

Appendix 2. Potential indicators

This appendix considers the input chosen for this study to discuss the existing indicators and those that could be added to capture the Lake Chad region's dynamics. The proposed options consist sometimes of collecting and managing (organising, analysing, and disseminating) existing data and other times of creating data where they do not exist. The main indicators are summed up in Table 2 at the end of the appendix.

1. Security and governance

1.1. Violence monitor

Given that the reconstruction possibilities for the regions bordering Lake Chad depend first and foremost on how the security situation evolves, consideration needs to be given to monitoring indicators. Leading centres of peace studies all maintain that the number of deaths due directly to armed conflicts is the only indicator that can reasonably be used for comparisons to identify trends in violence in a country or region and from one period to the next. The fact is that violence is multifaceted, and its non-lethal manifestations are too many and varied to be able to establish universally recognised categories. Interpol, for example, had to abandon the publication of comparative tables on world crime rates, because the definition of what constitutes a crime varies enormously from one country to the next. In Nigeria, adultery with a married woman can carry the death sentence under Sharia law in the north, but a mere reprimand from a cleric in the south. The practices of private security companies, which generally focus on the number of attacks, are just as confused, as they basically lump together lethal and non-lethal incidents.

Experts at the Stockholm International Peace Research Institute (SIPRI) and Every Casualty Worldwide (ECW) therefore concentrate on conflict-related excess mortality to identify trends. Their databases, without claiming to be comprehensive, are based on “passive monitoring”, which consists of recording, archiving, and coding incidents for the most part reported in the media and open sources. This methodology differs from victimisation surveys and insecurity polls, which take a snapshot of the situation at a given time but cannot be used to track trends. In addition to the usual problems of sample representativeness, perception surveys

in particular sometimes return findings entirely different from the reality—such as in France, where the feeling prevails that criminal violence has increased when homicide rates are actually on the decrease from one decade to the next. It is well known that temperatures felt can artificially rise and fall depending on wind and rain factors. Qualitative interviews in the regions bordering Lake Chad could consequently reveal a heightened awareness of land conflicts. Yet an upward trend can only be confirmed where there is a definition and accurate count of the lethal clashes actually due to competition for control over land.

In the absence of police and military statistics, it is therefore important to develop “passive monitoring” systems in the zone’s four countries. Such a tool already exists with the University of Ibadan’s www.nigeriawatch.org database, managed by the Institut Français de Recherche en Afrique (IFRA). Unlike the Armed Conflict Location and Event Data Project (ACLED), which produces only aggregate statistics, the NigeriaWatch project monitors the ECW charter standards and publishes its sources for each piece of data so that information can be checked on a case-by-case basis, a basic scientific principle. Constantly updated by Nigerian (rather than French, Swedish, or British) researchers, it also has more comprehensive and longer-term information on Nigeria. An extension of the project to Cameroon would be perfectly conceivable, based on the media coverage of a newspaper that is highly active in the north, *L’Œil du Sabel*. A feasibility study would be necessary for Niger and Chad, since the humanitarian organisations’ reports do not cover long enough periods to be able to identify trends. Obviously, the statistics produced in this way would have to be put to qualitative analysis. The Centre for Peace and Security Studies at the University of Yola (Modibbo Adama University of Technology) and the Centre for Peace, Security and Integration Studies and Research at the University of Maroua are well placed to do so. They could also round out the mechanism with studies on access to justice and courts.

1.2. Local governance

Development operators generally monitor shifts in the political contexts surrounding their interventions with weekly, monthly, or quarterly situation reports. This strategic work could be improved upon by posting and storing monographs and available studies on a website, whether Chatham House, Transparency International, DFID, or USAID surveys on corruption and justice in Nigeria, or African Union polls on perceptions of governance and security in French-speaking countries. A combination of qualitative and quantitative analyses would also be useful. It would be interesting to investigate the extent to which elections have positive effects on the legitimacy and workings of the public institutions. Analysis of the media and social networks would speak volumes in this respect.

Failing election observation missions, the development of local governance could be monitored by simple, closed questions administered to partners at the

universities of Diffa, N'Djaména, Maroua, Yola, and Maiduguri, essentially on the following:

- National, regional, and local election timeframes
- Actual length of terms of office
- Identification and mapping of the levels of elected and non-elected local administration positions
- Percentage of women in elected office, etc.

1.3. The political economy of the zone

It is important to monitor the zone's political economy, since it largely determines the intervention environment for the development operators. The problem is that the region suffers from a great deal of tax and fiscal opacity, with local officials hardly used to being accountable. However, local university partners could do some institutional groundwork by administering simple, closed questions to find out, for example, whether the different local administrative levels in the four countries publish budgets including their revenue and expenditure. The data available could be online on a joint website. The model for this is the excellent work by BudgIT (yourbudgit.com), a Nigerian initiative designed to both inform and educate the public about their fiscal transparency rights pursuant to the Freedom of Information Act signed in 2011. It would also be interesting in the study zone to collect and compile the evaluation reports on the different development projects funded by international, national, and local operators. This would be a world first, since it has never been successful in the other crisis regions for want of standardised procedures and political will on the part of the donors.

2. Climate and environment

The Chari River's discharge at the N'Djaména TP (*Travaux publics*) gauging station is an aggregate indicator of total annual rainfall over the basin (at peak flow or annual discharge). This measure could be coupled with readings of a gauging station on the Cameroonian side opposite the Chadian gauging station in order to secure data collection. Although this data cannot describe the distribution of rainfall over the season, an important productivity factor, it does provide a good approximation of total harvests and informs the lakeside populations in late October as to what the lake's high-water level will be from December (southern pool) to March (northern pool). The development of the telephone network is enabling the expansion of this informal warning network.

AGRHYMET agro-meteorological maps (quarterly forecasts and reports based on satellite and field data) usefully supplement the above indicator by specifying the distribution of useful rainfall in time and space. They are no doubt more

reliable than the national agricultural statistics, which also arrive late. They serve mainly to inform farmers of the advised sowing calendar at the start of the crop season.

Satellite altimeters provide a good estimate of water levels in the lake's southern pool, but not for the northern pool for which there has been no direct observation of water levels since 1976. Setting up one or more gauging stations or recorders managed by the local agencies of the national department of water resources would make for a debate based on observed data. Similarly, data on water levels at the Tildé station for El Beid, a tributary of the Yaere, would be useful to evaluate the flood in this system.

Climate change has begun to raise temperatures in different parts of the globe. It is essential to have more precise information on the effect of this phenomenon on the Chad basin (with a suitable network of regularly monitored meteorological stations) to be able to adjust potential agricultural adaptation measures and contribute to knowledge of the climate in this region, which currently provides very little input to the databases used for global models.

3. Production systems

The study zone's four countries have more or less good-quality systems within the Famine Early Warning Systems Network (FEWS NET) for monitoring agricultural and livestock production at local level. Their indicators are based on the findings of geo-referenced field surveys. In Niger, for example, they inform the Permanent Inter-State Committee for Drought Control in the Sahelian Zone (CILSS) early warning systems (EWS), in place since the droughts of the 1970s and 1980s to prevent and manage food crises. This system has been put to the test on a number of occasions, especially during the 2005 food crisis when the system's flaws were identified and corrected. Today, this early warning system is held up as a model and operational example for all the Sahelian countries. It is based on a set of indicators that compile satellite observations and local field data on:

- Vegetation, monitored by satellite by AGRHYMET since 1985, to evaluate cropland and pastureland production to provide advanced warning of food crises for people and animals. A fortnightly bulletin is issued at regional level starting in May for a three-month period to provide information on:
 - The development of the rainy season (field data on rainfall)
 - The NDVI (Normalized Difference Vegetation Index), which characterises vegetation cover based on the progression of the Intertropical Convergence Zone (ITCZ) and estimation of the production of biomass
 - Estimates of forage and cereal output.

- Stockbreeding. Each region has a trained, supervised, equipped team (GPS, computers, compasses, and motorcycles) in the livestock ministry’s regional delegation, supported in each department by livestock agents who collect data for the following indicators:
 - Onset of the rainy season (arrival of the rains and establishment of grass cover)
 - Surface water supply (qualitative index)
 - Animal health (pockets of disease)
 - Animal movements
 - Terms of trade for livestock/cereals (based on data from the agricultural market information systems—AMIS—and the livestock market information systems—LMIS).

This early warning system is integrated into the National Food Crisis Prevention and Management System (DNPGCA), in conjunction with the Food Crisis Unit (CCA), the National Food Products Board of Niger (OPVN), the AMIS, and the LMIS. Community-based early warning and emergency response systems (SCAPRU) were created in connection with decentralisation and the experience of crisis management in 2005. They inform the observatories and form the base level of the information that is then passed up through the departments and regions.

Although the presence of aid in the Diffa Region before the Boko Haram attacks in 2015 provided a gauge of the scale of the crisis and a way to quickly respond to needs, the data collected by the early warning system also help identify significant changes in production systems:

- Biomass monitoring shows the changes in the availability of resources in a context of high climate variability.
- Agricultural and livestock market price monitoring provides information on the ratio of supply to demand, on constant prices reflecting stable production levels, on sharp price drops indicative of localised overproduction, and on sharp price rises due either to a deficit of production or strong demand.
- Livestock-to-cereals terms of trade to the disadvantage of stockbreeding indicate an impoverishment of herders, which, if they were to continue, would point to possible capital loss.

These indices produced routinely in Niger are available from the different institutions that produce them (AGRHYMET, AMIS, LMIS, and the livestock ministry). The information produced warrants analysis independently of the food crisis system, to detect crisis situations for production systems and hence social groups and geographic sectors.

Although all the Sahelian countries have known of the model since the late 1980s, uptake has been laborious outside Niger. Burkina Faso has adopted it just recently, and Chad recently asked Niger for a training mission to kick-start their early warning system. Nigeria and Cameroon's systems are not operational. In Niger, market prices are collected by the WAMIS-NET¹⁵³ network, but the series are added to as and when projects take charge of data collection. Chad and Cameroon are not members of this network. In Cameroon, prices are collected on the markets by the agriculture and livestock services at arrondissement level, but only a fraction of them are digitised at too slow a pace to be able to be used as monitoring indicators and with no interaction between the different levels (local and intermediate levels send the data only to central level). In Chad, prices are monitored and broadcast by rural radio.

It is possible to improve these information systems, but this will require some years of experimentation.

Other possible production system indicators amount to ad hoc monitoring on representative sites by a regional system.

4. Mobility and migration

Existing data on migration and mobility are scattered and seldom updated.

General population and housing censuses (RGPH) generally provide information in each country on:

- The percentage of inhabitants born in other regions (place of birth)
- The percentage of inhabitants who have changed region in a shorter space of time (previous place of residence)
- The population situation at time t (current place of residence)
- The percentage of foreigners and their origin by region (immigration evaluation)
- Differentiation, in some cases, between types of migrants (permanent or temporary migration)
- Deduced net migration by region.

However, these censuses:

- Are national, and therefore unsuitable for regional comparison
- Vary in reliability depending on the country and the year

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¹⁵³ Network of 15 West African countries. See the website: www.resimao.net

- Cover variable time periods, depending on the countries and their statistical data production capacities
- Lack availability with respect to the oldest of them, due to a lack of archiving.

A first step on the road to building migration indicators would be to collect all the censuses taken on the countries in the region (available library archives) and conduct a comparative analysis to produce a short summary of long-term migratory trends in the Lake Chad region (emigration/immigration; interregional migration; and urbanisation and rural population growth). This first step would provide a simple IT tool for the compilation and analysis of existing data on migration (past censuses), capable of incorporating future census data.

Other data on migration come from the humanitarian players. They focus on displaced and refugee populations. The United Nations Office for the Coordination of Humanitarian Affairs (OCHA), UNHCR, and the IOM propose generally systematic data on forced changes of residence: numbers of displaced persons and refugees, hosting forms (cities, sites, camps, etc.), location, and so on. These data provide rough figures on forced migration but suffer from a lack of more qualitative analyses of forced migrant pathways. Well-sampled multi-site surveys could help understand what becomes of displaced and refugee populations (return dynamics, socio-economic trajectories, and access to services). These surveys could be conducted in coordination with NGOs producing good-quality, detailed, and mapped data on the displaced persons and refugees, such as the International Displacement Monitoring Centre and Reach Initiative. They could be rounded out by work to improve the compilation and study of the generally vast, scattered, imbalanced, and rarely archived grey literature produced by NGOs, in a database in cooperation with OCHA (and its websites <http://reliefweb.int> and <https://www.humanitarianresponse.info>).

In addition, information on certain migration phenomena remains sketchy despite their socio-economic importance: seasonal mobility (agricultural and pastoral) and sudden mass migration phenomena (due to climate crises, discoveries of extractive deposits, etc.). Regular seasonal mobility data collection could be organised at some sampled sites (crossing points, and source and destination areas) in order to analyse productive dynamics. Sudden migration phenomena could be studied by ad hoc reactive surveys at migrant arrival sites to identify their places of origin, their mobility, the length of their migration, their migration networks, and their socio-economic trajectories.

5. Trade and trade traffic

On the whole, little is known about trade movements in the Lake Chad region despite their importance to productive dynamics and regional integration.

Aside from qualitative surveys, the only tool that exists to attempt to fathom trade dynamics is the monitoring of agricultural and livestock prices on the markets (national monitoring, as in Niger, and FAO monitoring in each country with the food price information systems). However, price trends are affected by a wide range of factors extending far beyond the mere conditions of trade themselves: productive questions, monetary situations, and political constraints. Other more ad hoc information provides some indication of security conditions in transport (NGO accessibility map) and export–import movements (customs and data that can be accessed only locally).

There is therefore a need to create a trade traffic monitoring system in the Lake Chad region, taking a sample of roadside and market observation sites in order to:

- Check price trends
- Check the state of roads and progress with rehabilitation projects
- Take road, river, and lake counts
- Count checkpoints and legal/illegal levies
- Evaluate transport costs
- Analyse marketplaces (number of vehicles, diversity and origin of products, etc.).

These elements could be entered in a geographic information system on trade traffic trends in the study region. Once the methodological protocol is in place, the data could easily be collected by local correspondents (selected traders, producers, and transporters) with university oversight. The trade traffic monitoring system in the Lake Chad region would provide insights into the economic dynamics between territories, transport costs, production sector trends, market hierarchies, and the territories' integration and segmentation dynamics. It could also be used by the international aid players to improve the way they adjust the nature of their interventions to local economic situations (type and length of aid, geographic perimeter, etc.).

6. Health, education and access to services

A great deal of information is produced by governments and international players on access to services. This information can on the whole be separated into sophisticated data produced for specific purposes—requiring too much collection and processing work to lend itself to regular monitoring—and very basic data of

varying quality produced by government bodies. Their poor quality (especially, but not exclusively, in Nigeria) is such that there is a need for data to be produced based on a sample of representative sites. A particular challenge, therefore, is to identify the most significant, reliable, and straightforward data to be collected.

In public health, for example, multiple indicator demographic and health surveys (DHS-MICS) produce particularly useful detailed data that is partially spatial: geographic differences between the capital and other cities, urban and rural areas, and regional differences are presented for many of the indicators (surveyed households' general socio-economic characteristics, fertility, reproductive health, child health, breastfeeding, nutrition, malaria, child labour, domestic violence, female status, etc.). Studies of this kind were conducted in Cameroon in 2011, Niger in 2012, Nigeria in 2013, and Chad in 2014, with the support of partners such as, in the case of Chad, USAID, UNFPA, UNICEF, AFD, Switzerland, the World Bank, and the Global Fund to Fight AIDS, Tuberculosis and Malaria. Yet the survey mechanism is both heavy and focused on health issues (although, as mentioned, it does provide broader social and demographic information). This means that it cannot be used for regular monitoring (e.g. on an annual basis) to measure trends in access to services, even in the field concerned.

We therefore propose here several indicators, ranging from the simple to the sophisticated, which can measure the development situation and access to services in the four countries on an annual basis:

SMART surveys (measuring mortality, nutritional status, and food security in crisis situations) are based on methodology developed by UNICEF in response to specific challenges and contexts.¹⁵⁴ They can be used as an indicator of children's health and the food situation in the Lake Chad region by choosing sites representative of the range of regional situations. The question here regards uptake of the method by local teams.

In health, the number of health workers per capita (doctors, nurses, and midwives) provides information on the government's investment. This can be supplemented by the theoretical average range of health centre action, which captures average distance to different levels of health centre and therefore the extent of exclusion of part of the population.

The rate of access to clean water is a simple indicator that speaks volumes about changes in living conditions. It also measures investment by government and its partners in the water sector and changes to their project implementation capacities. It provides information on both female health and the situation of women (for whom an improvement in the clean water supply frees up time for other activities), and it can be monitored annually based on national statistics from the hydraulic or water ministries.

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¹⁵⁴ <https://smartmethodology.org/about-smart/>

Access to sanitation is also a highly useful qualitative indicator for monitoring housing quality and urbanisation trends. Relatively harmonised government data can generally be found in this area.

Access to energy is not a very easy area to handle. Access to electricity, for example, is often theoretical when there are frequent electricity cuts due to management difficulties and periods of tight supply to demand. In addition, there is not always a proven link between electrification and economic development.

Key education indicators need to correspond to the different levels of the education pyramid, considering differences between boys and girls in each case. In primary education, for example, this means reporting on gross enrolment rates and pupil–teacher ratios. In secondary and higher education, these indicators could be rounded out by other data to improve student category monitoring.

University records should provide the information required to track student numbers, but also social and geographic origin, given that distance can say a great deal about the capacity of universities and cities to provide prospects for social ascension to young rural populations. Similarly, it would be interesting to track such elements as the proportion of grants or scholarships and the number of strike days. The collection, organisation, and processing of these data could be assigned to teaching teams at the universities and regional schools.

With respect to private services, a map of mobile phone network coverage would be useful to determine relative isolation and disconnection trends. However, this depends on the operators' willingness to share their data. Moreover, there is no one telephone operator present in all four countries bordering Lake Chad. Orange, for example, operates in Niger and Cameroon but, to our knowledge, not in Nigeria or Chad. Short of having data provided by the operators, information could be collected on the ground by simple surveys of regional nodes such as weekly markets.

Last but not least, data on the number of financial establishments, banks, and savings and credit institutions, along with theoretical access distance for inhabitants, are useful to determine socio-economic integration. These data probably exist (World Bank), but would need to be analysed at study space level.

7. Inequalities, cultural dynamics, and social relations

Existing data are rare and difficult to aggregate for country comparisons. The number of formal jobs, for example, is generally available at national but not sub-regional level. Evaluation of the informal sector remains poor. Nevertheless, available statistics such as the age pyramid could be used to assess the scale of the challenges awaiting young people on the labour market. Sex ratios are also useful for gender analysis.

Data on cultural dynamics are important to understand relations between groups. With a sharp increase in Hausa in the zone, languages used in trade can reveal such factors as the development of social and community-based hierarchies to the disadvantage of linguistic minorities. The same holds true for school enrolment rates, which often determine access to the civil service and government institutions. The difficulty here is that ethnic and linguistic maps are not updated and are often misleading when they draw set lines. The reality on the ground is much more fluid than the picture of compartmentalisation, especially in exogamous societies.

In these circumstances, it is important to set up monitoring systems, which would prove very expensive for some. However, simple indicators could be developed in the religious and associative areas:

- Number and types of places of worship in control municipalities such as Diffa, Damaturu, Gombe, Marre, Gwoza, Mubi, Bol, Kousseri, and Maroua
- Identification and analysis of the main purposes of their Islamic and Christian organisations
- Number of operational local NGOs found in Maiduguri, Damaturu, Gombe, Yola, Garoua, Maroua, Diffa, and N'Djaména.

Table 2. Summary of the main proposed indicators

<p>Security</p> <ul style="list-style-type: none">• Location and levels of lethal violence: passive monitoring systems tracked in Nigeria and developed in the neighbouring countries.• Access to justice: ad hoc studies conducted. <p>Governance</p> <ul style="list-style-type: none">• Strategic reports: produced on a weekly, monthly, or quarterly basis.• Monographs, available studies, project and programme evaluations: compiled, archived, and published online.• Media and social networks: qualitative and quantitative analysis.• National, regional, and local elections: identification of elected and non-elected entities; tracking of election timeframes, lengths of terms of office, and percentage of women in elected office or standing for election.• Local administration fiscal transparency: current state of affairs and identification of problem areas. <p style="text-align: right;">.../...</p>

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Climate and environment

- Rainfall: discharge of the Chari River at N'Djaména coupled with readings on the Cameroonian side and water level recordings in the lake's northern pool and at Tildé.
- AGRHYMET agro-meteorological maps.

Production systems

- Agricultural and livestock prices on the markets, biomass, animal movements, etc.: early warning systems tracked in Niger and developed in the other countries or otherwise supplemented by ad hoc surveys.

Mobility and migration

- Emigration/immigration, interregional migration, urbanisation and rural population growth: summary drawn up and onlined, based on census data.
- Humanitarian monitoring of forced displacements.
- Seasonal agricultural and pastoral mobility developed at sampled sites.

Trade and trade traffic

- Price trends, state of roads, and transport costs—developed based on road, river, and lake counts, including the number of vehicles, product diversity and origin, and estimates of legal and illegal levies.

Health, education, and access to services

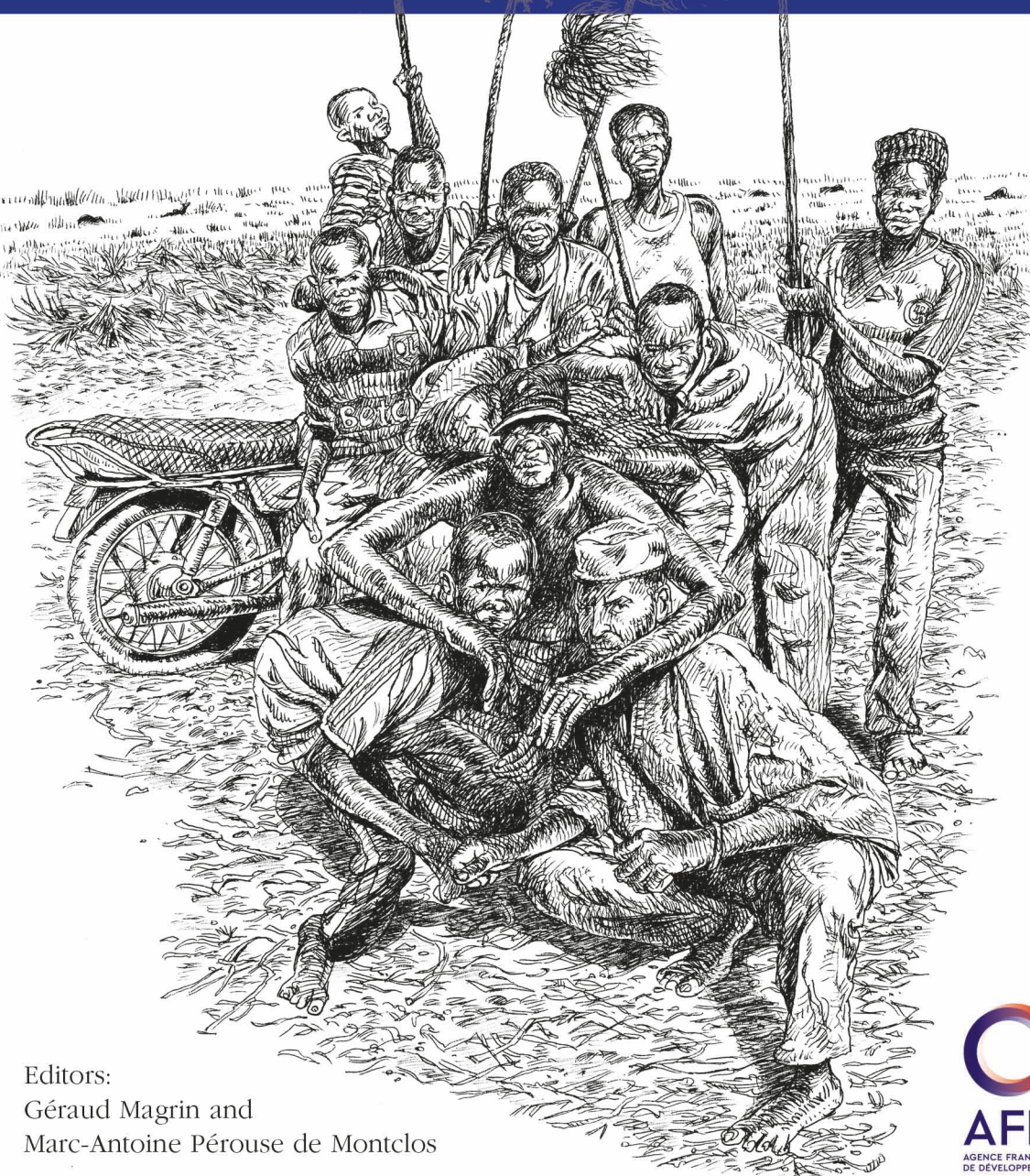
- Demographic and health surveys, nutritional data and food security monitoring by UNICEF.
- School enrolment rates, pupil–teacher ratios, etc. rounded out and tracked at higher education level.
- Telephone and banking networks mapping.

Inequalities, cultural dynamics, and social relations

- Age pyramid and sex ratio.
- Formal employment developed by disaggregating available data at sub-regional level.
- Mapping of the number and type of places of worship and religious NGOs.

Crisis and Development

The Lake Chad Region and Boko Haram



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Foreword

This report covers the benchmarking study on the Lake Chad region drawn up by the Research Institute for Development (IRD) under the terms of reference provided by the French Agency for Development (AFD). The main findings were obtained from workshops and field missions conducted from March to June 2017.

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