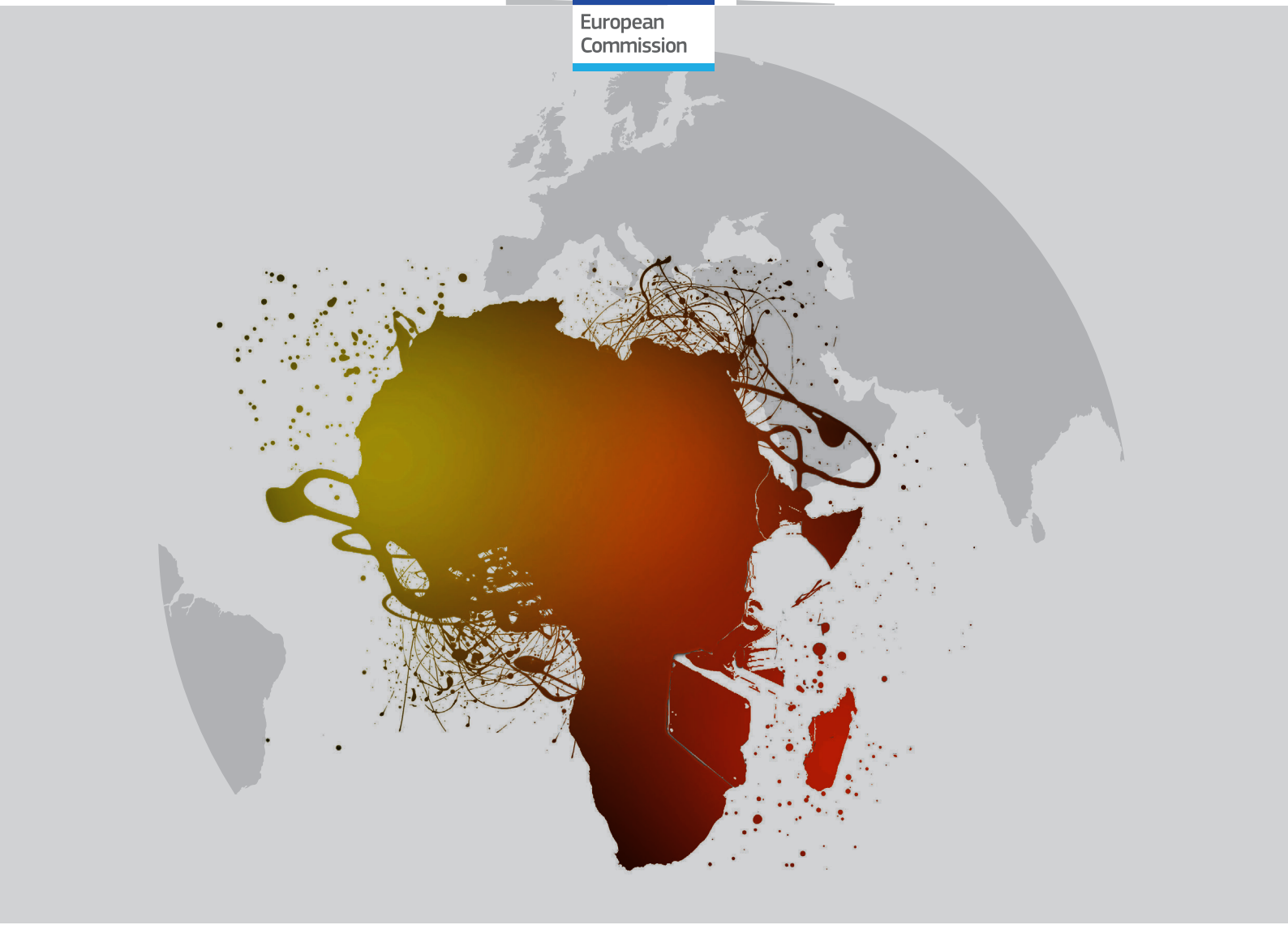
European Commission



EUR 29106 EN

MANY MORE TO COME?

MIGRATION FROM AND WITHIN AFRICA

Joint Research Centre

This publication is a Science for Policy report by the Joint Research Centre (JRC), the European Commission's science and knowledge service. It aims to provide evidence-based scientific support to the European policymaking process. The scientific output expressed does not imply a policy position of the European Commission. Neither the European Commission nor any person acting on behalf of the Commission is responsible for the use that might be made of this publication.

Manuscript completed in March 2018

JRC Science Hub
https://ec.europa.eu/jrc

JRC 110703

EUR 29106 EN

PDF ISBN 978-92-79-79363-9 ISSN 1831-9424 doi:10.2760/1702

Luxembourg: Publications Office of the European Union, 2018

How to cite this report: European Commission, Joint Research Centre, *Many more to come? Migration from and within Africa*, Publications Office of the European Union, Luxembourg, 2018 ISBN 978-92-79-79363-9, doi:10.2760/1702, JRC 110703

Many more to come? Migration from and within Africa

This paper analyses past and present migration patterns from and within Africa and the main drivers explaining African migration flows. It then looks at individual characteristics of Africans who prepare for a move abroad. Finally, it develops three scenarios to forecast how many Africans might leave their home countries in the decades to come.

MANY MORE TO COME?
MIGRATION FROM AND WITHIN AFRICA

Contents

“Are the forces
that drive Africans
to migrate across international borders
the same as those
that drove poor Europeans
to seek a better life
in the New World a century ago?
Are these forces likely to intensify
or weaken in the future?”

- Hatton and Williamson, 2003 -

Overview

This paper analyses past and present migration patterns from and within Africa and the main drivers and characteristics explaining African migration flows.

On this basis, it develops three scenarios to forecast how many Africans might leave their home countries in the decades to come.

The main findings are:

- African migration has so far grown in line with overall population growth.
- More than one in two African migrants moved to another African country, while the other moved mostly to Europe, Western Asia or North America.
- A number of distinct migration patterns can be identified:
    - From Maghreb to Europe (mostly family reunion);
    - From Egypt to the Gulf States (mostly temporary workers);
    - From Eastern Africa to the Gulf States (mostly temporary workers) and to neighbouring countries (mostly refugees);
    - From Western Africa to neighbouring countries (mostly temporary workers and long-term labour migrants) and to Europe (mostly family reunion and irregular migrants);
    - From Central Africa to neighbouring countries (for temporary work and refuge);
    - From Southern Africa to neighbouring countries (temporary workers and long-tern labour migrants) and to overseas destinations (mostly permanent migrants).
- The number of African immigrants settling legally in EU Member States has dropped significantly in the past decade. In counterpart, irregular migration flows across the Mediterranean have increased.
- Available data do not suggest an imminent mass exodus of Africans. However, our scenarios make it clear that socio-economic development, demographic shifts and climate change are likely to increase the number of African migrants. Even at an accelerated speed of socio-economic development, African countries will experience more emigration than immigration during the next 30-40 years. Development will reduce population growth, but it will also increase the ability of young people to migrate.
- Climate change and its potentially destabilising effects will accelerate future migration within Africa and eventually also to neighbouring parts of the world.
- It is not possible to predict the extent to which gradually increasing or additional migratory flows will take place mostly within Africa or to Africa's geopolitical neighbourhood – Europe, the Middle East and the Gulf States. This will not only depend on future migration pressures, but also on migration policies of receiving countries.

In sending countries, migration pressure will depend much on policy decisions in three key areas. Investing in a serious manner in education, especially of younger women, will slow down population growth. Boosting job creation, as well as reinforcing efforts aimed at reducing climate change will help to structurally reduce pressures on people to leave their homes. At the same time though, as GDP per capita increases, so does the ability of people to migrate.

From Europeans in Africa to Africans in Europe

Links between Africa and Europe are determined both by geographic proximity and by cultural, social, economic, post-colonial and migratory ties. Between the 16th and the 18th centuries, several European nations[1] established civilian and military outposts[2] in Africa to facilitate commodity and slave trade[3] as part of the emerging Atlantic economy, with links to the already established Arab and Ottoman trade systems. Until 1800, European presence in Africa was limited to a handful of traders, adventurers and pioneers. Turkey was the only European country with an extended colonial presence on the continent.

It was only **during the 19th and early 20th centuries that western and southern European nations[4] really expanded into Africa**, sending civil servants, soldiers and colonial settlers, as they integrated most parts of Africa into their colonial empires.[5] Large numbers of Europeans settled in Northern Africa, namely in Algeria,[6] as well as in Southern Africa[7] and to a smaller extent in Eastern Africa. **Until World War I Europe was the main global source of large-scale emigration**. Europeans were not alone – the British colonial administration facilitated the recruitment of Indian labour through agricultural producers and mining companies in eastern and southern Africa,[8] leading to the emergence of politically and economically dominant minority populations of both European and South Asian descent in some parts of Africa.[9]

During the 20th century, the direction of flows changed dramatically. Immigration to Europe took off in earnest in the early part of the century when France started to recruit labour and draft soldiers in northern Africa, in particular from Algeria.[10] Then, as African nations gained independence in the second half of the 20th century, **European civil servants and soldiers moved back to their countries of origin, accompanied by considerable numbers of African-born descendants** of colonial settlers.

In 1962, some one million native-born people of – mainly French and southern – European origins were driven out of Algeria en masse[11] when the country became independent. The secession from France also resulted in Algeria pulling out of the European Communities.[12]

The last big wave of post-imperial return comprised at least half a million colonial settlers of Portuguese ascent moving to the 'motherland' in 1974-1975.[13] Other minorities emigrated, including many people of Indian origin who were discriminated against after the independence in Eastern Africa. Similarly, members of the centuries-old Jewish communities of Egypt, Libya and the Maghreb emigrated as a consequence of the Arab-Israeli conflict, moving both to Israel and to European countries.[14] In the 1970s Israel organised the emigration of Jewish Falashas and Yemenite communities from Ethiopia.[15]

Aside from these return flows, post-colonial migration patterns also included an increasing number of Africans migrating to Europe as workers, students or dependent family members. Indeed, even after gaining independence most countries in northern and Sub-Saharan Africa remained oriented towards the former colonial powers as a result of established economic relations, but also cultural and linguistic ties. In 1960, an estimated 1.3 million African-born people were residents of one of today's 28 EU Member States.[16]

European countries attracted (and still continue to attract) considerable numbers of African students, many of whom did not return to their home countries after finishing their studies, but remained in Europe or moved on to Australia, Canada or the United States. As of the 1950s, migrants from Northern and Sub-Saharan Africa were also often **recruited as skilled or unskilled labour**, by Western European destination countries and industries based on bilateral agreements or individual employment contracts. Such labour recruitment agreements[17] were concluded with Algeria,[18] Morocco[19] and Tunisia.[20] However, this recruitment ended quite abruptly in 1972-1974 with the first oil price shock, as a consequence of which many migrant workers returned to their countries of origin. Nonetheless, those who remained were later followed by their spouses and children on the basis of laws enabling family reunion.

The share of Africans living abroad is not increasing

Since the early 1960s, **the absolute number of Africans living outside their country of birth has increased fourfold** – from 8.1 million to almost **36.3 million** in 2017.[21]

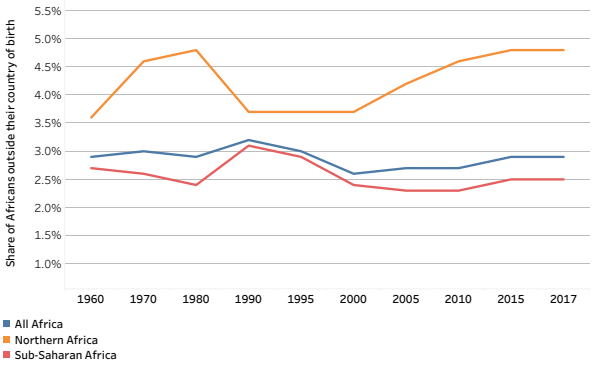
However, **this growth is in fact more or less in line with overall population growth on the continent**. As a result, the share of Africans living abroad compared to total African population actually remained pretty stable over the period, fluctuating between 2.6% and 3.2%, and standing at just 2.9% in 2017 (Figure 1).[22]

The share of North Africans living abroad did increase between 1960 and 1980, before dropping in the 1990s, and rising again between 2000 and 2017. **Today 4.8% of North African people live outside of their country of birth**.

In contrast, the share of **Sub-Saharan Africans** living abroad has remained rather stable, with **just 2.5%** of them living abroad in 2017 (Figure 1) – although the share of the Southern African population living abroad is much higher, at around 6.3% of the population, compared to lower rates of 2.2% to 2.5% in Eastern, Western and Central Africa.

FIGURE 1. AFRICANS LIVING ABROAD: THEIR SHARE IN AFRICA'S POPULATION IS SIMILAR TO THE 1960s

Share of Africans living outside their country of birth (stock data), 1960-2017, as a percentage of the total population at the region of origin.



Note: the rate is defined as the stock of Africans living outside their country of birth divided by the population of the countries of origin.

Source: UN Population Division; visualisation: Knowledge Centre on Migration and Demography (KCMD).

BOX 1 - African migration: a patchwork of data

Much of the uncertainty surrounding the scale of African migration stems from the lack of reliable data on migration flows between African countries and on stocks of migrants residing in Africa.Even where data are available there is often a lack of time series long enough to enable the identification of medium to long-term trends.

Information on **stocks of migrants** can be accessed via two major data sets assembled by the World Bank[23] and the UN Population Division[24] respectively. These data are either based on national population censuses, which in many countries are carried out only every 10 years; or on estimates, for countries providing very poor or no data.

Such data provide only a static picture of the number of foreign-born people residing in a destination country in a given year. This number reflects recent and past migration flows, but also a range of other factors, such as the intensity of return migration, or the migrants' age at arrival and life expectancy in the country of destination. Hence, the stock of migrants cannot be used as a proxy for recent migratory flows.

Quantitative estimates of **migration flows** can be derived for most African countries from the immigration statistics collected by the EU, the Organisation for Economic Cooperation and Development (OECD) and recruiting Gulf countries of destination. This, however, covers only those migrants who leave Africa for overseas' destinations in developed countries. In contrast, there is a stark lack of complete statistical information on flows within Africa.

An alternative source of information consists of estimates of net migration flows (immigration minus emigration) produced on the basis of residual demographic accounting exercises.[25] Such estimates do not perfectly match existing statistics on immigration and emigration in the case of OECD countries but they nonetheless represent the most comprehensive data source to analyse migration from and between less developed countries.

More than half of all African migrants live in other African countries

Over time, the destinations of African migrants have become more diversified. In the early 1960s less than one in four of the estimated 8.1 million African migrants (23 %) lived outside of their native continent – most of them (1.3 million or 16%) were residents of the EU 28 Member States.[26]

By 2017, the share of African migrants heading overseas had more than doubled, acounting for 47% of the estimated 36.3 million African migrants. This also means that **53% of African migrants (19.4 million) today remain on the African continent**.[27]

The majority of those who leave head to Europe. In 2017, the EU 28 was hosting 9.1 million African-born immigrants,[28] of which, 5.1 million from Northern Africa and 4 million from Sub-Saharan Africa. **Asia is the second most important overseas destination**, hosting 4.4 million African migrants. The vast majority of these are temporary workers from Egypt and Eastern Africa living in the Gulf States and in Jordan with very limited rights.

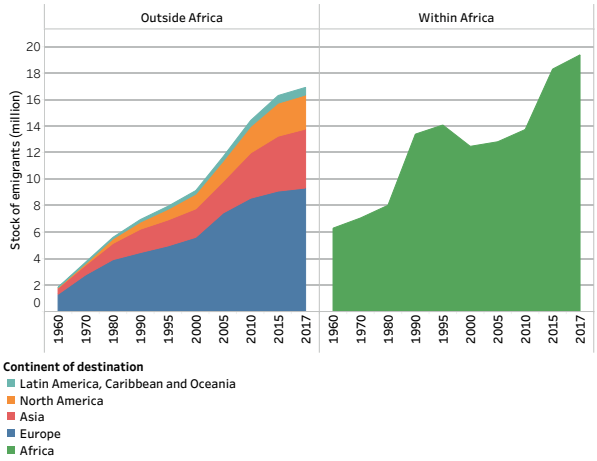
Despite its considerable Afro-American population,[29] North America is not a prime destination for African migrants. The US and Canada are home and host to just 2.6 million people born in Africa.

North African migrants are much more likely to head overseas than other African migrants. In fact, the share of North African migrants living overseas (in relation to all emigrants) has remained above 90 % since the 1970s already (Figure 3).

While figures are much lower **in Sub-Saharan Africa, a gradual diversification is clearly taking place**. Between 1960 and 2010 the share of Sub-Saharan migrants residing outside Africa rose from 3% to 34%. Between 2010 and 2017, the share stabilised at around 30 % (Figure 3). Among people born in Southern Africa the share rose from 7% in 1960 to 41% in 2005, but then dropped to 35 % (2017), namely following the end of apartheid. Since the late 1990s, moving to the Republic of South Africa has become a regional alternative to overseas destinations.

FIGURE 2. MORE AFRICANS ARE LIVING ABROAD THAN EVER BEFORE: WHERE DO THEY LIVE?

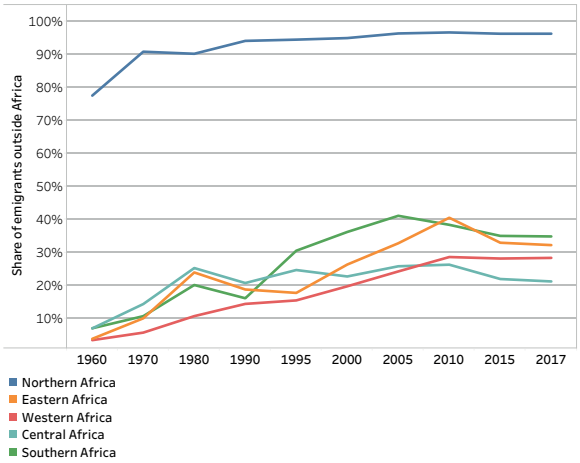
Africans living outside their country of birth (stock data) by continent, 1960-2017, absolute numbers, in millions.



Source: World Bank for the period 1960-1980 and UN Population Division for the period 1990-2017; visualisation: Knowledge Centre on Migration and Demography (KCMD).

FIGURE 3. A GROWING NUMBER OF AFRICANS IS LIVING OVERSEAS: SUB-SAHARAN AFRICA CATCHING UP

African migrants living outside Africa compared to total migrant population by region of origin, 1960-2017, in percentage.



Note: the share is defined as the stock of Africans living outside Africa divided by the total stock of people from the analysed region living outside the country of birth.

Source: UN Population Division; visualisation: Knowledge Centre on Migration and Demography (KCMD).

Looking in more detail across the main sending and receiving countries one can see some **distinct regional migration patterns** (Figure 4).

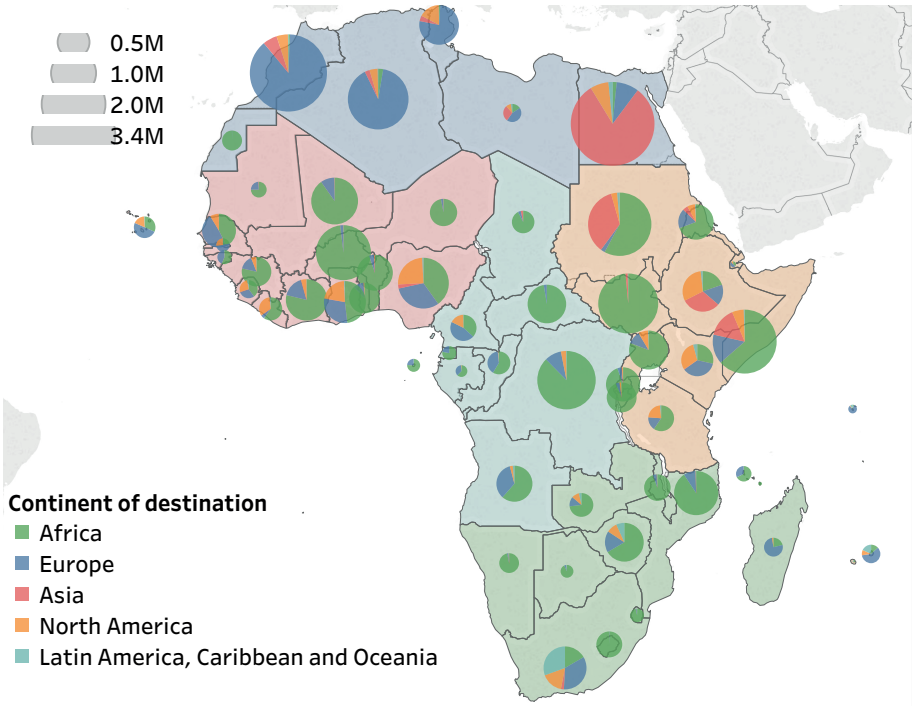
- Just over **one in four Africans living abroad in 2017 was from North Africa** (9.2 million migrants) – the vast majority of which are overseas. Two different regional migration patterns can be identified: The first is made up of **Maghreb-to-Europe flows**, with Algeria and Morocco as the main countries of origin, and migrants usually settling in Europe as permanent residents.[30] This pattern can be explained by geographic proximity, previous labour recruitment agreements and post-colonial ties.[31] The second consists of **migrants from Egypt** – the largest group of Africans living outside their country of birth in absolute numbers – most of whom head **to the Gulf States and Jordan** — usually as temporary workers. **Mobility between North African countries is today rather the exception**. Borders between Morocco and Algeria are closed, while Libya, until 2011 a major country of destination, no longer hosts large numbers of Arab migrants from Egypt and Tunisia.[32]

- **Around 27% of African migrants are from Eastern Africa** (9.8 million). Most of these live in another African country. Among them are **considerable refugee populations that found protection in neighbouring countries**; namely in Ethiopia, Kenya, Sudan, South-Sudan and in Uganda (Box 2).[33] Most of those countries which do not currently produce large-scale flows of internally displaced persons and refugees, such as Djibouti, Ethiopia, Kenya, the Seychelles, Tanzania and Uganda, tend to have a sizeable diaspora living in Europe and North America. Eastern African **labour migrants** also move in large numbers to the Republic of South Africa and to Botswana, while geographic and partly cultural proximity make the Gulf States an important destination for temporary labour migrants from Sudan, Ethiopia and Somalia.

- **Around a quarter of Africans living abroad were born in Western Africa** (8.9 million). All countries of this region are members of the Economic Community of West African States (ECOWAS) and, as such, their citizens have the right to enter, reside and establish economic activities in the territory of another Member State.[34] Strong networks among the many ethnic groups established in more than one country of the region also play an important role in facilitating and channelling migration flows.[35] Two different patterns can be identified in this region. In more than half of Western African countries a majority of migrants

FIGURE 4. AFRICA'S MIGRANTS AND DIASPORAS

Africans living abroad by continent of destination (stock data), 2017, absolute numbers, in millions..



Note: the size of the pies represents the stock of emigrants in absolute numbers and the different colours represent the share by continent of destination.

Source: UN Population Division; visualisation: Knowledge Centre on Migration and Demography (KCMD).

has moved within Africa, usually to another country. This intraregional migration within the **Economic Community of West African States** (ECOWAS) region is mostly due to **seasonal, temporary and permanent migrant workers** primarily moving from countries such as Burkina Faso, Niger and Mali toward coastal and commodity-richer countries such as Ghana, Ivory Coast and Nigeria.[36] However, different migration patterns prevail in Cabo Verde, the Gambia, Ghana, Nigeria, Senegal and Sierra Leone. For these countries the number of **diaspora members living in Europe and North America** is larger than the number of emigrants living in Africa. As a result, **Nigeria and Ivory Coast are not only among Africa's most important migrant sending countries, but are also among the main receiving countries** (Figures 4 and 6).

- **The number of international migrants with Southern African origin is around 4.2 million.** Most of them moved as temporary or permanent labour, but some also as refugees to the Republic of South Africa and in smaller numbers also to Botswana. Traditional sending countries are Malawi, Mozambique, Lesotho, Zimbabwe and Swaziland. Three countries of Southern Africa show a different pattern: Madagascar and Mauritius with a diaspora mainly residing in Europe; and South Africa itself, which is a country of immigration, but also has Africa's geographically most diverse emigration pattern, with its citizens (or former citizens) residing in Europe (in particular in the EU), North America and Australia (Figure 4). Many of them are not perceived to be 'Africans' because of the European origins of their ancestors.

- In 2017, **some 4.1 million people born in Central Africa were living abroad**, most of them in a neighbouring African country. Only in the case of Cameroon do around 46% of the emigrants live as diaspora members in Europe. **Conflict and political instability** have played an important role in migration both from and to neighbouring countries in Central Africa. Only Gabon hosts a larger number of migrant workers from the region.[37]

Africa hosts 21.7 million migrants and refugees

On top of the 19.4 million African-born migrants and refugees living in Africa, the continent also hosts some 2.3 million temporary or permanent immigrants from outside Africa, mostly from Asia and Europe.

Just as the majority of African migrants are currently residing in Africa rather than overseas, many of these also remain, for the most part, within their regions of origin (Figure 5). Among these numbers, a large number are forced migrants. In 2016, there were some **5.3 million registered international refugees in Africa** mostly coming from neighbouring African countries (Box 2).[38]

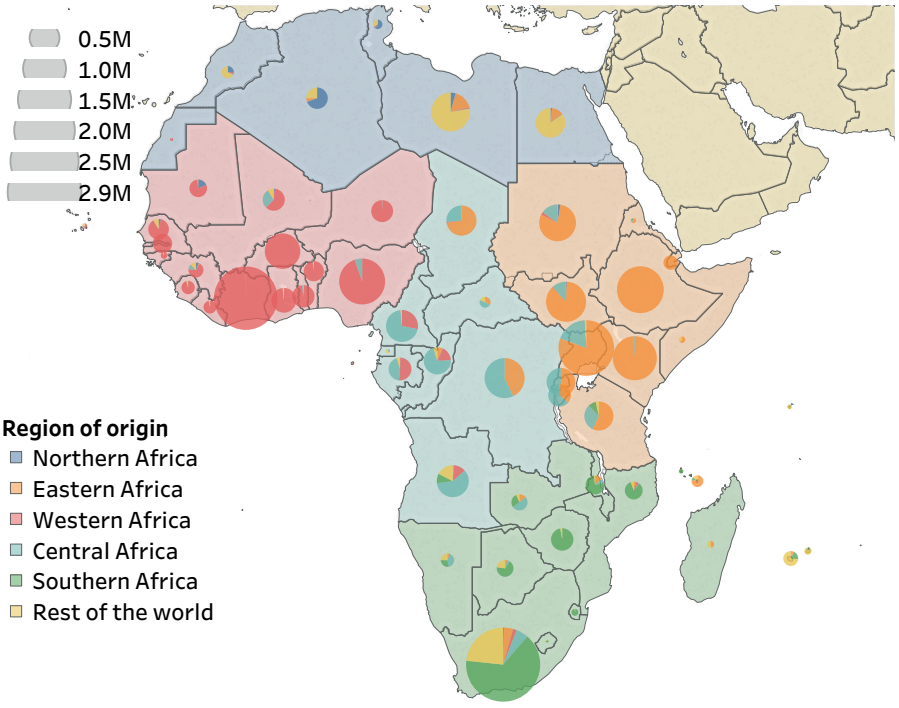
- **Northern Africa was home to 1.6 million foreign-born residents in 2017**. **Libya** is both the most important receiving and transit country. In 2017, it hosted an estimated 800,000 foreign-born residents and transit migrants. The majority of the more permanent immigrants are from the Middle East (Palestine, Iraq), while around 400,000[39] irregular African and Asian migrants transited through Libya to reach Italy during the years 2015-2017. The second most important receiving country is **Egypt** with almost 460,000 foreign-born legal residents; the majority of them Palestinians, Syrians and citizens of other Middle Eastern countries. On top of that, Egypt hosts large numbers of undocumented including labour migrants from Sudan, as well as refugees from Eritrea, Somalia and Syria (Figure 5).

- **The total number of migrants in East Africa was 6.9 million in 2017. Kenya** (1 million), **Ethiopia** (1.1 million) and **Uganda** (1.6 million) host the largest numbers. The majority are refugees from South Sudan (1.3 million), Somalia (0.6 million) and the Democratic Republic of the Congo (0.4 million).[40] In recent years the number of Chinese migrant workers, entrepreneurs,[41] government officials and military personnel moving to countries in the region has increased sharply.[42]

- **In 2017, Western Africa hosted 6.1 million foreign-born residents** – mostly labour migrants. **Ivory Coast** (2.1 million) and **Nigeria** (1.1 million) were the main destination countries. The largest immigrant community comes from Burkina Faso (1.3 million Burkinabe in Ivory Coast alone).

FIGURE 5. MIGRATION TOWARDS AND WITHIN AFRICA

Foreign-born population in Africa (stock data), 2017, absolute numbers, in millions.



Note: the size of the pies represents the stock of immigrants in absolute numbers and the different colours represent the share by African region of origin.

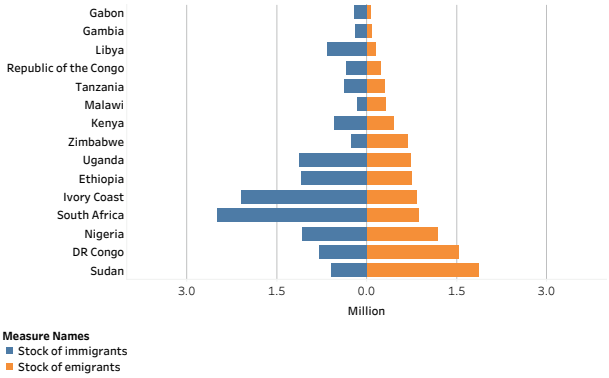
Source: UN Population Division; visualisation: Knowledge Centre on Migration and Demography (KCMD).

- **In Central Africa (3.1 million foreign-born in 2017), the Democratic Republic of the Congo** (0.8 million), **Cameroon** (0.5 million) and **Angola** (0.5 million) were the most important destination countries, hosting for the most part refugees from the Central African Republic, Sudan, Rwanda, Nigeria and South Sudan. The main destination for labour migrants was Gabon (0.3 million).

- **Southern Africa, which hosted 4.0 million foreign-born residents in 2017, is home to the African country with the largest number of foreign residents: the Republic of South Africa**. The country has seen a considerable rise in immigration, becoming an attractive alternative to Europe and other overseas destinations. In 2010, the country was home and host to 1.9 million migrants. In 2017, the number had risen to 2.9 million, making it Africa's most important magnet society (Figure 5). Immigrants have origins ranging from Central, Eastern and Southern African to European, South Asian and Chinese. People born in Zimbabwe and Mozambique are the largest groups of immigrants. Many African immigrants have found work in key sectors such as mining[43] while others work in the hospitality sector.

FIGURE 6. MIGRATION ON BALANCE – AFRICA'S MAIN COUNTRIES OF ORIGIN AND DESTINATION

Stock of immigrants and emigrants for selected African countries, 2017.



Note: 'immigrant' refers to foreign-born migrants residing in the listed country. 'Emigrant' refers to people born in the listed country currently residing outside their country of birth. Showing the top 15 African countries of destination and origin.

Source: UN Population Division, International Organisation for Migration; visualisation: Knowledge Centre on Migration and Demography (KCMD).

South Africa is not the only net receiving country on the continent. A few other African countries also have more foreign-born people residing on their territory than native-born emigrants living abroad. Among them, in 2017, were Ivory Coast, Ethiopia and Uganda (Figure 4).

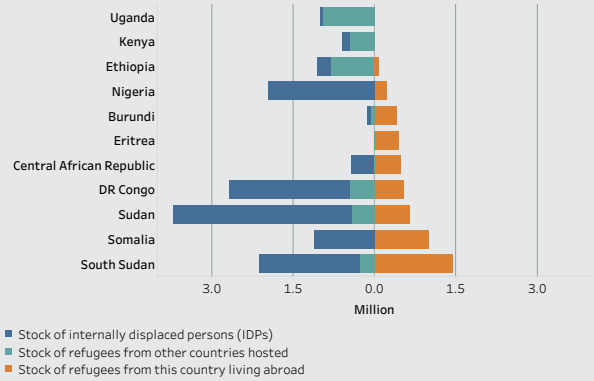
BOX 2 – International refugees and internally displaced persons in and from Africa

In 2016, **Africa hosted a total of 5.3 million refugees from other African countries**. Most of them found protection in Uganda,[44] Ethiopia, Kenya, and the Democratic Republic of the Congo (Figure 7). **Another 0.9 million Africans lived as refugees or asylum-seekers in Europe and North America**. The most important non-African host countries were Yemen (260,000), Italy (80,000), France (70,000), and the United States (50,000). African refugees are mainly citizens of South Sudan, Somalia, Sudan, the Democratic Republic of the Congo, the Central African Republic and Eritrea.

Next to this, **another 12.6 million Africans were internally displaced**[45] within their own countries in 2016, as a result of political violence and civil wars. The country with the largest violence-related internally displaced population, according to the International Displacement Monitoring Centre, was Sudan, followed by the Democratic Republic of the Congo, Nigeria, South Sudan and Somalia. They all had between 1.1 million and 3.3 million internally displaced citizens living on their territory. In the course of 2016, some 2.8 million Africans were newly uprooted (flow of internally displaced persons) due to political violence and civil wars. Historical data on the stock of people internally displaced by geophysical events and extreme weather conditions are not available, but in 2016 alone 1.1 million Africans were newly uprooted as a result of these factors.

FIGURE 7. FORCED MIGRATION ON BALANCE IN AFRICA'S MAIN REFUGEE-PRODUCING AND REFUGEE-RECEIVING COUNTRIES

Stock of refugees, stock of IDPs, 2016, absolute numbers, in millions.



Note: the figure shows the top African countries based on the stock of international refugees and internally displaced persons.

Source: United Nations High Commissioner for Refugees (UNHCR) and International Displacement Monitoring Centre, International Organisation for Migration; visualisation: Knowledge Centre on Migration and Demography (KCMD).

Less legal and more irregular migration from Africa to Europe

Between 2010 and 2015, some **1.3 million Africans migrated to another country each year**, on average. Among these, some **400,000 to 500,000 have been moving to Europe each year** (Figure 8).

Until 2012, the vast majority of these travelled as regular immigrants with visa and residence permits granted before arrival. However, **the number of African immigrants settling legally in EU Member States dropped significantly**, from 442,000 in 2008 to 270,000 in 2012. Since then, numbers have remained more or less stable, with 288,000 legal arrivals in 2016 (Figure 8).[46]

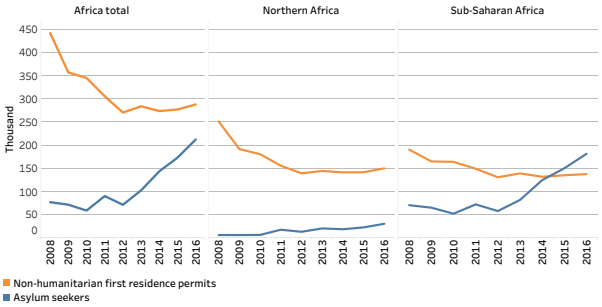
Among these recent (2008-2016) regular immigrants to Europe, almost 57% were Northern African citizens – although the flow of regular North African migrants fell by 40%, from 253,000 in 2008 to 152,000 in 2016. Over this period, the already small number of residence permits issued to Libyans dropped by 72%, while those issued to Moroccans and Egyptians dropped by 52% and 15% respectively. During this period Morocco was and remained the most important source country, followed by Algeria (Figure 9).

The remaining 43% of legal African immigrants to Europe over the period 2008 to 2016 came from Sub-Saharan countries. Legal immigration from this region fell by 31% from 190,000 in 2008 to 130,000 in 2012, and remained more or less stable until 2016 (138,000). Nigerians were the most important group followed by Senegalese and South Africans (Figure 9).

Family formation and family reunion remain the main legal gates of entry for Africans migrating to and staying in Europe, even if its nature is changing. During the period 2008-2016, some 167,000 to 182,000 first residence permits were issued each year to newly married or dependent family members (Figure 10). Unlike in the 1970s and 1980s, when family reunion consisted of labour migrants being joined by their spouses and minor children, today this type of legal migration is mainly linked to well-established Moroccan, Algerian and Tunisian diasporas in Europe, namely in France, the UK, Italy, Spain, Belgium and the Netherlands. It is the children and grandchildren of immigrants who are getting married to distant relatives and members of local communities living in their ancestral land. In many cases these marriages are arranged by relatives, and the subsequent family reunion almost always takes place in Europe.[47]

FIGURE 8. AFRICA-EU: LEGAL MIGRATION DROPS, IRREGULAR MIGRATION INCREASES

Annual flows of African citizens to the EU-28 based on first residence permits and asylum applications, 2008-2016, absolute numbers, in thousands.

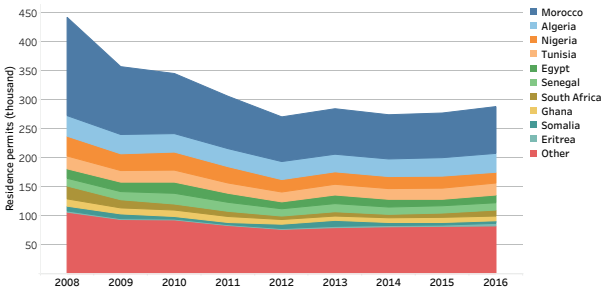


Note: the figure only includes first residence permits with a duration equal or longer than 12 months issued by the EU 28; it does not include residence permits for humanitarian reasons as most of the people receiving this status are included in the number of asylum-seekers.

Source: Eurostat; visualisation: Knowledge Centre on Migration and Demography (KCMD).

FIGURE 9. REGULAR IMMIGRATION OF AFRICANS DOWN UNTIL 2012 AND STABLE SINCE

First residence permits issued by the EU-28 to African citizens by citizenship, 2008-2016, top 10 countries of origin listed, absolute numbers, in thousands.



Note: the figure only includes first residence permits with a duration equal or longer than 12 months issued by the EU-28 for non-humanitarian reasons. It does not include residence permits for humanitarian reasons as most of the people receiving this status are included in the number of asylum seekers.

Source: Eurostat; visualisation: Knowledge Centre on Migration and Demography (KCMD).

Contrary to permits awarded for family reunion, which remained more or less stable over the period 2008-2016, **first residence permits awarded for work reasons fell by almost 70%**, down from 83,000 in 2008 to 26,000 in 2016 (Figure 10).[48]

In counterpart, irregular arrivals of Africans across the Mediterranean have increased considerably in recent years, with arrivals culminating in Italy, Spain and Greece during the years 2014-2016.

The destabilisation of Libya, combined with the rise in human smuggling activities and the increase in search and rescue operations carried out by European NGOs, coast guards and naval forces, played a significant role in generating and facilitating this flow.[49]

As a result, **asylum and humanitarian protection entry channels saw much greater demand**. Between 2008 and 2012, first-time asylum claims by Africans in the EU-28 averaged at around 75,000 each year. Since 2013, with more and more migrants crossing the Central and Western Mediterranean, the number of asylum claims rose drastically – peaking at 212,600 in 2016 (Figure 11),[50] although it fell to 140,000 in 2017.

The increase is linked both to higher numbers of irregular arrivals *per se,* as well as to an intensification of controls at points of disembarkation in Sicily and Calabria, which gave more visibility to irregular entries.[51] Since 2015-2016, most irregular migrants are registered upon arrival and almost all of them now ask for asylum in Italy, as crossing to North-Western Europe has become more difficult for them.

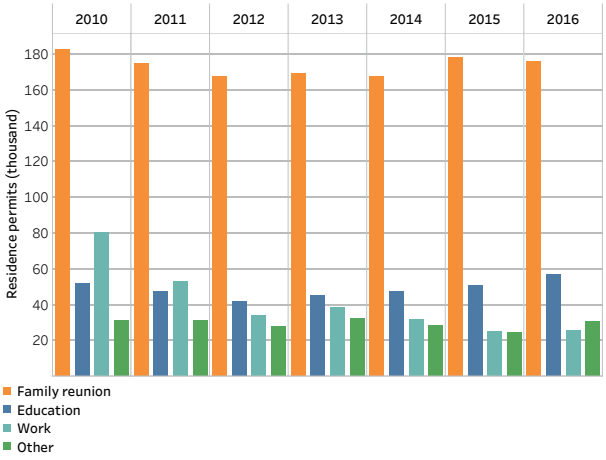
With the reinforced control efforts in Libya, irregular arrivals at Italy's southern shores dropped in 2017, but passages from Algeria and Morocco to Spain as well as from Algeria and Tunisia to Italy went up. In the case of Spain irregular entry to the Spanish exclaves of Ceuta and Melilla (located on the African continent) also play a role.[52] Overall though, asylum claims by Africans to the EU became a bit less frequent in 2017 compared to 2015 and 2016, and the drop continued in early 2018.[53]

The large majority of irregular arrivals were citizens of Sub-Saharan countries.[54] Among these, two different groups can be identified:

- Eritreans and Somalis, who have a considerable chance of being granted refugee status;[55]
- Citizens of other African countries, who only have a relatively small chance of being recognised as refugees. Claiming asylum, however, gives them access to temporary status, along with some social transfers, housing, healthcare and education. In this second group, the majority of asylum-seekers are from Sub-Saharan Africa with Nigeria, Ivory Coast, and Senegal being the most important countries of origin. A minority hail from the Maghreb; at first mainly from Morocco and Algeria, but more recently also from Tunisia.[56] In most cases, the asylum claims of the second group are rejected, but the migrants remain in Europe under a different status. The majority of irregular African migrants who were denied refugee status also remain in the EU — as most countries of origin are only reluctantly cooperating with EU Member State authorities in the return and readmission of their citizens.[57]

FIGURE 10. REGULAR IMMIGRATION FROM AFRICA: FAMILY REUNION DOMINANT, LABOUR MIGRATION DOWN, STUDENT MIGRATION SMALL

First residence permits issued by the EU28 countries to African citizens by 'gates of entry', 2010-2016, absolute numbers, in thousands.

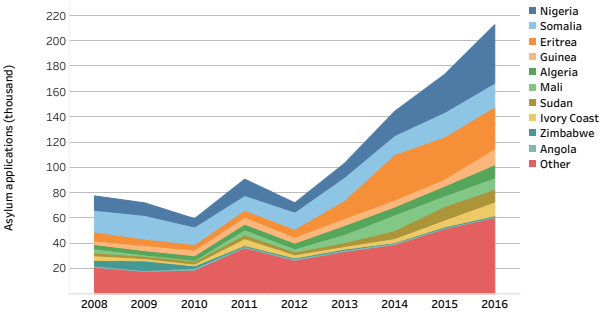


Note: the figure only includes first residence permits with duration equal or greater than 12 months issued by the EU-28 and excludes residence permits for humanitarian reasons.

Source: Eurostat; visualisation: KCMD

FIGURE 11. ASYLUM CLAIMS OF AFRICANS ON THE RISE SINCE 2012

First asylum applications in the EU-28, by countries of origin 2008-2016, absolute numbers, in thousands, top 10 countries of origin listed.



Source: United Nations High Commissioner for Refugees; visualisation: Knowledge Centre on Migration and Demography (KCMD).

Individual intentions: the gap between wish and reality

Personal aspirations play an important role in decisions to remain in one's place of birth or to move – within the country of origin or abroad – although there is often a gap between a person's wishes and their concrete actions (Figure 12).

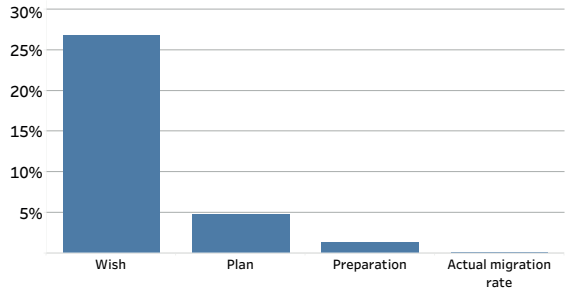
- During the period 2010-2015, 24% to 30% of Africans aged 15 or over declared a general wish to move to another country for an extended period or permanently.
- Over the same period, some 4% to 7% of Africa's population (age 15 and older) planned to move within a 12-month timeframe.
- 1% actually took concrete steps to prepare for that move.
- On average, only 0.12 % of Africa's total population (some 1.3 million people) actually emigrated each year over that period.[58] On an annual basis this represents less than one in 200 people who indicated a general wish of moving to another country.[59]

The global Gallup survey, which provides this analysis (Box 3) shows that the profile of Africans with no intention of moving abroad differs from the profile of those expressing a general intention to migrate, and from those who plan and prepare moving to another country (Figure 13).

On average, people who take concrete steps to leave their country of birth are in their 20s, and generally better educated and economically in a better position than those who merely express a desire to migrate, or those who do not even consider leaving their country. More than half of those who prepare their departure have completed secondary or tertiary education.

FIGURE 12. MIGRATION FROM AND WITHIN AFRICA: WISH AND REALITY

Migration intentions, plans and preparations of Africans (age 15+) as a percentage of the surveyed population (15+) and actual annual emigration rate as a percentage of the total population (average 2010-2015).



Note: the wish, plan and preparation are calculated on the basis of the Gallup surveys (2010-2015 waves) for age 15 and above. The actual emigration rate is calculated as the ratio between annual emigration flows and the total African population.

Source: Gallup; visualisation: Knowledge Centre on Migration and Demography (KCMD).

In contrast to public perception, more than one in two Africans (54%) who take concrete steps to migrate have a job. 16% are unemployed jobseekers, while 30% are economically inactive.

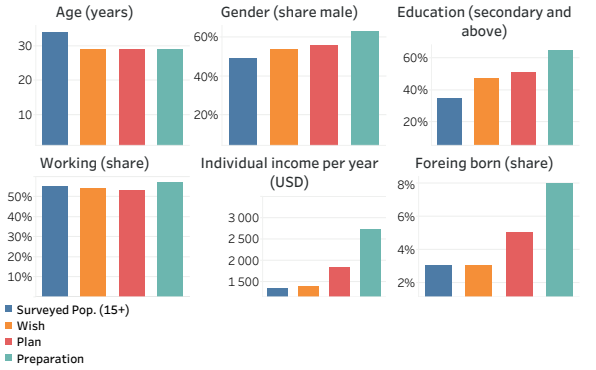
As a result, Africans, who are actually prepared to move have, on average, a higher income than those who want to remain or who are only considering leaving their country. Access to cash makes it more likely that people can afford to pay for travel documents, for the journey and – if necessary – for facilitators and smugglers along the way. Higher qualifications and previous work experience also contribute to emigration as the chances of finding work and earning money abroad increase (Figure 13).

When looking at *intentions to migrate* by gender for the period 2010-2015, men (age group 15+) were overrepresented among the minority of people who prepared for the move. In the end, more men than women move as economic migrants within Africa. The large majority of irregular migrants and asylum-seekers arriving in Italy and Spain are also men.[60] By contrast, women have a slightly higher chance of migrating legally to Europe for family-related reasons.[61]

Prior migration experience also increases the likelihood of planning and taking concrete steps to move abroad. Around 8% of those who take concrete steps are foreign-born, compared to 3% of those who just intend to migrate, which is the African average.

FIGURE 13. WHO WANTS TO MOVE ABROAD?

Selected characteristics of African adults with the intention, plan and preparation moving abroad, 2010-2015



Note: weighted samples. Source: Gallup; visualisation: KCMD

BOX 3 - From wish to reality: The Gallup World Poll Survey

The Gallup World Poll is a public opinion survey covering more than 150 countries worldwide.[62] For each of the countries, Gallup surveys approximately 1,000 individuals, who are representative of the country's population aged 15 and older.

The Gallup annual surveys from 2010 to 2015 explored potential migration.[63] More specifically, individual intentions to move abroad, along with the different stages of the possible migration decision, are captured through the following questions:

- Migration wish: ideally, if you had the opportunity, would you like to move permanently to another country, or would you prefer to continue living in this country?
- Migration plan: are you planning to move permanently to another country in the next 12 months?
- Migration preparation: have you done any preparation for this move?

As such, the survey contributes to a better understanding of the different drivers of migration wishes and of real actions.

Macro drivers of African migration: diaspora, income differentials, urbanisation and development

In addition to people's individual aspirations and characteristics, many other factors linked both to the country of origin and to the country of destination can come into play – often at the same time – in defining migration corridors between countries. So-called 'gravity models' of migration can help to identify drivers (Box 4, Figure 14).

- In the case of African migration, **diasporas in receiving countries** play a crucial role in shaping ongoing migratory flows – more so than in other world regions. This is particularly evident in the case of family reunion, where – mostly male, but sometimes femal too – diaspora members who are living in Europe or North America get married[64] to people from their regions of origin and/or distant relatives of their parents or grandparents. Within Africa and in the Gulf States, diaspora members and co-ethnic locals are active in identifying job opportunities for prospective economic migrants. As a result, the size of diasporas in receiving countries is a good indicator of the destinations that citizens of particular African countries are likely to migrate to. The larger the diaspora in a particular destination country, the more migration takes place to this country (positive effect; Figure 14).

- **Trade volumes** are a clear indication of existing links between countries. It is therefore no surprise that the scale of commercial exchanges between countries correlates with migration flows, although this is less apparent within Africa than between Africa and Europe or Asia. This has to do with the fact that bilateral trade volumes are much smaller within Africa than, for example, between Africa and the EU.[65]

- **Income differentials** between countries can also motivate people seeking better opportunities to move abroad in the hope of settling in a country with a higher GDP per capita. This is particularly evident in the case of migration from Africa to destinations abroad in Europe, Western Asia and North America, but it does not play any statistically significant role in the case of migration within Africa. This is largely due to the relatively small differences in GDP per capita between neighbouring countries in Africa. It also reflects the fact that a large share of migration flows within Africa are forced migration flows, determined by conflicts, poverty and instability in countries of origin, and by people looking for protection, rather than by economic conditions in destination countries.

- The negative effect that **GDP per capita** in the country of origin has on migration within and outside Africa indicates that lower levels of GDP can push people to migrate. However, this effect is less strong for migration outside Africa since poverty and a lack of access to cash may represent limiting factors for international mobility. On the one hand, higher development can reduce incentives to migrate, but on the other hand, it could enable more people to migrate outside of Africa by easing the poverty trap. These findings of the 'gravity model' are in line with results from the Gallup surveys of 2010-2015, which show that educated and economically active people with access to cash are overrepresented among those who actively prepare for emigration (Figure 13). As for the general model of migration for all countries in the world, the 'push' effect of low GDP per capita is not statistically significant. This can be explained by the non-linear relation between GDP and emigration rates, and the fact that three different patterns are bundled together:[66] In low-income countries, a growing GDP corresponds to more emigration as more people acquire the means to migrate (positive effect); in middle-income countries, the effect is null; in high-income countries, a higher GDP corresponds with less migration as people, on average, are less inclined to emigrate (negative effect). This supports the migration transition (or 'hump') theory – according to which migration first rises with economic development, up to a GDP per capita threshold of roughly of 7,000 to 13,000 international dollars per year, after which the relationship is reversed and people are more likely to stay in their home countries (Box 5).

- Rapid **population growth** also goes hand in hand with lower emigration (negative effect). One reason for this might be that African countries with the highest population growth are also the poorest, and poverty limits the mobility of citizens. At the same time a higher number of children among the population might also hinder migration. This is particularly true for those who intend to migrate to non-African destinations.[67]

- Contrary to expectations, a higher **share of young age groups in the population** does not represent a significant push factor for African emigration – neither inside the continent nor to external destinations. This is surprising as those aged 15-30 years tend to be the most mobile and the vast majority of Sub-Saharan African countries are at a stage of demographic transition in which

BOX 4: What drives migration? Using gravity models to understand drivers of migration

Regression models for migration – also called 'gravity models' – have been used by several authors to understand the relevance of drivers in general,[69] although none of these models was developed specifically for Africa.

Three models can be applied to measure the relevance of economic, demographic and geographical variables in explaining migration intensities: (a) between countries in Africa, (b) between countries in Africa and countries outside Africa and (c) between all countries in the world.

The dependent variable in these models is the bilateral migration flow between specific countries of origin and destination as a share of the population in the country of origin calculated every 5 years in the period between 1960 and 2015.

The explanatory variables that represent migration drivers are:

- Diaspora, i.e. the stock of emigrants in the previous interval of 5 years between a country of origin and a country of destination;
- Trade, i.e. the value of imports and exports between the country of origin and the country of destination as a share of gross domestic product (GDP) of the country of origin;
- Income differential, i.e. the difference in the GDP per capita between a country of destination and a country of origin;
- GDP per capita in the country of origin;
- Population growth in the country of origin;
- The share of population aged 20-24 in the country of origin;
- The share of urban population in the country of origin;
- The geographical distance between the country of origin and the country of destination.

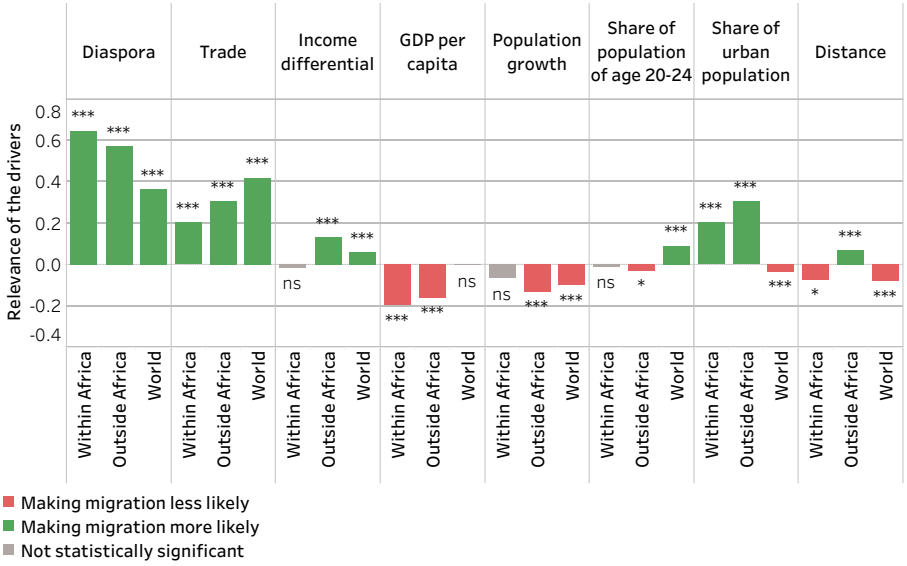
The yearly data for the independent variables were averaged over each 5-year period and analysed in order to be aligned with migration flow data.

To get comparable coefficients, both the dependent and the independent variables were expressed in logarithmic scale and standardised by subtracting the mean and then dividing it by the standard deviation.

The coefficient values represent the effect of the specific independent variable on migration flows. More formally, the coefficients indicate the change in standard deviations of dependent variables, per standard deviation increase in the independent variable.

FIGURE 14. WHAT DRIVES MIGRATION WITHIN AND FROM AFRICA?

Relevance of selected drivers of migration for bilateral migration intensities within Africa, outside Africa and around the world



Note: stars indicate statistical significance of the variable (P ≤ 0.05, ** P ≤ 0.01, *** P ≤ 0.001). See box for details on the model and a description of the variables. Visualisation KCMD*

almost half the population is below the age of 20.[68] While the absolute number of youth and young adults matters for migration in absolute terms, the share with respect to the total population size does not produce a significant effect on the emigration rates.

- In Africa, unlike in the general model for all countries of the world, **urbanisation** seems to act as a key driver of migration. African countries which are already at advanced stages of urbanisation tend both to be richer and to send more migrants abroad. This is particularly true for Northern Africa. Some of those who move from the countryside to bigger cities also seem to be more likely to move on to another country. In contrast, when looking at all migration corridors globally, the degree of urbanisation in countries of origin has no positive effect on migration flows.

- Within Africa, a higher **geographic distance** between two countries reduces the likelihood of migration (negative effect).[70] Africans tend to move to neighbouring countries rather than to distant African countries. This is true both for economic migrants and for forced migrants and refugees. As for non-African destinations, geographic proximity is not a central issue (the model even shows a positive effect of distance). This mainly reflects the migration preferences of Africans leaving their continent; the majority of which move to destinations in Europe, the Gulf States and North America.

The results of the gravity model thus clearly show that high population growth, a higher share of young people and a low degree of urbanisation in a given African country go hand in hand with lower emigration from that country (negative effect on emigration rates).

By contrast, there is more emigration from countries with lower population growth and a higher share of urban population. As regards migration outside of Africa, the push effect of low income on emigration is less evident, reflecting the fact that the majority of Sub-Saharan African countries are still in an early stage of socioeconomic development, which mostly favours migration to neighbouring countries rather than international migration given the lack of financial resources available to potential migrants.

Both the results of the Gallup survey and of the 'gravity model' make one thing clear: socioeconomic development, better education, job creation and improved income opportunities for Africans will not make them less mobile, but – at least in the short to medium-term – more mobile. It will take a long time before the majority of African countries reach the tipping point of a GDP per capita ranging between 7,000 to 13,000 international dollars per year above which emigration becomes less likely. Today only 11 of the 53 African countries have a GDP per capita above this threshold,[71] and at least three of these are still emigration countries.[72]

Scenarios for the 21st century: how demography, development and climate change will shape migration within and from Africa

A number of key determinants will most likely affect African migration over the coming decades. Among these are:

- demography;
- socio-economic development;
- climate change;
- political instability, violence and geopolitical factors.

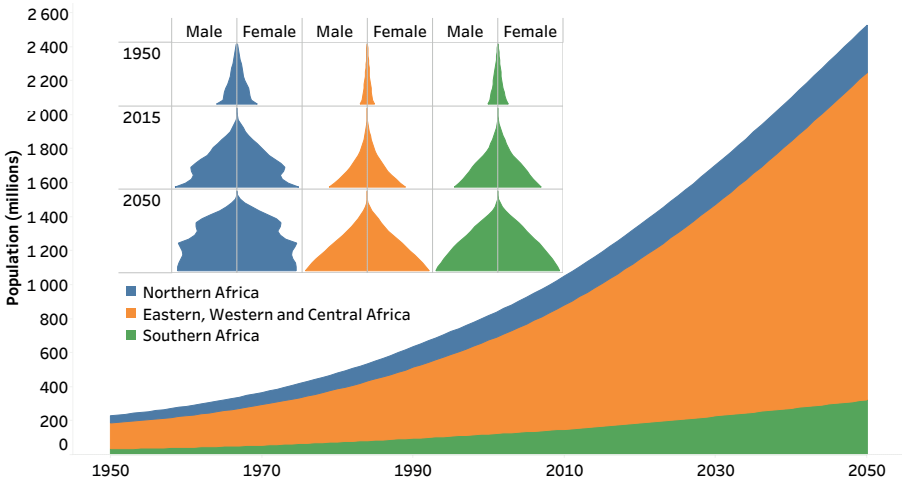
Forecasting future migration flows based on these determinants is more difficult than projecting total population (Box 6).[73] Possible interactions between some of these key determinants can, however, be described in the form of scenarios.

The determinant that we know best is **demographic change**. During the past 50 years the demographic transition in Africa has been slower than in other less developed parts of the world. While infant mortality has significantly decreased, many Sub-Saharan African countries report only slowly diminishing numbers of children per woman (total fertility). As a result, Africa has and will continue to experience very high population growth for several decades to come. The most recent UN World Population Prospects projection (medium scenario)[74] estimates that Africa's total population will double from 1.2 billion inhabitants in 2017 to 2.5 billion by 2050 – with most of the increase deriving from Western, Central and Eastern Africa (Figure 15).[75] Besides the overall increase in total population, Sub-Saharan African countries are seeing a transformation of their age structure from a pyramid shape (with the largest cohorts in the youngest age groups) to a more equal distribution in all groups below the ages of 35-40. This transition is already evident in some countries of Northern and Southern Africa where the age group 20-35 – the prime age at which Africans are most mobile – is already the largest. For many countries of Western, Central and Eastern Africa, this change will only happen in a more distant future (Figure 15). As a result, the number of migrants can be expected to increase over the next 20-30 years under any plausible scenario.

As for **socio-economic development projections**, an optimistic approach would assume that Africa will be home to a more rapid development triggered by domestic and foreign investment, coupled with better and more widespread education and a larger reduction in the average number of children (lower fertility). Based on such assumptions, a population projection variant (Shared Socioeconomic Pathways - SSP1) has been calculated by the International Institute for Applied

FIGURE 15. AFRICA'S POPULATION WILL MOST LIKELY DOUBLE BY 2050

Evolution of the population in Northern and Sub Saharan Africa and age pyramids according to UN Population Division projections (World Population Prospects (WPP) 2017 medium scenario), absolute numbers, in millions.



Note: the age pyramids show the distribution of population by gender and age groups (on the y axis starting from age 0 at the bottom).

Source: UN Population Division; visualisation: KCMD

BOX 5: Peak migration? The theories of migration and development

The neoclassical theory of migration[76] postulates that migration at the macro-level is mainly determined by differences in income levels between countries of origin and of destination: the larger the difference is, the more likely it is that people migrate from countries with a lower income to countries with a higher income. Over time, economic development should reduce income differences between countries and lead to less emigration from countries with lower wages.

The mobility transition theory[77] contrasts with the neo-classical approach by advancing that migration flows do not necessarily take place between countries with the highest income differentials, but are rather determined by stages of development and mobility. According to this theory, the poverty, widespread subsistence farming and slow economic development in many African countries represent a poverty trap which hinders international movements between African countries, as well as from Africa to Europe and other destinations, despite strong potential incentives to migrate due to high income differentials. At the same time, economic development – in particular in Sub-Saharan African countries – can trigger more migration as people acquire both the financial means and the human capital to successfully leave their countries in search of better opportunities abroad.

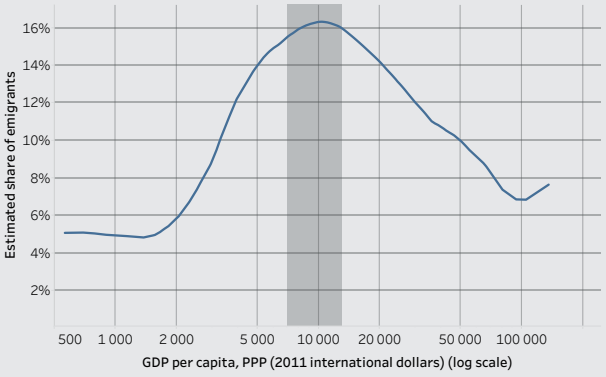
Available data underpins the plausibility of the mobility transition theory – also termed the 'hump hypothesis'.

Comparisons between Africa and other parts of the world show that emigration increases with economic development, up to a GDP per capita threshold of roughly 7,000 to 13,000 international dollars per year (measured in purchasing power parity (PPP) at constant 2011 international dollars). At this tipping point, emigration peaks and recedes with higher GDP per capita levels (Figure 16), while immigration becomes relatively more important. Today, only a few African countries have a GDP per capita above this threshold. Among them figure Algeria, Botswana, Equatorial Guinea, Egypt, Gabon, Libya, Mauritius, Namibia, the Seychelles, the Republic of South Africa, Swaziland and Tunisia.

Available data also show that, excluding refugees, the majority of African migrants do not come from the poorest countries. Today, by African standards the relatively richer Maghreb countries and Egypt are responsible for almost 50% of total migration. As most African citizens live in countries with a GDP per capita that is well below the threshold of 7,000 to 13,000 international dollars per year, their propensity to migrate is likely to increase with economic development in the years to come.

Under the optimistic assumptions of a sustained economic growth, most Eastern and Western African countries will reach a level of GDP which is corresponding to the peak in migration rates only after 2050 (Figure 17).

FIGURE 16. EMIGRATION IS INCREASING WITH DEVELOPMENT UNTIL A LEVEL OF AROUND 7,000 – 13,000 INTERNATIONAL DOLLARS OF GDP PER CAPITA



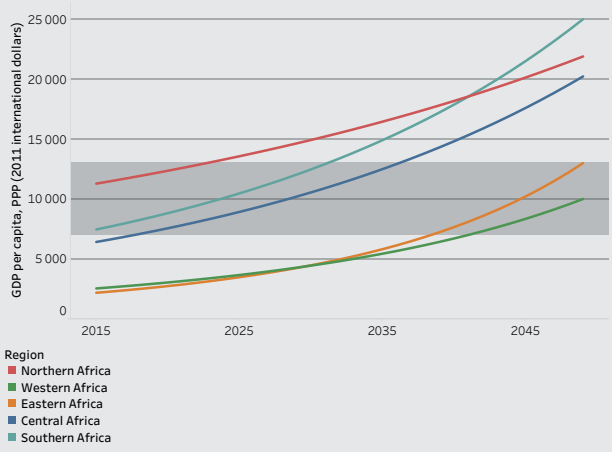
Note: the curve results from a non-parametric estimate of the relation between GDP per capita and emigration rates on the basis of 2015 data for all countries in the world.[78]

The shaded grey area represents the 7,000 to 13,000 threshold in 2011 international dollars.

Source: UN Population Division and World Bank; visualisation: KCMD

FIGURE 17. COUNTRIES IN EASTERN AND WESTERN AFRICA WILL NEED MANY MORE YEARS TO REACH A PEAK IN EMIGRATION RATES

Projected GDP per capita for 2015-2050 in African regions assuming an increase of 1% in annual growth rates compared to 2010-2015.



Note: the graph is showing average values for each region. The grey band shows the range of GDP per capita which according to the mobility transition theory is associated with a peak in emigration rates.[79]

Source: World Bank; visualisation: KCMD

Systems Analysis (IIASA).[80] It projects that Africa's total population would only increase to 1.8 billion in 2050 and would stabilise by 2080. Such a development path would be in line with projections for the EU's External Investment Plan which aims to channel more private investments into African infrastructure, create jobs and address the so-called 'root causes' of migration.[81]

By combining different assumptions about both the speed of socio-economic development (in line with current trends versus more rapid development) and the rate of population growth (higher versus lower population growth), two main scenarios have been developed to project future migration rates from and within Africa (Table 1).[82] A third scenario looks into the more destabilising and unpredictable impact that climate change can have on parts of Africa and on subsequent migratory flows.

Scenario 1 is based on a **continuation of current trends**, be it in terms of socio-economic development, population growth, or migration intensity. Migratory flows would remain above the world average in Northern Africa and below the global average in Sub-Saharan Africa.

At constant migration rates, it is principally the increase in the number of younger African citizens (aged 15-35) – mainly in in Western, Central and Eastern Africa – that will lead to an increase in the absolute number of migrants within and from Africa. The future number of African migrants can be estimated by applying each country's specific emigration rate from 2015 to the future size of its age group 15-35 (using the UN's 2017 World Population Prospects medium variant).

Under this scenario, **the annual number of mobile Africans leaving their country of origin would increase from 1.4 million in 2015 to 2.8 million in 2050** (Figure 18).

Scenario 2 assumes that **economic growth** triggered by more direct investment will lead to the creation of wage-bearing jobs in the formal economy and to subsequent socio-economic transformations, including access to better education and a faster decline in fertility rates that will eventually lead to a reduction of the number of people in the most mobile 15-35 age group.

At the same time, higher levels of socio-economic development will enable more Africans to access education, jobs and cash incomes, thereby also increasing the pool of people who have both the financial means to migrate and a level of human capital potentially providing access to better-paid jobs abroad. Increased investments in infrastructures will mean African countries are better connected with each other and with the rest of the world, reducing some of the existing barriers to geographic mobility.

TABLE1. THREE SCENARIOS OF FUTURE SOCIO-ECONOMIC, DEMOGRAPHIC AND MIGRATORY DEVELOPMENT IN AFRICA

SCENARIO 1	SCENARIO 2	SCENARIO 3
Continuation of current socio-economic development trends	More rapid socio-economic development	Socio-economic development disrupted in several African countries due to climate change
Current (2015) emigration rates remain constant	Emigration rates rise as Africa's low-income countries converge towards the median emigration rate of Africa's middle-income countries	Displacement and emigration rise with desertification, water scarcity and a rise in unrest and political violence
Higher population growth, in line with current trends (UN projections)	Lower population growth as a result of faster socio-economic development (Shared Socio-economic Pathways projection)	Higher population growth, in line with current trends (UN projections)

Note: For the merits and limitation of such scenarios see Box 6

Based on these projections, Scenario 2 assumes that emigration rates in Africa's low-income countries will gradually rise to the current average migration levels of Africa's middle-income countries, while the latter will stay the same.

In this scenario there are thus two opposite forces: on the one side, demography has a smaller effect on emigration (compared to scenario 1) as population growth slows; on the other, socio-economic development more than compensates for this lower demographic effect by enabling more international mobility. The future number of African migrants can thus be estimated by applying the modified country-specific emigration rates to a less rapidly expanding pool of 15-35 year-olds (using the Shared Socioeconomic Pathways – SSP1 projection).

Under this scenario, the combined effects of a smaller demographic expansion and of a convergence of African migration rates towards the higher values of middle-income countries, would lead to **an increase in the annual number of Africans leaving their country of origin from 1.4 million in 2015 to 3.5 million in 2050** (Figure 18).

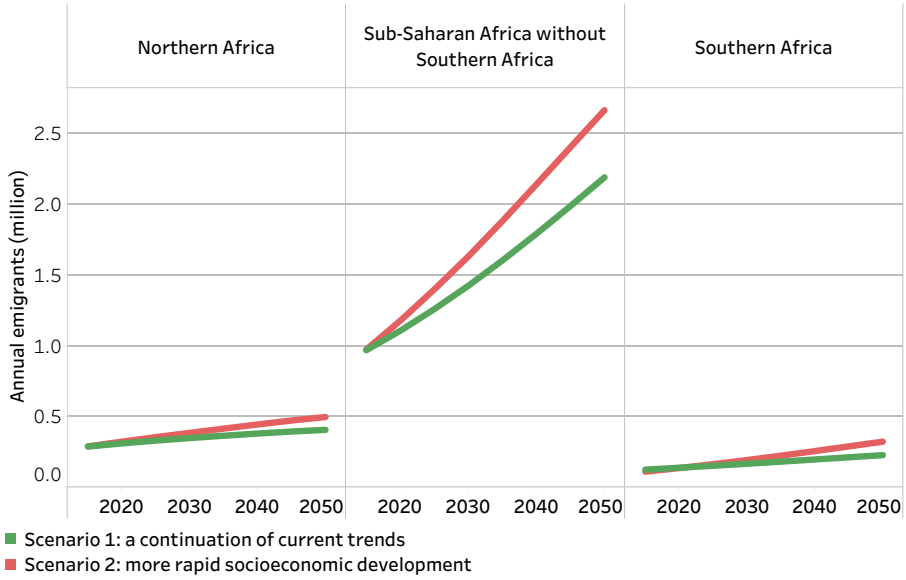
Scenario 3 assumes a **destabilisation of parts of Africa induced by climate change**. Particularly important impacts are expected to come from extended heat waves and higher surface temperatures, as well as disruptions in water cycles making droughts more common and human survival in affected regions more difficult – all the more so in currently populated arid regions like the Maghreb region, Egypt, Sudan, parts of Southern Africa and the Big Lakes region of Eastern Africa.[83]

Such developments could negatively affect some already fragile states, increasing existing tensions over land rights and scarce water resources (in particular between farmers and breeders), and triggering displacement and subsequent internal mobility from affected coasts and arid rural areas to urban areas. Such a scenario also implies higher food prices. All this could ultimately contribute to unrest and political violence, which would lead to additional displacement.

Many experts assume that climate change will result in higher mobility, but the relation between climate change and migration is indirect[84] and will most likely pass through complex interactions of disruptive events, gradual degradation, poverty, urbanisation and political instability.

FIGURE 18. THE FUTURE OF AFRICAN MIGRATION: MORE TO COME

Simple simulation of the annual migration flows from Northern Africa, Sub Saharan Africa and Southern Africa according to scenarios one and two, absolute numbers, in millions.



Note: see box for details on the simulation.

Source: Abel (2017) and UN Population Division; visualisation: KCMD

Resilience to the negative impacts of climate change is small in many of Africa's already vulnerable countries. As a result, internal displacement in such countries is likely to increase, but desertification as well as the loss of habitat in coastal regions could also lead to higher emigration.[85] In more developed African countries, people with the means to migrate might anticipate the negative impact of climate change and decide to leave ahead of the unfolding impact.

By combining climate change projections with demographic projections, it is possible to calculate the number of persons that could be affected by extreme changes in climate and estimate in this way the potential population which may be forced to move (Figure 19).

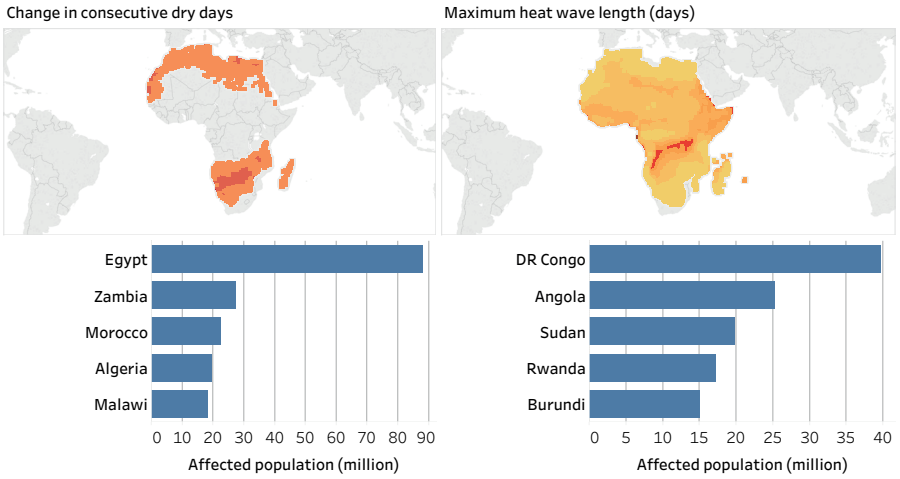
The duration of periods with high temperatures is expected to reach extreme levels (above 100 days) in particular in Central and Eastern Africa. Around 8% of the projected population living in Africa in 2100 will be affected by such prolonged periods of heat (149 million people). These changes will hit people in countries such as the Democratic Republic of the Congo (40 million people: 27% of the population), Angola (25 million people: 61% of the population), Sudan (30 million people: 32% of the population), Rwanda (17 million people: 79% of the population) and Burundi (15 million people: 100% of the population) the hardest.

When considering the number of consecutive dry days, it is possible to foresee particularly extreme conditions (more than 20 days in addition to current levels) for around 13% of the projected African population in 2100 (236 million people). The population affected is mostly concentrated in Egypt (88 million people: 91% of the population), Zambia (27 million people: 92% of the population), Morocco (23 million people: 98% of the population), Algeria (20 million people: 57% of the population) and Malawi (18 million people: 43% of the population).

Unlike in scenarios 1 and 2 it is hardly possible to quantify how many of those affected by climate change and extreme weather conditions will ultimately decide to migrate. To forecast such an effect it would be necessary to reconstruct the complex chain of interactions between climate change and the disruption of economic activities and take into account adaptation strategies. Some of these strategies could imply an increase in internal displacement and rural-to-urban mobility rather than in international migration to neighbouring countries and towards countries outside Africa.

FIGURE 19. CLIMATE CHANGE AFFECTS SOME PARTS OF AFRICA MORE THAN OTHERS

Projected change in consecutive dry days and maximum heat wave length and affected population by the end of the century.



Note: the two bottom charts show the top 5 countries on the basis of total population affected by changes in the two analysed indicators.[86]

Source: European Commission DG JRC

The following conclusions can be drawn from these three scenarios:

- It is almost certain that emigration from African countries will increase in the coming decades, with many more Africans living outside their country of birth than there are today.
- Much of the increase will be derived from an interplay between demographic change and socio-economic development.
- If social development and economic growth are low, the decline in fertility rates will remain slow and Africa's population will grow more rapidly creating a larger demographic pool of migrants (Scenario 1).
- If, however, development efforts bear fruit more rapidly and education and living conditions improve, the number of children per family will decline more quickly. This will lead to a smaller increase in the migration-prone age group of 15-35 year-olds, but many more Africans will be empowered to become mobile and able to leave their countries of origin (Scenario 2).
- Climate change and extreme weather events are also likely to play a key role in driving international migration, as internal displacement 'spills over' into neighbouring countries, and as Africans who have the means to move to more distant countries in reaction to or to anticipate negative developments (Scenario 3).

Available data do not hint at an imminent mass exodus of Africans. However, these scenarios indicate that, in the medium term, socio-economic development, population growth and climate change will lead to more Africans on the move than today. Even at an accelerated speed of socio-economic development, African countries will experience more emigration than immigration during the next 30-40 years. More rapid development will reduce population growth, but increase the ability of young people to migrate.

The number of Africans that will migrate to other African countries and the number that will move to Europe, Asia and North America will not only depend on the preferences and needs of Africa's potential migrants. It will also depend on migration and return policies adopted by countries of origin, of transit and of destination. In any case, boosting education and promoting family planning, accelerating job creation and mitigating climate change in Africa will be crucial to ensuring that people have a better future on their own continent.

BOX 6: The limits of forecasting future migration flows

Individual decisions to migrate depend on many factors at macro (country), meso (community, household) and micro (individual) level, a fact that makes forecasting migration at the aggregate level a highly complex task.[87] Besides the intrinsic complexity of international migration and the lack of a unified theory of migration, limitations in producing acceptable estimates of future migration flows stem from five main issues:

- The basic data about emigration flows[88] which are needed to fit a forecasting model are not available from official statistics at a global level and need to be estimated for a majority of country-to-country corridors.[89]
- When available, these data show a high variability across countries and across time (in several cases without clear trends). This indicates that annual migration rates are as affected by contingent factors as they are influenced by structural country characteristics like GDP per capita, wage levels or unemployment rates.
- In the medium to longer term, it is difficult to anticipate the level of economic development in countries of origin and of destination. As a result, the direction of flows might change.
- The relation between development and the likelihood of migration could be changing. Despite strong empirical evidence supporting the migration transition theory (Box 5) it is difficult to foresee whether the current GDP per capita threshold of roughly 7,000-13,000 international dollars per year at which emigration peaks will hold, or if it will move to a higher level.
- The translation of migration pressures into actual migration flows partly depends on economic, social and political factors including the demand for migrant labour, the acceptance of immigration and the admission and recruitment policies of receiving countries which can be anticipated, but are hard to predict accurately.

All of these limitations speak in favour of the application of scenarios. These scenarios are not predictions of the future, but serve as a basis for quantitative projections, which show what will happen under the conditions described in the scenario. As discussed, this can be done for scenarios 1 and 2, but not for scenario 3.

NOTES, REFERENCES AND CONTRIBUTORS

Notes

1. Belgium, France, Germany, Italy, the Netherlands, Spain, Turkey and the UK once controlled African territory.
2. The only exception is Turkey that conquered large parts of Northern Africa (from Egypt to Algeria) already in the 16th century.
3. Over the period of the Atlantic Slave Trade, from 1526 to its suppression in 1867, some 12.5 million had been enslaved and shipped from Africa, of which 10.7 million had arrived alive in in North America, the Caribbean and South America. Another 2 million Slaves were transported to Arab countries, partly across the Sahara to Northern Africa, partly along the Swahili coast to the Arab peninsula. Only 200.000 Africans were shipped to European destinations (in particular to mainland Portugal, the Azores, Madeira and the Canary Islands. Thomas, 2006).
4. Namely Belgium, Germany, Italy, France, Portugal and Spain.
5. Today the only parts remaining under European control are the Canary Islands, Ceuta and Mellila (Spain), Réunion and Mayotte (France).
6. France conquered the Northern part of Algeria from Turkey. This occupation soon turned into colonisation, which brought people of French, Spanish, Italian and Maltese origins to the country (Kateb, 2001).
7. European migration to South Africa started in 1652 with the settlement of the Cape of Good Hope by the Dutch. Despite the preponderance of officials and colonists from the Netherlands, there were also a number of French Huguenots fleeing religious persecution at home and German sailors returning from service in Asia and remaining in South Africa.
8. Flahaux and De Haas, 2016.
9. In particular: in Algeria, Angola, Kenya, Northern Morocco, Namibia, South Africa, Uganda and Zimbabwe.
10. MacMaster, 1997.
11. Most of those who did not move to Europe migrated to Israel (Kateb, 2001). This is also true for the Jewish community of Egypt.
12. Between 1957 and 1962 Algeria was part of the European Communities.
13. David, 2015.
14. Laskier, 1994.
15. Poskanzer, 2000.
16. Among them were many former colonial settlers of European origins. Certain groups of European citizens born in Africa are, however, not included in the available data, e.g. French citizens who had to leave Algeria after independence in 1962.
17. Jolivel, 2014.
18. France (1964, 1968, 1971), Belgium (1970).
19. France, Spain, and Germany (1963), Belgium (1964), the Netherlands (1969).
20. Belgium (1969).
21. Estimate of the UN Population Division for 2017: http://www.un.org/en/development/desa/population/migration/data/estimates2/estimates17.shtml: see also International Organization for Migration, 2018.
22. This is slightly below the global share of people living outside their country: 3.3 % of world population in 2017.
23. World Bank, http://databank.worldbank.org/data/databases/migration
24. United Nations Population Division, https://esa.un.org/unmigration/
25. Abel, 2017.
26. See footnote 16.
27. For shortcomings in the available and analysed date, see Box 1.
28. Many African colonial settlers of European origins who have moved to Europe between the 1960s and the 1990s as citizens of a European country are not included in this figure.
29. In 2010, the US Census counted 42 million so called 'non-Hispanic blacks' and multiracial African Americans. The large majority of them are descendants of enslaved Africans who were brought to the Americas between the start of the 16th century and the 1860s.
30. North Africa's most common migration corridors are: Egypt–Saudi Arabia, Algeria–France, Morocco–France, Morocco-Spain.
31. Natter, 2014.
32. http://www.migrationpolicycentre.eu/docs/migration_profiles/Libya.pdf
33. From Somalia and Eritrea to Ethiopia and Kenya; from South Sudan to Sudan, Kenya and Uganda; from Burundi to Tanzania. In 2017, the largest refugee populations were hosted by Uganda (1,250,000), Ethiopia (740,000), Kenya (490,000).
34. http://documentation.ecowas.int/download/en/legal_documents/protocols/PROTOCOL%20RELATING%20TO%20%20FREE%20MOVEMENT%20OF%20PERSONS.pdf
35. Flahaux and De Haas, 2016.
36. Devillard, Bacchi, and Noack, 2015.
37. Devillard, Bacchi, and Noack, 2015.
38. This figure does not include internally displaced people (IDPs).
39. Arrivals through the Central Mediterranean route from African countries in 2015, 2016 and until December 2017 according to European Border and Coastal Guard Agency data.
40. The refugees' data refers to 2016 and is based on UNHCR statistics on population of concern.
41. Djibuti hosts China's first foreign military basis.
42. Cook, Lu, Tugendhat, and Alemu, 2016.
43. Nshimbi and Fioramonti, 2013.
44. In 2017, the number of refugees in Uganda had risen to more than 1 250 000 mainly due to refugee flows from South Sudan. See http://data.unhcr.org/SouthSudan/country.php?id=229
45. Internal Displacement Monitoring Centre, 2017.
46. First residence permits for the purpose of family reunion, work or education covering a period of more than 12 months are used as a proxy measuring legal immigration.
47. Penn and Lambert, 2009.
48. Family reunion is the main gate of entry for legal immigrants from Northern, Western and Central Africa, while labour permits have been decreasing over the analysed period. Migrants from Eastern Africa usually arrive as asylum seekers and the majority of residence permits is issued for humanitarian reasons. For immigrants from Southern Africa, who are mainly citizens of the Republic of South Africa, first residence permits are issued mostly for work purposes, but numbers have been declining since 2010.
49. European Political Strategy Centre, 2017.
50. Residence permits for humanitarian reasons issued to citizens from Eastern and Western Africa mirror these patterns.
51. In 2015 and early 2016 some North African asylum seekers also came via Turkey and the Aegean to Greece and usually moved on via the Western Balkans to North Western Europe.
52. http://data2.unhcr.org/en/situations/mediterranean/location/5226
53. http://data2.unhcr.org/en/situations/mediterranean/location/5205
54. Irregular flows also included smaller numbers of citizens of Bangladesh, Syria and the Maghreb countries.
55. According to Eurostat data, the recognition rate of first-time asylum applications in 2016 was 93 % for Eritreans and 66 % for Somalis.
56. In 2016, the recognition rate of first time asylum applications was 22 % for Nigerians and Senegalese, 27 % for Ivoirians, but only, 7 % for Moroccans, and 5 % for Algerians. These figures include political asylum as well as humanitarian protection.
57. https://www.iom.int/news/working-group-return-and-reintegration-meets-discuss-migration-management-west-africa-0
58. Actual emigration is intended as flows and measured on the basis of Abel, 2017. See box 1 for the distinction between stock and flows and limitations in the estimation of flows within Africa.
59. A broad set of individual, structural and country-specific characteristics (such as risk aversion, financial constraints, political and economic conditions and migration policies in sending and receiving countries) may hinder the realisation of the wish to migrate. The gap does not only exist in Africa, but at a global level. In Latin America, for instance, 28% of the adult population would like to

move, while only 1% prepares for the migration. Similarly, in Europe, where the share of those wishing to migrate accounts for 21% of the adult population, again only 1% reported concrete steps to realise that intention.

60. See, for instance, the composition by gender of arrivals from the Mediterranean: http://data2.unhcr.org/en/situations/mediterranean
61. Over the period 2010-2016, more than 54 % of residence permits for family reasons granted to African citizens is issued to women according to Eurostat data.
62. The survey covers the following African countries: Algeria, Angola, Benin, Botswana, Burkina Faso, Burundi, Cameroon, Chad, Republic of the Congo, the Democratic Republic of the Congo, Egypt, Ethiopia, Gabon, Ghana, Guinea, Ivory Coast, Liberia, Libya, Madagascar, Malawi, Mali, Mauritania, Mauritius, Morocco, Mozambique, Namibia, Niger, Nigeria, Rwanda, Senegal, Sierra Leone, Somalia, South Africa, South Sudan, Sudan, Tanzania, Togo, Tunisia, Uganda, Zambia and Zimbabwe. Several of these countries have missing values in specific years of the 2010-2015 time series.
63. Esipova, Ray, and Pugliese, 2011.
64. In many cases this is a choice not made by the bride and groom, but by other family members.
65. A note of caution is needed to interpret both the role of trade and diaspora as causal factors for the annual migration flows. The strong coefficients may in fact just be indicative of associations since trade, current flows and the building up of a sizeable diaspora between country pairs may be interacting and derive from unobserved socio-economic, cultural and geographical linkages between countries.
66. This fact becomes evident when considering separate models for countries of origin grouped by levels of income. For brevity purposes these models are not included in this report. Further supporting empirical evidence of nonlinear relations between development and emigration rates can be found in De Haas, 2008; Dao, Docquier, Parsons, and Peri, 2018; Martin and Taylor, 1996; Clemens, 2014.
67. It should also not be overlooked that migration has an impact on population growth by reducing total growth in sending countries and increasing population growth in receiving countries.
68. The exceptions are the Botswana, Djibuti, the Maldives, Lesotho, Swasiland and the Republic of South Africa.
69. Beine and Parsons, 2015.
70. (69) This is shown in most gravity models of migration.
71. Today only Algeria, Botswana, Equatorial Guinea, Egypt, Gabon, Libya, Mauritius, Namibia, the Seychelles, the Republic of South Africa, Swasiland and Tunisia have a GDP/capita above 7 000 dollars per year (international dollars, purchasing power parity: see IMF 2017: http://statisticstimes.com/economy/african-countries-by-gdp-per-capita.php)
72. Egypt, Swasiland and Tunisia.
73. Buettner and Muenz, 2018.
74. World Population Prospects (WPP) of the UN Population Division for 2017, https://esa.un.org/unpd/wpp/Publications/Files/WPP2017_KeyFindings.pdf
75. During the projected period (2015-2050), the population of Sub-Saharan African countries is forecast to increase at an even higher pace: by 123 % until 2050.
76. Todaro, 1969.
77. Zelinsky, 1971.
78. See Clemens, 2014 for similar estimates.
79. Own calculations based on Clemens, 2017.
80. Lutz et al., 2014.
81. https://ec.europa.eu/europeaid/sites/devco/files/factsheet-eip-20171120_en.pdf
82. These scenarios only simulate the overall emigration flows from the countries of origin and not where they will be directed.
83. European Commission, Joint Research Centre, 2017.
84. Beine and Parsons, 2015..
85. Hummel and Liehr, 2015.
86. Climate change is represented by two indicators of heat waves and consecutive dry days at the end of the century (average of annual values in the period 2071-2100). A heat wave is the number of consecutive days with temperatures greater than the 90th percentile of current ones. Both indicators are calculated from a large ensemble of Regional Climate Models from the Coordinated Regional climate Downscaling EXperiment (CORDEX) (Dosio, 2017) and are based on a scenario of comparatively high greenhouse gas emissions (RCP8.5). These climate change indicators are combined with projected population disaggregated in a grid of with cells of around 50 by 50 km. Also this population data is projected to 2100 on the basis of the Shared Socioeconomic Pathways SSP1 scenario (Murakami and Yamagata, 2016).
87. Bijak, 2011.
88. Another limitation arises from the fact that most models are based on emigration rates not reconciled with the immigration rates of receiving countries (Buettner and Muenz, 2018).
89. This is done, for example, by the UN Population Division as a basis for their WPP.

References

Abel, G. J. (2017). Estimates of Global Bilateral Migration Flows by Gender between 1960 and 2015. International Migration Review. https://doi.org/10.1111/imre.12327

Beine, M., & Parsons, C. (2015). Climatic Factors as Determinants of International Migration: Climatic factors as determinants of international migration. The Scandinavian Journal of Economics, 117(2), 723–767. https://doi.org/10.1111/sjoe.12098

Bijak, J. (2011). Forecasting international migration in Europe: a Bayesian view. Dordrecht Heidelberg London New York: Springer.

Buettner, T., & Muenz, R. (2018). Modeling Alternative Projections of International Migration. KNOMAD Working Paper 30, Washington DC: World Bank. Retrieved from https://www.knomad.org/publication/modeling-alternative-projections-international-migration

Clemens, M. A. (2014). Does development reduce migration? In International Handbook on Migration and Economic Development (152–185). Cheltenham, UK: Edward Elgar

Clemens, M. A. , & Postel H. M. (2017). Deterring Emigration with Foreign Aid: An Overview of Evidence from Low-Income Countries. GLM|LIC Synthesis Paper. Bonn: IZA. Retrieved from https://glm-lic.iza.org/wp-content/uploads/2017/11/glmlic_sp008.pdf

Cook, S., Lu, J., Tugendhat, H., & Alemu, D. (2016). Chinese Migrants in Africa: Facts and Fictions from the Agri-Food Sector in Ethiopia and Ghana. World Development, 81, 61–70.

https://doi.org/10.1016/j.worlddev.2015.11.011
Dao, T. H., Docquier, F., Parsons, C., & Peri, G. (2018). Migration and development: Dissecting the anatomy of the mobility transition. Journal of Development Economics, 132, 88–101. https://doi.org/10.1016/j.jdeveco.2017.12.003
David, I. (2015). The retornados: trauma and displacement in post-revolution Portugal. Ethnicity Studies/Etniskumo Studijos, (2). Retrieved from Lithuanian Social Research Centre: http://www.ces.lt/wp-content/uploads/2016/01/7-Etn_St_David_The-retornados.pdf
De Haas, H. (2008). The myth of invasion: The inconvenient realities of African migration to Europe. Third World Quarterly, 29(7), 1305–1322.
Devillard, A., Bacchi, A., & Noack, M. (2015). A Survey on Migration Policies in West Africa. Geneva: International Organization for Migration. Retrieved from http://publications.iom.int/system/files/pdf/survey_west_africa_en.pdf
Dosio, A. (2017). Projection of temperature and heat waves for Africa with an ensemble of CORDEX Regional Climate Models. Climate Dynamics, 49(1–2), 493–519. https://doi.org/10.1007/s00382-016-3355-5
Esipova, N., Ray, J., & Pugliese, A. (2011). Gallup World Poll: The Many Faces of Global Migration. Geneva: International Organization for Migration. Retrieved from http://publications.iom.int/system/files/pdf/mrs43.pdf
European Commission, European Political Strategy Centre. (2017). Irregular Migration via the Central Mediterranean, From Emergency Responses to Systemic Solutions. Retrieved from https://ec.europa.eu/commission/sites/beta-political/files/irregular-migration-mediterranian-strategic_note_issue_22_0_en.pdf
European Commission, Joint Research Centre. (2017). Science for the AU-EU Partnership: building knowledge for sustainable development. Luxembourg: Publications Office of the European Union, Luxembourg. Retrieved from https://ec.europa.eu/jrc/en/publication/eur-scientific-and-technical-research-reports/science-au-eu-partnership-building-knowledge-sustainable-development
Flahaux, M.-L., & De Haas, H. (2016). African migration: trends, patterns, drivers. Comparative Migration Studies, 4(1). https://doi.org/10.1186/s40878-015-0015-6
Hatton, T. J., & Williamson, J. G. (2003). Demographic and Economic Pressure on Emigration out of Africa. Scandinavian Journal of Economics, 105(3), 465–486. https://doi.org/10.1111/1467-9442.t01-2-00008
Hummel, D., & Liehr, S. (2015). Migration in the West African Sahel-more than a response to climate change (ISOE Policy Brief 2). Retrieved from Institut für sozial-ökologische Forschung ISOE GmbH: http://www.isoe.de/fileadmin/redaktion/Downloads/Bevoelkerung/policy-brief-isoe-2015-2.pdf
Internal Displacement Monitoring Centre. (2017). Africa Report on Internal Displacement. Geneva: IDMC. Retrieved from http://www.internal-displacement.org/assets/publications/2017/20171206-Africa-report-2017.pdf
International Organization for Migration. (2018). World Migration Report 2018. IOM and United Nations, Geneva. Retrieved from https://www.iom.int/wmr/world-migration-report-2018
Jolivel, A. (2014). Negotiating labour Migration. A comparison of French and Spanish Bilateral Labour Agreements with Morocco (Fieri Working Paper). Retrieved from Universitad Autonoma Madrid, African Studies Group (GEA): http://grupodeestudiosafricanos.org/cms/wp-content/uploads/2015/06/JOLIVEL-2014-French-Spanich-Bilateral-Labour-Agreements-Morocco-Report.pdf
Kateb, K. (2001). Européens, 'indigènes' et juifs en Algérie (1830-1962): représentations et réalités des populations. Paris: Institut national d'études démographiques.
Laskier, M. M. (1994). North African Jewry in the twentieth century: the Jews of Morocco, Tunisia, and Algeria. New York: New York University Press.
Lutz, W., Butz, W. P., K. C, & Samir Kumar. (2014). World population and human capital in the twenty-first century. Retrieved from http://dx.doi.org/10.1093/acprof:oso/9780198703167.001.0001
MacMaster, N. (1997). Colonial migrants and racism: Algerians in France, 1900–62. Springer.
Martin, P. L., & Taylor, J. E. (1996). The anatomy of a migration hump, 43–62. Development Strategy, Employment, and Migration: Insights from Models. Paris: Organization for Economic Cooperation and Development, 43-62.
Murakami, D., & Yamagata, Y. (2016). Estimation of gridded population and GDP scenarios with spatially explicit statistical downscaling. ArXiv Preprint ArXiv:1610.09041.
Natter, K. (2014). Fifty years of Maghreb emigration: How states shaped Algerian, Moroccan and Tunisian emigration (IMI Working paper 95). Retrieved from International Migration Institute:

https://www.imi.ox.ac.uk/publications/wp-95-14
Nshimbi, C. C., & Fioramonti, L. (2013). A Region Without Borders? Policy Frameworks for Regional Labour Migration Towards South Africa. SSRN Electronic Journal. https://doi.org/10.2139/ssrn.2518432
Penn, R., & Lambert, P. (2009). Children of international migrants in Europe comparative perspectives. Basingstoke: Palgrave Macmillan.
Poskanzer, A. (2000). Ethiopian exodus. Hewlett, NY: Gefen Pub. House.
Thomas, H. (2006). The slave trade: the history of the Atlantic slave trade, 1440-1870 (New ed). London: Phoenix.
Todaro, M. P. (1969). A model of labor migration and urban unemployment in less developed countries. The American Economic Review, 59(1), 138–148. http://www.jstor.org/stable/1811100
Zelinsky, W. (1971). The Hypothesis of the Mobility Transition. Geographical Review, 61(2), 219. https://doi.org/10.2307/213996

Contributors

AUTHORS
Fabrizio NATALE[1], Silvia MIGALI[1], Rainer MÜNZ[2]

WE THANK
Thomas BARBAS[1], Peter BOSCH[1], Alex FUSCO[1], Harm GREIDANUS[1], Anna HAKAMI[1], Annick HILBERT[2], Anne-Mette JENSEN[1], Ann METTLER[2], Paola PICCININI[1], Rachel SMIT[2], Nikolaos STILIANAKIS[1], Alice SZCZEPANIKOVA[1] and Jana ZIFCIAKOVA[1] for the useful comments and internal review of the report; Alessandro DOSIO[1] and Alfredo ALESSANDRINI[1] for providing and processing the climate change data and Davide BONGIARDO[3] for the graphic design.

[1] JRC: DG Joint Research Centre
[2] EPSC: European Political Strategy Centre
[3] Piksel Srl

Photo Credits

- pages 8-20, © P. Ronco, JRC;
- pages 12-18-19, © A. M. Duta, JRC;
- pages 23-27, © EU, by A. Brink
- page 24, © Fotolia
- page 30, ©EU/ECHO/Anouk Delafortrie

KJ-NA-29106-EN-N

The European Commission's science and knowledge service

Joint Research Centre

JRC Mission

As the science and knowledge service of the European Commission, the Joint Research Centre's mission is to support EU policies with independent evidence throughout the whole policy cycle.

EU Science Hub
ec.europa.eu/jrc

@EU_ScienceHub

EU Science Hub - Joint Research Centre

Joint Research Centre

EU Science Hub

Publications Office

doi:10.2760/1702
ISBN 978-92-79-79363-9