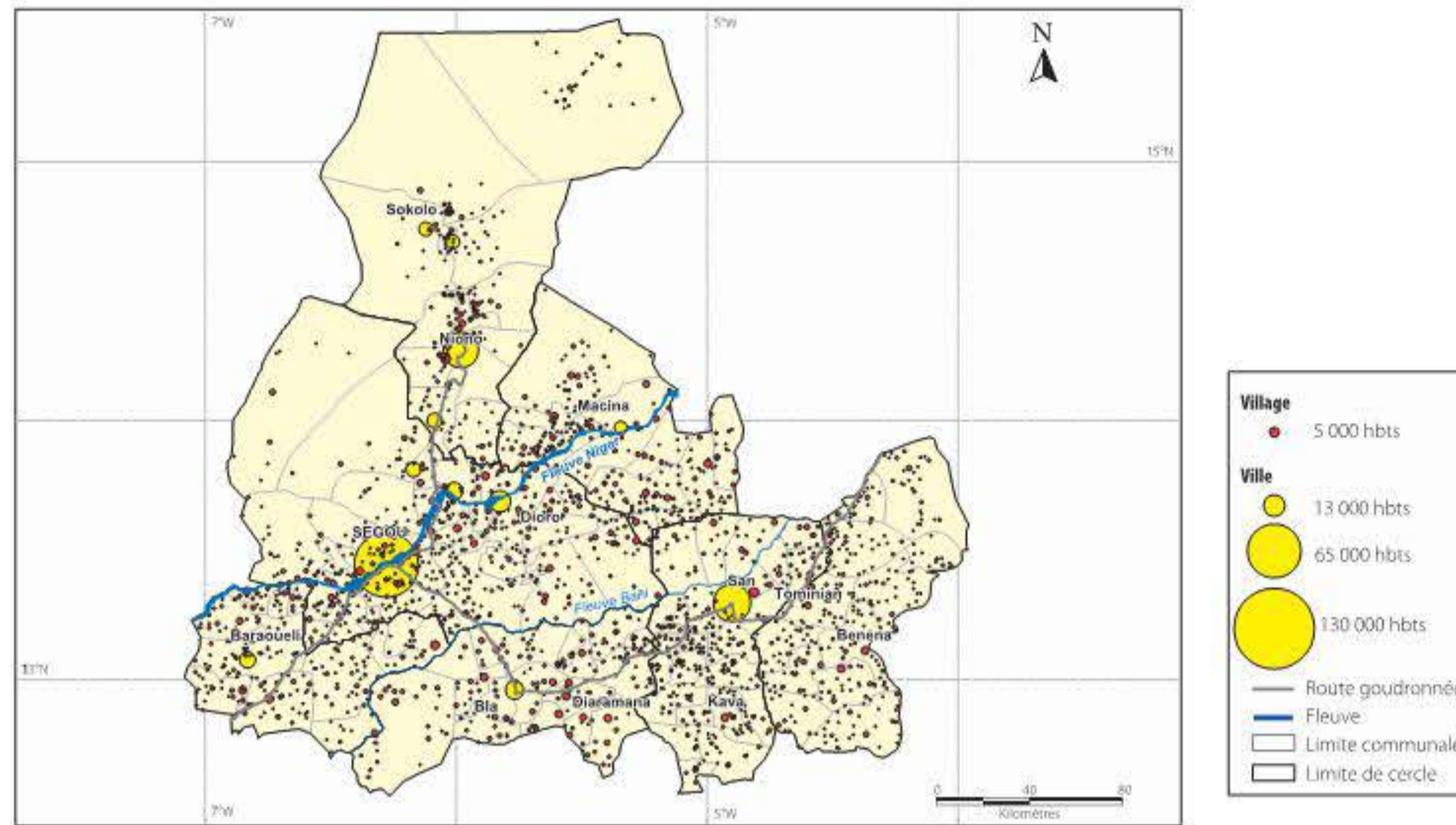
region, this commitment to decentralising land management has been partially successful: 83 out of 91 municipalities now have a local land office and most are still active despite the national crisis situation between 2009 and 2014. But the challenge of access to land, the focus of land policy for the next 15 years, remains unresolved. Since 2015, the region has been attempting to attract entrepreneurs by providing them with "secure" land within the framework of agricultural investments zones. But most of this land is proving to be already occupied by farmers. Knowledge about the areas available and about current rights and usage is still lacking. Facilitating access to land requires a thorough consultation process resulting in an agreement with rights holders at the local level.

Migration movements towards the least populated territories appear very limited because of strong socioeconomic ties with the territory of origin, the desire for access to minimal public services and fears about insecurity for goods and people. In order to stimulate readjustments that can boost development, policies must therefore focus on developing infrastructure and public services and investing in farms to facilitate their installation in territories where land is available, but of lower agricultural value. These policies should be driven by a global vision of territorial development, based on a reliable assessment of current realities and existing potential.

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Patrick Rasolofo, Jean-Michel Sourisseau

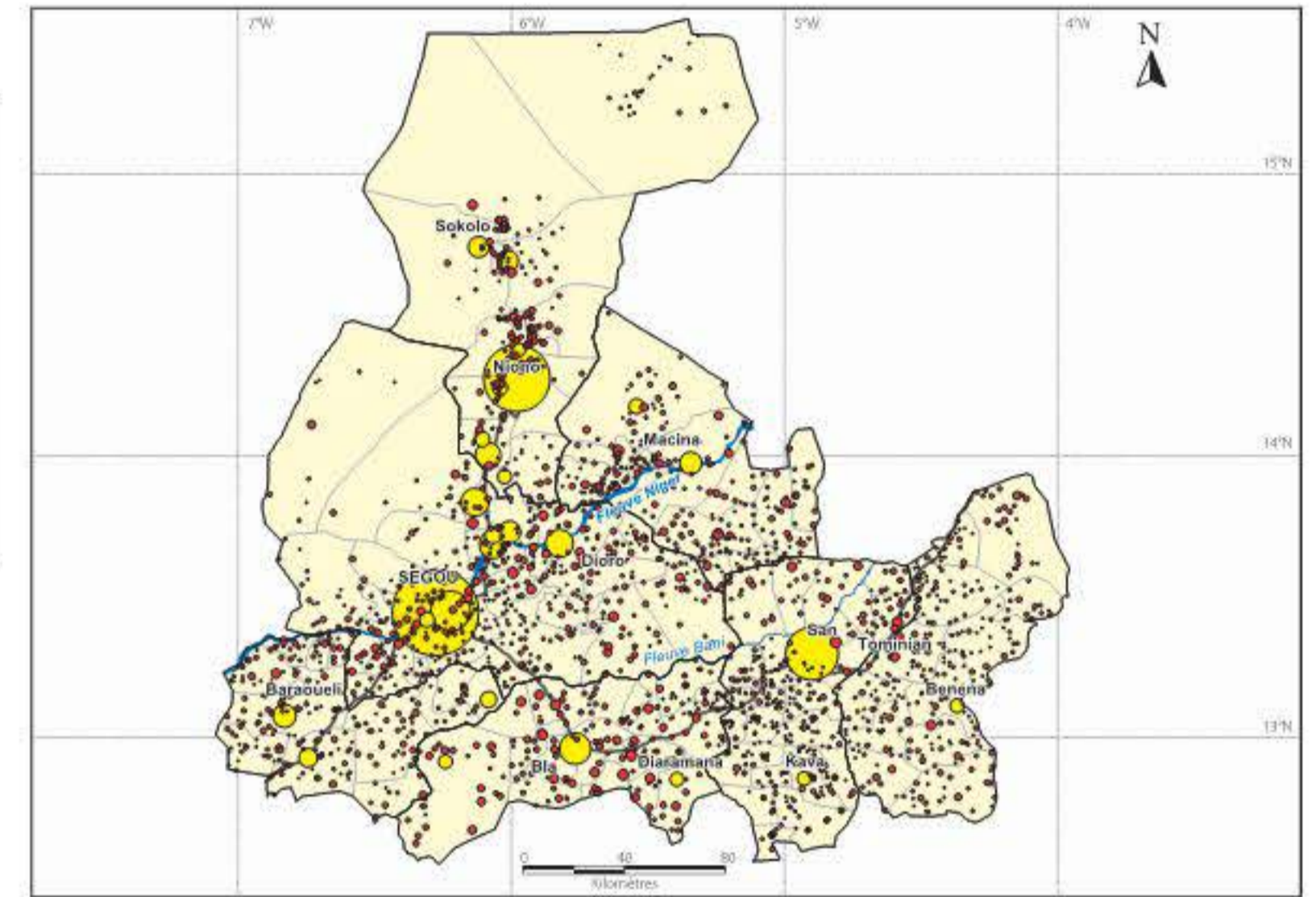
C44. Répartition de la population de la région de Ségo en 1987

Source : RPGH 2009



C45. Répartition de la population de la région de Ségo en 2009

Source : RPGH 2009



C46. Occupation de la population par secteur d'activité en 1987 et 2009

Source : RPGH 1987 et 2009

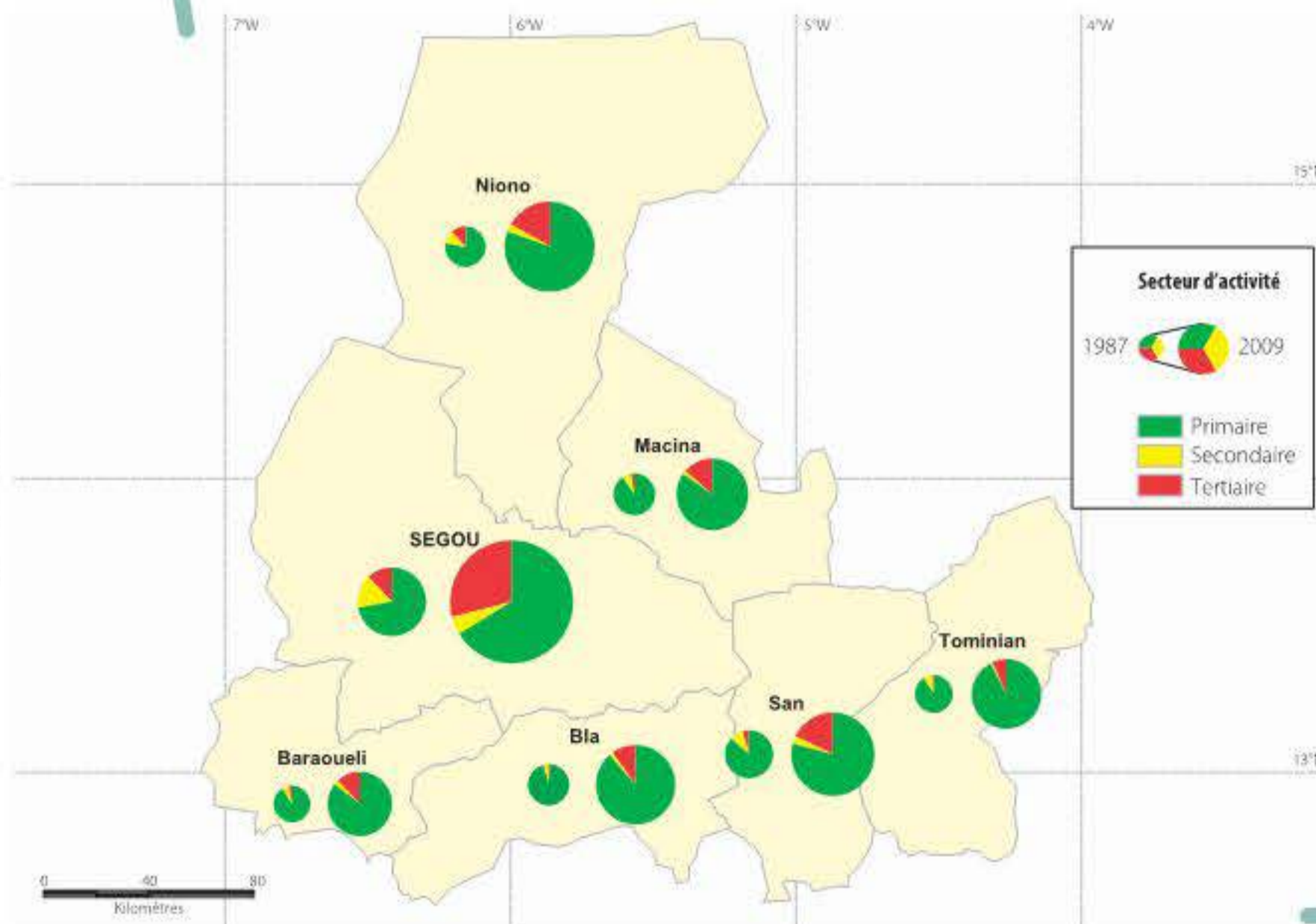
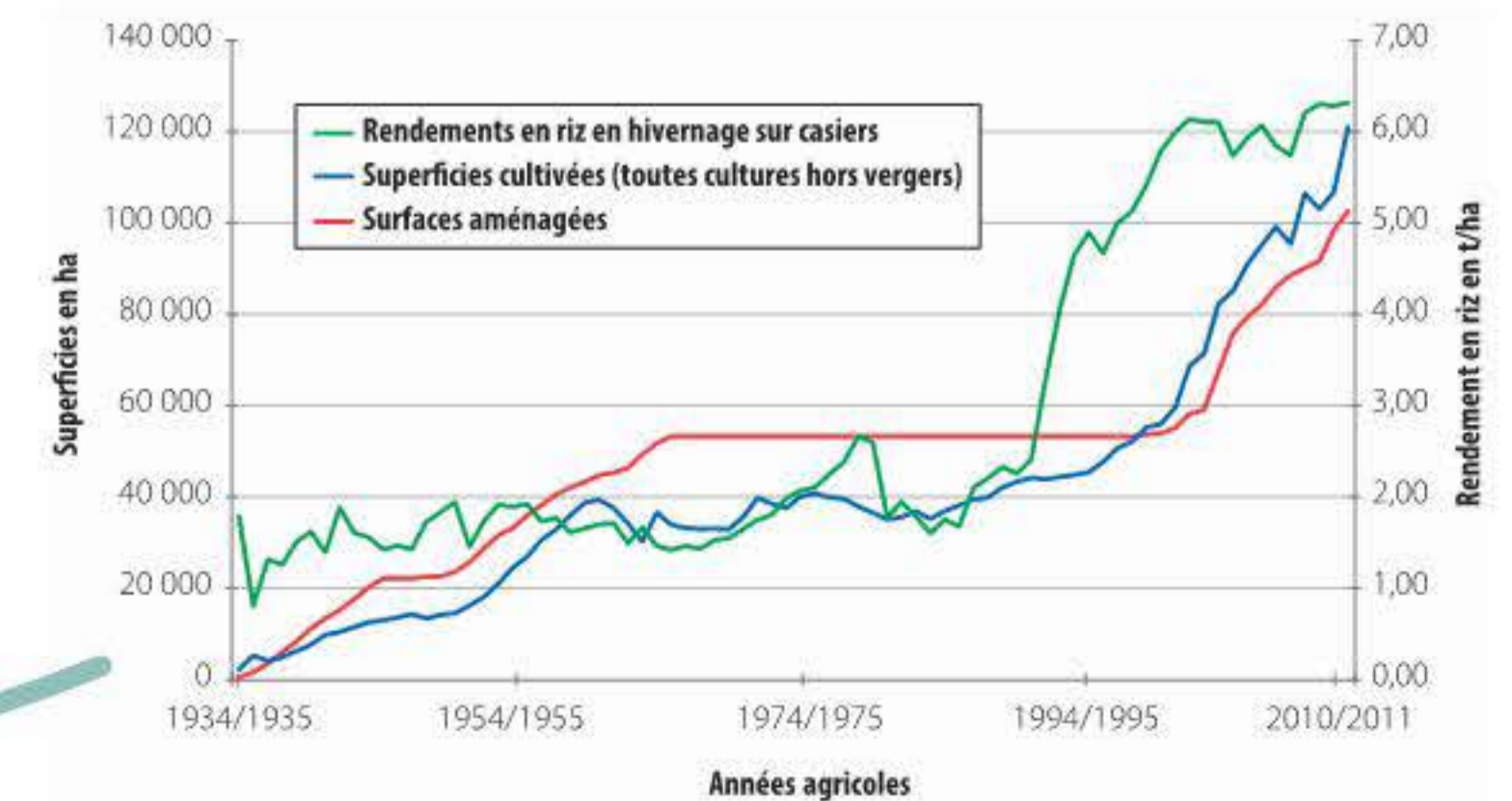


Fig. 22. Évolution des superficies aménagées, cultivées, et des rendements en riz à l'Office du Niger (1937 – 2011)

Source : Office du Niger et calculs des auteurs



TERRITORIAL PLANNING TO MEET THE DEMOGRAPHIC CHALLENGE IN SÉGOU (MALI)

In Ségou, as in most parts of Mali, agriculture is still the main source of livelihood for households. There is considerable potential for developing irrigation and the agri-food sector in the region, but economic diversification remains a challenge in terms of meeting the demand for jobs, both now and in the coming decades. The development of strategies at the regional level provides an opportunity for mobilising synergies between stakeholders and between sectors.

- **A long-standing specialisation in the primary and informal sectors**

The city of Ségou, the capital of the kingdom with the same name during the pre-colonial period, is a commercial crossroads and political centre, and has preserved its administrative tradition. Today, it is nevertheless agriculture that best characterises the region and its diversity, with: in the south, rainfed production systems based on millet and sorghum, sometimes including cotton; in the central zone, between the Bani and Niger rivers, the extensive cultivation of millet; and in the north, the Sahel, which is dominated by extensive systems and small ruminant breeding. This specialisation has been reinforced by the emblematic water project initiated in the 1930s by the Office du Niger (ON), which has enabled the irrigation of plains north of the river covering more than 110 000 ha (with a potential of around 1 million ha) and the development of rice cultivation and vegetable growing. The

ON, and to a lesser extent the area of the Office Riz Ségou, are key components of the country's food security strategy that focus political attention and give substance to the region's articulation with the national level.

Despite ambitions of economic diversification through the development of the agri-food industry and the tertiary sector, considered as a source of long-term growth, this primary specialisation has not diminished over the last few decades. It has even resulted in a decline in the secondary sector since the late 1980s. The tertiary sector is gaining ground, but the jobs concerned are mostly and almost structurally informal.

- **Challenges linked to the expected doubling of the population**

The population of the Ségou region increased by a factor of 3.1 between 1960 and 2015, in other words 2.7 million more people (3.3 million for the whole of Mali). This growth has so far resulted in the extension of agricultural land and rural densification: although urbanisation is progressing, it is not concentrated in the three main cities of Ségou, Niono and San. Instead, we are seeing the spread of small towns and villages, especially with new districts and hamlets, which add to the network of secondary towns. This densification is occurring along three lines: along the Bamako-Mopti road (and beyond to Gao); along the Niger River with the municipalities of Baroueli, Bla and San; and, more recently, along the Ségou-

Niono road. These three routes for the movement of goods and people (especially with internal flows of seasonal agricultural workers) link the medium-sized regional towns, carry agricultural production towards Bamako and govern mobility towards Côte d'Ivoire and Burkina Faso.

The population is expected to more than double by 2050, reaching 6.5 million people, with extreme densification in populated areas. This outlook will mean very high demand for jobs or income-generating activities. Assuming a constant employment rate of 70% (measured in 2012), 65 000 young people will need to find jobs every year by 2035, compared to only 38 000 in 2015. Cumulatively, this growth in demand represents around one million jobs to be generated between 2015 and 2035.

In 2035, a large part of activity will still be agricultural. Without any major technical changes, this growth will correspond to additional agricultural land requirements of 1.1 million ha by 2035 (compare to 1.4 million cultivated today). The plains provide significant potential for new land development, but the pace of extensions planned by the ON and the other irrigated areas needs to be tripled or quadrupled to ensure effective adaptation. Moreover, population densification will result in increased pressure on resources and more and more land-use conflicts between pastoralists, farmers and agro-pastoralists, in a context of insecurity caused by the jihadist threat in the northern and central parts of the country.

- **The need for territorial strategies**

Comparing past dynamics with the challenges of the next 20 years calls for the implementation of effective strategies for action. This implies creating income-generating, labour-intensive activities, while planning territorial development that takes into account pressure on natural resources.

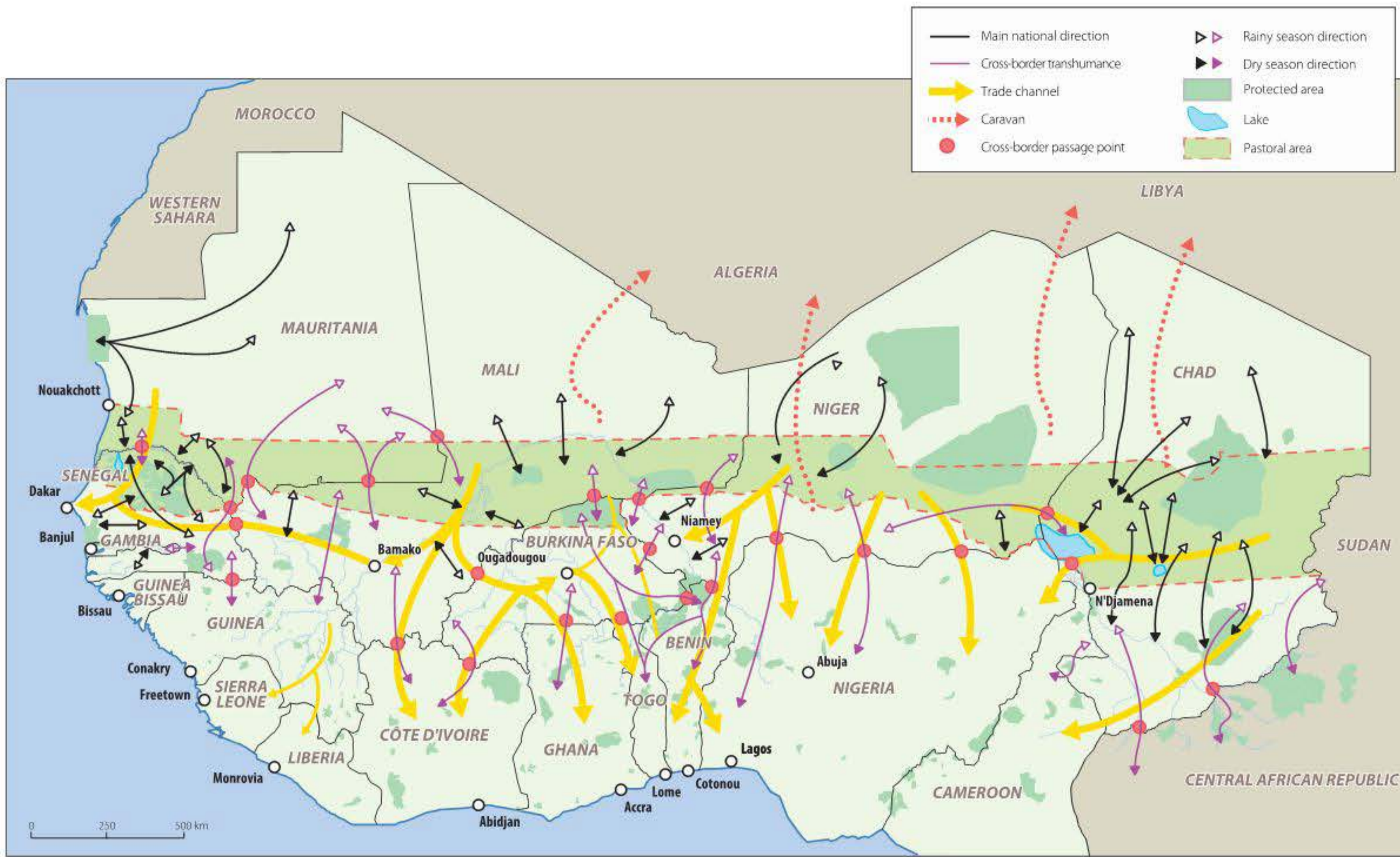
Renewed attention needs to be given to agriculture, especially with a shift towards production systems that are better suited to resource management, require less costly inputs, provide jobs, and promote and develop the skills of local farmers. This means providing support for family farms and their development, especially in the irrigated areas, and exploring agro-ecological solutions. But strictly sectoral policies are not enough. Job creation should also involve amplifying current dynamics and intersectoral synergies, both upstream and downstream of agriculture (especially the potential for product processing), and anticipating ways to meet the needs of the people.

One prerequisite is therefore investment in healthcare and education, combined with population and mobility policies suited to the regional context. Investment must also be made in economic infrastructure capable of initiating rapid, inclusive diversification, based on the development of small and medium-sized enterprises and on progressive support for the current informal sector.

This kind of strategic approach calls for spatial planning that reinforces the territorial authorities' resources and their complementarities, the relocation of development policies and their articulation with the national level. The new guidelines for the Malian government's decentralisation policy, with the establishment of the regional development agencies and the creation of the new regions, are a step in this direction.

The territorial prospective study conducted in the Ségou region in 2015 (Sourisseau et al. 2016) uses population projections for 2035 and 2050 that assume the region's share in the total population of Mali (around 15%) remains stable. Based on a fertility rate of 6.14 children per woman in 2015 (derived from the 6.35 children per woman estimated for the whole of Mali by the United Nations for the 2010-2015 period), the average hypothesis of a linear decline in the fertility rate has been adopted, with 3.5 children per woman in 2050 (and 4.6 in 2035).

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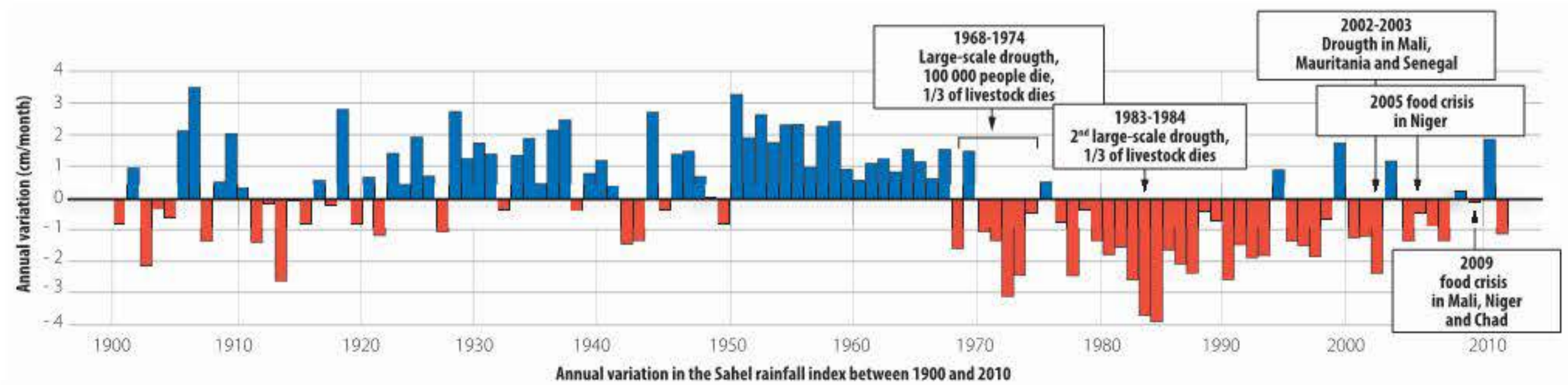
M47. Livestock mobility in 2013

Source: Touré et al 2012

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Fig. 23. Annual variation in the Sahel rainfall index between 1900 and 2010

Source: Touré et al 2012



PASTORAL MOBILITY, FROM A SAHELIAN TO A SUB-REGIONAL ISSUE

Public policies have long seen pastoral mobility as a problem, in connection with a sometimes divisive approach to productive land use. Today, because of the population, land tenure and economic dynamics at work in all territories, securing mobility is becoming an economic and political challenge of regional or even continental importance.

• Mobility, the core of an economy of shared resources

Extensive cattle, sheep and goat breeding are the predominant activities in the Sahel region. Pastoralism is characterised by close interactions between the family organisation, the herd structure and the natural surroundings, and these interactions require a great capacity for adaptation. Rangeland resources are heterogeneous, scattered and transient; rainfall varies by 30% every year around an average of 400 mm. In the dry season, surface waters are rapidly transformed into strings of pools and plant cover disappears, making mobility an essential condition for the reproduction of Sahelian pastoral systems. Furthermore, the sustainability of this pastoral economy, with its uncertain, shared resources, depends on bundles of collective rights to the basic factors of production, in other words livestock and access to shared water points. It is based on the division of tasks within the family and rights to livestock and to temporary labour. Finally, it responds to growing demand on markets that are located a long way from the pastoral areas. The dispersion of the resources needed for production is therefore not the only reason

pastoralists leave their home area. Looking for salt (natron), avoiding contagious diseases or land conflicts and driving herds to end markets in the large cities are also reasons for moving livestock within the region.

• The intensification of regional interdependence in changing territories

Until the recurrent droughts of the 1970s and 1980s, pastoral mobility was relatively unrestricted and confined globally to the Sahel countries. Indeed, from the 1950s, a number of pastoral hydraulic works built in dry sub-humid areas opened up regions that were previously useless in the dry season because of water scarcity. After the rainy season, herds thus moved, where possible, towards wetlands or rivers (Senegal River Valley, Inner Niger Delta) and to post-harvest agricultural land (grazing in exchange for fertilisation) and the huge territories under long fallow.

During the last drought events of the 1980s, up to 80% of herds were decimated in some pastoral zones, and this mortality opened up areas for surviving herds. Moreover, people and animals migrated to the south, in the Sahel countries and even in the coastal countries, joining livestock farmers who had been living for decades in northern Nigeria, Benin, Togo, Ghana and Côte d'Ivoire. At the same time, the reduction in trypanosomiasis (sleeping sickness) prevalence and crossbreeding by livestock farmers made it easier to move zebu and zebu cross cattle herds to the south, these

animals being less susceptible to this disease. Not all of these farmers returned to the Sahel zone after the crisis. Some stayed in their host areas, maintaining links with pastoralists in their areas of origin and forging new ones with those in their new location.

But since the 1980s, population growth has been altering the structure of pastoral and agro-pastoral areas. Human and animal population densities are increasing and pastoral areas are diminishing due to the expansion of agricultural land and of irrigated areas around water resources. In agro-pastoral areas, fallow periods are now limited. Moreover, farmers often also rear livestock. Competition for water and rangelands is therefore exacerbated and mobility is becoming very restricted, especially in the southern areas. This is where more and more transhumant pastoralists are now to be found looking for pastoral resources. The mobility of trade has also increased towards the capital cities of the coastal countries, which are becoming more and more populated, with growing demand for red meat.

More than in the past, but less than in the future, pastoral areas both within and outside the Sahel are necessarily interdependent and the shared use of land and resources is becoming more complex. Cross-border transhumance provides welcome supplies of animal products as well as trade and fiscal revenue at the borders, on markets and in towns, and provides fodder and fertiliser in the areas crossed.

• Renewed interest in pastoralism as an opportunity for integration

Mobile pastoralism is currently attracting much attention from a range of different stakeholders. Cross-border cooperation is in fact becoming a hobbyhorse for some coastal and Sahelian countries, for bilateral cooperation, regional

and non-governmental organisations, and for international financial institutions. Interventions cover different fields, even those that were not previously included in livestock development programmes: security, education, decentralisation, human health, etc. However, the stakeholders all have their own priorities and, consequently, programmes overlap in the same field without any subsidiarity or coordination. These initiatives, most of which are regional, could have a greater impact if the national policies on which they are based were to better integrate mobile pastoralism issues, and if regional integration directives were applied more effectively.

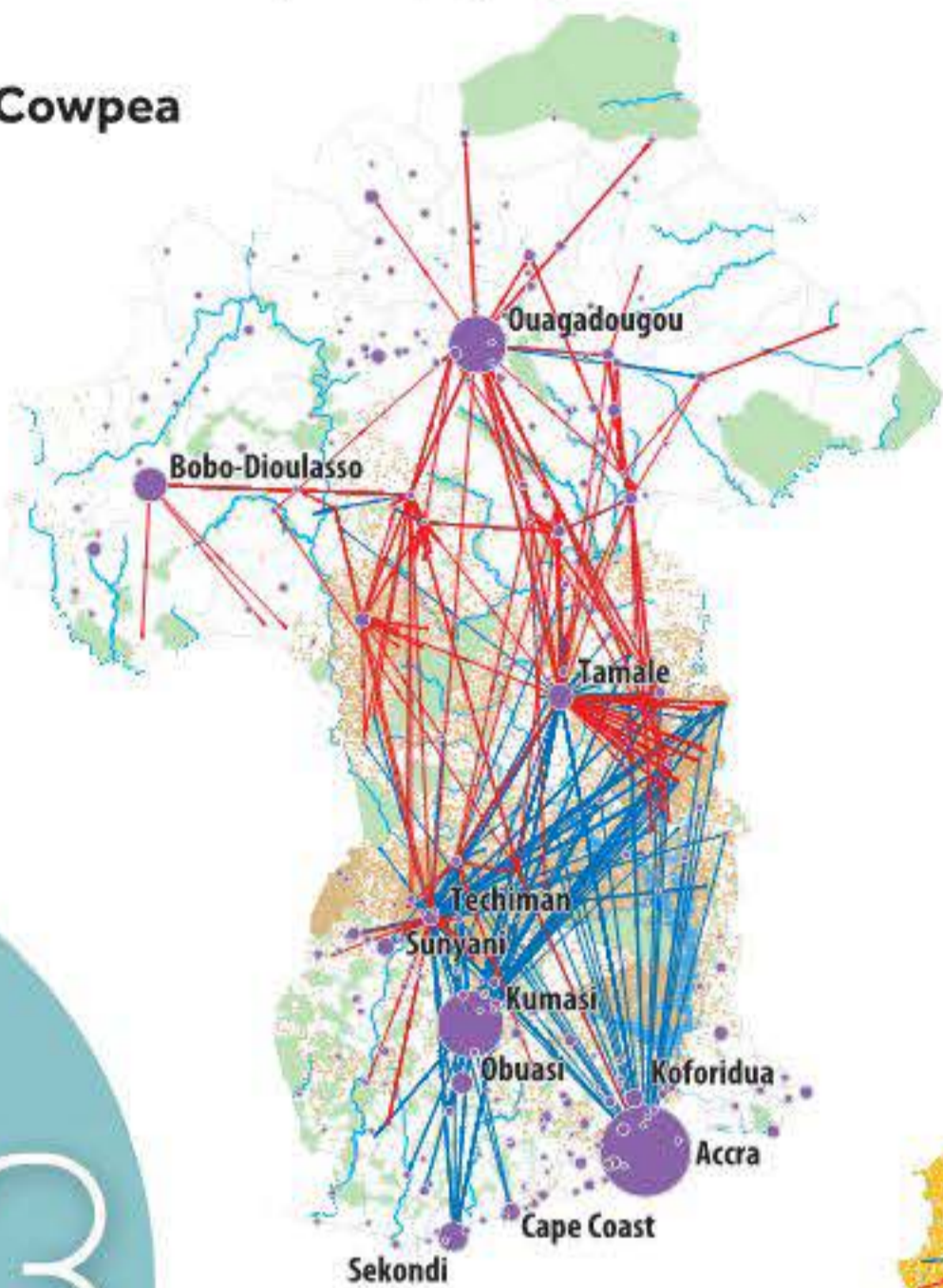
More secure, better regulated cross-border mobility would be an example for the regional integration of the main sector concerned by sub-regional trade in West Africa. This policy challenge represents an opportunity for decision makers to adopt a truly regional approach and to work towards greater stability in the Sahel, which also undoubtedly depends on these cross-cutting processes.

Christian Corniaux, Véronique Ancey, Ibra Touré, Astou Camara, Jean-Daniel Cesaro

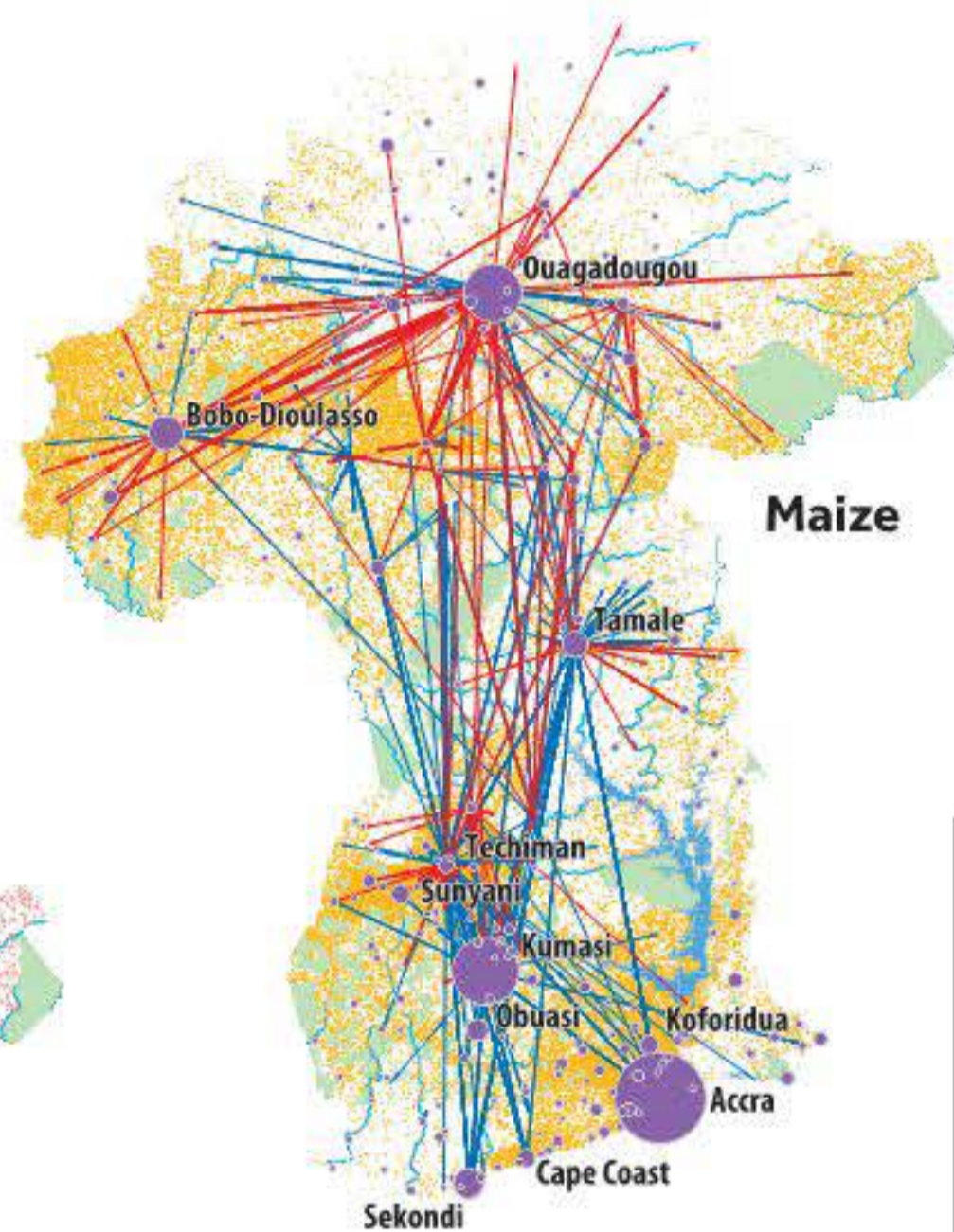
M48. Food crop flow of cowpea, maize and yam between Burkina Faso and Ghana - connections and complementarities

Source: author 2016 (see note page 69)

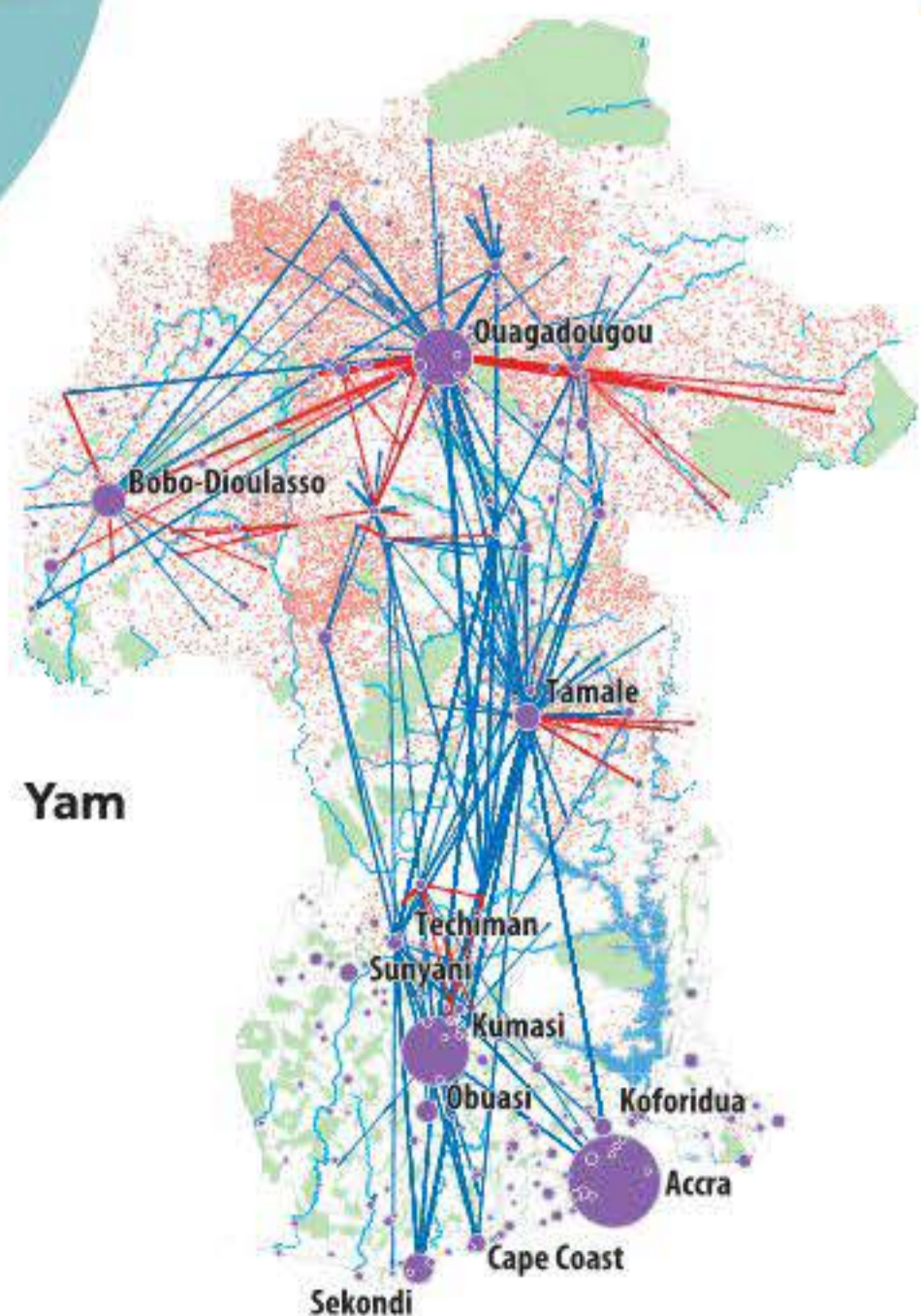
Cowpea



Maize

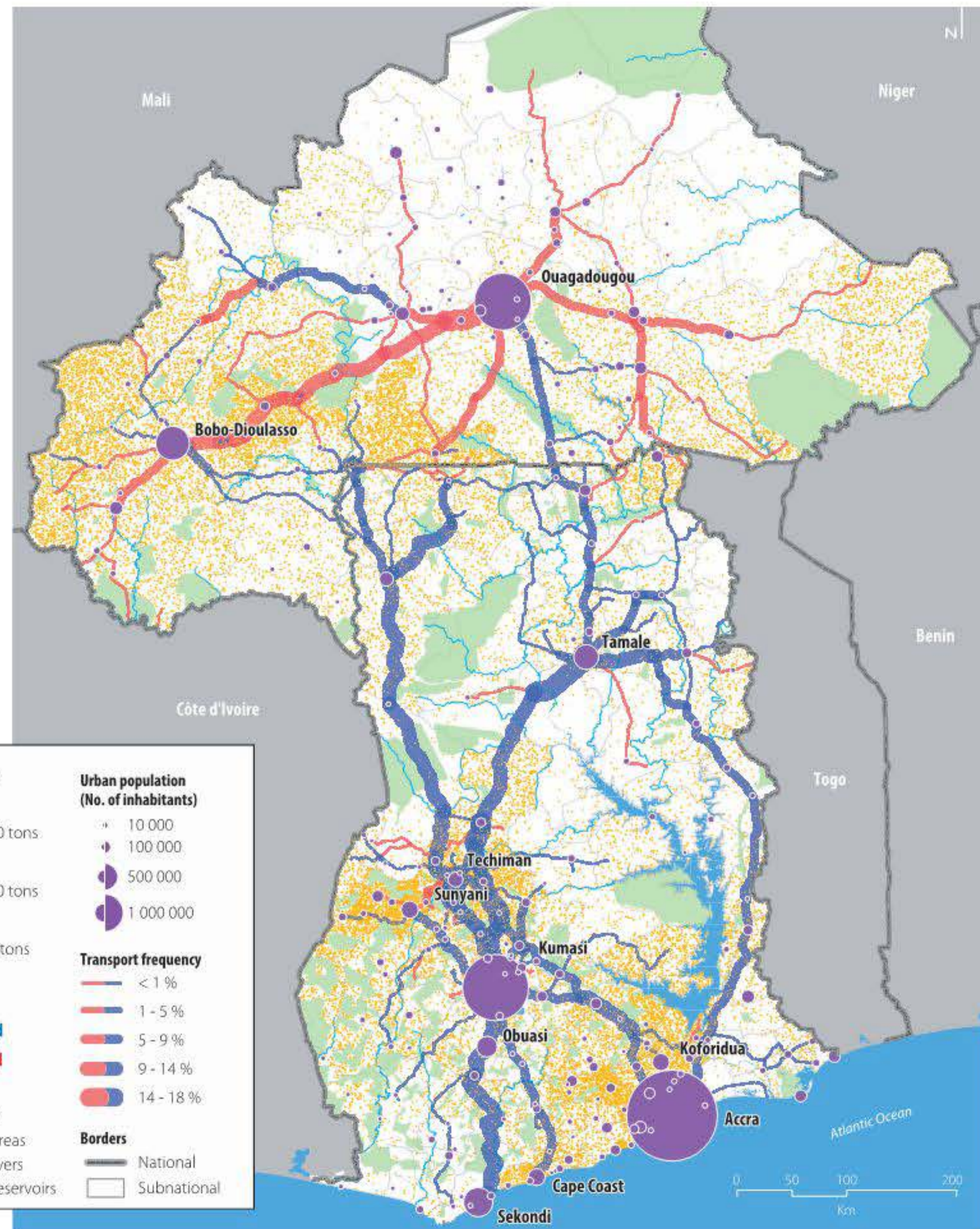


Yam



M49. Maize routes, from track to tarred road

Source: author 2016 (see note page 69)



2013 crop production		Urban population (No. of inhabitants)	
Yam	1 dot = 350 tons	• 10 000	• 100 000
Maize	1 dot = 100 tons	• 500 000	• 1 000 000
Beans	1 dot = 50 tons		
Flow direction		Transport frequency	
→ Southbound		< 1 %	
← Northbound		1 - 5 %	
		5 - 9 %	
		9 - 14 %	
		14 - 18 %	
Natural environment		Borders	
■ Protected areas		— National	
— Perennial rivers		□ Subnational	
■ Lakes and reservoirs			



THE OUAGADOUGOU-ACCRA CORRIDOR: SPATIAL INCLUSION THROUGH STAPLE FOOD CROPS

A heterogeneous area situated partially within the CFA franc zone, the Ouagadougou-Accra corridor is a real outsider in terms of regional integration in French-speaking Africa, and its food distribution channels foster complementarities between Ghana and Burkina Faso. Spontaneously reorganised during the Ivorian crisis, the resulting flows are restructuring the area, indicating potential that is attracting institutional attention.

• The concept of a corridor in West Africa

The concept of a corridor has many interpretations. As both a line of communication and a project territory, the functions, goals and stakeholders concerned differ from one corridor to another. With their concentration of transportation routes connecting remote places, corridors also sometimes enable movement within the areas they go through. In West Africa, the "Sahel-coastal" corridors are the legacy of colonial export infrastructure, reclassified after the countries gained independence as policies to tackle rural isolation. Initially the port-railway combinations orchestrated the movement of agricultural and mining products from the hinterlands and, in return, supplied these areas with consumer goods. Infrastructure policies have been conducted in these corridors for decades, with regional integration as a common goal for the different cooperation institutions. However, the effects of communication corridors do not necessarily result in the development of these territories.

• A corridor outside the WAEMU

Because of the route it takes and the formal trade that gravitates around it, the Ouagadougou-Accra corridor is not really the legacy of colonial infrastructure. The Kumasi-Accra road was indeed built for gold and cocoa in the early days of the British Gold Coast, but the Kumasi-Ouagadougou section, straddling Burkina Faso and Ghana, corresponds to other processes. Tamale was only linked to Kumasi by Road in 1920, for administrative purposes and the recruitment of workers for the south of present-day Ghana. The stretch linking Ouagadougou to Tamale will be consolidated over the next decade.

In terms of the economy and transport, the successive colonial and national policies implemented until the mid-1990s left the landlocked states dependent on the outside, generally through a single sector and a single maritime outlet. These states then opted for competition between the maritime outlet points which, combined with the Ivorian crisis, enabled the Ghanaian corridor to set itself apart from its neighbours, linked to Abidjan, Lomé or Cotonou. Formal international trade flows in the Ouagadougou-Accra corridor rapidly increased in volume in the 2000s, even though this area is an outsider to the West African Economic and Monetary Union (WAEMU) with no legacy of colonial infrastructure.

A first WAEMU/Ghana Road Programme was launched in 2002 under NEPAD, followed by economic integration policies and calls for

free movement by the Economic Community of West African States (ECOWAS), which includes the WAEMU member countries. But the removal of barriers to intra-regional trade is still limited: while ECOWAS external trade benefits from a common tariff, internal movements of goods remain problematic.

• Enhancing complementarities in food production

The main strength of this corridor is its diversity: a Sahel-coastal climatic gradient combined with a political, linguistic and monetary boundary. This diversity is a source of spatial complementarities illustrated by the food distribution channels for yams, maize and cowpeas. Yams, which are relatively rare in Burkina Faso, are grown in the forest-savannah transition zone, from the border to the south of Lake Volta, whereas cowpeas are mostly produced in the north, in the Sahel zone, and to a lesser extent in Ghana. Maize is grown along the whole length of the corridor, with high concentrations in the southern parts of both countries.

Flows of yams go in two directions: huge demand from southern Ghanaian cities and massive exports towards the Sahel. Movements of cowpeas are mostly towards urban parts of Ghana, after concentration in the major markets of Burkina Faso. Grown in most parts of the corridor, maize follows more complex patterns: the southern half of Ghana has two rainy seasons, but the humid tropical climate is an obstacle to drying and conservation. Flows therefore have interannual variations depending on harvests, are reversed according to the climate and are even reconfigured depending on prices. It is not unusual for grain from Ghana to be dried in the Burkinabe Sahel zone before returning to its country of origin. As a priority, these flows of food crops are intended for urban markets, but they also meet growing, more diversified demand from the emerging

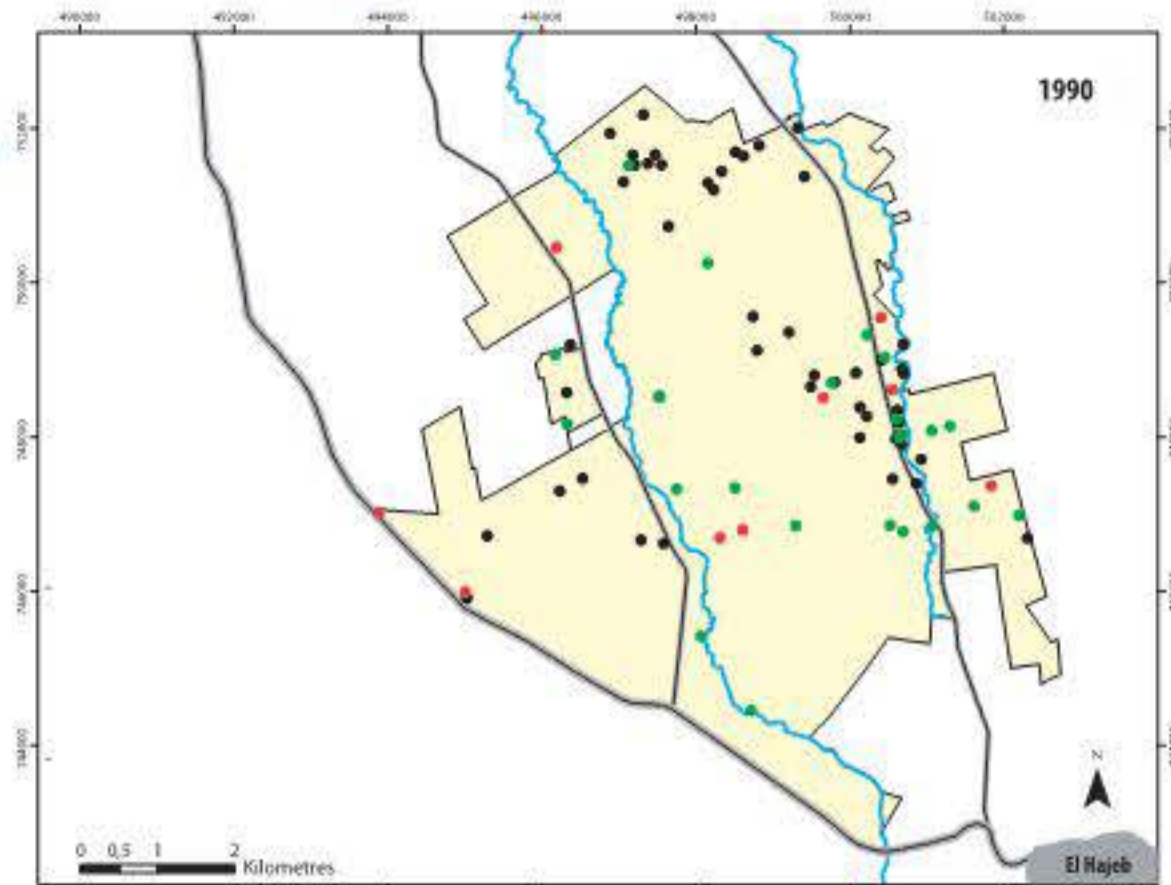
intermediate towns, and more recently from rural markets, which were previously largely self-sufficient.

• A cross-border perspective for spatial inclusion

The centre of gravity of cross-border trade – whether formal or informal – has shifted in favour of connections between Ghana and Burkina Faso, rather than the traditional Ivorian outlet inherited from colonial trade flows and the Bobo-Dioulasso zone. In an opportunistic manner, this trade has intensified and market specialisation has restructured the economic area of the corridor, but it has not become more formalised as a result. Although free trade is hampered by numerous illegal levies, strategies to avoid these many obstacles and border crossing practices range from completely legal to completely illegal. As a result, this trade network linking rural agricultural basins, intermediate towns, border markets and urban consumption hubs mobilises different types of stakeholders on different levels, from agriculture to the retail trade, via transport, logistics and finance.

Inclusive rural development projects have emerged in the cross-border areas this corridor goes through. These include the Northern Rural Growth Programme and the Savannah Accelerated Development Authority in Ghana, and the Bagré Growth Pole in Burkina Faso. Over and above the interconnection of the areas it covers, the Ouagadougou-Accra corridor provides a type of hybrid integration, which is neither institutionalised nor completely informal. Through the dynamism of its food distribution channels, this outsider corridor is a laboratory for more general spatial inclusion, which generates jobs and rural development.

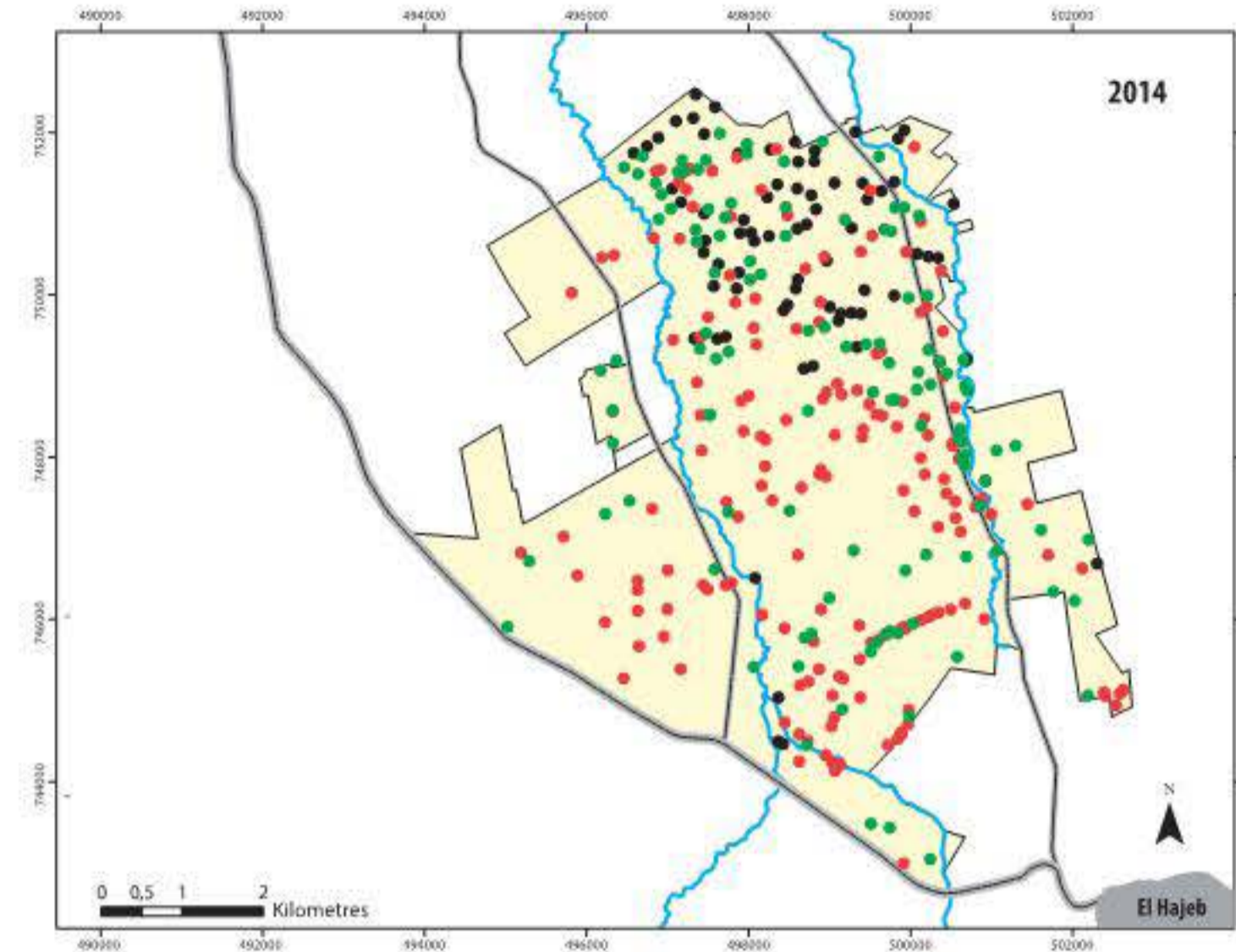
Gabriel Poujol



	1990	2014
Study area		
Non functioning wells	24	113
Wells	47	47
Tubewells	9	165
Roads		
Rivers		

M50. Pressure on groundwater resources in El Hajeb (Saiss) in Morocco

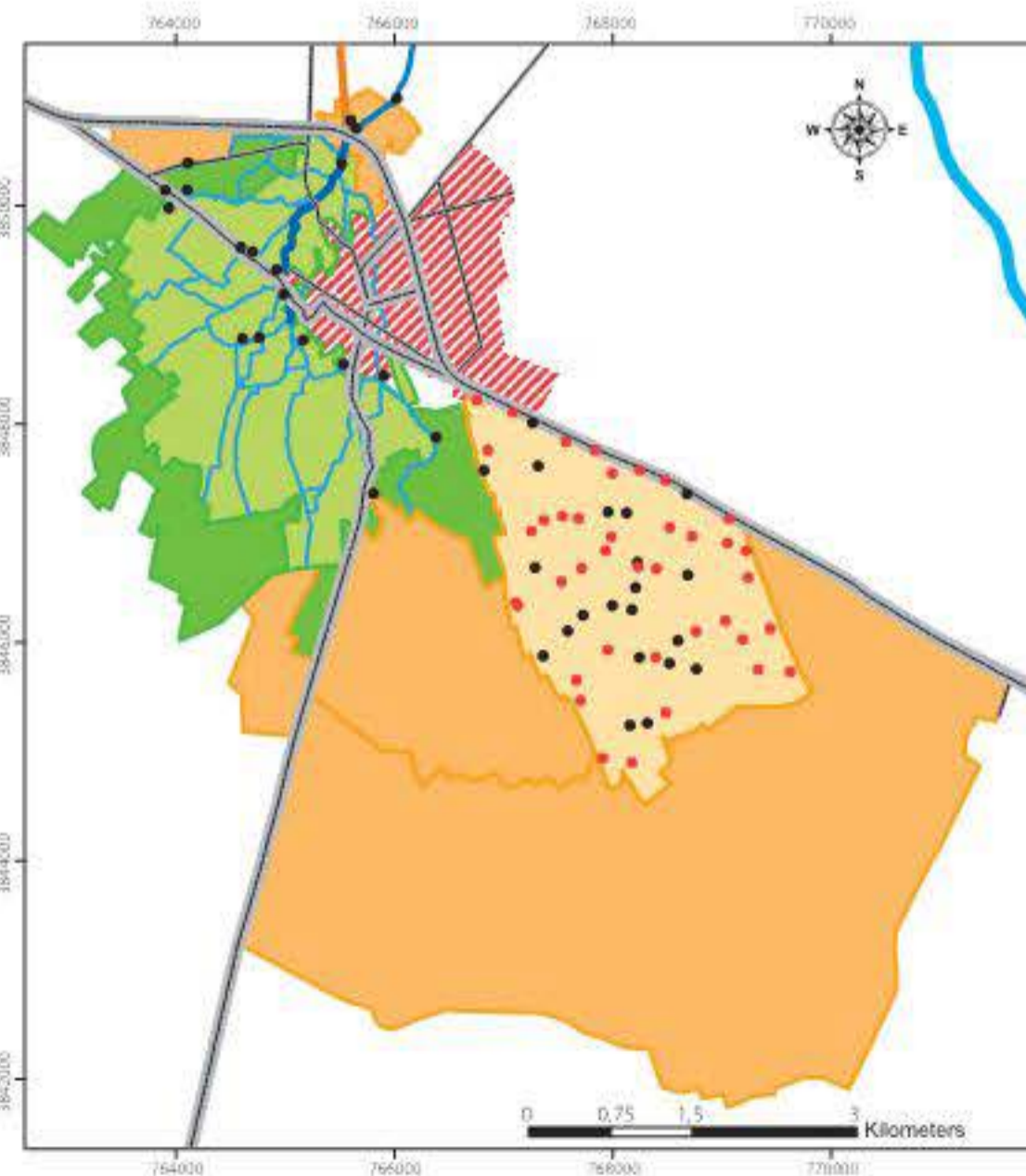
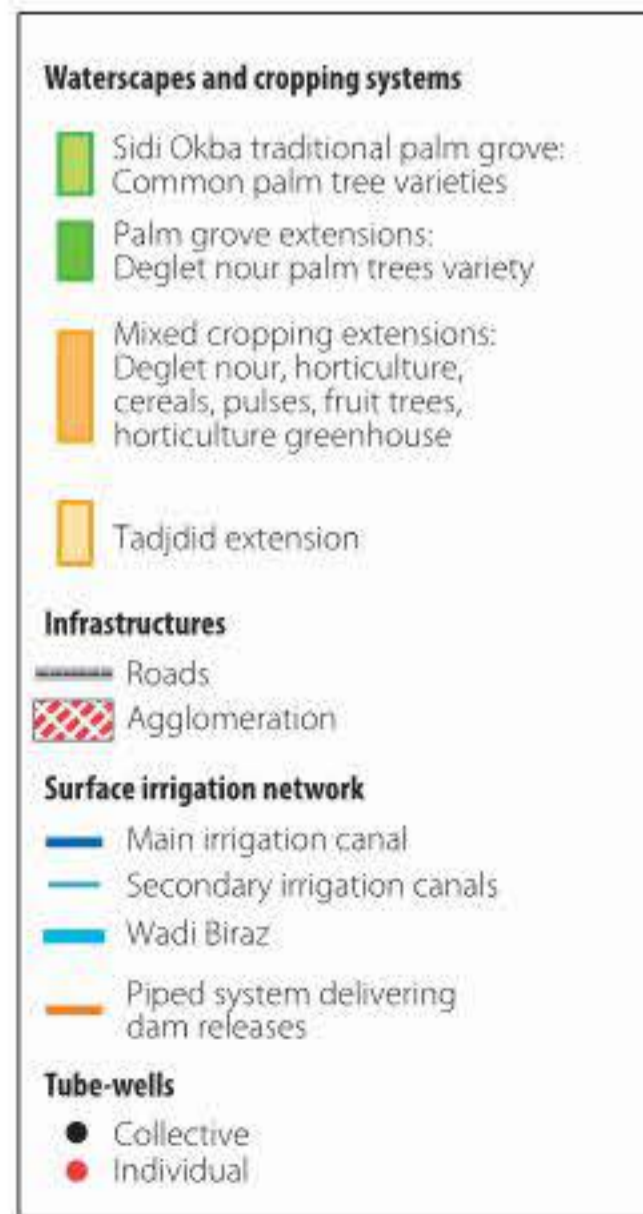
Source: author (see note page 69)



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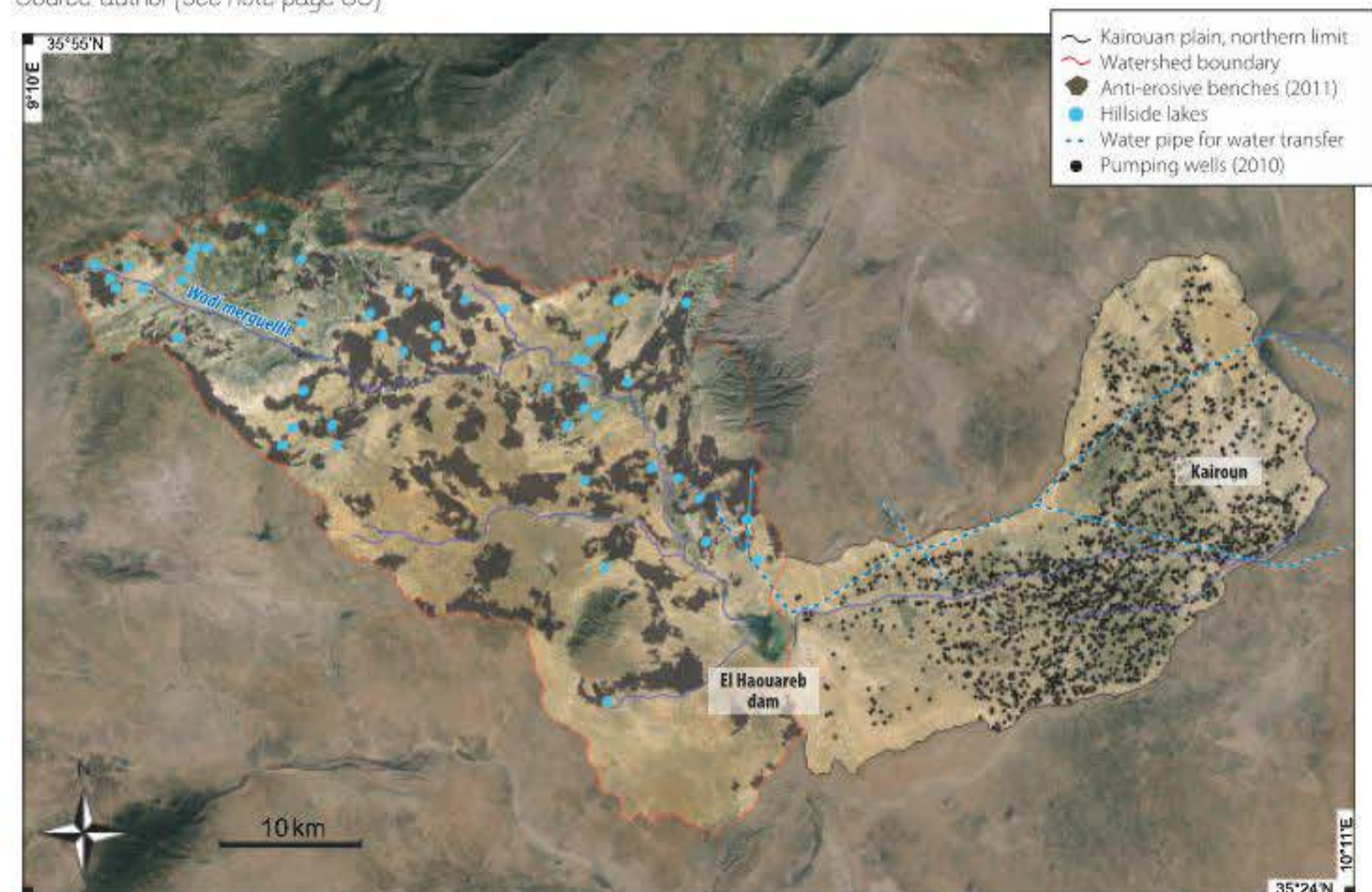
M51. Water territories in Biskra, Algeria, in 2015

Source: author (see note page 69)



M52. Intensive use of surface water and groundwater in Kairouan, Tunisia, since 2010

Source: author (see note page 69)



WHAT SHOULD BE DONE WITH NORTH AFRICA'S GROUNDWATER RESOURCES?

Groundwater has become an important source of welfare in North Africa. It is redefining irrigation frontiers and supplies water to more than 500 000 farms. However, more than half of aquifers, which cater to a minority of farmers, are declining. North Africa's groundwater economy is increasingly faced with physical and socio-economic stress.

• North Africa's rapidly expanding groundwater economy

North Africa has a long tradition of groundwater use in traditional irrigation systems. However, an agricultural groundwater economy, mainly based on private tube wells, emerged in the early 1980s with the availability of cheap technology, increased water demand and recurrent droughts. Groundwater use stimulated the intensification and diversification of farming systems and became the mainstay for more than 500 000 farms. It now caters to 88% of irrigated areas in Algeria, 42% in Morocco and 64% in Tunisia. However, about half of the aquifers have been declared overexploited and farmers' dependence on this vital resource means that a possible decline of the groundwater economy is a serious issue.

• Saiss: the expectations and risks of groundwater use

Farmers in the fertile plains of northern and central Morocco increasingly rely on groundwater to intensify and diversify their farming systems. These groundwater economies have existed for more than 30 years, and each supports several tens of thousands of hectares of irrigated agriculture. In the Saiss plain, droughts in the early 1980s along with the libe-

ralisation of the agricultural sector transformed rain-fed farming systems into groundwater-based irrigated agriculture. In 2012, 20% of the lands in the Saiss were irrigated, 91% of which (45 316 ha) depended on pump irrigation. Groundwater caters mainly to orchards, vineyards, horticulture and fodder crops. Due to the rapid decline of groundwater tables, a considerable number of wells taking water from the phreatic aquifer are running dry and farmers are increasingly installing tube wells to gain access to the deep aquifer, which is now also declining. Smallholders in particular are unable to follow the decline of water tables, as they lack the resources to install tube wells and to conduct intensive market-oriented agriculture to pay back such investments. While groundwater raises tremendous expectations, especially for young farmers keen to develop their agriculture, it thus also implies considerable risks: as water tables decline, farmers venture into more risky markets and may end up with debts.

• Biskra: new irrigation frontiers in the Sahara

Algeria's Sahara is one of the most water-rich regions in Africa due to the presence of enormous sedimentary aquifers, but with very low recharge rates. Groundwater is increasingly pumped for agriculture through deep tube wells. While in the past irrigation development was limited to some oases, private groundwater-based irrigation has changed the outlook for Saharan agriculture. In Biskra, the irrigated area increased five-fold from 16 500 ha in 1969 to more than 104 000 ha in 2013. A total of 94% of irrigation water is currently supplied

by groundwater through more than 4 200 wells and 9 000 tube wells. On these new irrigation frontiers, there has been a rapid extension of commercial palm groves (43 000 ha in 2014, 60% of which grow the reputed deglet nour variety) and intensive horticulture (17 365 ha; of which 4 900 ha produce greenhouse tomatoes, bell peppers and melons). Biskra's groundwater economy is developing at a very rapid pace. The classical limiting factors (markets, capital, labour, land and water) will undoubtedly emerge, but in the meantime, the agricultural boom is likely to continue.

• Kairouan: surface water development is inextricably linked to groundwater use

In the Merguellil river basin in central Tunisia, watershed development has focused on improving livelihoods, preserving soil and water resources and ensuring flood protection. This led to the construction of numerous water conservation structures and the El Haouareb dam in 1989, which reduced runoff and stored water upstream. This seriously affected groundwater recharge in the Kairouan plain, which was now limited to the area around the dam rather than extending along the whole riverbed across the plain. Meanwhile, groundwater development began with public tube wells in the 1970s to supply drinking water to the coast and to develop groundwater-based irrigated agriculture. Private irrigation rapidly took over to secure livelihoods and to potentially make profit with high-value crops. Nowadays, groundwater use from over 2 000 private tube wells is estimated to be equivalent to withdrawals from the 135 public tube wells, delivering 120 hm³/year. The total groundwater-based irrigated area was 20 000 ha in 2010. The combined effect of watershed development and groundwater use has caused

the water table to drop by 30m over the last 40 years. Farmers have had to adapt their irrigation systems to follow this decline, which has caused a number of smallholders to drop out of the race.

• Sustainable groundwater use or mining with care?

Most aquifers in North Africa are intensively exploited, as evidenced by the general decline in water tables. Often, the official ambitions of regulating groundwater use relate to the sustainable use of groundwater, understood as obtaining a new equilibrium in which groundwater use and recharge level out. Hydrologists challenge the relevance of this concept, as the exploitation of an aquifer with an imbalanced regime is not necessarily synonymous with long-term reserve depletion. Moreover, experience shows that reducing groundwater use in the short term is not realistic, as it has become too important from a social, economic and political viewpoint. Sustainable groundwater use is thus a fallacy, especially for the aquifers in the south, which have very low recharge rates. It is therefore better to acknowledge present groundwater practices as unsustainable and to focus the debate on what societies want to achieve with groundwater in terms of (rural) development. This could be called "mining with care".

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M53. Hydraulic dams, conflict and risk of water conflicts in West Africa

Source: HSM/IRD



3

M54. Farming irrigated systems in West Africa

Source: BM 2001, OCDE 2007



WATER, A RESOURCE REQUIRING BETTER GOVERNANCE IN WEST AFRICA

West Africa has a relatively large number of major rivers. Irrigation and hydroelectricity are gaining ground in the region, but are still far from reaching their full potential. Possibilities exist for meeting food and energy demands from the rapidly growing populations and economies. International river basin agencies are responsible for coordinating investment and resolving disputes.

• Untapped potential and growing demands

West Africa has a number of different climate zones ranging from the Saharan fringe to the Gulf of Guinea. Major fluctuations in rainfall in the 20th century were the cause of several serious food crises. For the future, climate forecasts remain hesitant: most models predict a slight increase in rainfall that will not offset the increase in evaporation caused by higher temperatures.

Surface water and groundwater are relatively abundant in the region. The south, which is wetter, suffers from regular flooding and the aquifers are relatively productive. In the North, which is far more arid, the Senegal, Niger, Volta and Chari rivers support high population densities thanks to floodplain meadows, to flooded, flood recession and irrigated cropping, and to fishing. These rivers are currently being regulated by dams and should be able to respond more effectively to rapidly growing demand.

Despite significant national differences, population growth in the 15 West African countries is indeed high (at around 3% per year) and economic growth in these countries is sustained

(at around 5%), a situation which is generating a rapid increase in water and energy requirements for households, industries, mines and services, but also for agriculture. However, governments are struggling to satisfy this demand and the Millennium Development Goals for drinking water have not been achieved, in spite of considerable progress. Less than 2% of cultivated areas are irrigated and hydroelectric installations fall far short of the region's high potential. Just under 45% of the population has access to electricity, around 40% of which is generated by dams.

• Major water engineering projects, a come-back?

After a break between the 1980s and the 2000s further to the structural adjustment plans, water engineering projects, some of which are quite old, are being dusted off. This return is explained by soaring demand for electricity and food requirements that make irrigation necessary, but also by more frequent flooding, which requires new hydraulic works. Finally, the decline in public debt is providing leeway for new investments. While Western countries are increasingly reluctant due to the cost and the social and environmental impacts of dams, China seems to be willing to finance and carry out major engineering projects.

The major hydro-agricultural installations have been criticised in the past because of their poor returns on investment. Progress has nevertheless been made in the Senegal River Valley and the Office du Niger (Mali), where yields are increasing and rice cultivation is becoming competitive with Asian rice imports.

Projects for the expansion of large-scale irrigation schemes are therefore being revived.

At the same time, small-scale private irrigation is continuing its expansion: hundreds of thousands of smallholder farmers are settling along rivers and reservoirs or are digging wells where groundwater is accessible. They produce irrigated fruits and vegetables through manual water lifting or inexpensive motor pumps. Deep aquifers are still untapped, but their use could intensify with the development of electrification. Proper regulation will be required in order to avoid their overexploitation.

• Better governance is needed to address risks

The authorities and civil society are concerned about the environmental and health situation in the water sector. First, water-borne diseases still have serious impacts on populations, especially chronic diarrhoea due to the lack of drinking water and/or sanitation (which also concerns cities that are often subject to water cuts). Second, the major wetlands, such as the Inner Niger Delta, Lake Chad and the flood valleys, have seen their surface areas drastically reduced and their biodiversity significantly degraded. Marine deltas, especially those of the Niger, Senegal and Gambia rivers, are being disrupted by sea level rise, river regulation by large dams and climate change, which are endangering their fragile ecosystems.

Dam building and hydraulic works have given rise to a number of cross-border conflicts that have generally remained of low intensity, with the exception of the one between Senegal and Mauritania (between 1989 and 1991) concerning the irrigable land of the Senegal River. Today, Ghana is taking Burkina Faso to task over its 1 500 small reservoirs, which are reducing the production of its major hydro-electricity dams. Engineering projects are ringing alarm

bells in neighbouring countries: Nigeria, which has traditionally sold its electricity at a low cost to Niger in order to avoid the construction of a dam upstream on the river, is concerned about the Kandadji dam. The Fomi dam in Guinea will have a significant impact on the Inner Niger Delta in Mali and downstream.

The construction of new dams leads to people being displaced against their will. Conflicts over access to land are exacerbated in irrigable areas, because the states foster the installation of national and international private investors in order to improve food production, fuelling concerns and opposition among local farmers and their organisations. Irrigated land also reduces water access corridors for animals, generating incidents that are often violent, whereas pastoral conflicts over access to wells are diminishing due to the creation of consultative bodies.

Better governance of water resources will therefore become a necessity and should result in an increase in international cooperation. There are several inter-state river basin agencies in operation. Their effectiveness is highly variable and their capacities could be strengthened. They nevertheless provide a basis for effective solutions to sharing the water from the major rivers, anticipating tensions and settling disputes.

**Bruno Barbier, Alioune Kane,
Bega Ouedraogo, Jean-Yves Jamin,
Jean Christophe Poussin**

NOTES

Cross-cutting note

This update of the atlas takes into account the creation of South Sudan, but some data is still unavailable. In this case, values for Sudan have been applied to South Sudan with the symbol // (note applicable to spreads 2, 8 and 9).

Specific notes

Spread 2

The size of each square is proportional to the cumulative annual cohorts of young people reaching the 15-24 age group over the 2015-2030 period. The size of an annual cohort corresponds to 1/10 of the 15-24 age group calculated for each year of the reference period.

Spread 5

In the anamorphic representation adopted for maps M11 and M12, also called area cartograms, the traditional representation of the different countries expressed in km² has been replaced by the total value of GDP (M11) and by the population (M12), while conserving geographical contours that are consequently deformed in proportion to the value of each indicator.

Spread 6

Figure n°7 represents an assessment of the regional integration index according to two specific dimensions. This data comes from the Africa Regional Integration Index Report 2016 (AU, AFDB, UN, 2016), which produces a regional integration index for Africa. This global index is composed of 16 indicators grouped according to five dimensions: regional infrastructure, financial and macroeconomic integration, free movement of people, productive

integration and trade integration. For this atlas, we have chosen to represent two of these: the free movement of people and trade integration. This report specifies three criteria for evaluating the free movement of people: the proportion of regional economic community (REC) member countries whose nationals are issued with a visa on arrival; ratification (or not) of the REC protocol on the free movement of persons; and the proportion of REC member countries whose nationals do not require a visa for entry. Four criteria are used to evaluate trade integration: the level of customs duties on imports; the share of intra-regional goods imports (% of GDP); the share of intra-regional goods exports (% of GDP); and the share of total intra-regional goods trade (% of total intra-REC trade).

Spread 8

The prospective study on income in 2050 is based on projections of agricultural value added, GDP, agricultural labour force and total population. GDP data are taken from the MAGE model from the *Centre de Recherche Français dans le Domaine de l'Economie Internationale* (CEPII - French research centre in international economics), the OECD ENV-Growth model and a medium scenario from the International Institute for Applied Systems Analysis (IIASA), known as the "middle-of-the-road" scenario (SSP2). Calculations of the agricultural labour force in 2050 are the result of geometric extrapolation of ILO data for the 1980-2020 period. Projections were based on the most recent rural population and total population data (UN 2015 revision). For agricultural value-added, we used calculations of the "net unit prices" of individual products applied to net production volumes (which are assumed to move in line with gross production). Two volume growth scenarios were adopted: i) we apply yield growth rates for cereals, oilseeds, animal products, coffee, cocoa and rubber observed over the last 40 years in East Asia and Western Europe, and for other products, we adopt growth rates estimated by FAO; ii) we use data from the FAO GAEZ project

and from IIASA to project both areas and yields in 2050, bearing in mind that where yields are concerned, the effects of climate change are integrated using the IPCC B1 scenario, and that we assume a medium intensity technological package. Other assumptions are also adopted concerning land constraints and the extension of irrigation according to forest protection and water availability.

Spread 11

To estimate the share of mineral resources in total exports, data from the World Development Indicators (WDI) database were difficult to use, and were therefore supplemented by data from alternative sources for 2014 or 2015 (OECD, AFDB, African Economic Outlook, Embassies' economic departments, etc.).

Spread 13

Monitoring large-scale land acquisitions could be compared to using a radar in the fog. Indeed, due to their lack of transparency, monitoring land transactions (identification, quantification, dynamics) is problematic. The data presented in this spread are based on "Land Matrix", which defines large-scale land acquisitions as deals that:

- entail a transfer of rights to use, control or ownership of land through sale, lease or concession;
 - cover an area of 200 hectares or more;
 - have been initiated since the year 2000;
 - imply a change of land use;
 - are concluded for agricultural purposes.
- Mining projects and tourism operations are therefore excluded from this analysis.

Land Matrix may only reflect partial information, but it is nevertheless a good basis that can be used to achieve a better understanding of the scope of the phenomenon and to develop hypotheses and initial analyses.

Spread 15

This map represents renewable water resources considered as those which, after use, should return to their previous stock level through natural replenishment processes (rainfall). The vast majority of renewable water comes from surface water. The map also represents what we call the "dependency ratio", which corresponds to the percentage of renewable water resources originating outside the country. The countries with high water availability are generally those in downstream parts of large international rivers, and are therefore relatively "dependent" on water from other countries. Islands have zero dependence, since they are not connected to rivers on the continent.

Spread 22

The maps produced by the author use data generated in Ghana by the statistics department of the Ministry of Food and Agriculture (SRID/MOFA) and the RS/GIS Laboratory; in Burkina Faso by the MARSABA statistics department and INSD-RPGH; and in a cross-cutting manner data produced by the World Conservation Monitoring Centre, the Openstreetmap, Africapolis and Digital Chart of the World databases, and data from field surveys conducted by the author to identify flows of products traded (thesis by G. Poujol, forthcoming). For the map on flows of maize, based on surveys of around 100 traders, the transport frequency indicator expresses the usage rate of each stretch of road for maize transportation, calculated across the whole network used. This indicator gives a macroscopic overview of the flow density and differentiates the road network according to its usage for maize transportation.

Spread 23

The data used in this spread were produced as part of the "Groundwater" project financed by the *Agence Nationale de la Recherche* (French national research agency) (ANR CEP S 09/11)



and the SIRMA and SICMED networks. The authors took inspiration from one of their publications, the collective work: Kuper M, Faysse N, Hammani A, Hartani T, Marlet S, Hamamouche MF, Ameur F., 2015, Liberation or Anarchy? The Janus Nature of Groundwater Use on North Africa's New Irrigation Frontiers. In: Integrated Groundwater Management, A Jakeman, O Barreteau, R Hunt, JD Rinaudo, A Ross (sc. Ed.). Springer, Dordrecht, The Netherlands: 583-615. ISBN 978-3-319-23576-9.

Spread 24

HSM/IRD. HydroSciences Montpellier is a joint research unit between IRD, the National Centre for Scientific Research and the University of Montpellier. Parts of their work, especially maps drawn by Claudine Dieulin, have formed the basis for the realization of the map of the spread 24 on Water in West Africa.

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