THE DATA REVOLUTION IN NORTH AFRICA:

Putting data at the service of structural transformation

United Nations
Economic Commission for Africa

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Nations Unies
Commission économique pour l'Afrique

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Abbreviations

CNAS Caisse nationale des assurances sociales des travailleurs salariés (national social insurance authority of Algeria)
DQAF Data Quallity Assessment Framework (IMF)
ECA Economic Commission for Africa
ECOFIE Association for Economic Studies, Financial Analysis and Future-oriented Assessment (Tunisia)
FAO Food and Agriculture Organization of the United Nations
GDDS General Data Dissemination System
GDP gross domestic product
ICT information and communications technology
IDA International Development Association
IEAG Independent Expert Advisory Group on the Data Revolution for Sustainable Development (United Nations)
IMF International Monetary Fund
ISO International Organization for Standardization
ODIN Open Data Inventory
ODW Open Data Watch
OECD Organization for Economic Cooperation and Development
PARIS21 Partnership in Statistics for Development in the 21st Century
SDG Sustainable Development Goal
SNA United Nations System of National Accounts
SWOT strengths, weaknesses, opportunities, threats
UNESCO United Nations Educational, Scientific and Cultural Organization
UNFPA United Nations Population Fund
UNICEF United Nations Children's Fund
UNIDO United Nations Industrial Development Organization
WHO World Health Organization

Preface

The success of the 2030 Agenda for Sustainable Development (United Nations) and Agenda 2063 (African Union) depends, to a large extent, on the capacity of the countries of North Africa to define, plan and monitor public policies for sustainable development. Together with a number of goals and targets of both agendas, the monitoring and assessment of the impact and repercussions of appropriate policies necessitate, above all, the availability of a wide range of high-quality statistical data. There is a need for high-quality, disaggregated and up-to-date data, to ensure that the countries of North Africa have the wherewithal to identify priorities, make informed choices and implement better policies to support sustainable development. The chronic data shortages experienced by developing countries, however, coupled with a lack of incentives to close gaps in their technical and financial capacity, pose a major obstacle to the attainment of those goals.

All the countries in question have made a commitment to implement the 2030 Agenda for Sustainable Development and adopt all the goals relevant to their development. Furthermore, African countries, in addition to the 2030 Agenda for Sustainable Development, have adopted their own Agenda 2063, a beacon for the continent's inclusive and sustainable development. The availability of data on the targets and indicators of the Sustainable Development Goals is a challenge, since such data are derived from the national indicators framework adopted by each country of Northern Africa. The choice of targets and indicators should be based on national priorities as reflected in national development policies, plans and programmes.

The preliminary reports of fulfilment of the Sustainable Development Goals have been assessed in the light of the data available to the countries and international agencies. These data do not, however, reflect all the efforts by countries in the implementation of the 2030 Agenda for Sustainable Development and Agenda 2063. At the same time, the available information clearly shows that countries will have to be much more ambitious in their efforts to honour the commitment of their peoples and of the planet as a whole. This commitment also lies at the heart of the sustainable development agenda. North African countries will have to carry out far-reaching structural transformations and step up their international cooperation and multi-stakeholder engagement.

The present report, "Data revolution in North Africa: putting data at the service of structural transformation", reviews the current status of national statistical systems in the countries of North Africa. It then identifies the principal stakeholders in statistical systems, analyses the capacity of national statistical systems and identifies gaps and constraints faced by these countries in producing and using good quality data. In summary, the report presents not only a detailed analysis of legislative, institutional and technical constraints faced by the countries of North Africa, but also priority actions and practical solutions for policy-makers and stakeholders in regional and international cooperation, in order to put data at the service of development.

It also suggests the way forward for making the best use of the data revolution and bridging the data gap on sustainable development. In the countries of North Africa, national Governments should take the lead in identifying the needs of national statistical systems. In this context, cooperation, including regional cooperation, is an undeniable asset. To that end, an agreement on data should be adopted with the inclusion of all stakeholders: national authorities, development partners, private entities and civil society.

In order to meet the demands of the 2030 Agenda for Sustainable Development and Agenda 2063 in terms of quality and disaggregated data, the national statistical systems of North African countries must take ownership of the new technologies and expand their scope of action. They must, in particular, combine data from traditional sources, such as censuses, periodic surveys and administrative data, with other data from new sources, such as geospatial information. The rapid increase in the number of new data sources brought about by the digital revolution will create large-scale opportunities for innovative solutions and these must be integrated into the strengthened official data systems

and structures. The use of metadata (so-called "big data") to enhance the availability of data will enable countries to develop strategies for the effective application of information on the population as a whole. This technological innovation will make possible the effective structural transformation of economies, and create new strategic partnerships among national statistical institutes, the private sector, universities and civil society with a view to providing the good quality data needed for better monitoring of the two agendas.

Lastly, the report offers an opportunity to set forth the countries' current status in terms of their capacity to provide good quality data for development. Thus, improving the use of reliable data and statistics is of paramount importance for fulfilment of the vision of a better future for people and the planet, as set out in the 2030 Agenda for Sustainable Development adopted by world leaders at the September 2015 summit. We need better data to track progress and inform policy decisions at the local, national, regional and global levels.

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Introduction

1. Background

Statistical data are essential for the monitoring and evaluation of the progress of the United Nations 2030 Agenda for Sustainable Development and Agenda 2063 of the African Union. But it is not enough merely to produce more data; in order for them to be useful in economic policymaking and monitoring and evaluating the impact of these policies, and also to ensure accountability, these data must be of good quality and reliable. The celebration by the United Nations of its second World Statistics Day (in October 2015), under the slogan "Better data for a better life", highlighted the need for countries to have at their disposal good quality, up-to-date and disaggregated data to be able to identify problems and inform policy development in support of sustainable development. The design and implementation of comprehensive approaches in the area of statistical capacity development are essential, therefore, both for countries and development cooperation stakeholders.

Where North African countries are concerned, they have made efforts at both national and continental levels to strengthen the capacity of their national statistical systems. At the continental level, the principal such systems are the African Charter on Statistics and the strategy for the harmonization of statistics in Africa, adopted by the Assembly of Heads of State and Government of the African Union in Addis Ababa in 2009 and in Kampala in 2010, respectively. These two initiatives are reference frameworks for the coordination, production, dissemination and use of good quality statistics for Africa in general and for the countries of North Africa in particular. At the national level, some countries have made undertakings to design and implement national strategies for the development of statistics (Mauritania, Sudan). Alternatively, other countries have set themselves the task of developing long-term national development plans and carrying out reforms of the legal frameworks, legislation and policies governing statistical data (Algeria, Egypt, Morocco and Tunisia). National statistical systems in North Africa have made significant progress in the production and dissemination of statistics and the use of new technologies. This progress notwithstanding, the statistical requirements for the implementation of the 2030 Agenda for Sustainable Development and Agenda 2063 far exceed the available data. A vast range of data are needed for the evaluation of indicators, far exceeding the means and capacities of most countries. This lack of data also relates to developed countries, but to a lesser degree.

As things stand, some North African countries[1] do not collect data in a number of basic statistical areas, even though a framework for such is available (births, deaths, agriculture, trade and other areas) and even less so for sustainable development indicators (the 2030 Agenda and Agenda 2063), for which each country is called upon to provide a statistical background. All countries have data on poverty, but they face difficulties in generating data for intervals of less than five years or to do so in a timely manner. Countries also face challenges in collecting comprehensive data on civil registration. As a result, a large number of births and deaths in those countries are not registered. In all countries, data are lacking for almost two thirds of the 232 Sustainable Development Goal indicators, and most of the data provided are not up-to-date. Even when data are available, they are often not sufficiently disaggregated, thus rendering it impossible for policymakers to develop programmes or measures to monitor and compare the situations of different population groups. Some countries of the subregion have ratified laws or legislative and regulatory instruments on statistics that are fully consistent with the fundamental principles of official statistics of the United Nations (United Nations, 2005), while others have not yet done so. Ma-

1 The national statistical systems of North African countries vary from country to country. The purpose of the report is not to classify countries according to their performance, but:

- To identify constraints on the production of statistics;
- To assess, in a comprehensive manner, the availability of data;
- To assess the efforts made to organize statistical production.

jor institutional obstacles remain: the human, technical and financial resources allocated to official statistics are not commensurate with the needs.

The African Consensus on Data, which followed the high-level conference on the data revolution held in Addis Ababa in 2015, calls for key measures and actions that can be implemented by African countries, including North African countries, to remedy this data gap and strengthen the statistical capacity of their national statistical systems (ECA, 2015). The data revolution makes it possible for governments and national statistical offices to produce more useful data from new sources, tools and innovative technologies, which should complement and strengthen official statistics, and not be a substitute for them. New technologies and new methods for the collection of data, including geospatial data (by satellite imagery), telecommunications data and sensor data mean that the production of the data needed by policymakers for the formulation of development strategies is easier, faster and less costly (United Nations Global Pulse Initiative, 2012).

Some countries have already embarked on the data revolution with encouraging results. Egypt, Morocco and Tunisia, for example, have improved the efficiency and accuracy of their collection of census and survey data using tablets for the conduct of interviews. In Egypt, use is already being made of a geospatial database to map cultivated land. In Algeria, computer-assisted personal interviews are being used in surveys. For a number of countries, however – Libya, Mauritania and the Sudan – much remains to be done: these countries are facing challenges in their efforts to take systematic advantage of the data revolution. These include the lack of capacity, knowledge, opportunities and resources. Major challenges remain in all seven countries of the North African sub-region. These are obstructing efforts to leverage the data revolution and take full advantage of its transformative potential. Significant investments will be devoted to capacity-building in human resources, technology tools and platforms. Reforms of the legal framework, legislation and policies are also necessary to create the environments and governance structures needed for a better management of the dramatic increase in the volume, speed and variety of data.

The present report – "Data revolution in North Africa: putting data at the service of structural transformation" – is part of that process. It focuses on an assessment of the current status of the national statistical systems in North Africa and on the way forward for the creation of data systems that are able to give full effect to the transformative potential of the data revolution.

2. Objectives

The report provides an update on the current status of national statistical systems in six of the seven countries making up the North African sub-region. It does not include Libya, although a desk study was carried out on that country. It then identifies the principal stakeholders in statistical systems, analyses the capacity of national statistical systems and identifies gaps and constraints faced by these countries in producing and using good quality data. In summary, the report not only presents a detailed analysis of the legislative, institutional and technical constraints faced by the countries of North Africa, but also reviews the priority actions and practical solutions for policymakers and stakeholders engaged in regional and international cooperation, in order to put data at the service of development. The report has the following three objectives:

- To carry out an analysis of components and stakeholders of data systems and to review their capacity to produce reliable data on the Sustainable Development Goals and Agenda 2063;

- To identify the gaps and barriers that these stakeholders face;

- To draw up a road map, with specific measures that enable North African countries to take advantage of the data revolution and to strengthen their national statistical systems.

3. Methodology

The information required to prepare the report was principally drawn from three sources:

- Desk study: this took into account the work carried out on the data revolution in the world as a whole and in Africa in particular. Reports, strategic studies and papers on the national statistical systems of North African countries were also reviewed. This study made it possible to map the various data systems: the principal stakeholders, their relationships and their interaction with legislative, legal and policy frameworks governing statistics and the organizational frameworks of national statistical systems;
- Interviews with resource persons: these interviews were conducted with the use of questionnaires with officials responsible for statistics of the sectoral units of different ministries directly related to sustainable development and national statistical offices. The interviews were carried out during visits arranged to five countries: Egypt, Mauritania, Morocco, the Sudan and Tunisia. The questionnaires were designed to elicit the following information: first, mapping of data sources and availability of statistical information on the 2030 Agenda for Sustainable Development and Agenda 2063; second, identifying the remaining data gaps and areas that require further work. An important component of the questionnaires was its focus on evaluation of national statistical systems and the quality of the data produced and disseminated. The assessment was prepared using the European Statistics Code of Practice and the International Monetary Fund (IMF) Data Quality Assessment Framework;
- Ad hoc meeting of experts: this meeting was organized by the ECA Subregional Office for North Africa with experts from all countries in the subregion, to discuss and validate the results of the study, the interim report submitted by the consultants, and other development initiatives on the data revolution, presented by certain experts during the expert group meeting to enrich the final report of the study.

4. Structure of the report

This report is organized as follows.

Chapter 1 examines the readiness of the national statistical system in North Africa to provide basic data and to monitor fulfilment of the 2030 Agenda for Sustainable Development and Agenda 2063. Where data permit, the assessment is comparative in nature: the results of data availability in North African countries are evaluated by comparison with those of other countries. This section gives an overview of the capacity of North African countries to produce data on development. It also identifies the challenges that they face in ensuring comprehensive monitoring of progress in the implementation of the 2030 Agenda for Sustainable Development and Agenda 2063. It presents case studies, innovations and pilots of new, unconventional methodologies developed in the context of the data revolution, which have been adopted in African countries or other regions and in developed countries. Many of these pilots could be routinely applied in the countries of North Africa and help to meet the growing demand for data and to fill the current data gap.

Chapter 2 reviews the status of national statistical systems in North Africa and identifies obstacles to the compilation of good quality data. It presents the results of an assessment conducted among staff and managers of statistical production processes. The assessment focused on the qualitative aspects, first, of the management of statistical systems; second, basic statistical processes; and, third, statistical products. The assessment looked at six components: quality requirements (legal and institutional framework); integrity assurance; methodological consistency; accuracy and reliability; user-friendliness; and accessibility.

Chapter 3 proposes focused actions to take advantage of the data revolution and strengthen national statistical systems in the countries of North Africa. The main objectives of the data revolution where the Sustainable Development Goals and Agenda 2063 are concerned are dictated by the need to fill many gaps, a need which affects the entire production and data-use chain, relating to legal and regulatory instruments, governance, institutional framework, standards, availability of data,

methods to measure the core indicators, and coordination between the different stakeholders. The path taken by the data revolution in respect of the Sustainable Development Goals and Agenda 2063 suggests that, to be effective, any reform of the national statistical systems in North African countries must comprise two components: first, it must strengthen and invest in the national statistical system, which requires a political commitment to improved capacity-building in the area of statistics; and, second, it must develop regional and international support arrangements to produce comparable indicators at the regional and international levels. Each of these two components comprises three areas pivotal to the fundamental principles of statistics of the United Nations and the African Charter on Statistics: the enabling environment; the statistical production process; and the use and dissemination of data.

Chapter 1: Statistical data and structural transformation in North Africa

Section I: Availability of statistical data in North Africa: shortage of reliable data for monitoring the Sustainable Development Goals and Agenda 2063

Despite some improvements in the quantity of data available in the countries of North Africa (recent general population and housing censuses and periodic surveys), the constituent elements of national statistical systems remain inadequate. Data collection on such fundamental matters as births and deaths, economic growth and poverty, trade, agricultural operations, and also on the environment and security, remains inadequate to this day, a shortfall that is particularly acute in two of the six countries of the sub-region. This shortfall is manifested in the scarcity of data (infrequent conduct of surveys, limited sample sizes, insufficient number of sectors considered) and their poor quality, often resulting in substantial differences between different sources or methods.

I. Acute shortage of baseline data

Some North African countries[2] have problems collecting data frequently and efficiently. Generally, the countries of the sub-region have systems for the recording of civil registration and population data. They have continuing difficulty, however, with the updating of certain social indicators. Some demographic data are estimated, however, from demographic and health surveys, previous censuses and on the basis of population projections.

In some countries such as the Sudan, the use of outdated baseline years (such as 1981–1982) for national accounts and price statistics, coupled with the lack of data from recent censuses or surveys, limit their capacity to produce reliable economic statistics essential for measuring growth, productivity and poverty. In the Sudan, the baseline year, showing the structure of the economy (production sectors) and identifying the goods consumed, dates back to the 1980s. This baseline year does not include production sectors that have emerged since that date or changes in consumption patterns, and is likely to lead to an underestimation of real wealth produced (the new sectors are not taken into account) and an underestimation of growth.

Table 1 identifies the countries that have conducted at least one survey or a census since 2000 across five meaningful social and economic categories: population; expenses and living standards of households; structure of the agricultural sector and land ownership; labour force; and informal sector (Mo Ibrahim Foundation, 2016). Apart from Libya, all the North African countries have conducted a population census in the last 10 years. In addition, three countries – Algeria, Egypt and Morocco – have carried out censuses on agriculture since 2000.[3] This is particularly noteworthy given the importance of the agricultural sector in national production and job creation. In almost all the countries of North Africa, the methodology used to compile the agricultural sector accounts (accounting in employment agencies and supply and use tables) is based on the statistical sources that have been developed. In addition to administrative statistics, agricultural ministries also publish the results of

2 The national statistical systems of North African countries vary from country to country. The purpose of the report is not to classify countries according to their performance, but:

- To identify constraints on the production of statistics;
- To assess, in a comprehensive manner, the availability of data;
- To assess the efforts made to organize statistical production.

3 In Tunisia, the first census on agriculture will be conducted during the period 2018–2020.

Box 1 : Benefits of civil registration

Civil registration and vital statistics are essential public goods which have major benefits for individuals and States

1. Benefits for governments

A comprehensive system of civil status registration is conducive to respect for civil rights and facilitates access to public services. It contributes to the process of establishing the legal identity of individuals and legal relations between individuals and the State, and also the relationship between the individuals themselves. A comprehensive civil registration system helps individuals to assert their right to public services such as education, health and financial allocations. It enables individuals to gain access to financial services (opening bank accounts) and the labour market, to purchase property or exercise inheritance rights, to participate in elections, and other actions (World Bank/WHO, 2014).

2. Benefits for governments

At least three benefits for governments may be listed:

2.1 Strengthening governance and public administration: civil registration enables the State to formulate policies and programmes, to deliver services to the population, and effectively to plan their current and future needs. Where health is concerned, for example, reliable statistics on trends in mortality and cause of death make it possible to identify threats to public health and the groups most at risk. A comprehensive civil registration system enables policymakers to determine the nature and location of necessary action and to map the provision of necessary resources.

2.2 An accurate analysis of demographic dynamics: vital statistics have clear advantages compared to the data produced by surveys. They help in the preparation of periodic estimates of births and deaths at the various levels: national, subnational and regional. These estimates are essential to an understanding of the dynamics of population growth, socioeconomic development and the use of insurance services and social security. They also make it possible to make reliable demographic projections.

2.3 Improving the effectiveness of electoral processes: civil registration systems provide exhaustive and up-to-date lists of those eligible to vote in the different ballots. Electoral rolls that are not based on civil status registration are unreliable and encroach on the democratic nature of the elections.

3. Benefit for the monitoring of the Sustainable Development Goals

Civil registration systems are the most reliable source of data for monitoring progress towards attainment of the Sustainable Development Goals. A comprehensive system makes available the accurate data needed to measure indicators relating to universal primary education, the reduction of child mortality, the improvement of maternal health, and the reduction of HIV infections, malaria and other diseases, social inequalities and geographical and gender inequalities.

statistical surveys on crop production, prices and livestock numbers.

Only Morocco and Tunisia are using the 2008 United Nations System of National Accounts (2008 SNA). For its part, Mauritania has just migrated to the 2008 SNA and the initial results of its national accounts were submitted to other entities in the national statistical system in October 2018. The other countries are still using the 1993 System of National Accounts, or that of 1968 (Sudan). This calls into question the comparability of their growth rates. The published gross domestic product (GDP) figures are often an extrapolation based on the previous year's total. Assumptions (hydrocarbon prices, commodity prices, and others) are used to evaluate GDP. Accordingly, growth figures should be further considered as growth assumptions rather than observed quantities.

Five countries – Egypt, Mauritania, Morocco, the Sudan and Tunisia – have conducted at least two surveys on poverty (or household surveys) over the past 10 years. For some countries, however, including Mauritania and the Sudan, the survey results are not comparable, in terms of their methodology. Trends in poverty and inequality levels remain largely unknown.

Table 1: Availability of baseline data in North African countries

Area	Collection methods	Laws in North African countries
Civil registration	Vital statistics; censuses; surveys	Countries have in place a comprehensive civil registration system, carried out at or limited to specific levels of administration
Population	Censuses	Except for Libya, all the countries have undertaken a census over the past ten years
Poverty and inequality	Household surveys	In Mauritania and the Sudan, the surveys are not comparable in terms of methodology
Economic growth	National accounts; administrative data	Only Morocco and Tunisia are using the 2008 SNA
Agriculture	Censuses	Only Algeria, Egypt and Morocco carry out agricultural censuses
Employment	Surveys	Only Algeria, Egypt, Morocco and Tunisia carry out employment surveys

II. Major challenges encountered in reporting on Agenda 2063 and the 2030 Agenda

The Sustainable Development Goals and Agenda 2063 are severely testing the national statistical systems of North African countries. All the countries lack data for a number of the indicators and are encountering major difficulties. Significant methodological and strategic challenges remain, including the need to reconcile the production of data necessary for monitoring regional and global goals and the production data needed for public purposes at the national level.

The 2030 Agenda for Sustainable Development and Agenda 2063 require a large amount of data for monitoring purposes. The 2030 Agenda includes 17 goals and 169 targets, broken down into 232 indicators. Agenda 2063 includes 20 goals and 174 targets. The first implementation plan for Agenda 2063, developed by the African Union Commission for the period 2014–2023, identifies 63 key indicators, 40 of which are identical to the Sustainable Development Goal indicators (ECA/African Development Bank, 2017).

II-1. Lack of reliable data for monitoring the Sustainable Development Goals and Agenda 2063

Through the mapping of data availability relevant information can be provided for an analysis and understanding of the current capacities of North African countries to produce reliable indicators on the Sustainable Development Goals and Agenda 2063. It is also important that there should be good quality data relating to the indicator design, definitions and methodologies. In addition, these data must be collected on a regular basis and be susceptible to disaggregation by age, sex, location, income, ethnic background, migratory status and disability, in order to respond appropriately to the fundamental principle of the Sustainable Development Goals that no one shall be left behind. The availability of data for monitoring the two agendas in North Africa represents a challenge. In addition, of the data needed to track the progress of the Sustainable Development Goals, 46 per cent are collected in Algeria, 43 per cent in Egypt, 48 per cent in Morocco, 35 per cent in the Sudan and 38.5 per cent in Tunisia.

Surveys on the availability of Sustainable Development Goal indicators must be approached with caution, because the indicators and data have not yet been clearly defined. Many of the data-producing services have been consulted on the 232 indicators for monitoring the Sustainable Development Goals included in the September 2017 list.

Figure 1: Sustainable Development Goals and Agenda 2063

AGENDA 2030 GOAL	AGENDA 2063 GOALS
1 NO POVERTY	1. A high standard of living, quality of life and well-being for all 5. Modern agriculture for increased productivity and production 7. Environmentally sustainable climate resilient economies and communities 17. Full gender equality in all spheres of life
2 ZERO HUNGER	1. A high standard of living, quality of life and well-being for all 3. Healthy and well-nourished citizens 4. Transformed economies and job creation 5. Modern agriculture for increased productivity and production 7. Environmentally sustainable climate resilient economies and communities 8. United Africa (Federal or Confederate)
3 GOOD HEALTH AND WELL-BEING	3. Healthy and well-nourished citizens 7. Environmentally sustainable climate resilient economies and communities 17. Full gender equality in all spheres of life
4 QUALITY EDUCATION	1. A high standard of living, quality of life and well-being for all 2. Well educated citizens and skills revolution underpinned by science, technology and innovation 16. African cultural renaissance is pre-eminent 17. Full gender equality in all spheres of life 18. Engaged and empowered youth and children
5 GENDER EQUALITY	3. Healthy and well-nourished citizens 5. Modern agriculture for increased productivity and production 10. World class infrastructure crisscrosses Africa 17. Full gender equality in all spheres of life
6 CLEAN WATER AND SANITATION	1. A high standard of living, quality of life and well-being for all 7. Environmentally sustainable climate resilient economies and communities
7 AFFORDABLE AND CLEAN ENERGY	1. A high standard of living, quality of life and well-being for all 6. Blue/ ocean economy for accelerated economic growth 7. Environmentally sustainable climate resilient economies and communities 10. World class infrastructure crisscrosses Africa
8 DECENT WORK AND ECONOMIC GROWTH	1. A high standard of living, quality of life and well-being for all 2. Transformed economies and job creation 12. Capable institutions and transformed leadership in place at all levels 16. African cultural renaissance is pre-eminent 17. Full gender equality in all spheres of life 18. Engaged and empowered youth and children
9 INDUSTRY, INNOVATION AND INFRASTRUCTURE	1. A high standard of living, quality of life and well-being for all 4. Transformed economies and job creation 5. Modern agriculture for increased productivity and production 6. Blue/ ocean economy for accelerated economic growth 8. United Africa (federal or confederate) 10. World class infrastructure crisscrosses Africa 19. Africa as a major partner in global affairs and peaceful co-existence
10 REDUCED INEQUALITIES	1. A high standard of living, quality of life and well-being for all 8. United Africa (federal or confederate) 16. African cultural renaissance is pre-eminent 20. Africa takes full responsibility for financing her development
11 SUSTAINABLE CITIES AND COMMUNITIES	1. A high standard of living, quality of life and well-being for all 7. Environmentally sustainable climate resilient economies and communities 10. World class infrastructure crisscrosses Africa 12. Capable institutions and transformed leadership in place at all levels 16. African cultural renaissance is pre-eminent
12 RESPONSIBLE CONSUMPTION AND PRODUCTION	1. A high standard of living, quality of life and well-being for all 4. Transformed economies and job creation 5. Modern agriculture for increased productivity and production 7. Environmentally sustainable climate resilient economies and communities 12. Capable institutions and transformed leadership in place at all levels 16. African cultural renaissance is pre-eminent
13 CLIMATE ACTION	5. Modern agriculture for increased productivity and production 7. Environmentally sustainable climate resilient economies and communities 12. Capable institutions and transformed leadership in place at all levels
14 LIFE BELOW WATER	4. Transformed economies and job creation 6. Blue/ ocean economy for accelerated economic growth 7. Environmentally sustainable climate resilient economies and communities
15 LIFE ON LAND	7. Environmentally sustainable climate resilient economies and communities
16 PEACE, JUSTICE AND STRONG INSTITUTIONS	11. Democratic values, practices, universal principles of human rights, justice and the rule of law entrenched 12. Capable institutions and transformed leadership in place at all levels 13. Peace, security and stability are preserve 17. Full gender equality in all spheres of life 18. Engaged and empowered youth and children
17 PARTNERSHIPS FOR THE GOALS	1. A high standard of living, quality of life and well-being for all 4. Transformed economies and job creation 10. World class infrastructure crisscrosses Africa 12. Capable institutions and transformed leadership in place at all levels 19. Africa as a major partner in global affairs and peaceful co-existence 20. Africa takes full responsibility for financing her development

The indicators are varying in nature. They take the form of ratios, annual averages, count or the status of legislation. Some indicators do not even lie within the field of statistics, relating more to the implementation of public policies. In these cases the indicator is merely binary (the answer "yes" or

Box 2: Assessing the preparedness of the statistical systems of North African countries to monitor the Sustainable Development Goals and Agenda 2063

For the purpose of assessing the readiness of North African countries in terms of monitoring the Sustainable Development Goals and Agenda 2063, questionnaires were circulated to the officials responsible for statistics in various ministries and to national statistical offices involved in the production of development data. These questionnaires relate to sustainable development. Their aims are, first, to map data sources and the availability of statistical information; and, second, to identify gaps and areas that require further work. The questionnaire for the mapping of data on the two programmes was specifically designed to identify the availability and frequency of data. Where data are available, additional information, such as the periodicity of data collection and their disaggregation by individual characteristics (age, sex, location, income, ethnic background, migratory status and disability) have been collected. The idea is to examine whether the data-collection system can ensure an adequate response to the fundamental principle of the Sustainable Development Goals, that no one shall be left behind.

With regard to the information that is collected, the interpretation of the results poses certain problems: in some cases, the staff of the statistical office have failed to provide any information because they are unfamiliar with the data customarily produced by administrations or agencies other than their own. In other cases, the indicators of the 2030 Agenda for Sustainable Development had not yet been fully defined, hence rendering it difficult for national respondents to identify the national data required for monitoring purposes (for example, indicator 1.a.1: Proportion of domestically generated resources allocated by the government directly to poverty reduction programmes; or indicator 8.9.2: Proportion of jobs in sustainable tourism industries out of total tourism jobs). The assessment also revealed uncertainty among national respondents regarding the availability of the data required to produce indicators. Some officials responded that they did not know if certain data were being produced in their countries. For example, some respondents did not know whether the data needed for global indicator 3.9.1 (mortality rate attributed to household and ambient air pollution) and indicator 3.9.2 (mortality rate attributed to unsafe water, unsafe sanitation and lack of hygiene) should be collected, because they could be gathered through independent research initiatives unconnected with official statistical institutions.

"no") and describes the situation in the country under the public policy or legislation concerned. These cannot therefore be the responsibility of the national statistical institutes, which, at best, are collectors of statistical data.

Of the 232 indicators, 37 are considered to be non-statistical. Thus, Sustainable Development Goal 1: "End poverty in all its forms everywhere", includes an indicator which is non-statistical in nature. This applies to the question whether countries have implemented policies, strategies or plans to combat the risks of natural disasters, as illustrated by indicator 1.5.3: Number of countries that adopt and implement national disaster risk reduction strategies in line with the Sendai Framework for Disaster Risk Reduction 2015–2030.

The goals for which most indicators are available relate to very familiar issues which have been carefully studied by the statistical services, such as those of labour, economic growth, education and health. Goal 8, "Decent work and economic growth", for example, includes, out of its 17 indicators, 14 that are available for Algeria, 13 for Egypt, 12 for Morocco and 10 for Tunisia. Conversely, the

Box 3: Statistical indicators vs. non-statistical indicators

The **available statistical indicators** are produced and disseminated at the national level. The indicators are collected and compiled by national statistical offices and the statistics departments of various ministries.

The **statistical indicators that are not available** have not been collected for several reasons:

– Indicators that cannot be calculated because the data needed for their elaboration are either not available or too complex;

– Indicators that are currently not produced but which could be produced taken in the near, medium and long-term. They still need to be clearly defined (such as indicator 11.7.1: Average share of the built-up area of cities that is open space for public use for all, by sex, age and persons with disabilities);

Non-statistical indicators are not related to statistics so much as to the implementation of public policies (for example, indicator 10.7.2: Number of countries with migration policies that facilitate orderly, safe, regular and responsible migration and mobility of people).

Figure 2: Availability of Sustainable Development Goal indicators in Tunisia

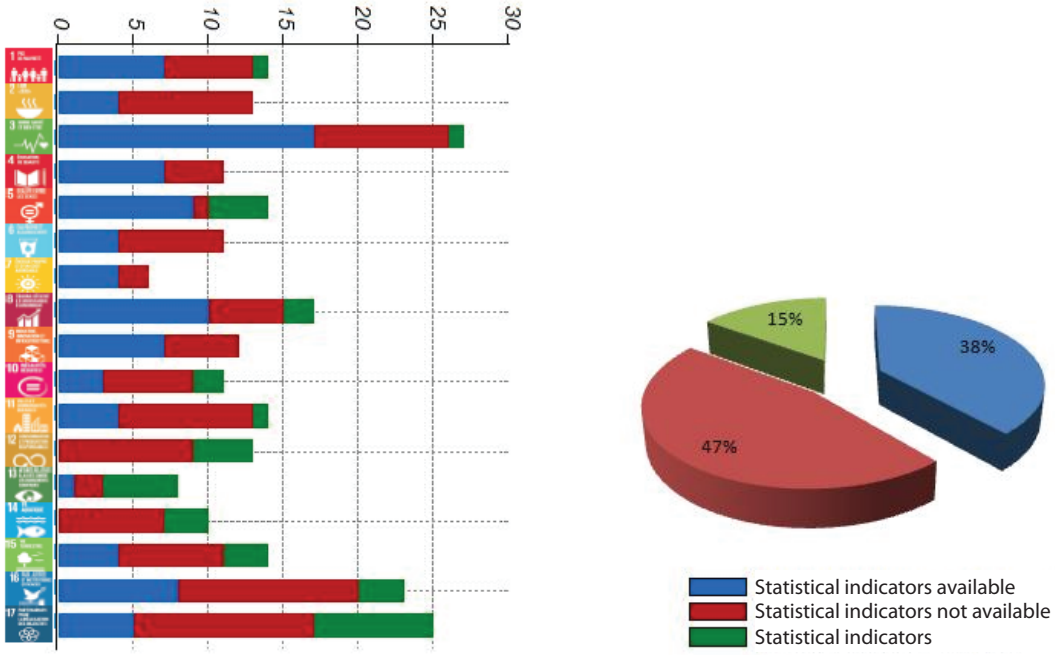
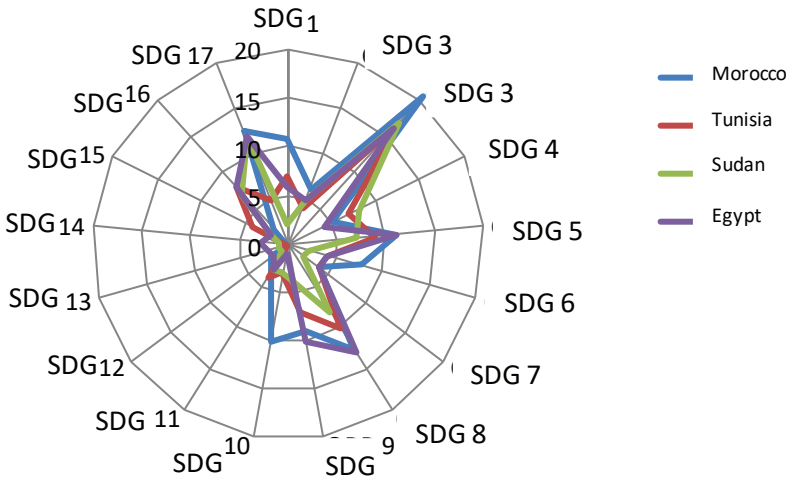


Figure 3: Availability of indicators for each of the Sustainable Development Goals



Box 4: Availability of indicators according to the United Nations categorization system

Availability of indicators according to the United Nations categorization system

At the international level, the Sustainable Development Goal indicators are grouped into three tiers:

Tier I: Indicator is conceptually clear, has an internationally established methodology and standards are available, and data are regularly produced by countries;

Tier II: Indicator is conceptually clear, has an internationally established methodology and standards are available, but data are not regularly produced by countries;

Tier III: No internationally established methodology or standards are yet available for the indicator, but methodology or standards are being (or will be) developed or tested.

objective for which the indicators are relatively less available often refer to more innovative issues or those which are more difficult to explore, such as biodiversity, peace and justice. This is the case of Goal 14: "Aquatic life", of whose 10 indicators none are available for Tunisia; three for Egypt and none for Morocco.

In addition to the lack of data needed for monitoring the Sustainable Development Goals, the available data are fragmented, outdated and sometimes inappropriate and, for that reason, difficult to compare. For some indicators, data are only available for a single year.

II-2. Difficulties in the provision of disaggregated indicators

The 2030 Agenda for Sustainable Development envisions a world where human rights and gender equality are respected, a world free of discrimination. The messages conveyed by the Sustainable Development Goals are that no one will be left behind; that targets are met for all nations and peoples and for all segments of society; and that the furthest behind shall be the first to be reached.

A review of the data available in North Africa shows that five out of the seven countries are able to produce indicators on Goals 1 (no poverty), 3 (good health and well-being) and 4 (quality education). These could be broken down by individual characteristics, such as gender, age and residence (urban or rural). At the same time, however, no country has data disaggregated by wealth, income, ethnicity, migration status or disability. For example, in Tunisia, 29 per cent of the available data on the three above-mentioned goals can be disaggregated by sex, and 22 and 13 per cent, respectively, by place of residence and age.

In some cases, national standards for the collection of administrative data may differ. The educational census forms, for example, indicate that almost all the countries collect data on schoolchildren disaggregated by urban vs. rural residence and sex. Only very few countries, however, collect data on vulnerable children or children with disabilities (Algeria, Morocco and Tunisia); other population groups (nomadic populations and displaced persons) are entirely absent from most national statistics (notably in Mauritania and the Sudan).

II-3. Precautionary approach to the review of data on the Sustainable Development Goals

The statistical information needed to calculate the Sustainable Development Goals indicators published by national statistical offices derives from surveys, censuses, administrative data and accounting data. In view of the different data-collection procedures, the frequency of surveys and the collection methodologies used, the results must be approached with considerable caution. The following examples, which are far from exhaustive, offer an overview of the uncertainties and nuances relating to the preparation of these indicators.

The poverty rates posted by official statistical authorities are in fact estimates. They also have margins of error resulting from the manner in which they have been calculated. In fact, the poverty rate is generally based on household budget and consumption surveys (conducted by national statistical offices). The results are sometimes compared to administrative sources. The problem is particularly acute for countries whose surveys are less frequent and where the poverty rate estimates are of necessity based on assumptions.

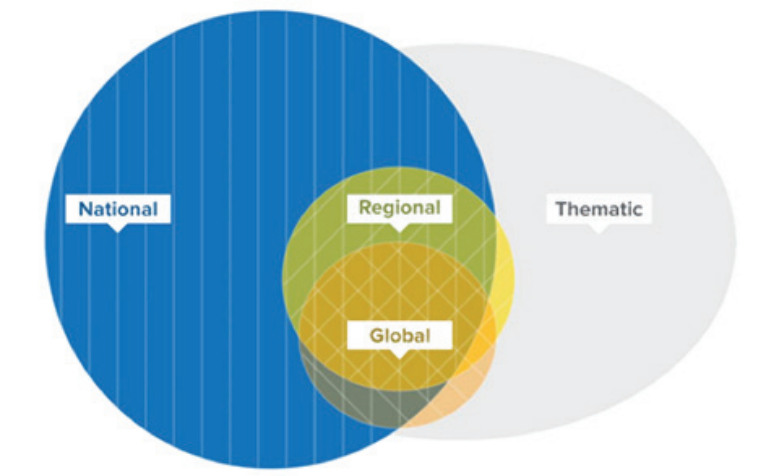
In the countries of North Africa, only Egypt, Mauritania, Morocco and Tunisia have data available from surveys on household consumption expenditure over the period 2014–2018. In Algeria, current estimates of poverty rates are based on a 2011 survey. This means that the figure of 320,000 persons (0.8 per cent of the population) living below the threshold of $1.25 per day (extreme poverty), as stated in the most recent official estimate of poverty, was estimated from an earlier survey.

Another major problem identified in calculating the poverty rate is the omission from household surveys of several categories of people: the homeless; people housed in charitable institutions (the disabled, older persons, and others); and mobile populations without fixed abode, such as nomadic and pastoral population groups, are not identified in the composition of household samples (this ap-

Box 5: Four tiers of Sustainable Development Goal monitoring

The synthesis report of the Secretary-General on the post-2015 agenda (UNSG 2015) recommends that consideration be given to four tiers of Sustainable Development Goal monitoring: national, regional, thematic and global, each serving a different purpose and including a number of indicators that vary accordingly..

Four tiers of Sustainable Development Goal monitoring



National tier monitoring: Each country shall decide on the number and nature of national indicators, which might not be comparable at the international level. National data offer better opportunities to inform policy decisions by a review of the differences between the sub-regions, disadvantaged groups specific to the various countries and other areas of importance for national and local policies. Thus, the national indicator frameworks take better account of local contexts. A limited set of global monitoring indicators will also be incorporated in national monitoring efforts. Although these could be drawn from official data sources, countries may also decide to include unofficial data among their national indicators.	**Regional tier monitoring**: This provides a platform for the sharing of knowledge, peer review and mutual learning between regions. It constitutes a set of indicators that can help to take into account priorities and issues of common concern (shared among the countries of a particular region). Some frameworks specifically aim to monitor the Sustainable Development Goals as part of a regional policy. This is the case with the set of Sustainable Development Goal indicators employed by the European Union, which comprises 100 indicators for monitoring the 17 Goals. In a different vein, the African Union has developed an ambitious set of development goals for the region in the framework of its Agenda 2063: The Africa We Want. This Agenda aligns the targets and indicators of its regional framework with the frameworks of the Sustainable Development Goals, but includes other indicators specific to the region (African Union, 2015).	**Global tier monitoring:** This is based on a more restricted group of indicators harmonized with common international standards and carefully selected to provide an overview of progress towards attainment of each of the targets. These indicators are primarily identified from official data and applicable to all countries, but some cover only a subset of countries (malaria is not relevant to temperate countries and landlocked countries do not collect ocean data).	**Thematic tier monitoring**: This adds a level of monitoring of comparable indicators in a specific sector (for example, education, environment, energy and health) or on a cross-cutting issue (such as gender). The thematic indicators provide a framework for monitoring progress on a comparable basis to that at the transnational level, and provide a more detailed overview of sectoral priorities than that available from the global tracking framework.

Sources: Indicators and a Monitoring Framework for the Sustainable Development Goals: Launching a data revolution for the SDGs, 2015 (A report to the Secretary-General of the United Nations by the Leadership Council of the Sustainable Development Solutions Network; Guido Schmidt-Traub, Eve de la Mothe Karoubi, and Jessica Espey).

plies in particular to Algeria, Mauritania and the Sudan). In practice, household surveys also take no account of people living in urban slums (owing to the difficulty faced in identifying and interviewing them) and hazardous areas. In other words, the very populations that the Sustainable Development Goals aim to reach – in ensuring that no one is left behind – are not covered by the surveys.

Uncertainties relating to infant mortality: All the countries of North Africa have comprehensive civil registration systems, but their registers of births and deaths are not complete. Accordingly, data on infant mortality are problematic, as they are generally based on household surveys, such as the Multiple Indicator Cluster Survey of the United Nations Children's Fund (UNICEF). In a number of cases, the information on births and deaths collected by these surveys is incomplete. They leave aside the full background history of births. Estimates of infant mortality are therefore based on assumptions.

Maternal mortality, a challenge to be surmounted: In the countries of North Africa, much remains to be done in the area of maternal mortality. In some of those countries, it is difficult to measure the number of women who die every year as a result of obstetric complications during pregnancy or childbirth, or during a period of 42 days after delivery, or during delivery. In theory, these data could be obtained from hospital records but, in North African countries, many women are dying outside hospitals. This leaves household surveys the task of estimating maternal mortality.

The use of surveys for this purpose, however, is problematic. The sensitivity of maternal mortality could persuade family members to withhold the cause of death in their responses to the questionnaires. More generally, maternal mortality is a relatively rare occurrence, measured per 100,000 live births, as compared to the infant mortality rate, which is measured per 1,000 births. A household survey would probably uncover few respondents who had experienced a maternal death in their household or who had a brother or sister that had died from pregnancy-related causes. Thus, the margin of error associated with estimates of maternal mortality is very high. For most of the countries of North Africa, maternal mortality is estimated on the basis of that model.

Table 3 shows the trends in estimates of the maternal mortality rate for the seven North African countries in 2015. In Mauritania, the maternal mortality rate for 2015 is estimated at 602, but the confidence interval suggests that the true value may be between 516 and 1,377. If the real number of maternal deaths lay near the lower limit of the confidence interval in 1990 but on the upper limit in 2015, it could mean that the number of maternal deaths had increased over that period. The wide margins of error place in doubt not only the maternal mortality rates but also the associated trends.

Table 2: Maternal mortality rates by country, changes between 1990 and 2015

	Maternal mortality rates (MMR)						Average annual change in MMR 1990–2015	Uncertainty interval in the annual change in MMR	
	1990	1995	2000	2005	2010	2015		Lower estimate	Upper estimate
Algeria	216	192	170	148	147	140	1.8	-0.8	3.5
Egypt	106	83	63	52	40	33	4.7	3.8	5.9
Libya	39	25	17	11	9	9	5.7	2.8	8.8
Morocco	317	257	221	190	153	121	3.8	2.7	5.1
Mauritania	859	824	813	750	723	602	1.4	-1.2	3.2
Sudan	744	648	544	440	349	311	3.5	2.0	5.4
Tunisia	131	112	84	74	67	62	3.0	1.4	4.3

Source: Trends in Maternal Mortality: 1990 to 2015 Estimates by WHO, UNICEF, UNFPA, World Bank Group and the United Nations Population Division.

Box 6: Statistical reliability of administrative data for monitoring the Sustainable Development Goals

Administrative data are data collected by a broad range of public institutions. They form a heterogeneous set of data that most often measure immediate or intermediate results, such as the number of doctors per patient in a hospital or a region, the number of jobs created by a ministry following the granting of a subsidy or the number of students per subject area.

Administrative data are characterized by their high volume, and by the likelihood that they are kept and managed in a decentralized manner, in multiple sectoral offices or agencies. In some North African countries, the production of these statistics is governed by agreements between the national statistical office and these offices or agencies, thereby ensuring the production of statistical indicators of good quality.

The following example illustrates the complementary relationship between official statistics and administrative data.

Example: data from administrative sources produced by various departments are collected by national statistical offices. They relate to the full range of socioeconomic and environmental sectors. They are processed, verified and made available to users, including in response to general needs and also those of national accounts in particular. The use of such data sources, the timing of the submission of some of these data and their quality sometimes pose problems. Problems relating to content (units concerned, concepts, definitions, classifications, scope, periodicity, accessibility in terms of background materials and location) are also identified.

Source: Studies by consultants.

Section II: Using the data revolution to close the gap in statistical information

I. Definition of "data revolution"[4]

The United Nations Independent Expert Advisory Group on a Data Revolution for Sustainable Development defines the data revolution as an "explosion in the volume of data, the speed with which data are produced, the number of producers of data, dissemination of data, and the range of things on which there is data, coming from new technologies such as mobile phones and the 'internet of things', and from other sources, such as qualitative data, citizen-generated data and perceptions data". It reflects a growing demand for data from all parts of society. For the Advisory Group, the data revolution for sustainable development is "the integration of these new data with traditional data to produce high-quality information that is more detailed, timely and relevant for many purposes and users, especially to foster and monitor sustainable development". It responds to "the increase in the usefulness of data through a much greater degree of openness and transparency, avoiding invasion of privacy and abuse of human rights from misuse of data on individuals and groups, and minimizing inequality in production, access to and use of data". Ultimately, it extends to "more empowered people, better policies, better decisions and greater participation and accountability, leading to better outcomes for people and the planet".

The involvement of a wide range of data user communities, and of data sources, tools and innovative technologies in data, for the production of disaggregated data will be conducive to decision-making, service delivery and citizen engagement; and information empowering Africa to take ownership of its own story. It is a partnership that brings together all the data communities and upholds the principles of official statistics, and also openness across the data value chain, to create a vibrant data system that produces timely, user-driven and disaggregated data for public good and inclusive development. (*A World That Counts: Mobilising the Data Revolution for Sustainable Development,* the Independent Expert Advisory Group on a Data Revolution for Sustainable Development, 2014).

The key actions called for by the Africa Data Consensus in support of the data revolution and for the effective monitoring of implementation of the 2030 Agenda for Sustainable Development and

4 (A World That Counts: Mobilising the Data Revolution for Sustainable Development, the Independent Expert Advisory Group on a Data Revolution for Sustainable Development, 2014).

Agenda 2063 in African countries may be set out as follows:

- "Create an inclusive data ecosystem involving government, private sector, academia, civil society, local communities and development partners that tackles the informational aspects of development decision-making in a coordinated way. Governments must play a proactive role in engaging this community and other stakeholders should prioritize partnership with government;

- "As a critical first step to strengthening the data ecosystem, review the capacity needs, legal and financial frameworks, participating institutions, data assets and gaps at national, subnational and community levels to recognize the roles of the various stakeholders and create a workable roadmap with clear milestones;

- "Governments should take the lead in ensuring that the recurrent costs of production and dissemination of all required data is financed from sustainable domestic resources;

- "Existing national strategies for the development of statistics should be revised to become more inclusive of all data communities;

- "Governments should identify a body authorized to provide credentials to data communities providing open data, based on established criteria for quality, reliability, timeliness and relevance to statistical information needs;

- "The development of civil registration systems that produce credible vital statistics must be a cornerstone of the data revolution. Similarly, population, economic, labour, health, education, land and agricultural management information systems should be supported to ensure timely and accurate data to drive decision-making at national and subnational level;

- "Public-private partnerships should be adopted, fostered and strengthened as a strategy for knowledge transfer and to promote sustainable collaborations;

- "All international norms and standards relating to official statistics should, where applicable, be extended to all data so as to improve their validity and credibility;

- "Innovative, integrated methodologies and technologies, including geospatial referencing, should be promoted to improve data collection, analysis and usage;

- "Integrate gender statistics and gender specific indicators in monitoring and evaluation;

- "The pan-Africanist institutions (African Development Bank, African Union Commission and ECA) should take the lead in the realization of the Data Consensus, in partnership with other development partners" (Economic Commission for Africa, African Union, African Development Bank and United Nations Development Programme, *Africa Sustainable Development Report: Tracking Progress in the Implementation of Agenda 2063 and the Sustainable Development Goals*, 2017).

II. Data revolution: a tool for development

II-1. Closing the gap in development data

The data revolution affects all phases of the statistical process, from data collection to analysis and dissemination of results. In some countries, new applications and new technologies have been adopted to improve the reliability of conventional data collection sources, such as censuses, surveys and registers of births and deaths. In others, by contrast, new sources are being used for the generation and collection of data or new platforms for the provision or sharing of data (World Bank, 2016).

Box 7: Principles of the Africa Data Consensus (ECA, 2015)

- "Data must be disaggregated to the lowest levels of administration by gender, age, income, disability, and other categories;
- "People must be counted to make them count. Civil registration should be accessible and provided at no cost;
- "Official data belong to the people and should be open to all. They should be open by default;
- "The data community should embrace the Fundamental Principles of Official Statistics as a starting point;
- "There is a need for governance and coordination of the data ecosystem;
- "African governments should acknowledge open data provided by credentialed data communities as acceptable sources of country statistical information;
- "Technology, new forms of data and other innovations should be actively embraced;
- "Data communities should promote a demand-driven data user culture spanning the entire ecosystem;
- "Privacy and intellectual property rights should be respected;
- "Data should be translated into information that is simple, understandable and relevant;
- "Information must be timely, accurate, relevant and accessible;
- "Data must be driven by needs rather than for its own sake;
- "The data revolution in all its facets should be gender-sensitive."

Source: Studies by consultants.

Surveys, censuses and the collection of administrative data are, without any question, the main sources for the production of statistical information. More reliable estimates of population, farming operations, businesses, employment and other variables require, however, the further refinement of the methodologies, classifications and sampling methods, to ensure that the data are accurate and consistent. The data revolution and related technologies provide the necessary tools to improve these traditional data sources (box 8)

Some countries have used the data revolution for sustainable development by making use of information held by the private sector or non-profit organizations. Stakeholders in the national statistical system (national statistical offices and sectoral departments) are developing partnerships with these organizations for profit-making and non-profit purposes. These partnerships can help in reducing the costs of data collection and in making comprehensive and accurate data available. This involves the use of "metadata" (big data), in which vast quantities of complex data may be selected and analysed for results (United Nations, 2012). Social media, detailed records of telephone calls, sensors, Internet pages and satellite imagery all represent new sources of information which have the potential to produce more data, which are more diverse and more accurate and to produce it faster (in fulfilment of the four Vs of big data: volume, velocity, veracity and variety).

Box 8 reviews case studies conducted in selected countries which North African countries may adapt to close the persistent deficit data gap and to be able to generate and use good quality data for sustainable development (ECA, 2017)

II.2. Reducing production and data collection costs

The use of non-traditional data sources can help national statistical systems to save resources, through the sharing of data and the lack of investment costs for data management infrastructure. "For example, if we assume a survey programme of six surveys in a given 10-year period and about 13,000 households per survey (using an East-African country), traditional paper questionnaires and processing are estimated to cost about $1.8 million per 10-year cycle. Such surveys require multiple steps, including reproducing the questionnaire, providing and supervising data entry personnel and machines at a central location, transporting the questionnaire, and running regular data edits. The same survey using Android mobile technology and free data processing software could cut data

Box 8 : New sources of data collection and statistical systems

The following experiences show how new data sources and related technologies may, first, improve traditional data management systems and, second, generate and make use of large volumes of statistical information.

Improving traditional data management methods

1. New technologies can be used to improve survey methodologies.

In Kenya, Nigeria and the United Republic of Tanzania, large geospatial databases are used to capture data on such issues as stunting, literacy and access to contraceptives. As many categories of social and health data are correlated with physical phenomena, such as elevation, land use and distance to roads and schools, it was possible to use geospatial data in conjunction with other conventional data sources (surveys and censuses) to determine the social and health conditions of communities that had not been taken into consideration when the samples were constituted, thus ensuring that these groups were not left behind. "Big data and the well-being of women and girls" (Data2X, 2017).

2. New technologies may be used to improve survey and census data collection.

In the national panel survey conducted in Uganda in 2011/12, the rural socioeconomic survey in Ethiopia in 2013/14 and the community survey in South Africa in 2016, personal interviews were conducted with the use of computer devices, such as tablets and notebook computers, in order to improve the efficiency and accuracy of the collection of census and survey data.

3. New technologies may be used to improve the reliability of administrative data.

The national statistical institute of South Africa (Statistics South Africa) uses detailed data gathered from scanners and provided by retail chains to calculate the consumer price index (GWG, 2017a).

The World Bank Group is working in partnership with the Government of Colombia to assess the use of detailed telephone call records to measure income and inequality.

4. New technologies may improve civil registration

The Government of Uganda, with the support of UNICEF and Uganda Telecom, has piloted the use of mobile phones for birth registration through an application called Mobile VRS. The system can be summed up by the following chain: a mother reports a birth to

Innovative use of metadata

1. Sensor data and geospatial data: use of satellite photos (geospatial data) for the estimation of poverty levels

Poverty levels are typically derived from household surveys. These are held every five years and cover only a small sample of the population. To overcome these limitations, some statistical offices use geospatial photos to provide faster and more reliable estimates of poverty levels. The Uganda Bureau of Statistics has identified roofing materials as a proxy indicator of poverty. Thatched (makuti) roofs harbour pests and disease and need intensive maintenance. When the situation of households improves, families often improve their homes by replacing the makuti thatch with corrugated iron. The changes in the roofs and landscapes are visible when satellite images are examined over time. Pulse Lab Kampala has developed a prototype system that automatically maps roofs with the use of satellite imaging. The prototype uses image-processing software which identifies and automatically counts the roofs and the roofing materials used.

2. Telecommunication data: use of mobile phones to flag potential hotbeds of animal diseases and to monitor immunization campaigns

In Kenya, the Food and Agriculture Organization of the United Nations (FAO) has established a partnership with the Royal Veterinary College and Vetaid, a local non-governmental organization, to support a mobile application pilot known as EpiCollect. With the use of this application, vaccination campaigns and animal care programmes can be tracked.

Thanks to alerts transmitted rapidly by digital devices, animal diseases can be detected and isolated in record time. This early warning system can be used to prevent the deaths of tens of thousands of animals, thereby safeguarding the livelihoods and food security of populations and preventing the spread of diseases that can be transmitted to humans.

3. Social networks: use of Google trends and analysis of feelings to measure subjective well-being.

This experiment was conducted in the United States of America. The aim was to build an indicator of individual well-being based on the Google Trends website. The indicator is a combination of key words that correspond to measures of subjective well-being

a local government notifier immediately after childbirth or when she reports at the hospital with her child (for the child's initial vaccines, for example). The information, which is transmitted by a simple encrypted SMS, is then transferred to a government database. After verification by an administrative official of the hospital, an official birth certificate is printed and given to the person making the report. This simple, low-cost technology has enabled some villages to achieve a birth registration rate of almost 100 per cent.

New technologies may be used to improve data dissemination

In the United Republic of Tanzania, several platforms have been developed for data dissemination. One of these platforms is the "socioeconomic database". It is a database that disseminates official statistics from various ministries, along with a range of socio-economic variables, including income, consumption expenditure, literacy levels, access to education and health services. In accordance with the data sources, the database makes it possible to disaggregate data at the national level and at the subnational level of districts and sub-districts. The database has a web-based dashboard, via which the main indicators may be subjected to statistical analyses.

used in Gallup Analytics surveys. These are traditional measures designed to measure and analyse the well-being of the population at high frequency and local level. The experiment also demonstrated that it is possible to use Internet search engines to identify key aspects of well-being. The keywords associated with job search, financial security, family life and leisure are determinants of subjective well-being in the United States.

Source: Studies by consultants.

processing costs by about $1.2 million, a saving of over 60 per cent. The survey costing estimates of needs for the monitoring of the Sustainable Development Goals by the Sustainable Development Solutions Network of the United Nations indicate that the data processing component would be about $74 million for a 15-year survey programme for reporting on development indictors in all 77 International Development Association (IDA) and Blend countries. Applying new technology for only one component of the survey programme, namely data processing, could save about US$ 44 million" (PARIS21, United Nations Industrial Development Organization (UNIDO), UNICEF, Open Data Watch, World Bank, Data for Development: A Needs Assessment for SDG Monitoring and Statistical Capacity Development, 2017; Jessica Espey (SDSN); with Eric Swanson, Shaida Badiee and Zach Christensen (Open Data Watch); Alex Fischer, Marc Levy, Greg Yetman, Alex de Sherbinin, Robert Chen and Yue Qiu (CIESIN); Geoffrey Greenwell, Thilo Klein and Johannes Jutting (PARIS21); Morten Jerven (SFU); Grant Cameron, Ana Milena Aguilar Rivera, Victoriano C. Arias, and Samuel Lantei Mills (World Bank); and Albert Motivans (UNESCO)).

While these new and unconventional data sources may be very promising, major obstacles need to be surmounted if they are to be effectively harnessed. A response must be found, for example, to the issues of the perceived risks of data-sharing and privacy protection. The report entitled "Data-driven development: Pathways for progress" (World Economic Forum, 2015) highlights the reluctance of many commercial entities, such as non-profit organizations, to share their data holdings. Data conveying tangible information about their clients or their strategy are often confidential. National statistical organizations, which are already bound by rigorous and professional standards and are required to maintain confidentiality, also have the same concerns. Data-sharing thus threatens the privacy of individuals. Laws on the protection of privacy are often the source of regulatory constraints. "As most current privacy and data legislations do not specifically cover Big Data, existing laws are open to interpretation. Hence, NSOs do not have a clear

mandate to exploit sensitive micro-data such as call detail records. Second, both public and private stakeholders face reputational and ethical issues: the simple fact that companies retain their customers' data can induce these to change providers. The transfer of data therefore poses an important risk to organizations" (NSDS Guidelines –https://nsds-guidelines.paris21.org/fr/node/716).

III. Preparedness of North African countries to harness the data revolution

In assessing the extent to which North African countries are prepared to exploit the benefits of non-traditional data sources and take advantage of the opportunities offered by the digital revolution, attention had been focused on the Networked Readiness Index of the World Economic Forum. The index assesses national capacities (conditions, policies and institutions) to use and take advantage of information and communication technologies (ICT) to boost their competitiveness and well-being. The Network Readiness Index is based on an aggregation of 53 individual indicators grouped under four main headings: environment (policy and regulatory environment, businesses and innovation environment); readiness (infrastructure, affordability and skills); usage (individual usage, business usage and government usage); and impact (economic impacts and social impacts).

Table 3: Network readiness index (scale 1–7)

	Algeria		Egypt		Morocco		Mauritania		Tunisia	
	Rank	Value	Rank	Value	Rank	Value	Rank	Value	Rank	Value
	117	3.2	96	3.7	78	3.9	136	2.5	81	3.9
Environment	3.1		3.5		3.9		2.8		3.6	
Policy and regulatory environment	3.0		3.3		3.8		2.6		3.5	
Business and innovation environment	3.2		3.7		4.1		3.0		3.7	
Readiness	4.3		4.2		4.3		2.1		4.9	
Infrastructure	3.9		3.1		3.0		1.2		3.7	
Accessibility	4.4		5.8		6.3		3.3		6.3	
Skills	4.6		3.7		3.7		1.9		4.7	
Usage	2.8		3.5		4.0		2.5		3.7	
Individual usage	2.8		3.8		4.2		2.2		3.9	
Business usage	2.9		3.0		3.3		2.8		3.3	
Government usage	2.7		3.8		4.6		2.5		4.1	
Impacts	2.6		3.4		3.5		2.5		3.4	
Economic impacts	2.6		3.4		2.8		2.7		2.9	
Social impacts	2.7		3.5		4.3		2.4		3.9	

Source: World Economic Forum, The Global Information Technology Report 2016: Innovating in the Digital Economy.

The range of performance by country in the North Africa sub-region remains very wide, with Morocco (78th) ranking 58 positions higher than Mauritania (136th). Where performance is concerned, there has been no significant shift observed between 2013 and 2015. Algeria, Morocco and Tunisia have held their positions, while other countries – Egypt and Mauritania – have dropped in rank.

Morocco and Tunisia remain the best performing countries of the sub-region in terms of networked readiness. In both cases, performance is driven by accessibility, including through low prices for mobile telephone and Internet services. While the public sector is lagging behind in terms of digital deployment, the public sector in these countries is notable for the greater importance that it attaches to ICT, which is reflected in the vision and efforts mounted by governments to improve the regulatory framework. The greatest challenges faced in Morocco are infrastructure and affordability, in particular for the private sector, and, for Tunisia, the need to boost usage of ICT by businesses.

Overall, the North African countries that are facing difficulties in regularly publishing their data are not yet ready to harness the data revolution in a systematic manner, owing to the lack of the necessary resources, appropriate skills, infrastructure financing and reforms of the institutional and regulatory framework.

Chapter 2: Current status of data ecosystems in North African countries

Section I. The data system in North Africa

In the context of the data revolution, national statistical systems operate under extended data ecosystems. These ecosystems include, in addition to the national statistical system,[5] a large number of communities of producers and data users from civil society, the private sector, universities and scientific institutions and from regional and international agencies, and also specialized data producers. Interactions between these communities are determined by legal, political, technological and financial rules, and also by the common interest in maximizing the generation and use of data made available to them through their mutual exchanges.

Figure 4 sets out a simplified representation of the data ecosystem as it currently exists in the countries of North Africa. There are five major producers of data:

- Official statistical data communities which comprise all the constituent members of the national statistical system, namely, all stakeholders and organizations that collect, process and disseminate official statistics for the Government;
- Private sector data communities;
- Scientific data communities;
- Data communities of international and regional agencies and other United Nations agencies.

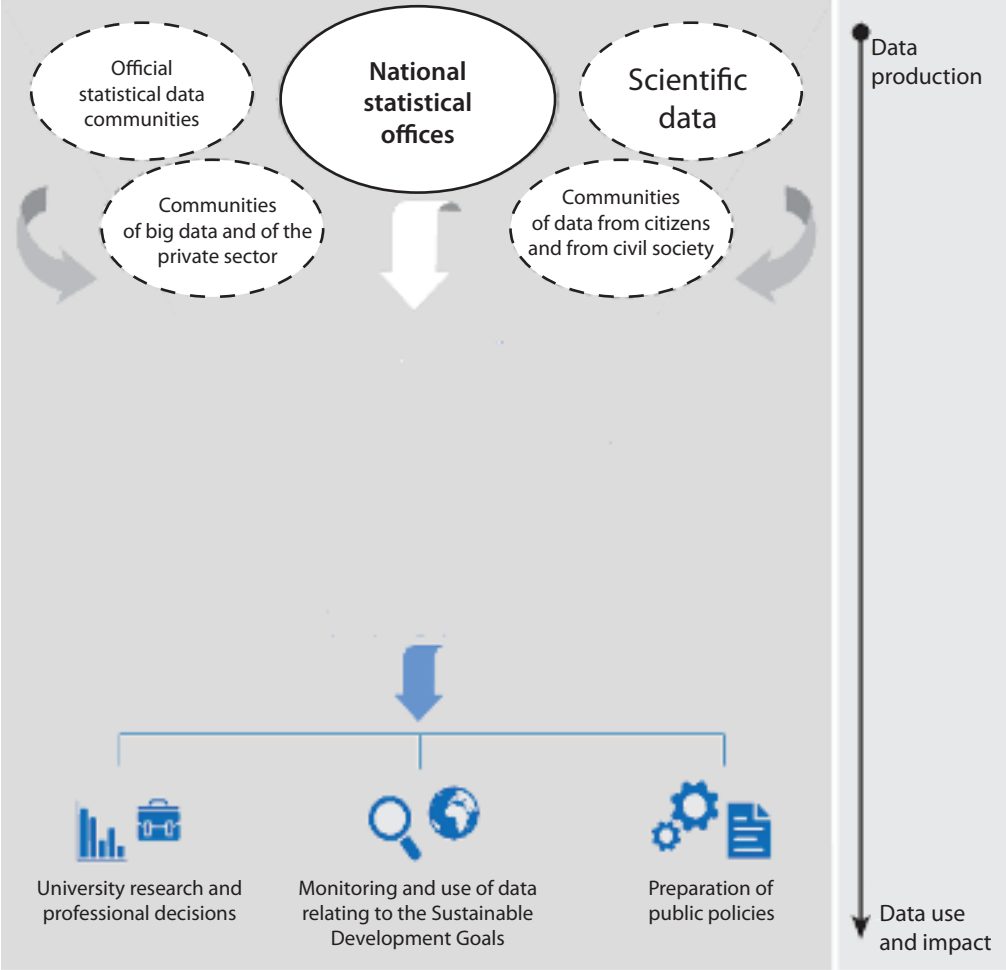
At the heart of the national statistical system is a unit referred to by the generic name "National Statistics Office", which plays the role of lead agency and coordinator. According to the Fundamental Principles of Official Statistics of the United Nations, the national statistics office is an independent body with its own budget and reporting primarily to the legislative branch. In the countries of North Africa, the national statistics office neither enjoys administrative and financial autonomy nor is it protected from partisan influences by laws and regulations.

From a functional standpoint, the organization of national statistical systems in North Africa is relatively centralized. Although the entire process for the production (census, surveys, and so forth) and dissemination of official statistics is managed directly by the national statistical office, some ministries, such as those responsible for health, education and agriculture, or agencies, such as customs and social security, may publish some of their own statistics. In the Sudan, in addition to its operationally centralized position, the national statistical office is also geographically centralized. The Central Bureau of Statistics has a federal structure. In particular, data collection is carried out by statistical institutions at the State level and the Central Bureau of Statistics operates on the basis of consistent standards and methodologies for data collection in all entities.

With the exception of Egypt and the Sudan, the coordination of the national statistical system is carried out by a national statistical council. In Algeria and Morocco, the National Security Council has the responsibility of ensuring effective coordination, in particular with regard to authorizing the production of statistics and the conduct of surveys and censuses. Its main activities include the preparation and monitoring of plans and statistical programmes, coordination between the producers and users of statistics, and harmonizing definitions, methods and classifications. In Tunisia, the National Security Council is responsible for institutional coordination and relations between producers and users, while the technical coordination and harmo-

5 The national statistical system includes all statistical agencies and services that collect, process and disseminate so called "official statistics". These statistics are based on data produced by government agencies in the course of their official duties.

Figure 4: Ecosystem for the production and use of data



Source: Resource Mobilization and Alignment Working Group of the Global Partnership for Sustainable Development Data, The State of Development Data Funding 2016..

nization of methods and classifications form part of the functions of the National Statistical Institute. In Egypt, in the absence of a statistical council, a consultative committee has been set up within the Central Bureau for Public Mobilization and Statistics (box 9) to coordinate and interact with users of statistics.

I. Statistical data producers

The production and publication of official statistics in the countries of North Africa are governed by laws (statistics acts) and regulatory instruments that set out the conditions under which statistical activities are to be conducted. Although these laws and legislative instruments vary in content, they all define, to some extent or other, the prerogatives of national statistical agencies. The challenge lies in the establishment of effective coordination between those operating the national statistical systems and that task is made more difficult by the shortcomings and inconsistencies of national laws.

In all the countries, laws or regulations relating to statistics cover, first, the authorization and responsibility for the collection and publication of statistical data and, therefore, the organization and functioning of the national statistical system and the national statistical office; second, the obligation placed upon individuals and enterprises to respond honestly to official surveys and censuses; third, rules on the dissemination and confidentiality of statistical data; fourth, the programming processes, including the need for stakeholder consultation and full transparency (relates only to Algeria and Tunisia). Some countries, however, continue to shirk the problem of ensuring the independence of statistical activity from the political authorities and the exchange of statistical information in the pub-

lic administration is not covered by the statistical legislation.

The existence of appropriate statistical legislation and its implementation are necessary conditions for the development of official statistics. The lack of statistical legislation, or its inconsistency or poor application may be the source of problems that could seriously undermine the quality of statistics:

- The dependence of national statistical offices on political authorities could result in the late publication of statistical data or have other collateral effects.

- The lack of rules governing the exchange of statistical information within administrative offices is likely to limit the possibility of cross-checking and comparing statistical data from other sources. In some instances, it may even give rise to parallel statistical activities, which may result in an additional administrative burden, the inefficient use of public financing and an increase in the number of statistical publications.

- Regular meetings of stakeholders would help in the preparation of statistical programming based on the statistics produced and aligned with user needs.

In North Africa, statistical laws and the organization of administrative bodies that produce statistics vary greatly from country to country. Whichever approach is adopted, these laws should more closely match the fundamental principles of official statistics of the United Nations and regional statistical frameworks, such as the African Charter on Statistics (ratified by Tunisia in 2014).

I-1. Producers of official statistical data

The main producers of official statistical data in the countries of North Africa are, first, the national statistical offices; second, the statistical departments of the ministries concerned (the sectoral bodies); and, third, other producers of official statistics, including the Central Bank, observatories, agencies and others.

The **national statistical offices** are the principal agencies and the national statistical systems are the main producers of official statistics. In all the countries of North Africa, national statistical offices are responsible for most of the statistical publications and most of the surveys. The status of the national statistical office and its reporting relationship determine the extent of its autonomy vis-à-vis the political authorities and its own authority within the national statistical system. In North Africa, none of the national statistical offices has the status of a public corporation with its own budget; sometimes they are attached to a ministry. The authority in charge of the national statistical office varies from country to country: in Algeria, Mauritania and the Sudan, the national statistical office reports to the Ministry of Finance; in Tunisia, to the Ministry of Development, Investment and International Cooperation; and in Egypt to the Ministry of Planning, Monitoring and Administrative Reform. In Tunisia, the National Statistical Institute is an independent public body with its own budget. In Morocco, the office in question has the status of a dedicated administrative body vested with functional and intellectual institutional independence (High Commission for Planning). This body reports to the Head of Government. It is the principal operator and coordinator of the national statistical system. It plays a central role in the national statistical system in Morocco: it is the main producer of statistical, economic, demographic and social information and of the national accounts. In Algeria, article 4 of Executive Decree No. 95-159 of 3 June 1995, amending the regulations of the National Statistics Office, stipulates that the office is a national public institution with legal personality and financial autonomy.

In addition to data generation, national statistical offices are also responsible for coordinating statistical activities. In some countries, the national statistical office is responsible for ensuring consistency of the definitions, classifications and methodologies. Its coordination functions are purely technical (Algeria, Mauritania, Morocco, Tunisia). In other countries, there is no functional national statistical council (Egypt and Sudan), and the national statistical office is also legally responsible for the prioritization and coordination of statistical activities among the various government agencies. In

this case, the coordination function is therefore of an institutional nature.
The technical coordination of statistical activities is very important; it ensures consistency of results between different statistical series, through the use of uniform classifications, methods and concepts. Institutional coordination is also required. Without it, there is the danger that the various producers of official statistics will also be responsible for organizing different data collection exercises and will produce competing statistical sources, none of which would therefore be credible.

Box 9 describes the national statistical office in Egypt (Central Agency for Public Mobilization and Statistics). The Agency is the body responsible for technical and institutional coordination and also for supervision of the national statistical system.

One of the main challenges facing the national statistical offices in the countries of North Africa relates to their funding. Financial problems may take several forms: insufficient budget (all North African countries, with the exception of Algeria); delays in authorizing funds and unpredictable annual budgets (Mauritania and the Sudan).

The statistics departments of ministries (sectoral statistical bodies): ministries of social affairs, education and health have statistical services. Their role is to produce and collect official statistics that are by-products of their institutions. These departments are highly familiar with the field and aware of the specific questions and issues to be considered in the strategic decisions. They also enjoy direct contact with stakeholders. The main data generated by these departments are the following: administrative data and survey data. Administrative data are produced from reports about entities in the sector and are recorded in administrative registers. These data are usually collected to assist in the management of the institution. The survey data are collected less frequently, in collaboration with various organizations, primarily international organizations.

In some ministries of North African countries, statistical departments are not included in their organization charts. This is the case of the Directorate of Studies, Programming and Cooperation of the Ministry of Equipment and Transport of Mauritania and the Directorate of Studies, Programming and Cooperation of the Ministry of Trade, Industry and Tourism. In all the ministries of North African countries, with a few exceptions, the production, processing and dissemination of administrative data are shared among a number of bodies without any specific instructions to that effect.
The fragmentation of data among different departments of a ministry is a common practice, but what is most striking here is that, in some cases, several departments of different ministries are responsible for generating data for the same sector, for example those of education (basic education, secondary education, vocational training) and of higher education. It should also be noted that, in several cases, the official mandate for the collection of administrative data is not assigned to the appropriate department. In these cases, problems have arisen with data coverage and with the duplication of activities.
Observations made during field trips have shown that the statistical units of different ministries differ in their scope and their characteristics. Some units have a long tradition in the production and use of statistics, while others are much more recent. Some units have adequate human and financial resources and a physical infrastructure appropriate to their statistical activities, while others suffer from a chronic lack of resources. For example, the Statistics Department of the Ministry of Commerce of the Sudan operates with a staff of one official.

I-2. Other data producers

Private sector data community

Private-sector enterprises, primarily those that are engaged in the financial sector (securities exchanges, commercial banks) and in service activities (tourism) or extractive activities (oil and mining companies) regularly produce statistical data. These enterprises have at their disposal fairly sophisticated information systems and gather substantial volumes of statistical data. These data are restricted to in-house use, however, because of their sensitivity and also because of apprehensions associated with security risks.

Although in some North African countries, laws and regulations governing the production and dissemination of statistics authorize private entities to col-

Table 4: Statistical legislation in the countries of North Africa

Laws and other statutory instruments	Algeria Act No. 94-01, 15 January 1994	Egypt Presidential Decree No. 2915, 1964	Morocco Royal Decree Nos. 370-67 and 371-67, 1968	Mauritania Decree 90.026, 1990	Sudan Statistics Act, 2003	Tunisia Act No. 32 of 1999, and decrees
Authority and responsibility for the collection and publication of data	Yes	Yes	Yes	Yes	Yes	Yes
Organization and operation of the national statistical systems and the national statistical office	Yes	Yes	Yes	Yes	Yes	Yes
Independence of statistical activities from the political authorities	No	No	No	No	No	No
Obligation for individuals and enterprises to respond honestly to official surveys and censuses	Yes	No	Yes	Yes	Yes	Yes
Rules governing the dissemination and confidentiality of statistical data	Yes	Yes	Yes	Yes	Yes	Yes
Exchange of statistical information in the public administration	No	No	No	No	No	Yes
Programming procedures	Yes	Yes	Yes	Yes	Yes	Yes
Requirement for a stakeholder consultation and optimal transparency	Yes	No	No	No	No	Yes

Source: Compilation by authors, statistical laws and statutory instruments to the various countries.

lect and use data within the scope of their activities (Algeria, Morocco, Tunisia), collaboration between the private sector and producers of official statistics (national statistical offices and sectoral bodies) is almost non-existent. Collaboration between the private sector and producers of official statistics is certainly of great importance. There are, however, obstacles to this collaboration, at the legal, technological, financial and human resources levels.

Scientific data communities

Data producers from academic and scientific institutions of North African countries include universities, specialized research institutes, think tanks (Economic Research Forum in Egypt, for example) and individual researchers. Their data production levels are very low compared to those of producers of official statistics (national statistical offices and sectoral statistical bodies) and their data are generally not accessible to the various stakeholders in the national statistical system.

At the international level, North Africa has fewer researchers than other developed countries. Thus, there are some 581 scientists per million inhabitants in Egypt, 864 in Morocco, 19 in the Sudan, 1,394 in Tunisia, compared to 4,125 in France, 4,355 in Germany, 6,428 in the Republic of Korea and 3,984 in the United States of America. A total of 15,885 articles were published in 2014, or less than 1 per cent of the total research output in the world. A region that is home to nearly 225 million people produces fewer research papers than Belgium (18,208 articles).

A number of constraints affect the production of scientific data in North Africa. These range from a lack of financial resources and inadequate infrastructure, to the low use of data by policymakers, and, in consequence, the lack of coordination and cooperation with national statistical systems.

Box 9 : Central Office for Public Mobilization and Statistics in Egypt: agency responsible for the coordination and supervision of the national statistical system

Central Office for Public Mobilization and Statistics in Egypt: agency responsible for the coordination and supervision of the national statistical system

The Central Office for Public Mobilization and Statistics is the central agency for the collection, analysis and dissemination of statistical data in Egypt. The Office is responsible for technical and institutional coordination and also for supervision of the national statistical system.

According to the provisions of regulations adopted in 1960 and 1964, the Office is required to perform the following functions:

(a) To collect, collate, analyse and publish economic and social data and those of the national accounts;

(b) To conduct censuses and surveys;

(c) To collect administrative statistics, as required;

(d) To organize and maintain a central repository of publications (documents and reports), statistical data and metadata;

(e) To guide and coordinate the sectoral statistical bodies;

(f) To prepare an annual statistical programme.

Demand for statistics

The production and dissemination of statistical data will serve no purpose if the data are not requested and used. The demand for data is in line with the needs expressed by data users (public agencies and institutions, the private sector, researchers and civil society entities), for their application in a wide variety of areas. The most representative of these areas of application is the planning and development of policies and strategies.

In the face of all those needs, any strategy for the development of national statistical system cannot be effective without taking them fully into consideration. In countries where there is no functional national statistics council, there are no formal mechanisms for consulting users, verifying the relevance and usefulness of statistics in relation to their current needs and taking into consideration their new needs and priorities. User satisfaction surveys, which are conducted only in Morocco and Tunisia, provide support for decisions concerning the plans and priorities reflected in statistical work programmes.

The countries of North Africa are faced with a double challenge relating to the supply and demand for data that are closely interlinked (figure 5). In the Sudan, the use of statistics by policymakers is less developed, leading to policies and strategies that are ineffective in terms of their development outcomes. In that country, the national statistical system is less active and has less influence on statistical development, which in turn impedes sustainable financing, reducing investment in staffing, infrastructure and tools, as a consequence of the inadequate availability of statistics in terms of quantity and quality.

The quadrant III countries, namely, Egypt, Morocco and Tunisia, are those in which there are constraints on the demand for statistics and in which the quantity and quality of the data produced are continuously improving, although much still remains to be done. In these countries data are used in the preparation of medium-term strategies and national development plans, while in others this is not the case for several reasons, including, first, the lack of awareness by officials of the data available and how to gain access to them; second, the data are often scattered across different institutions and data-producing agencies; third, policymakers lack statistical expertise and are generally not able to make effective use of the available data; and, fourth, users have doubts about the accuracy and precision of available data.

In all the countries of North Africa (quadrant I and quadrant III countries), there is a need to boost the statistical skills of citizens and decision-makers and to recognize the usefulness of statistics. It must be emphasized, however, that certain countries have drawn up communications strategies for the de-

velopment of a statistics culture, including training plans for different categories of users and primarily journalists, participation in different national and regional fairs and events for schoolchildren. Institutions and public authorities must recognize the value of statistics in guiding public action, evaluating results and creating useful products. The national statistical offices have a role to play in this regard: they should develop partnerships, build relationships with user groups and familiarize them with formal and informal programmes with a view to mainstreaming statistical literacy. Only by promoting a widespread understanding of statistics and the effective use of data will it be possible to take full advantage of their potential.

It is vital, however, for the countries of North Africa to put this poor performance behind them and to move their national statistical systems into a virtuous cycle (as in quadrant IV) in which growing demand and the improved quantity and quality of data lead in turn to an improvement in the performance of those systems. "To create a virtuous data cycle, national contexts and politics matter. The political appetite and demand for solid evidence for policymaking varies among countries and governments, while the nature of this demand has a direct impact on data supply and on how the data ecosystem functions and whether it is capable of managing and benefiting from the data revolution. ... National governments are ultimately responsible for ensuring that the data ecosystem is capable of producing and using quality data to design and implement policy priorities and monitor their outcomes" (OECD, 2017).

Section II Assessment of the statistical capacity of national statistical systems: level of statistical development in the countries of North Africa

I. International indicators of statistical capacity-building: initial assessment of national statistical systems

International data sources are useful for an initial assessment of the national statistical systems in the countries of North Africa, although their principal objective is to provide the basis for inter-country comparisons. The assessment will focus on the results of the statistical capacity indicator of the World Bank, for an evaluation of methodological practices, data availability and timeliness of dissemination.

The World Bank statistical capacity indicator is a composite score which assesses the effectiveness of a country's statistical system. It is based on a diagnostic framework comprising three areas of assessment: methodology, data sources, and periodicity and timeliness.

The first dimension, statistical practices, measures a country's ability to meet internationally recommended standards and practices. National statistical systems are assessed on the basis of a set of criteria, including the use of a baseline year for national accounts, the use of the latest balance of payments manual, the status of external debt, and adherence to the IMF Special Data Dissemination Standard. The second dimension, data sources, indicates whether a country's data collection activities are in line with the internationally recommended periodicity and whether administrative data are available, reliable and usable for statistical purposes. Specifically, the criteria used are the periodicity of population and agriculture censuses, periodicity of poverty and health surveys, and the completeness of coverage by the civil registration system. The third dimension, periodicity and timeliness, considers the availability and frequency of key socioeconomic indicators, including nine indicators relating to the Millennium Development Goals. The criteria include indicators on income poverty, maternal and child health, HIV/AIDS, primary school completion, gender equality, access to water and the growth of GDP.

The statistical capacity indicator is based on a simple idea: that the production and dissemination of reliable, relevant and timely statistics require capacities covering all three dimensions. Any weakness in one of its dimensions will create a weakness

in the statistical process as a whole. The statistical capacity indicator thus makes it possible to identify gaps in the national statistical system and in statistical areas that need improvement.

Figure 6 shows the average score (as percentage) of the statistical capacity of seven countries of North Africa for 2017. The scores assigned to different national statistical systems were divided into three bands: 20–50 (limited capacity), 51–75 (moderate capacity) and 76–100 (high capacity). The lowest score was that of Libya, at 22.2 per cent. The strongest statistical capacity was registered by Egypt: 83.3 per cent. Four countries (Algeria, Mauritania, Sudan and Tunisia) are in the second band, with moderate statistical capacity. Morocco and Egypt are the only countries with a high statistical capacity.

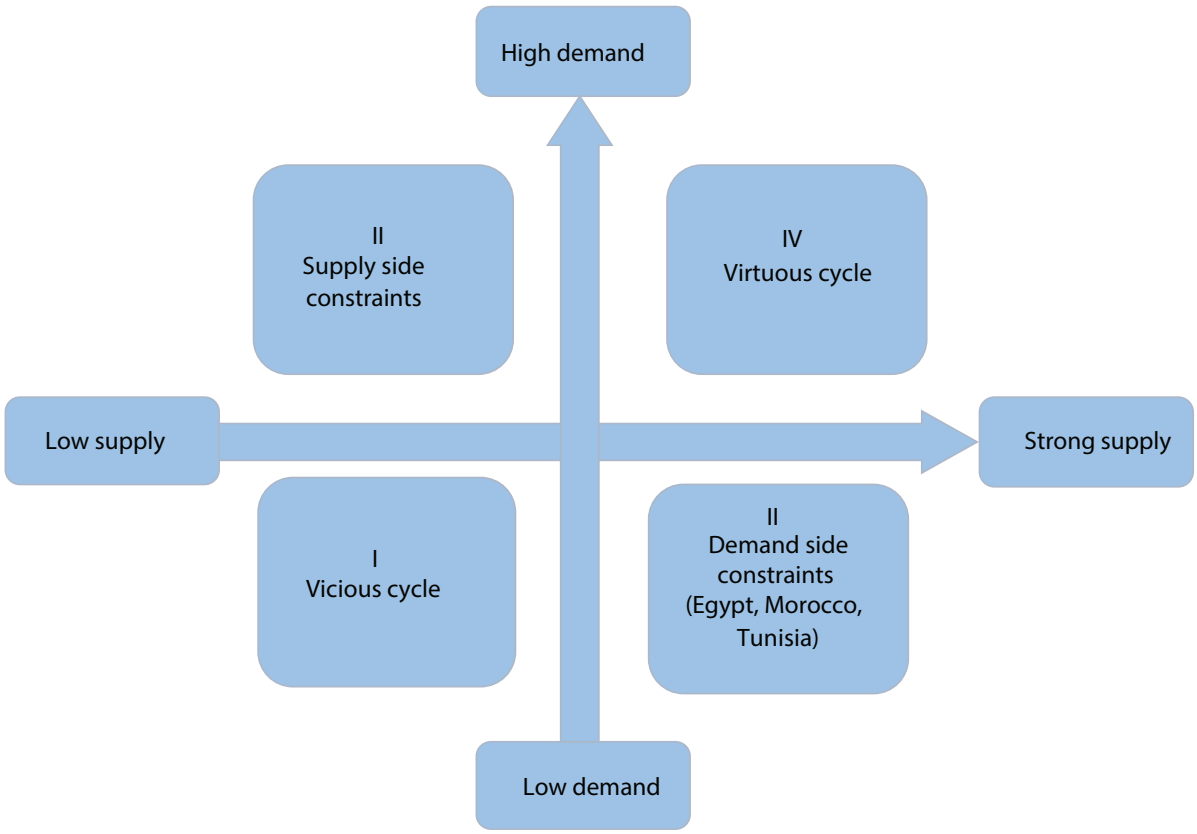
The results of the statistical capacity indicator also show that national income appears to have little effect on a country's statistical capacity. The development of the national statistical system is not only an issue of capacity. Given its per capita income, Algeria should have a well-functioning national statistical system, if not more developed than that of Egypt. The statistical capacity of a national statistical system is also a matter of political will.

For the four countries with moderate statistical capacity, the areas that are particularly lacking in the three dimensions of such capacity are methodological practice and data sources (table 5).

Table 5: Dimensions of the statistical capacity indicator for medium-capacity countries, 2017

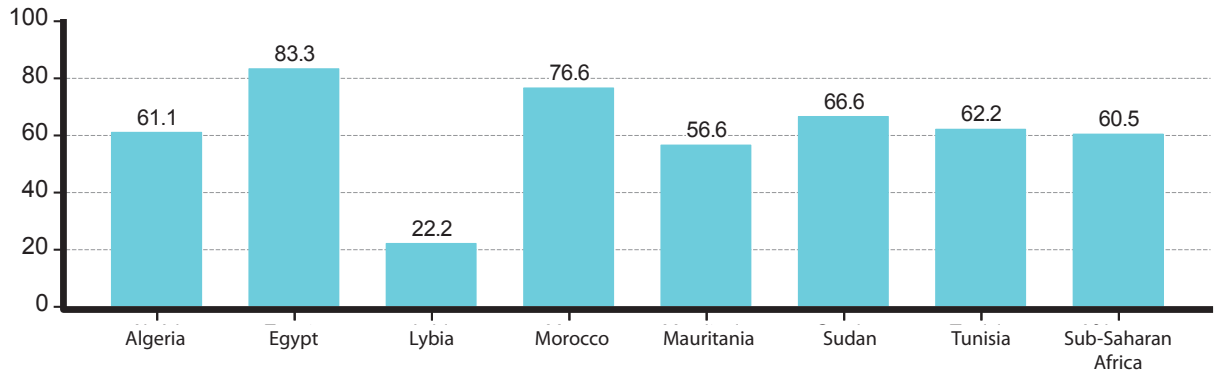
Dimensions of statistical capacity indicator	Algeria	Mauritania	Sudan	Tunisia
Methodology	60	40	50	70
Timeliness and punctuality	83.3	90	80	76.6
Data sources	40	40	70	40
Average score	61.1	50.6	66.6	62.2

Figure 5: Double challenge of supply and demand



Source: Ben Kiregyera, The Emerging Data Revolution in Africa: Strengthening the Statistics, Policy and Decision-making Chain, 2015.

Figure 6: Statistical capacity indicators (percentages), 2017



Sources: World Bank database, statistical capacity indicators (http://databank.banquemondiale.org/data/source/statistical-capacity-indicators#).

The national statistical system in Mauritania is very illustrative: on the basis of the criteria used in calculating the baseline index of the dimension, methodological practice, it appears that the reference year for the national accounts is obsolete (baseline year 1999); the index of industrial production and the import and export price indices are not available at monthly or quarterly intervals; the public finance accounts are not consolidated; national data on immunization coverage are not in line with WHO estimates and the country has not subscribed to the IMF General Data Dissemination System, which sets out the criteria for economic and financial statistics. As for the dimension: statistical data sources, it appears that Mauritania has not conducted any agricultural censuses over the last 10 years; household poverty and health surveys remain sporadic and ad hoc and the civil registration system is incomplete.

The non-availability of data is a significant problem in Mauritania where the conduct of enterprise and microenterprise surveys is concerned. Because of the low response rate to the questionnaires, the national statistical system of Mauritania has no reliable information to use in monitoring its real economy. As a result, the reliability of national accounts is bound to be compromised. The national statistical system of Mauritania faces challenges of coordination, which hamper the monitoring and evaluation of the internal consistency of the country's system of national accounts. Similar shortcomings may be seen in the compilation of the prices and wages series: the national accounts system of Mauritania does not track the prices of inputs used in the manufacture of goods and its consumer price index only covers urban areas.

It should be noted, however, that significant progress has been achieved in Mauritania in the formulation of statistical rules and standards. The new system of national accounts (2008 SNA) recommended by the United Nations is now being implemented and the data sources and the periodicity of the issuance of data have been greatly improved. This is also the case with Algeria and Tunisia, which have greatly improved their national statistical systems over the past few years.

Table 6 : Dimensions of the Mauritanian statistical capacity indicator, 2017

Methodology	Status	Value	Weight	Score
Baseline year for national accounts	Baseline year outside the last 10 years	0	10	0
Manual followed for the balance of payments	Use of the fifth edition	1	10	10
Status of reports on external debt	Actual or preliminary	1	10	10
Baseline year for the consumer price index	Baseline year within the last 10 years	1	10	10
Index of industrial production	Not available at monthly or quarterly intervals	0	10	0
Indices of import and export prices	Not available at monthly or quarterly intervals	0	10	0
Public finance accounts	Unconsolidated accounts	0	10	0
Report to UNESCO on enrolments	Annual reports over the last four years	1	10	10
National immunization coverage	Country data on immunization coverage not in accordance with WHO estimates for four years	0	10	0
	Not enrolled			
IMF Special Data Dissemination Standard		0	10	0
Total methodology 40				
Data sources	Status	Value	Weight	Score
Population census	Conducted over the last 10 years	1	20	20
Health survey	Two surveys conducted over the last 10 years	0.5	20	10
	Two surveys conducted over the last 10 years	0.5	20	10
Poverty survey	No census over the last 10 years	0	20	0
	Incomplete	0	20	0
Agricultural census				
Coverage of civil registration system				
Total data sources 40				

Source: Prepared by authors with the use of the World Bank statistical capacity indicator database.

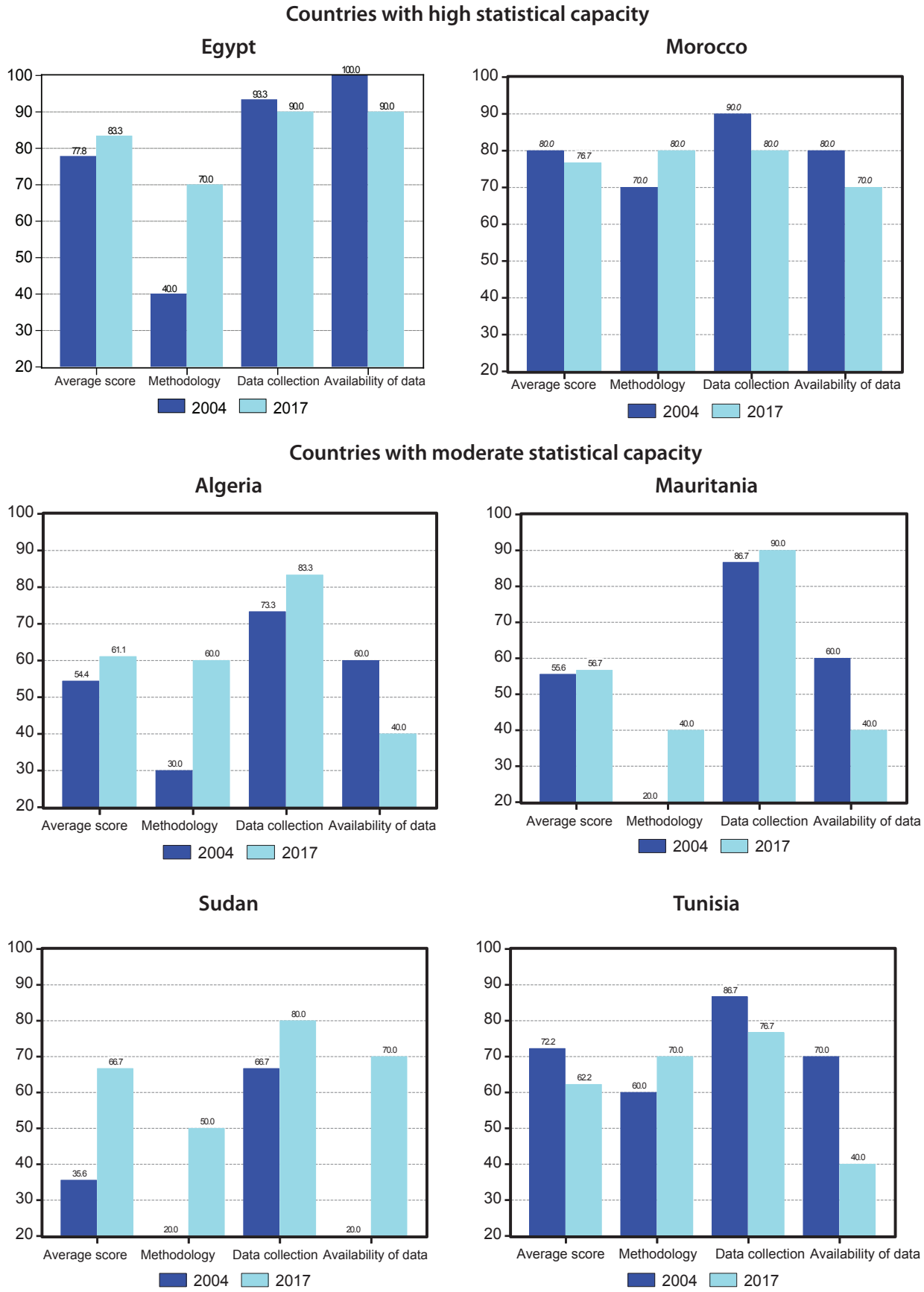
Figure 7 provides an overview of historical trends in the performance of national statistical systems in North Africa and its various dimensions. In the different countries, the methodological dimension increased over the period 2004–2017, which explains the trends followed by national statistical systems in complying with the standards and best practices followed at the international level. The data availability dimension, however, declined between 2004 and 2017 in almost all the countries of North Africa as a result of financial constraints impeding the organization of censuses and surveys.

II. Use of standards and codes of practice for the assessment of national statistical systems

The detailed assessment of a national statistical system must provide an overall assessment of different topics, relating to the following:

- Regulatory framework and the strategic relationship between the stakeholders in the national statistical system and the Government (statistical law and regulatory instruments, statistical coordination arrangements, programming of statistical activities, relations between producers and users of statistical data);

Figure 7: Trends in the statistical capacity indicators of the countries of North Africa



Source: World Bank database, statistical capacity indicators (http://databank.banquemondiale.org/data/source/statistical-capacity-indicators#; 2018).

- Financial resources (whether or not public funds are lacking) and human resources issues (staffing allocation systems aligned with the working methods, whether or not knowledge and skills are lacking, the existence or absence of a human resources strategy and staff training, and skills drain);

- Systems and infrastructure (statistical software, computer systems, communications systems or premises).

The study attempts to assess the organization of national statistical systems in the countries of North Africa, their legal foundations and the status of their resources by using the European Statistics Code of Practice as a methodological framework. Box 11 provides an outline of the pilot questionnaire sent to stakeholders of national statistical systems to identify their key aspects in different countries.

The assessment of national statistical systems should not be limited to the institutional environment of national statistical systems, but should also take into consideration data quality and the procedures used for the production of the systems. For example, it is possible that, in a national statistical system, there are no financial or human resource limitations, but the relevant data, or the existing data, are of poor quality or obsolete, or the data are available but have not been disseminated. Problems of this kind justify an intervention to strengthen the national statistical system.

There are a number of tools that may be used to assess the quality of statistical data. IMF provides two such tools: the General Data Dissemination System (GDDS) and the Data Quality Assessment Framework (DQAF). Other quality frameworks include the Quality Framework for OECD Statistical Activities and the International Organization for Standardization (ISO) quality standard ISO 9000. The present study makes use of the IMF Data Quality Assessment Framework to assess the quality of the data produced in the countries of North Africa. This assessment framework covers the different dimensions of quality. It takes into consideration all the stages of the statistical process by which data are collected, processed and disseminated. It thereby refers to the quality, first, of the overall organization of the process; second, of the data collection, processing and dissemination operations; and, third, of the statistical outputs.

In that way, the IMF Data Quality Assessment Framework covers the institutional environment, the statistical process and the statistical results, consistent with the United Nations Fundamental Principles of Official Statistics. The coverage by the IMF Data Quality Assessment Framework of the areas of governance, processes and outputs is articulated around five dimensions: ensuring integrity; methodological consistency; accuracy and reliability; ability to use; and accessibility (box 12).

II-1. Institutional environment

Shortcomings and inconsistency of the legal and regulatory framework

In North Africa, statistical legislation varies considerably from one country to another and there is no single approach to the development and organization of the bodies that produce statistics. These laws have ensured a measure of progress by establishing national statistical systems, organizing their operations around the national statistical offices and national statistical councils, for some countries (Algeria, Morocco, Tunisia), and encouraging administrations and other statistical bodies to contribute to the production of statistics. The statistical laws and regulatory texts have, however, shown limitations in their application: they do not respect the United Nations Fundamental Principles of Official Statistics (Statistical Commission, 2014) in their entirety, and, as a result, they provide no governance of national statistical systems.

Among the Fundamental Principles of Official Statistics, principle 1 affirms the duty of statistical offices to make official statistics available to all: "official statistics that meet the test of practical utility are to be compiled and made available on an impartial basis by official statistical agencies to honour citizens' entitlement to public information". Principle 2 indicates that, in order to maintain trust in statistics, there is a need to exercise scientific and professional judgment "on the methods and procedures for the collection, processing, storage and presentation of statistical data". Principle 5 observes that "data for statistical purposes may be drawn from all

Box 10: World Bank statistical capacity indicator: some limitations

Despite its capacity to assess national statistical systems, the statistical capacity indicator has certain limitations. It does not incorporate the elements of institutional and organizational capacity; nor does it distinguish between the financial capacity and the technical capability of a national statistical system. Given that the funding shortfall is often a major constraint on data collection activities, the use of the statistical capacity indicator could lead to overestimation of the statistical capabilities of countries that rely heavily on external funding for the production of data and the underestimation of countries that face financial difficulties. Nor does the statistical capacity indicator track certain important areas of statistics, including occupational statistics, and also those of enterprises and of the environment. For the areas that it covers, the indicator only specifies the quality of the statistical output in terms of methodology, availability and periodicity of data. The quality of sampling and of data processing and analysis is not included in the assessment of statistical capacity. Despite all these limitations, the statistical capacity indicator provides an operational framework for assessing a country's ability to produce the statistics and, to a lesser extent, to disseminate and publish them.

Source: Overview of statistics development in Asia and the Pacific, Economic and Social Commission for Asia and the Pacific, 2008.

types of sources, be they statistical surveys or administrative records". Principle 6, for its part, points out that individual data must be kept "strictly confidential and used exclusively for statistical purposes". The preamble to the Fundamental Principles emphasizes that "professional independence and accountability of statistical agencies are crucial" and that "the fundamental values and principles that govern statistical work have to be guaranteed by legal and institutional frameworks and be respected at all political levels and by all stakeholders in national statistical systems".

In the countries of North Africa, laws and regulatory instruments do not refer to those principles in their entirety and, even if they are cited, their implementation poses difficulties, undermining the efficiency of national statistical systems and the quality of the statistics produced.

In most countries, the statistics laws are not applicable to the scientific independence of the national statistical office, but they are to its professional independence. The regulatory framework makes no mention of institutional independence: it does not include specific provisions for the appointment and dismissal of the director-general of the national statistical office. These provisions are subject to the same rules as those pertaining to other directors-general of the country's administration. The appointment and dismissal of the director-general is therefore effected by decree, on the proposal of the competent ministry. To ensure the professional independence and accountability of statistical agencies, the law must specify the conditions for appointment of the director-general, for his or her period of office and the possible grounds for termination of office, along with institutional conditions for the exercise of the director-general's mandate. If the national statistical office is attached to a ministry, or does not have its own budget or its own prerogatives, it is unlikely to be sufficiently independent to publish data without external influence.

The credibility of the national statistical system also depends on how statistics are disseminated to users. The dependence of the national statistical office on political authorities may delay or even prevent the publication of statistical data. Discussions with users during field missions in seven countries have shown that some have doubts about the independence of the national statistical office: the dissemination timetable, methodological notes, accuracy and timeliness of data were still contentious issues. One thing that is certain is the failure by the national statistical office in all national statistical systems to give systematic and advance notice of possible delays, to explain their reasons or to set new dissemination dates. The situation for sectoral statistical bodies is much more problematic: interviews with the heads of these bodies have shown their relative indifference to users' needs. Statistical information is circulated at the request of users or is not circulated at all. This dysfunction leads to significant delays in the flow of information, which in turn leads to a certain inefficiency at the global level.

Box 11: Review of the operation of the national statistical system: key pilot issues

General information regarding the national statistical system

- The national statistical office is an independent entity – or is part of a ministry.
- The national statistical office has the capacity to use its own budget as it sees fit.
- Periodicity of the preparation of the budget for the national statistical office
- Does the Government have access to statistics within the office prior to their publication?
- Is there a code of good practice for the operation of the statistical system?
- Does the national statistical office have free data or are the data provided for a fee?
- Availability of microdata
- Are the national statistics collected by several institutions?
- What are the links between the institutions that produce and collect statistics?
- What is the legal role of the national statistical office vis-à-vis the organizations responsible for official statistics?

National statistics council and statistical programming

- Is there a national statistics council or other coordinating agency?
- Who are the members of the national statistics council?
- Is the national statistics council a statutory or regulatory authority?
- Frequency of meetings (as per the regulations and in practice)
- Is the national statistics council responsible for the preparation of the statistical programme and budget?
- Who approves the statistical programme and budget?
- Duration (in years) of the statistical programme

Statistics act

- Date of the act
- Date of its latest update
- Which individual or agency enforces application of the statistics act?

International measures

- Is there a national strategy for the development of statistics?
- Steps in its preparation
- Does the national strategy for the development of statistics have an official budget?
- Is there a principal statistical plan?

Resources

- Staff of the national statistical office (including statistics graduates)
- Number of people responsible for statistics in the ministries and other bodies (including statistics graduates)
- Annual budget of the national statistical office
- Number of computers in the national statistical office
- Network within the national statistical office

Source: Questionnaire sent to the various national statistical offices.

Box 12: IMF Data Quality Assessment Framework

Institutional environment

Institutional and organizational factors have a significant influence on the effectiveness and credibility of any statistical agency that produces and disseminates statistics. The relevant aspects are the political and legal framework, the adequacy of resources, relevance, quality awareness, professionalism, transparency and ethical standards.

- Principle 1: Political and legal framework: The legal and institutional environment for any statistical agency (national statistical office and, where applicable, any other statistical authorities) has a significant influence on the efficiency and credibility of the agency.
- Principle 2: Adequacy of resources: The statistical agency ensures that resources are commensurate with the statistical programmes, staffing, facilities, equipment, technologies, training and funding of its information systems.
- Principle 3: Quality awareness: Quality is the cornerstone of statistical activities. The statistical agency systematically and regularly identifies strengths and weaknesses in order to ensure continuous improvement in the quality of the process and its output.
- Principle 4: Professionalism: Statistical policies and practices are guided by professional principles.
- Principle 5: Transparency: The statistical agency produces and disseminates statistics in an objective and transparent manner in which users are treated equitably.
- Principle 6: Ethical standards: Policies and practices comply with ethical standards.

Statistical processes

The standards, guidelines and good practices should be fully observed in the processes followed by statistical agencies in organizing, collecting, processing and disseminating official statistics. The credibility of statistics is enhanced by their reputation in terms of good management and efficiency. The most important aspects in this regard are the soundness of the methodology and accuracy and reliability.

- Principle 7: Robustness of the methodology: The methodological basis on which the statistics are produced is in line with the standards, international guidelines and good practices.
- Principle 8: Accuracy and reliability: The data sources and statistical techniques are robust and the statistical outputs provide a sufficiently accurate picture of reality.

Statistical outputs

The available statistics must meet the needs of users. The statistics are consistent with international quality standards and the needs of international institutions, governments and research institutions, responding to the concerns of the business community and the general public. Important aspects are their relevance, periodicity and timeliness, coherence and accessibility, and clarity.

- Principle 9: Relevance: The statistics respond to the current and potential needs of users.
  - Relevance to current political issues;
  - Disaggregation, especially geographical, to an appropriate level;
  - Representative coverage.
- Principle 10: Periodicity and timeliness: The statistics are published in a timely manner, following an internationally accepted schedule.
- Principle 11: Coherence: The statistics are consistent with a data set and over time, and also with other important data sets.
- Principle 12: Accessibility and clarity: The statistics and metadata are readily available, presented in a way that is clear and understandable, and user support is available. This applies to:
  - Methods of publication and dissemination;
  - Full availability of results and metadata;
  - Orientation of publications to users of statistics.

Source: Eurostat, 2012, Guide to Statistics in European Commission Development Co-operation.

Inadequate institutional coordination arrangements

Principle 8 of the United Nations Fundamental Principles of Official Statistics states that: "Coordination among statistical agencies within countries is essential to achieve consistency and efficiency in the statistical system". In North African countries, poor coordination of the national statistical system is evident in the statistical activities (institutional coordination) and the harmonization of statistical concepts, classifications and methods (technical coordination). Evidence shows that institutional coordination of national statistical systems is either not practised (in the Sudan there is a National Statistics Council, which is not operational) or is difficult to implement. The systems for generating national statistics are composed of an assemblage of isolated statistical production bodies, which have come together without any functional reporting relationship in an inappropriate legal and regulatory environment, and which, for some countries (Sudan), are not operational.

In Morocco, it is the Committee for the Coordination of Statistical Surveys which is responsible for coordinating and promoting statistical surveys. It oversees application of the various provisions of the Statistics Act. The Committee's meetings are held at irregular intervals. Its main activity consists in ensuring coordination through the coherence and convergence of sectoral statistical programmes. All statistical surveys require the Committee's approval for their implementation. In order to update the legal framework that governs the statistical activities of the national statistical system, draft laws are submitted for approval, in particular by the National Security Council.

In Mauritania, the inefficiency of coordination and governance is strongly linked to the outdated nature of the statutory instruments governing statistics activities. The official statistics system can only be improved through an institutionalized dialogue between the various parts of the system. This can only be achieved through the establishment of a national statistics council which is effective and operational. It should be noted that the current Council has not met since 2010. The Statistics Act and its implementing legislation must be revised to enable the national statistical system to function properly and to review the composition of the National Statistics Committee, to kick-start statistics work.

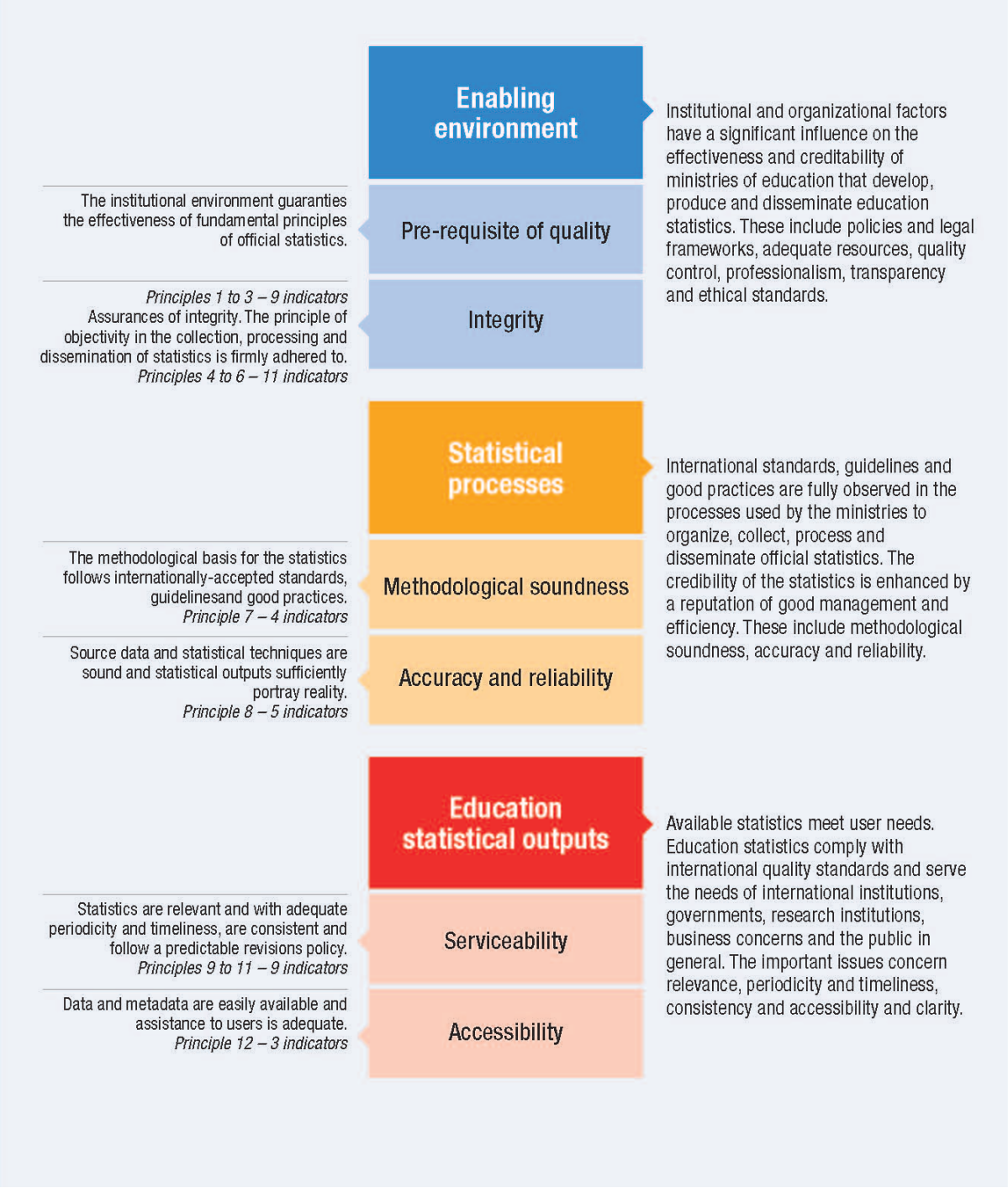
The institutional coordination of statistical activities requires data producers to be guided in choosing and implementing the most appropriate statistical tools to meet the demand, thus avoiding duplication of work and statistical surveys, reducing the burden of responding to surveys and ensuring the efficient use of financial and human resources. The development of a statistical programme is the cornerstone of such coordination. In North Africa, the implementation and monitoring of the programme is totally absent for some countries (Sudan). In others (Egypt, Morocco, Tunisia), these statistical programmes face major challenges due to the lack of human resources and adequate technical tools. In almost all the countries, however, there are no formal arrangements for collaboration and information exchange between the national statistical office and the various ministries. Data exchanges do not follow a predetermined schedule, because of administrative hold-ups. In principle, effective coordination between sectoral bodies and between the national statistical office and other statistical bodies must necessarily be based on memorandums of understanding; each protocol must specify in detail the characteristics of each collaborative arrangement.

In Tunisia, such exchanges are formalized and regulated (by order of the Minister of Development and International Cooperation of 2 June 2010 establishing the modalities for the transmission of reports) and memorandums of understanding are signed between stakeholders.

Inter-institutional coordination is properly formalized in Algeria through a range of arrangements, such as:

(a) Regulatory instruments pursuant to Executive Decree No. 16.3 of 13 December 2016 providing open access to the databases of the National Statistical Office and the National Business Registration Centre or Executive Decree No. 17-278 of 9 October 2017 establishing the Algerian classification of activities and products;

Figure 8: Structure of the Data Quality Assessment Framework



Source: UNESCO Institute for Statistics, The Quality Factor: Strengthening National Data to Monitor Sustainable Development Goal 4, 2017

(b) The producers and users working groups on available administrative sources, the owners of these sources, the methods by which the sources are produced, the needs of the national statistical office and key partners, and so forth;

(c) The agreements and protocols drawn up between the national statistical office and various partners such as the General Tax Directorate, the National Business Registration Centre, the national social insurance authority (CNAS), the Bank of Algeria, the Directorate-General of Customs, the Association for Economic Studies, Financial Analysis and Future-oriented Assessment (ECOFIE).

In addition to poor coordination between producers of statistics, the national statistical systems of the countries of North Africa have inadequate col-

Box 13: Professional independence

European Statistics Code of Practice (Eurostat, 2012):

Professional independence of statistical authorities from other policy, regulatory or administrative department sand bodies, as well as from private sector operators, ensures the credibility of European Statistics.

Indicators

1.1: The independence of the National Statistical Institutes and Eurostat from political and other external interference in developing, producing and disseminating statistics is specified in law and assured for other statistical authorities.

1.2: The heads of the National Statistical Institutes and of Eurostat and, where appropriate, the heads of other statistical authorities have sufficiently high hierarchical standing to ensure senior level access to policy authorities and administrative public bodies. They are of the highest professional calibre.

1.3: The heads of the National Statistical Institutes and of Eurostat and, where appropriate, the heads of other statistical authorities have responsibility for ensuring that statistics are developed, produced and disseminated in an independent manner.

1.4: The heads of the National Statistical Institutes and of Eurostat and, where appropriate, the heads of other statistical authorities have the sole responsibility for deciding on statistical methods, standards and procedures, and on the content and timing of statistical releases.

1.5: The statistical work programmes are published and periodic reports describe progress made.

1.6: Statistical releases are clearly distinguished and issued separately from political/policy statements.

1.7: The National Statistical Institute and Eurostat and, where appropriate, other statistical authorities, comment publicly on statistical issues, including criticisms and misuses of statistics as far as considered suitable.

1.8: The appointment of the heads of the National Statistical Institutes and Eurostat and, where appropriate, of other statistical authorities, is based on professional competence only. The reasons on the basis of which the incumbency can be terminated are specified in the legal framework. These cannot include reasons compromising professional or scientific independence.

African Charter on Statistics

1: Scientific independence: Statistical authorities must be able to carry out their activities according to the principle of scientific independence, particularly vis-à-vis the political authorities or any interest group.

2: Impartiality: Statistics authorities shall produce, analyse, disseminate, and comment on African statistics in line with the principle of scientific independence, and in an objective, professional and transparent manner.

3: Statistics authorities and African statisticians shall employ unambiguous and relevant methods in the collection, processing, analysis and presentation of statistical data. Statistical authorities shall also have the right and duty to make observations on erroneous interpretation and improper use of the statistical information that they disseminate.

4. Transparency: To facilitate proper interpretation of data, Statistics authorities shall provide information on their sources, methods and procedures that have been used in line with scientific standards. The domestic law governing operation of the statistical systems must be made available to the public.

laboration with users, primarily those from civil society. Users in this category have no forums for dialogue in which they can communicate their requirements for statistical data and articulate their views on statistical outputs. In practice, scant account is taken of the needs of civil society by the

coordinating bodies, both because they are used to operating exclusively in the official administrative arena and also because the intermediary bodies which represent the interests of civil society are so weak. In Tunisia, the National Statistics Council includes very few civil society representatives (General Union of Tunisian Workers, National Union of Tunisian Women and the Consumer Protection Organization).

Limited and unstable budgets

The funding for official statistics is particularly inadequate[6] in North African countries. The national statistical offices and other bodies responsible for sectoral statistics, which lack any institutional independence, often do not have their own budgets and receive inadequate financing from the Government, leaving them dependent on foreign donor resources to perform their functions of producing, processing and disseminating statistics. Budgetary constraints are the reasons most often cited by statistical officials and others responsible for statistics during field trips conducted to the six countries.

While the national statistical offices may generally have their own budgets, the same is not true of sectoral statistical services, whose resources are often conflated with those of the units of which they form part. It is difficult, if not impossible, to estimate the amount of resources allocated in the State budget to sectoral statistical services. Part of the problem is that the cost of producing data and statistics, and also of creating and maintaining statistical capacity, is not included in government plans and budgets, thereby rendering these needs less visible and, inevitably, reducing the resources allocated to them.

Although only a few, limited data are available by country and by region, the Marrakech Plan for Statistics estimates that low-income countries and those whose population varies between 10 million and 50 million inhabitants must double their spending on statistical capacity-building in order to produce an appropriate set of data on development. The statistical systems of the countries of North Africa are usually faced by two situations: either they do not have their own budget dedicated to statistical production activities, or the funding allocated is insufficient to meet the set targets. Another problem is related to the slow disbursement of funds, which can cause delays in the processes of generating and collecting statistical data.

Faced by a lack of domestic funding, North African countries generally turn to external donor funding to cover the costs of their statistical activities. In some countries, such as the Sudan, almost all data collection activities are funded mainly by external resources. Heavy reliance on external financing could increase the autonomy of the national statistical office. Donor dependence affects the type of data produced and the nature of expenditures covered, with additional effects on the accuracy, relevance, timeliness and relevance of data.

The external funding of national statistical systems and national statistical offices is not only insufficient but is also earmarked for data collection in specific sectors (health, agriculture and education), at the expense of vital statistics and administrative data, or capacity-building to ensure sustainable production and sustainable use of critical data. Unlike government policymakers, who give priority to data that cover the entire territory, can be disaggregated at regional or subregional scales and can be produced on a regular basis, donors are more amenable to the funding of sample surveys aligned with international indicators that will inform their decisions to allocate funds to a number of countries, or that cover a limited geographical area of a specific programme (OECD, 2017).

6 Large-scale statistical operations are almost always financed by international agencies (World Bank, United Nations, African Development Bank, and others).

Table 7: Statistical capacity-building assistance from the Development Assistance Committee (millions of United States dollars)

	2008	2009	2010	2011	2012	2013	2014	2015	2016
Algeria		0.119							
Egypt			0.017	0.076	0.093		0.128	0.254	0.663
Morocco	0.008					0.001	6.1		0.350
Mauritania	0.053								
Sudan	7.84	0.04	0.344		0.149	1.659		0.033	2.800
Tunisia		0.01							

Source: OECD, OECD Statistics on International Development (database 2017), http://stats.oecd.org/Index.aspx?DataSetCode TABLE7B.

Inadequacy of human resources

The national statistical office and other sectoral bodies responsible for the production of statistics face major challenges in the management of their human resources. The main challenge is the shortage of statistics professionals and their inadequate qualifications, both in the national statistical office and, in particular, in the sectoral bodies. Even in such countries as Egypt, Morocco and Tunisia, where staff numbers are considered adequate, their qualifications in statistics are inadequate because, for the most part, they have not graduated from statistical training institutions. In Mauritania, a study carried out in 2015 on the development of the array of statistical units in the national statistical system revealed a lack of qualified and high-level statistics professionals across the national statistical system. According to this study, only just over 15.3 per cent of the staff in the national statistical system are qualified statistics professions, while 84.7 per cent are professionals in other fields.

An examination of the human resources situation of national statistical systems shows that statistics producers are currently faced by the following problems:

- Staffing arrangements that are not in line with working methods (an adequate number of staff members but a limited number of technical staff with high-level statistical expertise).

- The coexistence of two laws: that governing staff of the national statistical office (more favourable) and that governing civil servants working as staff statisticians in sectoral ministries.

- Only a small number of sectoral statistical departments have qualified statisticians. Those responsible for statistics in ministries are generally administrative officials to whom statistical duties have been assigned.

- Lack of a human resources strategy. Most countries in North Africa are experiencing the retirement of professionals without the recruitment of replacement staff in good time in advance of those retirements. As a consequence, there is a shortage of qualified professionals at higher and middle levels ready to fill vacant administrative and management posts. In Morocco, new budgetary restrictions mean that there is no longer any possibility of recruiting staff to fill the increasing number of vacancies due to retirement. The number of such vacancies in various categories stands at 210. This number is of heightened significance since the vacancies are for qualified statisticians, analysts and demographers. Often, to compensate for the shortage of temporary staff, a system of tendering is used (engaging private contractors).

- The skills drain to the private sector or abroad because of inadequate salaries and lack of opportunities: there is a need for career paths tailored to the tastes and competencies of all, for continuous learning, for mobility within the national statistical system and its management, and for participation in projects.

- The lack of continuous training, in particular for new information and communications technologies (ICT), and in particular for

their application in the areas of analysis and dissemination. There is also a lack of training to adapt statisticians on national and international development programmes. Statisticians trained a decade ago were probably not trained to produce statistics on the environment, on governance, or on gender analysis.

Inadequate allocation of equipment and infrastructure

The national statistical offices in North African countries, with the exception of the Sudan, generally have an adequate working environment. Overall, these statistical offices have suitable computer equipment (computers, networks, software), although some lack data centralization and archiving platforms.

Where the sectoral statistics bodies are concerned, the following may be noted:

- Insufficient and outdated computer equipment (computers, statistics software, lack of maintenance contracts for their computer equipment);
- Inadequate premises (cramped or dilapidated offices), unsuited to the work of preparing statistics;
- Lack of interconnection between the national statistical offices and the sectoral statistics bodies and a lack of shared data-transfer tools;
- Lack of a platform for the centralization and archiving of statistical data.

Promoting ICT use

Information and communications technologies (ICT) play a vital role across the entire statistical process, ranging from the directories (sampling frames), to analysis and dissemination, through the stages of data sampling, collection, processing and storage. ICT use can significantly reduce the costs and time involved in various statistical operations, and also facilitate the dissemination of the results to users. In Egypt, Morocco and Tunisia, use is already being made of tablet PCs, ultralight netbooks and personal digital assistants for the collection of survey data. The time taken by data processing and analysis is reduced by the use of the Internet to report data. Web-based applications are also being used, to centralize data on servers in the headquarters of the national statistical offices. The national statistical offices in the three countries have opted for the web-based dissemination of their statistical activities, thereby ensuring the prompt availability and accessibility of results to different users.

Inadequate awareness of quality

Apart from Algeria, no national statistical office of North Africa has a unit responsible for quality control issues, or has drawn up a list of quality indicators for statistical activities.[7] The sample plans and surveys are produced by the units responsible and none of the national statistical offices has its own sampling unit, in other words, a unit specializing in surveying techniques and responsible for designing the various surveys that are conducted. Information is usually collected by face-to-face interview and with the use of personal digital assistants, which means that no benefit is derived from computer-assisted personal interviews, with regard to the control of collection errors.

Concerns about quality are a prominent feature of the various different national statistical offices visited. There is, however, no assessment framework based on recognized quality control models such as the IMF Data Quality Assessment or the European Statistics Code of Practice, still less a fully integrated overall quality management system such as Total Quality Management. The main statistical

7 This list should include at the very least: (i) sampling errors; (ii) the quality of the sampling frame, in particular the gap between the most recent update of this frame and the reference period of the survey; (iii) the percentage of substitutions; (iv) the response rate for the information units and for the entries; (v) the maximum number of visits planned for the siting of the information unit; (vi) the control programme: percentage of errors detected, percentage of errors corrected; (vii) public access to the results, results on line, number of consultations on line.

outputs are rarely subjected to regular and thorough evaluations, where necessary with the assistance of external experts.

User groups offer an excellent means of identifying and exploring reactions and studying user needs. Once again, this is something which the national statistical offices of North African countries lack. Very few offices carry out quality assessments which are made publicly available so that people can appraise the quality of statistical operations.

This situation is even more problematic for the sectoral bodies. Very little methodological information (not even the sampling plan) is provided in the publications and the quality of administrative records, including the quality of the data in these records, is not assured.

II-2. Statistical processes

Inadequate harmonization of the definitions, concepts and classifications used

In all the countries of North Africa, the national statistical systems consist of an assemblage of isolated statistical production bodies, which have no functional reporting relationship and no integrated architecture. In the majority of cases, each producer of statistics (body, department) develops its own methodology for it area of competence and its own quality control measures. This leads, of course, to the duplication of efforts, inconsistencies and a complicated and inefficient process for the production of statistics. For most countries, however, the national statistical offices are responsible for technical coordination and the approval of statistical operations (selection of the sample, the questionnaire and the methodology).

Although the national statistical offices are responsible for the technical coordination of statistics producers, they are struggling to ensure the harmonization of national statistical systems in such areas as the classifications, definitions and concepts used. Among the laws and statutory instruments, there is none which stipulates effective means of ensuring such coordination. Even when national statistical systems have national statistical councils, the latter do not have the power to impose on sectoral bodies the nomenclature, classifications and definitions to be used by the national statistical offices, or to bring the nomenclature in line with international standards. When sectoral statistical bodies carry out surveys, it is more likely that these will be aligned with international standards because of the insistence of donors than because of their relations with the national statistical offices.

In North Africa, the national statistical offices have no official guidance in methodological matters, or for the elaboration and monitoring of the implementation of statistical methods by the thematic units and the sectoral statistical bodies. In the thematic units of the national statistical systems, it is the staff members concerned who have to deal with methodological problems. The situation is much more problematic for the sectoral bodies. Some do not even have professional statisticians.

The use of administrative data is equally difficult. These data are generally very advantageous for the compilation of statistics, since they are less costly than the conduct of surveys and the processing of the survey data. Reliability and, in particular, the adequacy of administrative data depend, however, on the capacity of the national statistical offices to harmonize the classifications, definitions and concepts used by government information systems. This is not the case in the national statistical systems of the countries of North Africa. In current practice, as observed in the field missions, the use of administrative data does not give the national statistical offices the right to examine and analyse their characteristics. In several countries, only aggregated administrative data are transmitted to the national statistical offices and these data generally reflect the administrative coverage and concepts, and not those of official statistics. In most cases, there is no analysis of the consistency of these administrative data with other sources, nor are they processed in line with statistical concepts. In some cases, regulations protect the confidentiality of administrative data to such an extent that they may not be disclosed within the national statistical offices.

Lack of harmonization of data collected from various sources

The profusion of data sources (administrative records, censuses and surveys) within the national statistical systems of North African countries is causing confusion among users.

The discrepancies between the administrative data and data derived from surveys and censuses are much more prominent in the areas of education, agriculture, health and poverty. For example, in Morocco, an examination of data on the enrolment of children under the age of 11 shows large differences between the statistics obtained from the administrative data sources of the Ministry of Education and those obtained from population censuses. These differences are not marginal: school enrolment rates from administrative sources show that Morocco is on track to achieve the target of universal primary education under Sustainable Development Goal 4. In the meantime, census data suggest that this target has not yet been reached and that much remains to be done.

In terms of quality, it is very important for national statistical offices, in their role as technical coordinators, to compare the data from different sources, as this will enable them to identify and understand issues and gaps, to correct errors, and to calibrate and harmonize the definitions and classifications used. National statistical offices should consider setting up dedicated methodological units, which have the task, first, of managing the basic concepts, definitions and classifications within national statistical systems; and, second, of providing scientific and methodological support for the production and dissemination of the statistics produced by national statistical systems.

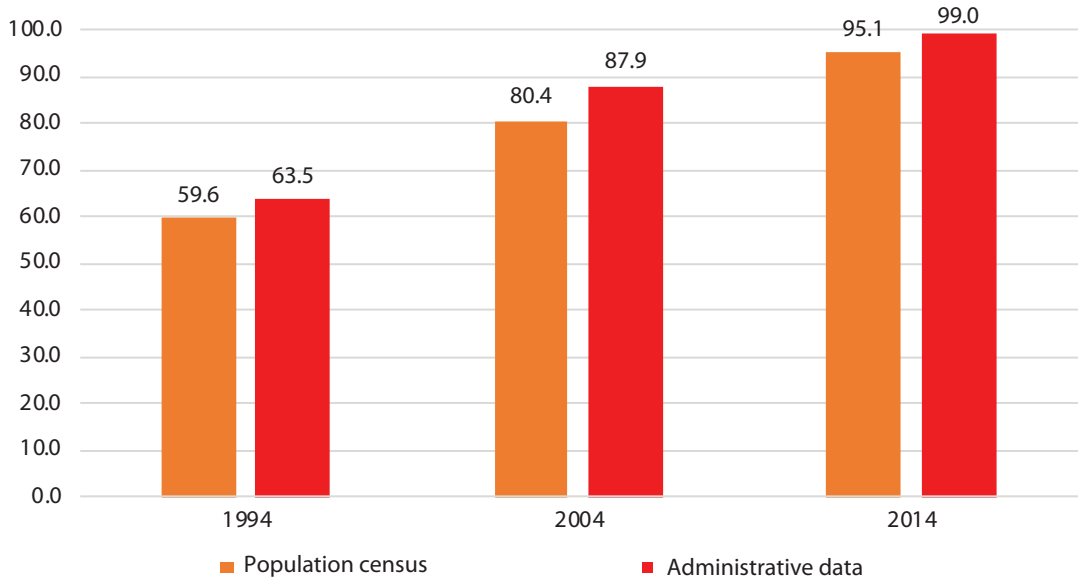
II-3. Statistical output

Data generated are insufficiently open, transparent and accessible

Even the most dependable and relevant data will be useless if they are not accessible to policymakers, the research community, the private sector and civil society in a user-friendly format. In the countries of North Africa, the national statistical office and sectoral statistics departments struggle to publish certain data because they lack the necessary capacity to publish and manage data according to international best practices, or because of their failure to understand the user needs for data and their inability to provide such information. Some sectoral bodies are inhibited from disseminating data by their fear of the reactions of political decision-makers.

All the national statistical offices of the national statistical systems in North Africa have websites

Figure 9: School enrolment rate for children under 11 years of age



Source: Administrative versus census figures.

or feature data portals. Some national statistical offices routinely organize media briefings for the launch of the most important statistics (Algeria, Egypt, Morocco, Tunisia). By contrast, the sectoral bodies are less forthcoming where openness to the public is concerned. Interviews with some officials have demonstrated their reluctance to acknowledge that the statistical output of their bodies also meets the needs of the private sector, researchers and civil society, and not only those of their line ministries.

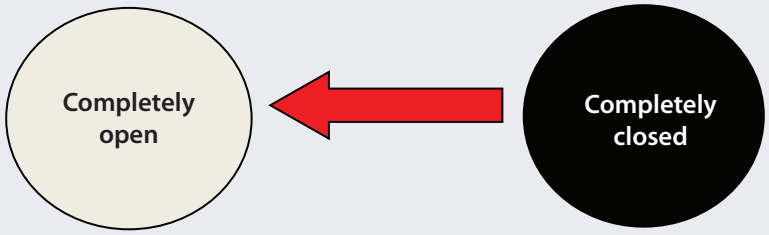
Most ministries do not publish the statistics of concern to them on their websites. Their statistical reports are intended exclusively for policymakers; researchers and other users who have need of them have to go to libraries to gain access to them.

Of the seven countries of North Africa, only Morocco and Tunisia are members of the group of countries that adhere to the IMF Special Data Dissemination Standard. These standards require cyclical statistics to be issued in accordance with a schedule set out on the website, approximately four months in advance. Delays in the issuance of cyclical indicators are generally not accompanied or followed by a press release, nor are they posted online with technical clarifications of the reasons for the delay or an indication of the expected new publication date.

The Open Data Inventory, or ODIN, which measures the extent of data coverage and level of openness (box 14), shows that North African countries must make further efforts in this regard (ODW, 2017a, 2017b). ODIN scores have been obtained from assessments of all the countries, and these range from 38.9 for Egypt to 13.7 for Libya. Those countries that have undertaken openness reforms have made substantial progress (Egypt, Mauritania, Tunisia), but, in some cases, the coverage of important statistical categories is still patchy (Mauritania).

Box 14: Open data in North Africa

Open data are data that are complete, primary, timely, accessible, machine-processable, non-discriminatory, non-proprietary, licence-free, permanent and free (Sunlight Foundation, 2010)



Caractéristiques des données

Accessibility	**Accessible to a larger number**	**Accessible only to a group of individuals or organizations**
Machine-processable	**Available in formats easy to be recovered and processed by computer tools**	**Available in formats difficult to be processed and recovered**
Cost	**Free**	**Available only against payment**
Licence-free	**Right to reuse and redistribute data**	**Reuse, republication and distribution prohibited**

The Open Government Partnership is a multilateral partnership aimed at promoting the openness of data.

Of the seven countries of North Africa, only **Morocco and Tunisia** are members.

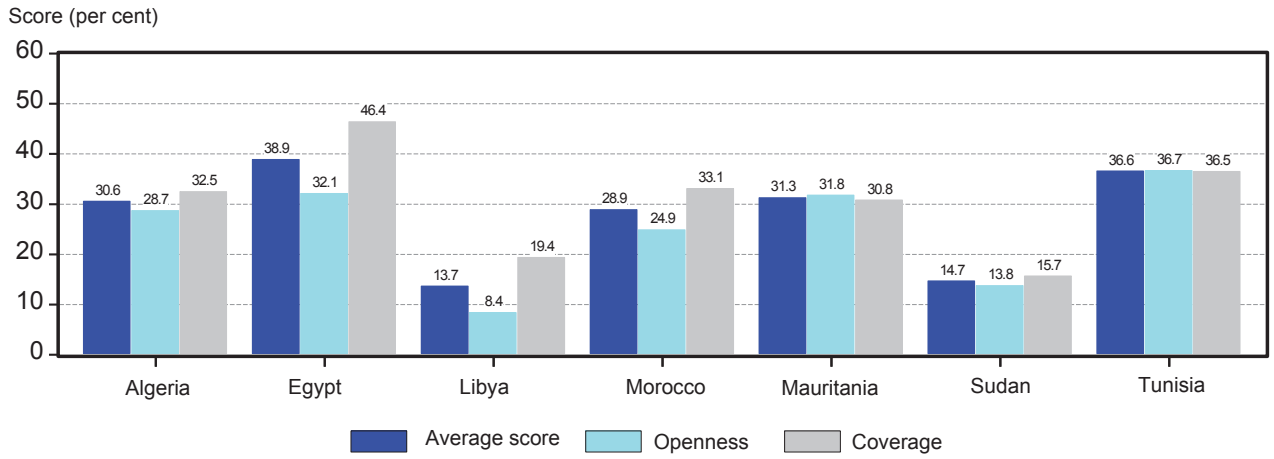
Source: Mo Ibrahim Foundation (2016), Strength in Numbers: Africa's Data Revolution, compilation by authors.

In addition to these measures, the reality is that many household surveys are still not available in all the national statistical systems of the countries of North Africa; thus limiting their usefulness. With regard to the dissemination of microdata files, the catalogue of the International Household Survey Network shows that only 50 per cent of the microdata from household surveys carried out between 2000 and 2017 are available in the national statistical systems of North African countries.

Discussions held with the heads of the national statistical offices and sectoral statistics departments have made it possible to identify the key constraints to the dissemination of data:

- Financial constraints and the lack of skilled human resources;
- The increase in workload occasioned by the regular updating of data;
- The apprehensions of officials relating to the challenges posed by open data portals.

Figure 10: Average 2016 Open Data Inventory scores for data coverage and openness



Source: Open data inventory watch — Open data inventory: http://www.opendatawatch.com.

Box 15: Measuring the degree of openness with the use of the Open Data Inventory

The Open Data Inventory assigns scores to 173 countries for data coverage and their degree of openness. The following items are included under data coverage: disaggregation; data availability over the past five years; data availability over the past 10 years; availability at the first administrative level (governorates, provinces, regions; availability at the second administrative level (municipalities). The following items are included under data openness: machine-readable; non-proprietary; downloading options; availability of metadata; free or unrestricted use.

The Open Data Inventory assigns a score to each country for 20 data categories grouped into: social statistics; economic and financial statistics; and environmental statistics. Under each statistics category, representative indicators are selected, either because they are often requested by policymakers or because they illustrate the statistical processes of national statistical offices.

Social statistics: Population and civil registration statistics, infrastructure of the educational system, school performance, health system infrastructure, health system performance, sexual and reproductive health, gender, crime and justice, and poverty.

Economic and financial statistics: National accounts, employment statistics, price index, public finance, currency and banking, international trade, balance of payments.

Environmental statistics: Land use, uses of natural resources, energy use, pollution, built environment.

Source: Open Data Inventory 2017; Methodology report, Open Data Watch, 2018.

Table 8 : Dissemination of microdata from household surveys: 2000–2017

	Algeria	Egypt	Morocco	Mauritania	Sudan	Tunisia
Data available from external sources	3	28	11	13	9	10
Microdata not available	4	16	25	7	4	18
Total surveys	7	44	36	20	13	28

Source: Catalogue of the International Household Survey Network, 2018.

Section III: Analysis of strengths and weaknesses of national statistical systems, of their opportunities and the threats that they face

Overall, the stakeholders of national statistical systems, national statistical offices and sectoral departments have a variety of assets which are conducive to their regular operation, up to a certain degree. These stakeholders face a number of challenges, however, in particular with regard to the legal frameworks, statutory provisions and policies that regulate them, financial and human resources, infrastructure, the tools and platforms that they use, and the relationships that govern them. These stakeholders are also influenced by factors that affect their external environment and that may represent opportunities or threats. The choice of a strategy to promote and build their capacity and their perception of the strength of the opportunities and severity of the threats that they face are related to their mode of operation and, ultimately, their strengths and weaknesses. These strengths are internal elements. If they are employed in a positive way and are oriented towards the opportunities, they can yield benefits. On the other hand, weaknesses are deficiencies that need to be remedied. The tables below reflect the elements described in the previous section, but in summarized form. They describe the strengths and weaknesses (table 9), opportunities and threats (table 10).

Table 9: SWOT analysis of national statistical systems: strengths and weaknesses

Strengths	Weaknesses
Existence of legal frameworks, legislative provisions and policies that govern statistical activities; Existence of infrastructure to undertake data collection activities (censuses, sample surveys, etc.); Availability of human skills for the collection and analysis of data in the national statistical office and certain sectoral bodies; Existence of cooperative regional and international entities, which are able to provide technical and financial support; Existence of various initiatives aimed at strengthening statistical capacity; Willingness of key stakeholders of statistical systems to collaborate with a view to ensuring cost-effectiveness and efficiency in the production, analysis and dissemination of statistical data.	Shortfall in the availability of basic data and data on development; Limited professional independence of the national statistical offices; Lack of local funding; Inadequate statistical capacity (in human, technical and organizational terms) in most sectoral bodies; Inconsistency of data from different sources and poor quality of data; Lack of statistical information on some key development indicators, including the environment, gender and governance; Low level of data openness; Lack of incentives and capacity to use data.

Source: Compilation by authors.

Table 10 : SWOT analysis of national statistical systems: opportunities and threats

Opportunities	Threats
1. Widespread awareness by officials of the weaknesses of national statistical systems and the urgent need to implement strategies and specific measures to strengthen those strategies; 2. Commitment of regional and international cooperation providers to support statistical capacity-building initiatives, both financially and technically; 3. Emergence of new, non-traditional sources of data that could be used to fill the current data gap.	Inability to attract and retain skilled human resources; Declining investment in statistical capacity-building; Lack of reforms of the legislative framework and regulatory instruments; Lack of commitment to coordination among various stake-holders in national statistical systems; Profusion of initiatives and, above all, lack of coordination among international partners.

Source: Compilation by authors.

Chapter 3: Data revolution to serve the development of national statistical systems and to close the data gap on the Sustainable Development Goals and Agenda 2063

North African countries are called upon to launch a data revolution to establish effective national statistical systems for monitoring progress of the Sustainable Development Goals and Agenda 2063. The main objectives of this revolution must respond to the need to fill the many gaps in terms of legal and policy provisions, governance, human and financial capacity, technologies, data-use tools and platforms, data standards and the use and dissemination of data (IEAG, 2014). The form taken by the data revolution requires, therefore, that it have two components: first, the strengthening of national statistical systems that underpin the monitoring of the Sustainable Development Goals and Agenda 2063; and, second, the creation of international and regional support mechanisms for the production and dissemination of good quality data. Each of these two components comprises three areas pivotal to the Fundamental Principles of Official Statistics of the United Nations and the African Charter on Statistics: the enabling environment, the statistical production process and the use and dissemination of data.

Enabling environments: Adaptation of laws, regulations and standards with a view to creating institutions capable of producing reliable data, of building human, technical and organizational capacity, and of improving the quantity and quality of funding for statistics.

Data production: Setting in place the essential attributes for the credibility of statistics, including methodological soundness, accuracy, timeliness and reliability; harmonizing data collection standards between the national statistical offices and the sectoral bodies; reaching out to non-conventional data sources; strengthening basic statistical programmes.

Use and dissemination of data: Strengthening arrangements for the use and dissemination of data; making use of technology to enhance the impact of data and information.

At the same time, however, the success of the data revolution depends to a large extent on the involvement of policymakers. The importance attached by the political authorities to good quality data has a direct impact on the availability of data and on the manner in which national statistical systems operate. It is the national governments which are ultimately responsible for ensuring that the data ecosystem is capable of producing and using quality data to design and implement policy priorities and monitor their outcomes.

Section I. Foundations of national statistical systems

I. Creating an enabling environment

Action 1: Adapting laws, regulations and standards in order to establish institutions capable of producing reliable data

The existence of adequate statistical laws and their implementation are essential for the establishment of reliable and transparent statistical institutions and bodies. Over the past 20 years, some North African countries have taken steps to reform their national statistical systems (Algeria, the Sudan and Tunisia). Serious problems remain, however, including the lack of functional autonomy and professional independence of their national statistical offices. A second major problem is the status of the national statistical offices in national statistical systems and their capacity to deliver leadership roles and to promote coordination among sectoral statistical structures. Although many national statisti-

cal offices are able to adopt international standards and follow good practices, it is up to them to ensure the promotion and use of these standards by sectoral bodies and to coordinate statistical activities across the national statistical system as a whole.

Given the growing number of public and private sector and civil society stakeholders and organizations involved in the production and use of data in the national statistical systems of countries of North Africa, it is now all the more necessary to pilot new institutional models such as public-private partnerships in the collection of data that are difficult to obtain or outsource data-collection activities. These institutional models will be supplemented by clear instruments, standards and protocols of a legal and ethical nature to ensure reliable statistical production that respects existing standards.

Establishing functional autonomy: To ensure that national statistical offices in the countries of North Africa are protected from any partisan influence, in each national statistical system, the national statistical office could operate independently of the sectoral government ministries and enjoy independence from political and administrative influence, just as the private sector and civil society stakeholders could be independent in the process of producing and disseminating official statistics. To this end, regulatory instruments will be prepared to establish the national statistical office as an independent body with its own budget and reporting primarily to the legislative branch.

From the operational point of view, measures to be taken as part of the reform of the legislative framework relate to the rules for the appointment and removal from office and also on the qualifications and selection procedures of the director of the national statistical office. In particular, the director of the national statistical office could be appointed by a board of directors rather than by the executive branch, provided the executive branch has no objection to that person's candidature. The board may, however, in addition to policymakers and public officials, be represented by academics and representatives of the private sector and civil society. The director should be appointed for a predetermined period of time, which does not coincide with the electoral calendar, and the possible grounds for dismissal should be specified.

Where the exercise of professional independence is concerned, it is above all vital to set in place laws (or to enforce laws already in place for countries that have them) governing compliance with the periodicity and timeliness of the dissemination of statistics, regardless of any political agenda. Certain measures could be taken, in addition to the regulatory framework, relating to communication with users and, more broadly, with civil society stakeholders. The publication of press releases and the organization of press conferences should become routine for the launch of the most important statistical publications.

Ensuring leadership of national statistical offices and promoting coordination among sectoral statistical bodies: The status of the national statistical office and its ability to assume a leadership role and to promote coordination among sectoral statistical bodies is another serious problem in some North African countries. Although the national statistical offices demonstrate a willingness to improve the coordination of statistical activities across national statistical systems, some are finding it difficult to achieve that goal, first, because of the difficulties encountered in managing their own statistical programmes, and also because of the absence of a clear law and regulatory instrument. Most of the laws and legal instruments in North African countries assign a major role to the national statistical offices in the area of technical coordination, including the harmonization of concepts, definitions and classifications, and also the management of directories and administrative records. These laws and legal instruments do not, however, provide for any effective means for the achievement of those tasks. North African countries must revise their legal instruments and pass laws that govern the coordination of the sectoral bodies. A legislative decision which obliges all components of the national statistical systems to harmonize definitions, classifications and nomenclature would strengthen the role of technical coordinator that the legal instruments assign to the national statistical office.

Piloting new institutional models: Models such as public-private partnerships, for the collection of data that are difficult to obtain or the outsourcing of data collection and analysis activities. The national statistical offices and international de-

velopment partners could provide the necessary funding to private entities to manage specific statistical operations (such as open data programmes, data collection, data analysis and others). These partnerships could undoubtedly enhance the operational and financial autonomy of the national statistical offices and maintain, if not increase, their accountability to stakeholders. They may also free up the national statistical offices and reduce the work overload of their statistical programmes, so that they can focus more on monitoring functions, including quality control of official statistics.

Several forms and models of public-private partnerships in the domain of statistics have been piloted (Robin, Klein and Jütting, 2016). Two forms may be particularly effective in North African countries. The first is the outsourcing of activities of the national statistical office: activities typically carried out by the office may be delegated to the private sector. These activities may include the production and collection of basic data, but also the processing and analysis of data from non-conventional sources (such as retail prices reported on the net). The second form is the transfer of databases held by the private sector to the national statistical offices, as the end user, under a protocol that sets out clear terms specifying the objectives of the agreement, the quality of the data, the responsibilities of each party involved and the penalties for non-compliance with the terms of the contract.

Operationalizing the role of the national statistical councils: National statistical systems in the countries of North Africa represent an aggregation of isolated statistical production bodies without a functional reporting relationship. Institutional coordination of the national statistical systems is either not functional or difficult to implement. The institutional coordination of statistical activities is effected, in practice, through the development of a statistical programme. For some countries, implementation of the statistical programme (the Sudan) is totally lacking, while for others it is monitoring and follow-up of the programme that are missing (Egypt, Mauritania, Morocco and Tunisia). A revision of laws and legal instruments is, however, necessary: this must determine the procedures for the preparation, monitoring and follow-up of the statistical programme.

In some countries (Mauritania, the Sudan), coordination among the sectoral statistical bodies and between them and the national statistical offices is based on personal relationships. The revision of the laws is indispensable, to ensure that established agreements are clearly articulated through protocols. Each protocol must specify in detail the characteristics of each collaborative arrangement.

Action 2: Building human and technical capacity

The availability of skilled human resources and appropriate information and communications technology (ICT) is critical to the effective production and dissemination of quality statistics. That applies not only to the national statistical offices, but also to all the sectoral bodies responsible for producing statistics. Despite some progress, the countries of North Africa still lack the skills and infrastructure required to compile good quality data. The 2030 Agenda and Agenda 2063 not only need more data, but also more disaggregated data, and the technical resources and skills needed to make appropriate data available.

Statistical capacity-building is therefore essential. This includes, among other things, investing in human resources and improving the conditions in which the national statistical offices and sectoral bodies operate. Statistical capacity-building efforts should therefore cover the two levels of human and technical capacities. Training and education represent important aspects of capacity-building, ensuring that the staff concerned have the technical knowledge and management skills to carry out the tasks vested in them. The provision of appropriate ICT, in respect both to the equipment and the software applications required, is important in the context of the statistical process as a whole: from the directories (sampling frames) to the stage of analysis and dissemination, through the sampling, collection, processing and storage of statistical data.

Where human capacity-building is concerned, a number of measures could be taken. The first is to explore the possibility of seconding staff members of the national statistical offices to the sectoral statistical bodies and, over time, to create inter-ministerial teams of statisticians. A policy whereby statisticians are deployed across the entire nation-

al statistical system would therefore make good sense. This, however, will require the recruitment of many new staff members, in addition to those needed for the normal activities of the national statistical offices. With regard to training, the establishment of in-service training centres within the national statistical offices is a promising initiative. This initiative should be extended to the staff of the sectoral bodies. Each national statistical office should build partnerships with the training facilities of other more developed countries in the domain of statistics.

Lastly, a career management unit should be established within each national statistical office, with the aim of energizing its human resources. This unit will have the task of developing and planning the careers of staff (to discourage the brain drain), by providing them with motivating opportunities: career profiles adapted to individual tastes and skills, continuous training, mobility within the national statistical system and the administration, participation in projects.

Action 3: Improving the quantity and quality of funding for data

The production, analysis and dissemination of official statistics are insufficiently funded, in particular in countries where the national statistical offices are heavily dependent on external resources (such as the Sudan). This problem is attributable to the fact that the costs of producing data, and also of building and maintaining statistical capacity, are not included in national budgets and development plans, rendering it difficult to identify needs and, by corollary, the resources to be allocated to them. The guidelines issued by the Partnership in Statistics for Development in the 21st Century (PARIS21), (OECD, Paris, 2017, http://nsdsguidelines.paris21.org) also stress that funding for statistics, both national and international, is often earmarked for the collection of data on specific sectors (such as health and education), to the detriment of civil registration and administrative data. This is compounded by the fact that stakeholders in national statistical systems, national statistical offices and sectoral bodies, generally have no resource mobilization strategies for activities with cooperation agencies and technical and financial partners.

For cooperation providers to be capable of producing large volumes of high-quality data, it is necessary to increase their budgets. This can only be achieved by enhancing the transparency and accountability of funding for statistical data. The governments of the countries of North Africa should include data funding in their budgets and development planning and set it as a priority in their national development strategies. Ultimately, the level of funding assigned to statistics demonstrates the importance which public authorities attach to statistics in their list of priorities, and in light of the state of public finances. In order to boost the funding allocated to statistics, the political authorities

Box 16: Adapting laws, regulations and standards in order to establish institutions capable of producing reliable data

1.1 North African countries must adopt national laws and regulations in the domain of statistics that authorize the functional autonomy and professional independence of the national statistical offices and that ensure their leadership role and effective coordination with sectoral bodies, in relation to the harmonization of concepts, definitions and classifications and the management of registers and administrative records.

1.2 These national laws and regulations would sanction the adoption by the national statistical offices of new modes of data collection, to work in partnership with external agencies, including private sector entities, and openly to disseminate the data. Laws on the right to information and open data policies will complement those instruments and ensure that users have access to statistics held by government offices, while ensuring the protection of privacy and confidentiality.

1.3 It is desirable that development partners (OECD, Eurostat, the World Bank and others) and Pan-African institutions (African Development Bank, ECA), assist North African countries in developing appropriate legal and strategic frameworks to ensure compliance. Through substantive dialogue and technical cooperation, they can defend and support the development of broadly representative national statistical systems, underpinned by robust and independent institutions and entities, and also by the necessary monitoring arrangements to ensure that development data will be reliable, inclusive and freely accessible.

should make a clear commitment to the development of their national statistical systems.

The countries of North Africa could also develop innovative instruments to mobilize new sources of funding, including from the private sector. This could include, among other measures, involving the private sector in the generation and collection of data, under the oversight of the national statistical office. Public-private partnerships are therefore a preferred option in the domain of statistics. It would eventually be necessary to develop specific budget lines for the sectoral statistical bodies in the various ministries.

II. Ensuring robust data production

Action 4: Developing the essential attributes of statistical credibility: methodological soundness, accuracy, timeliness and reliability

The establishment of a system of effective and, if possible, independent quality control within the national statistical systems of North African countries is an indispensable measure. This system must perform the role of standardizing and mainstreaming quality control procedures. It must have an appropriate organizational structure (a quality unit), a comprehensive framework and tools for the action plan and for monitoring the quality of the data collected.

Setting in place data quality control measures

Quality units should be set up within the national statistical offices, with the responsibility for maintaining, overseeing and controlling quality in the processes of data collection and analysis conducted by the offices and the sectoral bodies. The sectoral assessment framework developed by the South African national statistical office, Stats South Africa, provides a good example in that regard. This framework prepares improvement plans for public agencies and sectoral bodies and assesses the quality of those entities with the use of a matrix of indicators.

The quality units must be responsible for, first, drawing up a harmonized list of quality indicators for statistical operations; second, ensuring that all surveys are published with their sampling pan; third, that the sectoral bodies include quality indicators in their statistical operations; and, fourth, ensuring consistency between data produced by the national statistical offices and those produced by the sectoral bodies.

It is also necessary to develop a general framework of quality control rules and procedures. The responsibilities under this action plan include quality assessment and improvement, both at the overall level and at the level of the specific areas of statistics. The plan should be detailed, with specific actions, timelines and quality indicators.

Monitoring progress and establishing accountability

Users of statistics, including civil society organizations, think tanks, researchers and private entities, should monitor progress, primarily that of the national statistical offices, in improving data quality, and should hold them accountable for their results. It is therefore necessary that the national statistical offices should include a dedicated page on quality in their websites. This page should provide information to the public on how the national statistical office ensures conformity with the codes of practice and the United Nations Fundamental Principles of Official Statistics.

Action 5: Co]mbining traditional and non-conventional data sources to closes the data gaps

Box 17: Action 2: Building human and technical capacity

1.1 The countries of North Africa should invest in human resources (quantity and quality) and improve the conditions, technology and infrastructure with which the national statistical offices and sectoral bodies operate.

1.2 The countries of North Africa should strengthen and prioritize their basic statistical capacities, including in respect of the skills and technical tools needed for the preparation of censuses, surveys and administrative registers, which are an essential part of the national statistical system.

In order to meet the requirements of the 2030 Agenda for Sustainable Development and Agenda 2063 in terms of disaggregated data, the national statistical systems of North African countries must adopt new technologies and expand their scope of action. They must, in particular, combine data from traditional sources, such as censuses, surveys and administrative data, with other data from new sources, including geospatial information. Earth observations made by satellite and other remote-sensing devices (drones, for example) may be integrated with conventional data from censuses, surveys or other sources; these data can then be analysed and processed by geographic information systems. When combined with household surveys, geospatial data can be broken down according to spatial characteristics such as proximity to a road or population density.

The application of geospatial information and metadata analysis require, however, further advances in various ICT fields. ICTs not only provide the foundation for the data revolution, they are also key to the improvement of public administration services and to the wide dissemination of data and statistics. The national statistical systems of the countries of North Africa should therefore strengthen their capacity in this area.

To meet the challenge of linking conventional socioeconomic data to geospatial data, North African countries need to strengthen collaboration between the official statistics community and the geospatial community. This collaboration will be developed if partnerships and official relations are established between the two communities. They may also be extended to organizations with similar objectives. As part of their efforts to strengthen human and technical capacities, the national statistical offices might consider including a geospatial information system and seeking to develop statistical training activities in the domain of outer space. When developing national statistics plans, the national statistical offices could consider the idea of linking statistical and spatial data, taking into account their priorities in the area of statistical development.

Action 6: Strengthening baseline statistics programmes

North African countries lack the capacity to produce all the data needed for the planning and monitoring of their development programmes, or to inform users of all the outcomes of their statistical activities. The statistical planning and resource mobilization necessary for the implementation of plans are the primary function of a statistical system. These plans should give priority to programmes relating to baseline statistics: censuses, surveys and administrative data, in particular civil registration and vital statistics. These programmes remain essential in national statistical systems; enhancing their efficiency, through the adoption of new technologies and methods, would be an essential task.

Strengthening civil registration systems: At the international level, only a few advanced statistical systems have been able to replace population censuses with the use of data drawn from the civil registration system and other administrative sources. For most countries, including those in North Africa, the population census provides the only opportunity to generate comprehensive demographic statistics detailing important characteristics of the population, such as age, sex and place of residence.

Box 18: Improving the quantity and quality of funding for data

3.1 Enhancing the transparency and accountability of funding for statistical data. The countries of North Africa should include data funding in their budgets and set it as a priority in their national development strategies.

3.2 Boosting public and private resources assigned to statistics, including through public-private partnerships.

3.3 Setting data production as a cross-cutting priority of development cooperation, and developing resource mobilization strategies with cooperation providers and technical and financial partners.

3.4 Establishing a dedicated budget line for the production of statistics for each sectoral ministry.

Source: Studies by consultants.

Civil registration and vital statistics systems are essential for updating baseline demographic data. Any statistical system must be aimed at the exhaustive registration of births and deaths. Timely and reliable statistics are needed to guide public policies and economic and financial decisions.

In strengthen their civil registration and vital statistics systems, the countries of North Africa should implement the Africa Programme on Accelerated Improvement of Civil Registration and Vital Statistics (African Union, 2017). In addition to this regional programme, North African countries can draw on some successful experiences and make use of innovative technologies to improve their national registration systems. Two experiences may be cited here: the online registration of vital events in Rwanda and the use of mobile telephones for birth registration in Uganda.

Strengthening investment in the collection of administrative data: an evaluation of the quality of administrative data in various sectoral bodies has demonstrated a number of constraints, including, first, the lack of data quality control; second, the possibility that only partial data are recorded, or even no data at all (incomplete files); third, discrepancies between definitions and nomenclature with the standards of the national statistical offices, creating the possibility of bias and coverage problems; fourth, lack of timeliness (it sometimes happens that only part – or even none – of the data are received on time). In North Africa, the lack of human and material resources and of adequate equipment and premises poses an impediment to a great many sectoral statistical bodies and the upgrading of these bodies can only be achieved through investments in capacity-building.

III. Making the data more open, more transparent and more accessible

Action 7: Developing strategies for the dissemination of statistical data

The national statistical offices should develop strategies for the dissemination and reporting of data. They should also produce documents that will be made available to users. These documents must include annual plans on published data, including the use of the web site, the schedule for the publication of data and relations with the media. The national statistical offices should also conduct user satisfaction surveys among users and draw up directories of users whom they can consult from time to time to assess their level of satisfaction with the available data and their need for new data. Any delay in the publication of data must be accompanied by a press release with technical details on the reasons for the delay and on the possible new date of publication. Lastly, the national statistical office could consider establishing a data warehouse with a metadata system, granting users access to microdata.

Section II: Regional and international support and funding

The national statistical systems of the countries of North Africa often lack human and financial resources. All countries are dependent, to varying degrees, on the support of cooperation providers

Box 19: Establishing the essential attributes of the credibility of statistics

Stepping up collective efforts to improve data quality

1.1 Setting up "quality units" with the responsibility for maintaining, overseeing and controlling quality in the processes of data collection and analysis conducted by the offices and the sectoral bodies.

1.2 Drawing up a directory of quality-control rules and procedures to monitor, assess and improve the quality of statistical data, both at an overall level and at the level of specific areas of statistics.

1.3 Developing pages on quality in the websites of the national statistical offices. These pages will provide information to the public on how the national statistical offices ensure conformity with the codes of practice.

Source: Studies by consultants.

Box 20: Combination of traditional data sources with non-conventional data could fill statistical gaps on the Sustainable Development Goals and Agenda 2063

Combination of traditional data sources with non-conventional data could fill statistical gaps on the Sustainable Development Goals and Agenda 2063

5.1. North African countries need to strengthen the collaboration between the official statistics community and the community of non-conventional, geospatial data. This collaboration will be developed if partnerships and official relations are established between the two communities. These relations may also be extended to organizations with similar objectives.

5.2 The national statistical offices of the countries of North Africa might consider including a geospatial information system and seeking to develop statistical training activities in the domain of outer space.

5.3. When developing national statistics plans, the national statistical offices could consider the idea of linking statistical and spatial data, taking into account their priorities in the area of statistical development.

Source: Studies by consultants.

for the strengthening of their statistical capacity. Effective support, at sub-regional, continental and international levels, could help to break the cycle of underperformance and lack of resources and prevent national statistical systems from being caught in a vicious cycle.

In the countries of North Africa, the international support provided for statistical data is largely focused on technical assistance, such as support for the preparation of surveys, training, the provision of data management systems and the necessary assistance. Characterized by weak coordination among the providers, support of this kind is targeted at specific sectors (health, education, agriculture and others) and is dictated by the availability of data and not the needs of all the national statistical systems as a whole. Focus is placed on the data needed by the cooperation providers or the national statistical offices. Capacity development is often prioritized to initiate actions to fill data gaps, such as the assessment of poverty rates, rather than to build the capacity of the national statistical office, and in many cases poverty thresholds are calculated by external consultants, while there is no one in the national statistical office capable of updating or continuing the analysis. "With this type of data production – driven by the desire to generate an immediate output needed by the external funder – short-term needs crowd out long-term effectiveness and sustainability" (OECD, 2017). In general, these efforts have not led to a perceptible strengthening of the statistical capacity of national statistical systems. Progress has been slow (but still increasing) and has not helped the countries of North Africa attain the ambitions of the 2030 Agenda for Sustainable Development and Agenda 2063.

In the context of the data revolution, the countries of North Africa need to redefine their approaches to international support to bring them into line with their national priorities, by implementing country-driven data agreements and ensuring that support is duly coordinated. The 2005 Paris Declaration on Aid Effectiveness emphasizes the importance of country ownership and alignment of the activities of cooperation providers.

Box 21: Birth registration by mobile telephone in Uganda

The Government of Uganda, with the support of UNICEF and Uganda Telecom, has piloted the use of mobile phones for birth registration through an application called Mobile VRS. The system is very simple: a mother only needs to reports a birth to a local government notifier immediately after childbirth or when she reports at the hospital with her child (for the child's initial vaccines, for example). The information, which is transmitted by a simple encrypted SMS, is then transferred to a government database. After verification by an administrative official of the hospital, an official birth certificate is printed and given to the person making the report. This simple, low-cost technology has enabled some villages to achieve a birth registration rate of almost 100 per cent.

Source: Studies by consultants.

Box 22: Strengthening baseline statistics programmes

6.1. In their statistical planning, the countries of North Africa should give priority to programmes on baseline statistics, such as censuses, surveys, and administrative data, in particular, civil registration and vital statistics.

6.2. Strengthening of civil registration and vital statistics systems to update baseline demographic data. By registering births, marriages, divorces and deaths, these systems provide the legal basis for citizenship and inheritance, and the right to public services and, by recording the cause of death, provide valuable information to the health-care system.

6.3. The countries of North Africa should step up their investment (human and material) in the collection of administrative data.

Source: Studies by consultants.

Table 11: External support: moving from conventional support to revitalized support

Traditional approach	Data revolution
1. Heavy reliance on technical aspects, such as support for survey design, supply of and assistance with a data management system. 2. Statistical work programme focusing on donor priorities and needs. 3. Low levels of funding; little coordination among providers of development cooperation; limited results-based funding; view of statistics technical aspects of funding. 4. Limited focus on national statistical offices, little attention given to external users.	1. Expansion beyond technical assistance to building partnerships and fostering skills. 2. Support aligned with national statistical plans and priorities; focus on the use and user of data as well as on proper dissemination and format (disaggregated, open, geospatial integration). 3. Increased support (domestic, international, private) for statistics; increased use of new funding mechanisms with a results-based focus; statistics seen as key means of achieving the Sustainable Development Goals. 4. Country-drive strengthening of national statistical systems.

Source: OECD, 2017.

Action 8: Increased use of results-based funding arrangements

The countries of North Africa may use funding modalities based on the attested impact on the production of good quality data or promotion of the dissemination and use of data. Results-based funding arrangements link the results of the statistical capacity-building programme to the funding. Funding should be contingent on the quality of the results and should reward good results. Political leaders must specifically demonstrate that aid earmarked for statistical capacity-building is used for that purpose. Suppliers need to know how their financial assistance has been used and with what results.

The Kenya Statistics Program-for-Results operation provides a good example that North African countries may follow. The programme aims to strengthen the statistical capacity of the national statistical office in Kenya – the Kenya National Bureau of Statistics – and comprises six pillars: first, remedying deficiencies and filling data gaps; second, improving the quality of data by boosting the processes of their production and collection; third, mainstreaming statistics in ministries and agencies; fourth, expanding communication, dissemination and access to statistical information; fifth, strengthening

Box 23: Developing strategies for the dissemination of statistical data

7.1. The countries of North Africa must increase their capacity to produce updated and reliable data and statistics. They must adopt a culture of openness, sharing data freely and forging partnerships with other data producers.

7.2. The countries of North Africa should promote the use of data for decision-making by involving users within and outside of Government and by implementing programmes that aim to develop the understanding and use of statistics.

Source: Studies by consultants.

Box 24: Use of results-based funding arrangements

8.1. The countries of North Africa should identify measures and strategies to strengthen statistics that meet their needs and provide guidance to aid providers. Partners should respect the national priorities for managing the supply of statistics, while investing in statistics in line with those priorities.

8.2. Aid providers should make arrangements to monitor and evaluate progress in efforts to strengthen statistics, compared to the baseline situation.

Source: Studies by consultants.

human resources and physical infrastructure; and, sixth, improving governance.

To this end, the countries of North Africa could participate in the Statistics for Results Facility Catalytic Fund programme to surmount the funding difficulties of the statistical capacity-building plans of their national statistical systems. The programme, managed by the World Bank on behalf of a number of funders, gives priority to results-based management in relation to development assistance and the PARIS21 Declaration on Aid Effectiveness. The Statistics for Results Facility Catalytic Fund programme provides grants for the following purposes:

- To catalyse support for the implementation of the national strategy for the development of statistics or comparable plans for the development of statistics;
- To promote an approach that reaches across the entire national statistical system;
- To promote better coordination and enhanced partnership between users and producers of statistics;
- To provide guidance and more effective and efficient technical assistance to strengthen statistical systems and the measurement of results.

Action 9: Developing innovative financing arrangements to leverage more resources for data

The countries of North Africa could explore the possibility of establishing domestic funds for the development of statistics. Since the adoption of the African Charter on Statistics in 2009, some African countries have decided to set up funds of this type in variety of different forms: as allocation accounts housed in the treasury and managed in accordance with public accounting rules or those of public institutions.

Other innovative financing arrangements, such as peer-to-peer support for statistical capacity-building, could offer promising solutions.

Box 25: Action 9: Developing innovative financing arrangements to leverage more resources

The countries of North Africa could establish domestic funds for the development of statistics. Those funds could take the form of allocation accounts housed in the treasury and managed in accordance with public accounting rules or those of public institutions.

Source: Studies by consultants.

Conclusion

Reliable data, collected in accordance with the rules of good practice and recognized methods and standards, are essential to results-based management. The use of statistics makes it possible to assess a country's level of development and assist in the development, monitoring, evaluation and measurement of development policies in the economic, demographic, social and environmental domains.

Despite advances in the volume of data available in the countries of North Africa, the various components making up the national statistical systems continue to face the challenges of development. Some of the countries of North Africa[8] have problems collecting data regularly and efficiently.

The reasons for this are manifold: shortcomings and inconsistency of the regulatory, legislative and policy framework; poor institutional coordination arrangements; limited and unpredictable budgets; staffing shortages; insufficient supply of equipment and inadequate infrastructure; insufficient attention given to quality; inadequate alignment of classifications, concepts and definitions; and the lack of harmonization of data collected from various sources.

The Sustainable Development Goals and Agenda 2063 are severely testing the national statistical systems of North African countries. All the countries lack data for a large number of the indicators. Significant methodological and strategic challenges remain, including the need to reconcile the production of data necessary for monitoring regional and global goals and the production data needed for public purposes at the national level.

Statistical data are essential for the monitoring and evaluation of progress towards the United Nations 2030 Agenda for Sustainable Development and Agenda 2063 of the African Union. One of the requirements of these programmes is the need for quality data, disaggregated and easily accessible to users for monitoring the attainment of targeted objectives.

The present report, "The data revolution in North Africa: putting data at the service of structural transformation", reviews the current status of national statistical systems in the countries of North Africa. It recommends key measures and actions that could be implemented to close the data gap and strengthen the statistical capabilities of national statistical systems of those countries.

The data revolution makes it possible for governments and national statistical offices to produce more useful data from new sources, tools and innovative technologies, which should complement and strengthen official statistics, and not be a substitute for them. New technologies and new methods for the collection of data, including geospatial data (by satellite imagery), telecommunications data and sensor data mean that the production of data is easier, faster and less costly.

All the recommended actions were identified during various missions undertaken to the national statistical offices and ministerial departments of North African countries concerned with the Sustainable Development Goals. They require preliminary awareness-raising measures for the political authorities. The importance attached by the political authorities to good quality data has a direct impact on the availability of data and on the manner in which national statistical systems operate. In this regard, the development partners (OECD, Eurostat, the World Bank and others) and Pan-African institutions (African Development Bank, ECA) have an important role to play in ensuring the effective involvement of policymakers and decision-makers, in the process of strengthening the capacity of national statistical systems and enhancing the quality and quantity of statistics, to ensure that all areas are covered.

8 Libya, Mauritania, the Sudan.

The priority areas for improvement identified by the national statistical offices primarily relate to institutional issues. The recommended actions in this regard relate to the adaptation of laws, regulations and standards in order to establish institutions capable of producing reliable data. There is also need to ensure the operational autonomy and leadership of the national statistical offices and to promote coordination among the sectoral statistical bodies. As for the national statistics council, it is important to make it operational and to ensure that its membership is sufficiently flexible to facilitate such meetings.

Capacity-building is essential to the successful production and dissemination of good quality statistics. This applies not only to the national statistical offices, but also to all the sectoral bodies responsible for producing statistics. Despite some progress, the national statistical systems of the countries of North Africa lack the skilled professionals (statisticians, demographers) needed to produce high quality data.

Further needs have been identified by the national statistical offices relating to the widespread use of new technologies such as the automatic scanning of documents, the decentralization of data production and use, and the establishment of a directory with a unique identifier and one that is updated over time. It should also cover certain variables such as turnover, employment and occupation. At the same time, it would make sense to improve access to the administrative records of technical ministries and to ensure better recognition of the needs of users in the public and private sectors.

Where the monitoring of indicators of the two programmes is concerned, it would be essential to set up a body responsible for the preparation of such indicators and for follow-up. This body would be made up of representatives of the national statistical systems. The objective would be to mobilize all traditional sources (censuses, surveys and administrative statistics), but also to make use of non-conventional data made possible by the data revolution to fill the statistics gaps relating to the Sustainable Development Goals and Agenda 2063.

Where the data revolution is concerned, the national statistical offices of North African countries have expressed their wish to take advantage of the benefits offered by the production of certain statistical indicators. The implementation of this revolution requires many innovations, two of which are of particular importance. The first is the rethinking of the traditional concept of national statistical offices, responsible for centralizing all official data that are collected and reported. The allocation of that prerogative to so-called "data communities" made up of people from all organizational walks of life (private sector, non-governmental organizations, the scientific community, national statistical offices and other government agencies) would seem to be the most appropriate approach. The second approach is based on the principle that these data produced by communities could be accepted as a source of official statistics, provided that they are approved by the national statistical office.

A genuine data revolution would draw upon new data sources in addition to those already in existence and would push for the full integration of statistics in decision-making, to promote open access to and use of the data and to provide substantial support for statistical systems. This revolution focuses on statistical capacity-building and promotion of the statistical culture of "small data" and the analysis of big data, the upgrading of data collection systems, and the dissemination of data to promote transparency and develop new targets and indicators.

This new data environment should encourage national statistical systems to adapt so that they meet user needs. They shall also be required to employ new approaches to the performance of statistical operations, such as keeping records of telephone calls by mobile telephone operators. Survey and census data are likely to remain the principal source of information. Systems for the collection of administrative data should also be developed with a view to the consolidation of new data sources.

If full advantage is to be taken of the data revolution for the development of national statistical systems, a road map is required, setting out the actions to be taken, in particular those desired by the national statistics office:

- Raising the awareness of governments of institutional aspects of the organization of statistics, to ensure an effective response to the needs of users, to new demands and to the opportunities offered by the data revolution;

- Capacity-building in the use of new technologies for the collection, compilation and dissemination of data, to develop proficiency in use of the tools of the data revolution and in data analysis;

- The provision of assistance for the development of sectoral action programmes that apply to a particular sector, such as education, health and agriculture, and which take the form of sectoral development programmes (vital statistics, non-governmental organization statistics, environment statistics, business statistics, culture and communication statistics, satellite accounts and others);

- Assistance in drawing up an agreement (which brings together all stakeholders of the data ecosystem: national statistical offices, public administrations, the private sector, civil society, donors) for the coordination and harmonization of efforts to invest in data;

- Encouraging the sharing of experiences and good practices in the coordination and harmonization of statistics by stakeholders of the national statistical system;

- Strengthening of international cooperation, in particular South–South, between the countries of North Africa.

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Annex

United Nations Fundamental Principles of Official Statistics

Principle 1. Official statistics provide an indispensable element in the information system of a democratic society, serving the Government, the economy and the public with data about the economic, demographic, social and environmental situation. To this end, official statistics that meet the test of practical utility are to be compiled and made available on an impartial basis by official statistical agencies to honour citizens' entitlement to public information.

Principle 2. To retain trust in official statistics, the statistical agencies need to decide according to strictly professional considerations, including scientific principles and professional ethics, on the methods and procedures for the collection, processing, storage and presentation of statistical data.

Principle 3. To facilitate a correct interpretation of the data, the statistical agencies are to present information according to scientific standards on the sources, methods and procedures of the statistics.

Principle 4. The statistical agencies are entitled to comment on erroneous interpretation and misuse of statistics.

Principle 5. Data for statistical purposes may be drawn from all types of sources, be they statistical surveys or administrative records. Statistical agencies are to choose the source with regard to quality, timeliness, costs and the burden on respondents.

Principle 6. Individual data collected by statistical agencies for statistical compilation, whether they refer to natural or legal persons, are to be strictly confidential and used exclusively for statistical purposes.

Principle 7. The laws, regulations and measures under which the statistical systems operate are to be made public.

Principle 8. Coordination among statistical agencies within countries is essential to achieve consistency and efficiency in the statistical system.

Principle 9. The use by statistical agencies in each country of international concepts, classifications and methods promotes the consistency and efficiency of statistical systems at all official levels.

Principle 10. Bilateral and multilateral cooperation in statistics contributes to the improvement of systems of official statistics in all countries.