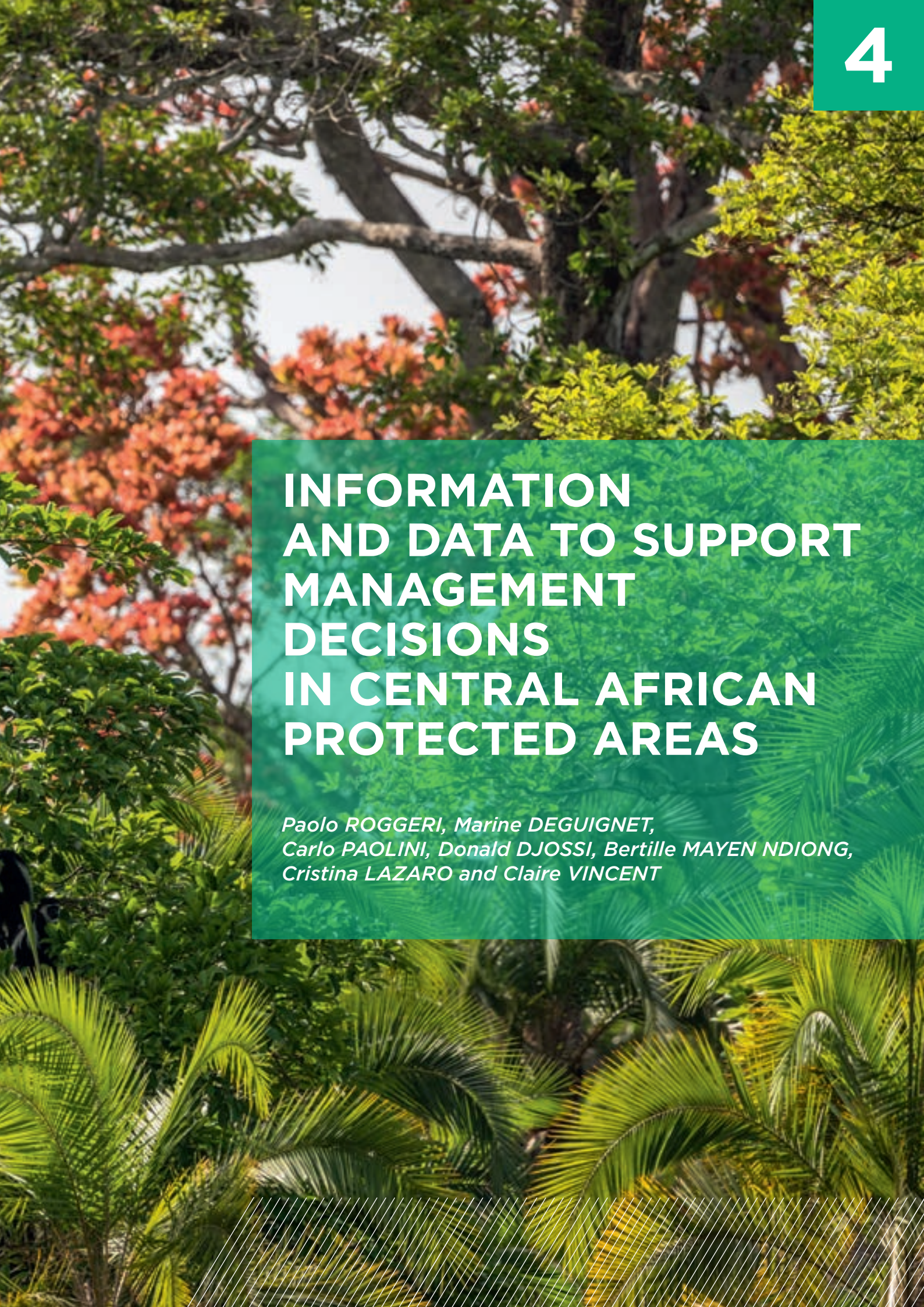

4

INFORMATION AND DATA TO SUPPORT MANAGEMENT DECISIONS IN CENTRAL AFRICAN PROTECTED AREAS

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Biodiversity conservation is a major challenge for policymakers in Central African countries. In a context of chronic underfunding, information plays a crucial role in ensuring the effectiveness of interventions and investments. The use of information is vital for a number of reasons: information supports all decisions related to planning and management, it helps to target and calibrate the efforts that need to be made, and it allows the impact of actions undertaken to be measured. Nonetheless, far too little attention and resources are devoted to information collection and information management.

> **Information** can be considered as the resolution of uncertainty. The concept of information has different meanings in different contexts. In our case, information is associated with data linked to understanding conceptual and concrete elements. The more an element is uncertain, the more information is needed to resolve this uncertainty and to find a viable solution.

The very usefulness of having priority information for the management and governance of protected areas is sometimes questioned. Many managers still see data collection as an unnecessary activity that diverts resources from more important actions. Yet insufficient information negatively impacts the quality of planning, the identification of intervention priorities and, ultimately, the outcomes of actions undertaken.

This situation is mainly due to two factors. On the one hand, there is a vicious circle in protected areas. A lack of information makes management more complicated, leading managers to work in a reactive mode, responding to problems as they happen rather than taking a proactive approach with a long-term perspective. On the other hand, we still have in the frame of support projects in Central Africa insufficient dialogue between protected area managers and information producers (experts, groups of specialists, biodiversity observatories, networks, etc.). The former are not always able to clearly identify their information needs. The latter, in the absence of guidance from managers and real benchmarks, are unable to focus their efforts on producing information that could be directly useful in achieving desired outcomes in the field.

This undermines planning, monitoring, and evaluation capacities, reduces the ability to identify management objectives and complicates decision-making. A clear vision of conservation objectives makes it possible to better develop the rationale behind an intervention and to formulate sound medium and long-term work programs at the level of both specific sites and protected area networks. The more management is proactive and adaptive, the more information needs will be targeted and reduced, and the more resources can be directed towards achieving conservation objectives rather than resolving short-term problems.

Adopting a proactive approach requires the mobilization and use of data. It is therefore essential to invest in training protected area managers in the collection, production, management and use of data and information, using new technologies, statistics, analysis, interpretation, etc., directly or with the support of partners.

This chapter proposes a set of possible solutions for both information producers and users (protected area managers and policymakers) to strengthen their capacities and levels of interaction and to improve the production, interpretation and use of information.

How to read this chapter?

This chapter is intended for anyone interested in increasing their knowledge of best practices in information management to support decision-making related to biodiversity, especially protected areas. It discusses the importance of having accurate baseline data and of developing systems to collect and manage this data for their easy analysis and processing in view of informing decision-making processes.

The chapter has two parts. The first part, consisting of sections 1 and 2, emphasizes the importance of relying on targeted information to effectively conserve biodiversity (Annex 1 provides a set of

general information on data collection), and discusses the status of information use for decision-making in Central Africa. The second part, covering sections 3 to 7, focuses on the principles of information management and use to support decision-making. It describes the main tools that are available and used in the subregion (see Annex 2 for detailed descriptions), as well as the analyses that can be derived from them. It also illustrates the importance and role of the Central African Forest Observatory (referred to by its French acronym, OFAC) in supporting protected areas and national services in their strategic activities and daily work. Lastly, this part emphasizes how important it is for different actors, and notably national administrations, to share information and promote the role and work of OFAC.

While it is recommended to read the entire chapter, it also is possible to concentrate on either the first or second part, or simply on specific topics of primary interest to the reader.

Note for the reader

In the absence of targeted, in-depth and comprehensive studies in Central Africa on the subject under discussion, the various findings reported are based mainly on the experience gained during IMET (Integrated Management Effectiveness Tool) campaigns conducted in the region (Paolini & COMIFAC, 2020; Paolini *et al.*, 2020), as well as on the personal experience of the authors and of various resource persons.

1. Importance of an action-oriented information system

Biodiversity conservation plays a crucial role in maintaining the balance of ecosystems for the economies of countries in the Central African subregion and for the many people who directly depend on natural resources for their livelihoods. Over recent decades, there has been a significant acceleration in biodiversity loss, including within protected areas. A growing number of species, both animal and plant, are subject to mounting pressures and are facing an increasing loss of their habitats and ecosystems.

Protected areas play a major role in this fight against biodiversity loss. However, protected areas also are facing increasing pressures (Table 1). In response, national governments, sometimes with the support of the international community, are developing action plans relying on information and on technical and financial resources, which are often insufficient or irregular.

Table 1 – Main threats in Central African protected areas

Fragmentation and destruction of natural environments	Urban growth
	Expansion of subsistence farming
	Illegal harvesting of wood (fuel, timber)
	Bush fires
	Illegal mining
Overexploition of wildlife species	Overfishing
	Deforestation
	Poaching
Introduction of invasive exotice species	Fire ants
	Water hyacinth
	Rats and cats on islands
Pollution	Industrial
	Agricultural
	Urban
Climate change	Direct and/or indirect effect on biodiversity
	Failure to demonstrate the importance of protected areas in the fight against climate change
Poor governance	Lack of institutions and procedures for fair conflict resolution
	Weak management capacity
	Failure to enforce relevant legislation
	Absence of a participative management framework
Inadequate conservation actions	Conservation actions that are not relevant, targeted or effective
	Lack of planning based on reliable and up-to-date data and information

Sources: adapted from Paolini et al. (2020) and Jacquemot (2018).

Larger than elephants!

Adapted from the European Commission (2016)

The development of the strategy, "Larger than Elephants" (European Commission, 2016), as the European Union's contribution to a strategic approach to wildlife conservation in Africa, was time-consuming because the information needed to take stock of the situation and make proposals was not available in a format that could be used immediately. Therefore, information from very diverse sources had to be sought, organized, summarized and illustrated in order to develop this strategy.

In the future, such national or regional approaches should be easier to develop relying on previous inventories, observed trends, future perspectives and the desired vision. If relevant information is not organized and structured, the formulation of strategies will continue to require considerable efforts and will remain short on information, and therefore will be insufficiently precise.

Under these conditions, biodiversity conservation strategies must be relevant and targeted. They also must be implemented effectively, and be monitored to ensure their effectiveness and enable them to evolve over time in response to changes on the ground.

Conservation objectives are not always up to date. Their wording may be generic or imprecise, or they may not anticipate changes over time due to a lack of monitoring indicators or specific objectives. Under these conditions, it is difficult to make operational recommendations and to intervene effectively. Even when these objectives (or targets) are identified correctly or are associated with monitoring indicators, there may be gaps in knowledge regarding the nature and extent of the problem, making it difficult to identify reference baselines.

In Central Africa, a large amount of data exists, but it is difficult to access to this data and the information that can be drawn from it. These data are not always comparable or regularly updated, and they are rarely quantified or organized in a structured or useable database. This situation is confusing for decision-makers who struggle to "filter" this information. Despite the apparent abundance of information, a wide gap often remains between the level of "critical knowledge" (what is needed and can be used to intervene in an effective and targeted manner) and what is actually known about the reality on the ground. Also, it is worth distinguishing "information" from "practical knowledge" while managing Central African protected areas.

Elephants and Zakouma National Park

Adapted from Paolini (2009).

Between 2002 and 2010, 95% of the elephants in Zakouma National Park (Chad), representing nearly 4,000 animals, were slaughtered by poachers for their ivory tusks. A lack of information had created the impression that the significant increase in the park's elephant population during the 2000s was due to the park's effective management. In reality, while the number of elephants inside the park had risen during this period, this was due to pressure from poachers across the region driving elephants towards areas of refuge like Zakouma Park. The increase of animals inside the protected area thus masked widespread poaching, which was taking place at a scale that went far beyond the park itself.

Within the park, the elephant population also was being inadequately monitored due to the animals' seasonal migration outside the park during the rainy season. More comprehensive information about these elephant populations in the subregion, and the monitoring of elephants during their migrations before 2000, could have made it possible to better understand the evolution of poaching activities and to organize a response better adapted to the actual situation.

Today, from the 500 surviving individuals, the elephant population is growing. The park managers know exactly where they live and have been able to adopt more effective planning measures. The monitoring and management of large mammals takes place not only inside the park, but also outside the protected area in collaboration with local communities.

Three conclusions can be drawn from this experience: 1) the 4,000 elephants killed between 2002 and 2010 came not only from Zakouma Park but also from neighboring countries (Cameroon and Central African Republic); 2) the losses could have been limited through a proactive approach formulated on the basis of information from several sites, shared between countries, and regional collaboration; and 3) the resources invested in the protection and restoration of the surviving elephant population of «Zakouma Park/subregion» are considerably higher than the costs of management based on preventive information.

In the management of protected areas, the **information** needed for informed decision-making concerns the status and changing trends of key elements that we wish to preserve. **Practical knowledge**, based on one's own experiences and what one believes one knows, has its own value, but it is neither targeted nor systematized (very qualitative).

To define appropriate responses to the problems posed, decision-makers and field actors must have access to critical information that enables them to orient and prioritize their interventions. Regional observatories such as OFAC can play an important role in compiling, organizing and facilitating access to this data and information for everyone. They also can help to identify critical gaps in knowledge and to formulate actions to be taken by promoting a quantified "objectives-indicators-benchmarks" approach.

Information is not only fed through the collection of data; this data must be shared, analyzed, and used for planning and decision-making. Today, these aspects continue to receive insufficient attention. Sharing data helps to define a vision that is both broader and more accurate, enabling countries to achieve better levels of understanding. It also provides an immediate return in terms of capacity building and improved effectiveness in the implementation of conservation policies. For further information on data collection and management, please refer to Annex 1.

"Sentinel" indicators

OFAC (*Observatoire des Forêts d'Afrique Centrale*), a regional observatory (www.observatoire-comifac.net/), can provide a sentinel indicator and/or alert service to monitor pressures on and threats to biodiversity. Sentinel and alert indicators are a type of "substitute" indicator that can take the place of indicators in logical frameworks and Planning-Monitoring-Evaluation (PME) systems of projects and activities. This type of indicator is not used to measure the outcome of an activity, but rather as a signal to indicate an important change in a key element within a complex system. They therefore should be easy to collect and communicate, and signal the need for more in-depth analysis and investigation. Sentinel indicators support adaptive and proactive project management, and are not tied to a fixed objective.

Sentinel indicators are used to monitor key elements of a system in order to monitor and provide information about relationships of mutual influence between different actors and their context. Unlike performance indicators, which are used to measure changes leading towards a desired condition or expected results, sentinel and early warning indicators are used to signal changes within the system in which a project is operating. A distinction may be made between **sentinel indicators**, which enable long-term monitoring of contextual factors, and **alert indicators**, which are collected more regularly and can indicate an immediate need to adapt management or to conduct an in-depth analysis of a situation.

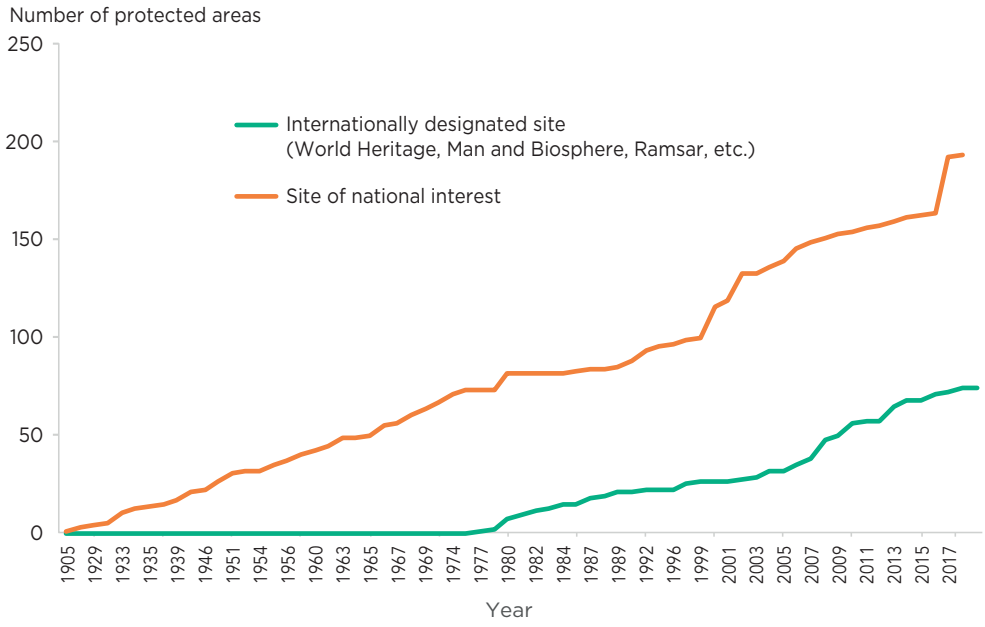
For example, in relation to the Covid-19 pandemic, it would be possible at an operational level to use sentinel indicators to monitor closely and regularly the evolution of forest cover and habitat integrity which, if degraded, could facilitate virus spread, or monitor bushmeat markets, etc. Sentinel indicators can provide important information for the management of protected areas, including aspects that may be more strongly impacted by the consequences of the pandemic and by restrictive measures adopted by different governments. This includes, for example, increased poaching in relation to a drop in tourism and reduced national funding for conservation sectors and sites.

2. Status of data collection and processing in the management of Central African protected areas

2.1 Insufficient consideration of core data in the creation of Central African protected areas

The creation of protected areas in Francophone Africa can be traced to three historical periods: between 1930 and 1950 during the colonial era, between 1960 and 1990 following independence, and since 1990, after the Rio Conference (Figure 1). The creation of protected areas in the region took place in a wide variety of contexts, responding to clear conservation goals or aiming to meet international commitments. However, these initiatives have not always relied on baseline data enabling a better understanding of the ecological wealth of these areas and their importance for the human societies living in them. A textbook example was the creation of certain forest parks in the Democratic Republic of the Congo (DRC) in the 1970s after a simple flyover in a plane. Furthermore, the creation of a considerable number of protected areas over a very short period of time was not followed up with the support or resources needed for their management.

Figure 1 – Evolution of protected areas in Central Africa



Note: sites with a "proposed" status and a value of "0" for the designated year were excluded from the analyses.
Source: WDPA (2020).

While the progress measured in relation to Aichi Biodiversity Target 11 in the Convention on Biological Diversity (CBD) testifies to the efforts being made by Central African countries to achieve this target (Mengue-Medou, 2002; Deguinet *et al.*, 2018), the expansion of protected areas nonetheless does not always explicitly refer to clear conservation priorities. According to the management guidelines for protected areas prepared by IUCN (International Union for Conservation of Nature), all protected areas should be established with a precise conservation objective. Basic information also must be available to characterize this objective and to define the targeted results (e.g., protection of a habitat or a rare species), the actions to be carried out and the mode of management. The importance of being able to have up-to-date and quality data to characterize the situation on the ground and identify the best sites and the best management options is obvious. Unfortunately, this has not always been the case, and various protected areas in Central Africa, regardless of when they were established, do not have, or can no longer find, the basic information justifying their creation (Thomas & Middleton, 2011).

Nevertheless, it must be recognized that in general, even without objective or in-depth information, the creation of protected areas has relied on technical notes and/or information, sometimes oral or experts accounts, which have led to more in-depth investigations and the decision to put the territory in question under protection (as in, for example, the case of Odzala-Kokoua National Park in Congo). Some approaches, such as IUCN's identification of critical sites for forest conservation, the Important Bird Areas (IBAs) compiled by Birdlife International, or the creation of Gabon's network of national parks, have been based on more or less detailed studies, with a greater emphasis on knowledge related to biodiversity than socioeconomic interests (IUCN, 1989; Fishpool & Evans, 2001; Doumenge *et al.*, 2003a and b).

The systems now used to collect, manage and process data on protected areas in Central Africa have evolved considerably. Nonetheless, the lack of infrastructure and insufficient support in terms of capacity building of protected area management actors remain significant. Consequently, managers are not always able to keep on top of changes in tools used for data monitoring, processing and analysis.

Data analysis is a process of inspecting, cleaning, processing and modelling data in order to highlight information that enables a better understanding of the situation, suggests conclusions, and facilitates decision-making.

Data processing refers to a series of processes that extract information or produce knowledge from raw data.

Based on feedback from assessments of the management effectiveness of protected areas generated by the IMET tool since 2015, it appears that a small number of protected areas are using and promoting such approaches and tools to improve planning and management (Paolini & COMIFAC, 2020). This trend is more noticeable in protected areas receiving external technical support under large conservation programs or which are part of Public-Private Partnership (PPP) governance

systems. However, these programs are time-limited and their objectives rarely fit into a comprehensive intervention logic that takes into account the protection of values and human well-being.

At the national level, the process of collecting and centralizing information varies widely in the countries covered by COMIFAC (*Commission des Forêts d'Afrique Centrale*), and often is oriented towards administrative or surveillance information rather than ecological or socioeconomic monitoring. Only a few countries, such as Cameroon, Gabon, Congo and DRC, have a data centralization and processing unit within the institutions in charge of protected area management, which allow these institutions to have detailed information on the protected areas that they manage.

2.2 Description of the current situation

Data on protected areas and biodiversity are collected by national conservation services in partnership with other national and international actors. Due to their often extremely limited resources and the mounting number of threats faced, their operational objectives focus on preventing situations from further deteriorating by adopting an approach that is more reactive than proactive, and which does not consider critical underlying factors. In practice, management often boils down to a routine activity far removed from an approach based on factual data and analysis.

At present, it is clear that a regional database does not yet exist which lists all of the efforts to assess management effectiveness that have been carried out in the different countries and the different protected areas of Central Africa. This is certainly an initiative that should be set up with OFAC's support. Over the past five years (2015-2020), multiple assessments of the effectiveness of protected area management have been carried out using the IMET tool (Paolini *et al.*, 2020). According to feedback from past experiences (IMET campaigns, Sub-working group on protected areas and wildlife (SGAPFS) of COMIFAC, experiences of resource persons), it seems that all too often there are "rudderless navigation" situations where management plans, annual action plans, and even anti-poaching activities are developed or implemented without essential knowledge about the context of intervention of protected areas and their peripheries.

Overall, the efforts of field partners to share, secure and centralize the data collected for future use remain insufficient. A significant number of actors in the field, data generators and data collectors (operators in charge of PPPs, non governmental organizations (NGOs), research institutes) work outside the IUCN framework of the Global Database on Protected Areas Management Effectiveness (GD-PAME). Some have adopted their own approaches. Others are unwilling to share their data, either because they have an eye on future publications, or due to the sensitivity of certain information, or to avoid provoking conflict or criticism.

Even today, once a program is completed, some partners leave the site taking with them much of the data and information generated during their period

The importance of accurate and up-to-date conservation objectives

IMET analyses carried out in 2015-2016 in some one hundred Central African protected areas have sometimes highlighted extreme situations with regard to planning-monitoring-evaluation systems. During the planning analysis, one national park reported objectives from a management plan that were over 20 years old. If the management team of the park in question continues to take actions to achieve objectives defined on the basis of an inventory made over 20 years ago, there is a strong risk that it will be out of step with the current situation of the protected area, which will call into question the effectiveness of the actions undertaken.
To reduce the risks of biodiversity loss, managers must: 1) identify clear, achievable and up-to-date management objectives, and 2) adopt a results-oriented PME approach.

of support. Many of the protected areas in the region are permanent research laboratories for many of the international agencies and research centers located there, with the permission of the research ministries. Research activities producing massive amounts of data are regularly conducted by students completing master's theses and PhD dissertations.

A problem found repeatedly in Central Africa is that this mass of information is not used for management, and the research carried out does not meet management needs. Unfortunately, no coordination yet exists between research actors and the ministries in charge of research and technical supervision which could ensure that the results obtained are centralized in order to formulate conservation and operational management strategies. Yet making such information available is essential to help define baseline situations and to be able to monitor trends in the field. The failure to secure data and a lack of synergy between different actors are the reasons why each time new initiatives are set up, the first task that must be undertaken is to establish the baseline situation, which sometimes requires considerable financial resources.

In protected areas which have a significant quantity and quality of information, these data are sometimes inconsistent or sectoral, often very dispersed, and sometimes stored in private computers. However, it is important to emphasize that there are numerous examples of good information management in the subregion. Experience has shown that better information management facilitates effective protected area management, one that is more results-oriented and, most importantly, enables management objectives and results to be achieved even when financial and human resources are limited.

It is also interesting to note that, in general, problems related to the management of protected areas are rarely addressed in an integrated manner despite the close links between various issues and the intervention context. The management of natural resources is influenced by the institutional context, the threats and pressures faced by these areas, the goods and services rendered to human societies, climate change, and so on.

2.3 Main constraints

Several difficulties may arise when implementing a sustainable data collection system. Table 2 shows the most recurrent.

3. The challenges of information management for decision-making

When collecting data and managing information, protected area managers and experts face many challenges and constraints, including the following: funding availability, prioritization of the collection(s) needed to fill gaps in critical information, availability

Table 2 – Main constraints related to implementing sustainable data collection systems

Main constraints	Associated issues
Insufficient financial and logistical resources	The establishment of long-term systems for collecting and processing data requires substantial financial resources.
Weak staff capacities in the field and in central services	There have been significant technological advances in collection, storage and analysis tools. Certain phenomena observed in protected areas require sophisticated tools to be able to quantify them. Although these tools exist, staff are not sufficiently trained in their use.
Inadequate staffing levels	The staff available is often insufficient to guarantee the proper functioning of the planning, coordination, monitoring and evaluation processes, or to guarantee the proper implementation of field activities, an inherent part of management.
Institutional instability	Administrative staff posted to sites are subject to particularly rapid rotations. In addition, the departure of an individual is rarely anticipated and not at all prepared. Beyond the direct impacts on operation, these departures often result in the loss of data collected during the person's stay at his or her post because the use of personal computers is frequent and centralized data storage systems are rarely set up or updated.
Politicians' limited interest in conservation	For example, investments in operations like research and information gathering are very low. Politicians generally are unaware of the benefits that conservation actions can provide.
Difficulty in managing and using available data	The problem of using, developing and exploiting data in the management of protected areas remains vast. The shortage of national and regional biodiversity experts and the limited use of structured collection tools linked to a centralized database for the processing, analysis and interpretation of data constitute real bottlenecks. These activities are mainly carried out by experts who often do so independently, without direct collaboration with protected area staff.

of resources and materials, staff skills, logistics organization, Information Technology (IT) support for data recording and data transfer, and even data archiving at the central level or in the reference database. Despite the efforts made, given the increasing decline in biodiversity, the results achieved have been mixed. Coordinated action, based on a better knowledge of the contexts of intervention and the establishment of effective surveillance and monitoring systems, is essential to improve the situation on the ground. Investments to strengthen the capacities of key actors responsible for data analysis are also needed to provide accessible, organized and usable data and information.

The smooth and transparent flow of data, and the potential to easily analyze and compare data, are critical elements for adjusting and informing actions in the field. The constitution of such an information system would make it possible to establish indispensable links between the planning, monitoring and evaluation of actions, ensuring an approach and responses consistent with the reality on the ground.

Another important issue involves the practical difficulties encountered when the status of specific situations (particular themes, assets, or threats) needs to be represented by compiling different types of information coming from different sources, origins and periods,

and on different scales. This exercise is nonetheless necessary to provide decision-makers – ideally with the support of technical and statistical analysis tools – with thematic and visual summaries (Decision Support Systems, or DSS). These summaries must reflect the reality on the ground, simplify the identification of the current situation, and allow desired future conditions to be formulated in order to calibrate the interventions.

These summarizing efforts, as well as the establishment of well-structured databases, are decisive elements for the effective management of protected areas. They allow various actors to see more clearly and save national officials, experts and donors from having to undertake extensive research to find the information necessary for decision-making.

4. From data collection to data storage

Targeted data collection based on the management objectives of each protected area promotes proactive and adaptive management focused on results.

4.1 What questions are we trying to answer?

The information sought must always be oriented towards decision support and the achievement of well-defined objectives and results, both on an individual protected area and its peripheries and on an entire network. Each protected area site and network is characterized by its own conservation priorities, each with specific underlying questions that data collection must help answer to confirm or reject initial hypotheses. Decision-makers must be informed about the situation in the field, the implementation status of strategies (or management plans) and, more generally, the state of biodiversity conservation in their reference site, country or region.

With respect to this objective, it is important to be able to have a structured information system that can offer a transparent view of the vital information actually available on different themes and on protected area management issues.

At the national level, the overall framework for intervention is usually the CBD and the national biodiversity conservation strategy. It is essential to facilitate the monitoring of their implementation through efficiency and performance indicators.

> **Vital information** is the information that is crucial or truly important for decision-making. It is the information that enables decision-makers to avoid drowning in a sea of excess information, only a small portion of which is relevant or directly useful for decision-making. An efficient information system should enable decision-makers to access a dashboard and instruments that allow them to easily assess and make decisions about a situation.

For each **priority management objective** identified (for example, the conservation of animal or plant species, of habitats, of ecosystem services, etc.), monitoring specific indicators and related reference levels will allow decision-makers to visualize the gap between the actual situation and the target situation. When these indicators are unavailable, specific work should be initiated with the supervisory authorities to formulate them (or reformulate them if necessary). For each of the national priorities selected, a basic inventory must be available or, at the least, the capacity to assess (as much as possible on the basis of quantitative information) the level of knowledge of the situation on the ground.

4.2 Archiving and storing data

Data collected must be archived and stored in computerized databases at both the site level and national and regional levels. These databases should be suitably organized to enable further data processing, support analyses and facilitate the adoption of result-oriented approaches. These same data should be able to be updated regularly.

One of the main challenges is archiving data collected in the field (for example, during research campaigns, anti-poaching patrols, territory inspections, ecological monitoring and monitoring-evaluation exercises). Data collected using digital tools (for example, smartphones, iPads, Cybertracker, IMET Offline, laptop computers and tablets) must be transferred to the central system of the protected area, either remotely if the data collection tools are able to do so, otherwise as soon

as the teams return to the home base. The same holds true for data noted on paper or in specific collection forms which must be quickly entered and saved in the central system. The rapid transfer of field data makes it possible on the one hand to use the information in real time and, on the other, to limit the risk of losing information collected through the accumulation of an unmanageable backlog or the deterioration of the equipment itself.

Data archiving refers to the transfer of data to the protected area's central system or to a higher level.

Data storage refers to the manner by which different information collected is archived and therefore organized in the databases of the central system of the protected areas or at a higher level.

Storing the data collected requires the database to be organized so that the data can be further processed as easily as possible. The organization of databases at different management levels (protected area, provincial or regional office, central service, etc.) must be the same, or at least be sufficiently compatible for data to be easily transferred from the site to higher levels. It must enable all information relating to the same theme (for example, the same protected species or the same threat) to be easily visualized and extracted, thereby facilitating an overview of the situation in the field and the level of knowledge (surveys, inventories, studies, patrol reports), and allowing a better identification of critical information gaps.

When protected areas and national services have been able to equip themselves with digital information systems, the ways data are stored had to be adapted. Indeed, they are generally designed to facilitate the storage of information for consultation and visualization purposes rather than for the purpose of actually processing and extracting data to produce analysis reports and support decision-making.

Furthermore, there is a lack of synergy and pooling of efforts between the operators of national monitoring systems and those of OFAC's regional system, which limits the emergence of a comprehensive perspective. It is therefore useful to strengthen the interoperability and articulation between databases and to favor systems which, thanks to a structure in different thematic modules, support and facilitate processing and analysis processes.

Three key criteria should guide data collection, and particularly the choice of data collection tools and instruments: quantification, comparability, and change of scale. Tools and information systems following these principles exist and are used in Central Africa, including, for example, the IMET tool, whose database offers "advanced" data processing capacities (OFAC, 2020).

Quantification: need to quantify data as accurately as possible. This element is critical to supply reference data and develop work plans that are as accurate as possible.

Comparability: possibility to compare the situation and performance of different protected areas regarding specific aspects.

Scaling up: the ability to perform analyses at the level of protected area systems (national, regional or ecosystem) based on information on individual protected areas.

It also is critical to clearly define the procedures and modalities for the **transmission of information** both at the local level and to higher levels (e.g., national agency or service responsible for protected areas, OFAC). The definition of the data transmission system and the roles of each within it, and rigorous adherence to these procedures and modalities, form the basis of effective information management.

4.3 Responses to the main challenges related to information management

The main challenges related to the continuous updating of information on protected areas are, beyond essential financial resources, the total absence of standards for data transmission systems and for clear workflow within protected areas and between these areas and the administrations concerned. In practice, managers face a wide range of difficulties and problems when collecting and managing data (technical, logistical, financial, equipment, organization, training, data transmission, computer connections, etc.).

Some general recommendations are proposed in Table 3. They aim to improve information management within conservation sites and at the central level. However, to achieve meaningful results, each of these recommendations requires strong political will and backing.

Table 3 – Recommendations for improved information management

Recommendations	
Formalize and document	In administrations, it is important to formalize and document the procedures for processing information on biodiversity through guidelines and to have these applied at the central level and on the sites.
Centralization and management of data at the site level, creation of data management units at the central level	At the site level, this means ensuring the monitoring and centralization of data. At the central level, the task is to create and ensure the correct functioning of a data collection and management support unit to work transversally with other units. The mission of this unit would be to compile, centralize, harmonize and produce analyses contributing to the preparation of state of conservation reports (monitoring and evaluation).
Structure and promote the interoperability of databases	This means establishing well-structured and interoperable databases in protected areas with monitoring systems at different scales (up to national and Central African levels).
Favor field observations	There is an urgent need to promote data collection that is oriented and based on simple field observations instead of always waiting for in-depth studies by experts in a specific field.
Monitor the state of biodiversity	Periodic reports transmitted to the headquarters level should be centralized. Reports should integrate aspects of monitoring the state of biodiversity and not be limited only to the description and listing of activities carried out.
Make the data collected accessible	Full access to the data collected, and the possibility to visualize them and use the information derived from them, must be guaranteed to all decision-makers, managers and operators in the field, both at the level of each site and at national and regional levels (observation bodies such as OFAC). This will ensure better staff involvement in the understanding and interpretation of situations and thus ensure a constant improvement in the quality of conservation actions.

4.4 Main data collection tools in protected areas

The technological advances of our era have facilitated a significant change in the way data are collected. The tools available are increasingly powerful, efficient, versatile, easy to use, connected, affordable and widespread. The new models offer more and more interoperability and potential, especially in terms of autonomy (batteries) and archiving or storing information (data, images, maps, etc.). Although more traditional tools such as fact sheets, patrol reports and expert studies continue to be widely used, numerous other methods now exist to collect data in protected areas.

Depending on the themes or aspects targeted (ecological monitoring, fighting poaching, governance, social surveys, management efficiency, tourism, etc.), there are different systems and structured collection methods that are more or less articulated and complex, most supported by one or more specific tools.

Among the ecological monitoring tools, we can cite the various monitoring software developed for Cybertracker, a portable device for collecting data in the field that was widely used in Central Africa in the 2000s. Other computer applications also are available to facilitate animal censuses and flora and fauna inventories.

Among the tools supporting law enforcement and the fight against poaching, we may cite SMART (Spatial Monitoring And Reporting Tool). This is a monitoring and reporting tool which aims to collect and archive conservation data with a particular focus on patrol activities. It helps to promote better decision-making and the more effective organization and deployment of patrols (SMART, 2019). DAS (Domain Awareness System) is another tool that provides a set of applications recording in real time the positions of radios, vehicles, and aircraft and animal sensors. The tool is intended to help managers make immediate tactical decisions to effectively deploy the necessary resources. An IMET module focused on fighting poaching also is being developed and currently is being tested in several Central African protected areas.

In terms of social surveys, beyond traditional survey forms, managers can access some very specific tools such as BNS (Basic Necessities Survey, adapted by WCS, Wildlife Conservation Society, to conservation contexts; Davies, 2020), PA-BAT (Protected Areas-Benefits Assessment Tool; Dudley & Stolton, 2009) and METT (Management Effectiveness Tracking Tool; Stolton & Dudley, 2016). IIED (International Institute for Environment and Development) also has developed a consolidated approach supported by an IT tool called SAPA (Social Assessment for Protected and conserved Areas; Franks & Small, 2016), which is intended to assess the social impacts – positive or negative – of protected areas and any related conservation or development activity.

Widely used and recognized systems do not yet exist for the assessment of governance. However, several tools are currently under development or are being tested in the field. These include GAPA (Governance Assessment for Protected and conserved Areas, Frank & Booker 2018), SAGE (Site-level Assessment of Governance and Equity), and the IMET module for assessing the governance of ecosystem services which is currently being tested in some protected areas in the subregion.

Tools for assessing the management effectiveness of protected areas deserve particular attention given their importance for supporting sound protected area management. Over 70 methods and tools are listed in the GD-PAME. Among those most used in the field, including in Central Africa, we may mention the following:

- EoH (Enhancing our Heritage), which was specifically designed for UNESCO (United Nations Educational, Scientific and Cultural Organization) to assess the management effectiveness of World Heritage sites;
- RAPPAM (Rapid Assessment and Prioritization of Protected Areas Management), developed by IUCN, which helps to compare the management effectiveness of different protected areas;
- METT, which allows a rapid assessment of the management effectiveness of a given protected area but which is not suitable for inter-site comparisons like RAPPAM;
- IMET, which is specifically designed to support decision-making by managers.

Among these tools, the integrated tools combine elements for monitoring management effectiveness, governance, and social assessment. This is the case for IMET and IUCN's Green List of protected areas. These tools are particularly interesting insofar as they allow a much more comprehensive view of a situation and, therefore, directly and effectively support decision-making processes through a planning-monitoring-evaluation approach.

Annex 2 includes a comparative table presenting the main tools commonly used in the subregion. A brief presentation of each tool is complemented by a discussion of its usefulness and main advantages and disadvantages. A map showing the dissemination of these tools in the different countries of Central Africa also is provided. Table 4 presents the use of these tools in Central African countries.

Two examples of integrated results-oriented tools to support decision-making

IUCN Green List of protected and conserved areas: this list is an IUCN initiative to identify and highlight protected areas which are achieving good conservation results and that are effectively managed and equitably governed. It is a certification program and the first global standard for best conservation practices.

IMET: this instrument provides managers elements and tools from different approaches and methods in an integrated package on the same platform. Although initially designed to monitor management effectiveness, IMET offers the possibility of addressing different themes and aspects of management and governance while still supporting planning-monitoring-evaluation processes. It accompanies managers in an analytical approach which, working from an inventory, makes it possible to assess the management effectiveness of a protected area and to determine the management changes needed to achieve the conditions desired. Thanks to an integrated monitoring and evaluation process, managers can periodically fine-tune the planning of their actions based on actual changes observed in the field.

Table 4 – Current status of the use of decision-support tools for the effective management of protected areas in the COMIFAC area

Pays	METT	RAPPAM	EoH	GAPA	IMET	Green list	SAGE	SAPA	SMART	IBA
Cameroon	✔	✔	✔		✔		✔	✔	✔	✔
Gabon	✔	✔			✔			✔	✔	
Equatorial Guinea	✔	✔							✔	
Burundi	✔	✔			✔				✔	✔
Central African Republic	✔	✔	✔							✔
Democratic Republic of the Congo	✔	✔			✔				✔	✔
Congo	✔	✔	✔						✔	✔
Rwanda										
Sao Tome and Principe										
Chad		✔			✔		✔	✔	✔	✔
Total	7	8	3	0	5	0	2	3	7	6

Source: GD-PAME database, June 2020.

Importance of integrating different tools and methods of analysis

When assessing and analyzing field situations, it is possible to achieve important outputs by using several approaches and tools or by relying on integrated approaches. These results would be difficult to achieve if only one empirical approach or a single tool was used.
For example, during an IMET training program held in Bolivia, national managers wanted to begin a threat analysis exercise with a brainstorming session. The exercise was repeated several times using the «threat calculator» employed in IMET. The comparative analysis made it possible to identify three threats which had not been highlighted previously, one of which, concerning overgrazing in community-managed areas, was particularly important.

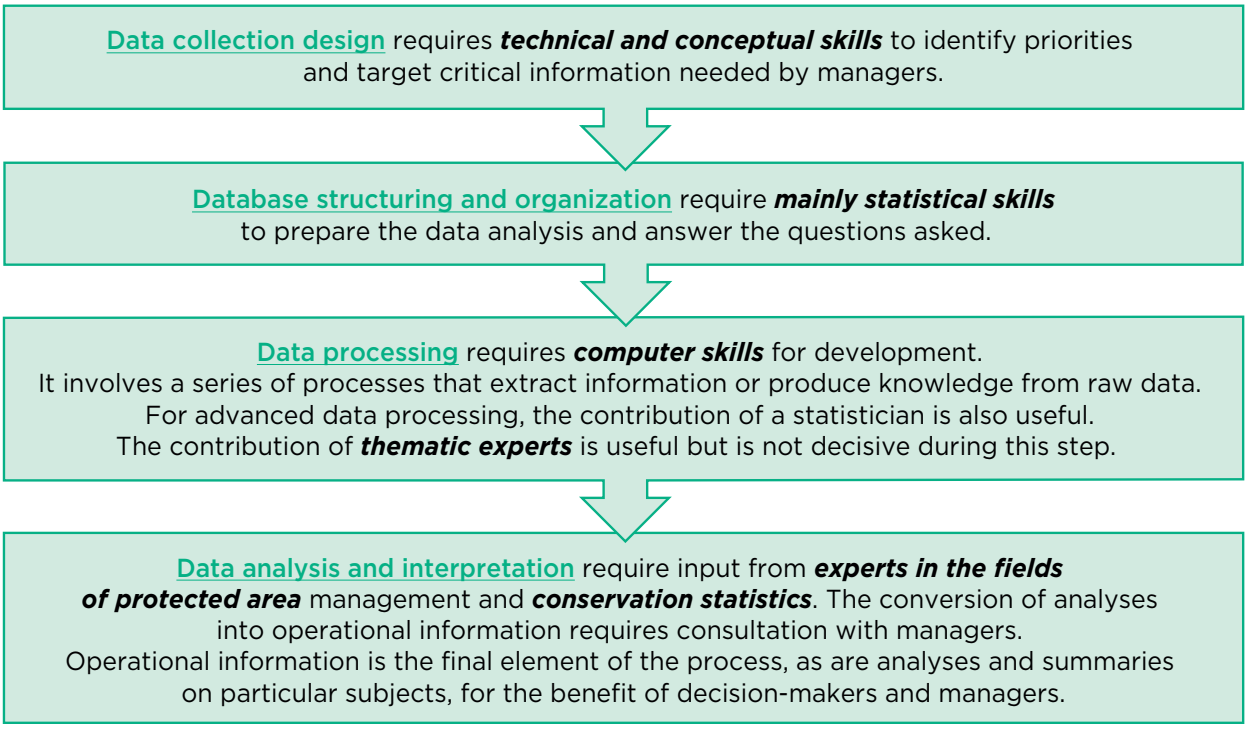
5. Data processing and analysis

5.1 Required skills

Information management is a complex process that calls for a range of skills and requires the involvement of thematic experts, protected area management experts, IT experts and statisticians (Figure 2). Every national administration and regional monitoring agency should invest heavily in capacity building and ongoing training for the planning, management, monitoring and evaluation of the institution itself.

It should be remembered here that statistics is a powerful tool that can greatly contribute to conservation. At present, there are few, if any, national services that rely on specialized statistical staff for monitoring and evaluation, at least in the field of conservation.

Figure 2 – Different stages of information management and required skills

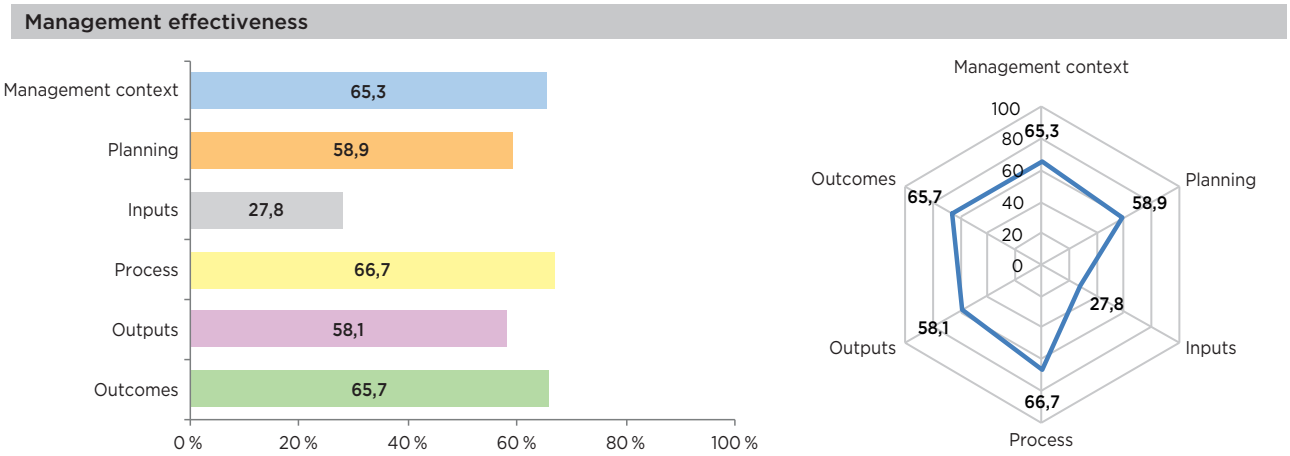


A **decision-support system (DSS)** is an information system which supports decision-making activities within organizations. These systems serve the management, operations, and planning levels of an organization, and support decision-making related to issues that can evolve rapidly.

5.2 Some of the possible analyses

Statistical analysis processes make it possible to study large amounts of data and identify the most interesting features. The success of this approach in recent years is largely due to graphical representations used in decision-support systems that are easy to understand and that "speak" to both policymakers and managers. These visual representations highlight relationships that are difficult to grasp through the direct observation of data tables, relying on the objective depiction of the phenomenon analyzed. Figure 3 presents an example of a decision-support graph from an IMET analysis in the form of a bar chart (on the left) and a radar chart (on the right).

Figure 3 – Visualization of the results of an IMET analysis for supporting decision processes



Source: BIOPAMA (2018)

Protected Areas Management Effectiveness (PAME) assessments

Like most PAME tools, IMET organizes the different elements of the analysis around the six steps of the protected areas management cycle (Hockings et. al, 2018):

- 1. Management context
- 2. Planning
- 3. Inputs
- 4. Process
- 5. Outputs
- 6. Outcomes

The score achieved by each element can be visualized along a scale of 0 to 100, in the form of histograms and radar charts which allow one to synthetize the outcomes of the PAME assessment undertaken. The visualization tools are used to support the reflection underpinning decision-making. They are not meant for a numerical evaluation of the protected area.

The boundaries of the marine section of Mayumba National Park (Gabon)

From Paolini et al. (2020).

The first IMET analyses undertaken in Gabon made it possible to understand the potential of the DSS underlying the design of the tool. Mayumba National Park, on the coast of Gabon, had demonstrated important progress in terms of achieving management objectives. It therefore needed to set new objectives and revise its management plan. Only the marine section of the park showed lower achievement values, which were clearly demonstrated by the graphic representations (radar charts and histograms) of the DSS part of IMET.

The park's director was responsible for reporting the results to officials of the *Agence Nationale de Préservation de la Nature* (ANPN) in Libreville. The presentation of the management effectiveness immediately drew the attention of officials to the difficulties of achieving the assigned objectives in the park's marine section due to the need to refine the park's boundaries.

The changes in the classified area's boundaries requested by the park were approved the following month. The DDS enabled the director of Mayumba Park to present the situation and the difficulties to be addressed in a simple, organized and comparative manner, which allowed him to garner the attention and support of his superiors needed to obtain the changes requested and to guarantee better management of the park.

Among the many possibilities for further analysis and use of the information generated by processing data collected, we would like to draw attention to the following three types.

Analysis at the level of protected area systems

The possibility of carrying out analyses at the level of protected area systems as a whole, whether at the level of landscapes or major biomes, as well as at the national or at the regional level, undeniably offers great added value. This scaling up of the analysis makes it possible to formulate more effective responses to questions that arise at the level of the entire system considered. However, this change of scale is only possible if the analysis is based on information that is quantified and can be compared, and in Central Africa, as in other regions, this is rarely the case.

This type of analysis is feasible only in the presence of databases which are structured in the same way, and depends heavily on the willingness of national administrations to share their data. In Burundi, for example, this work made it possible to revise the national biodiversity conservation strategy and to make the case for funding needs based on well-documented analyses and proposals.

These comparative analyses at the levels mentioned above facilitate dialogue with the international community and donors. They are crucial when deciding whether, where and how to finance conservation projects.

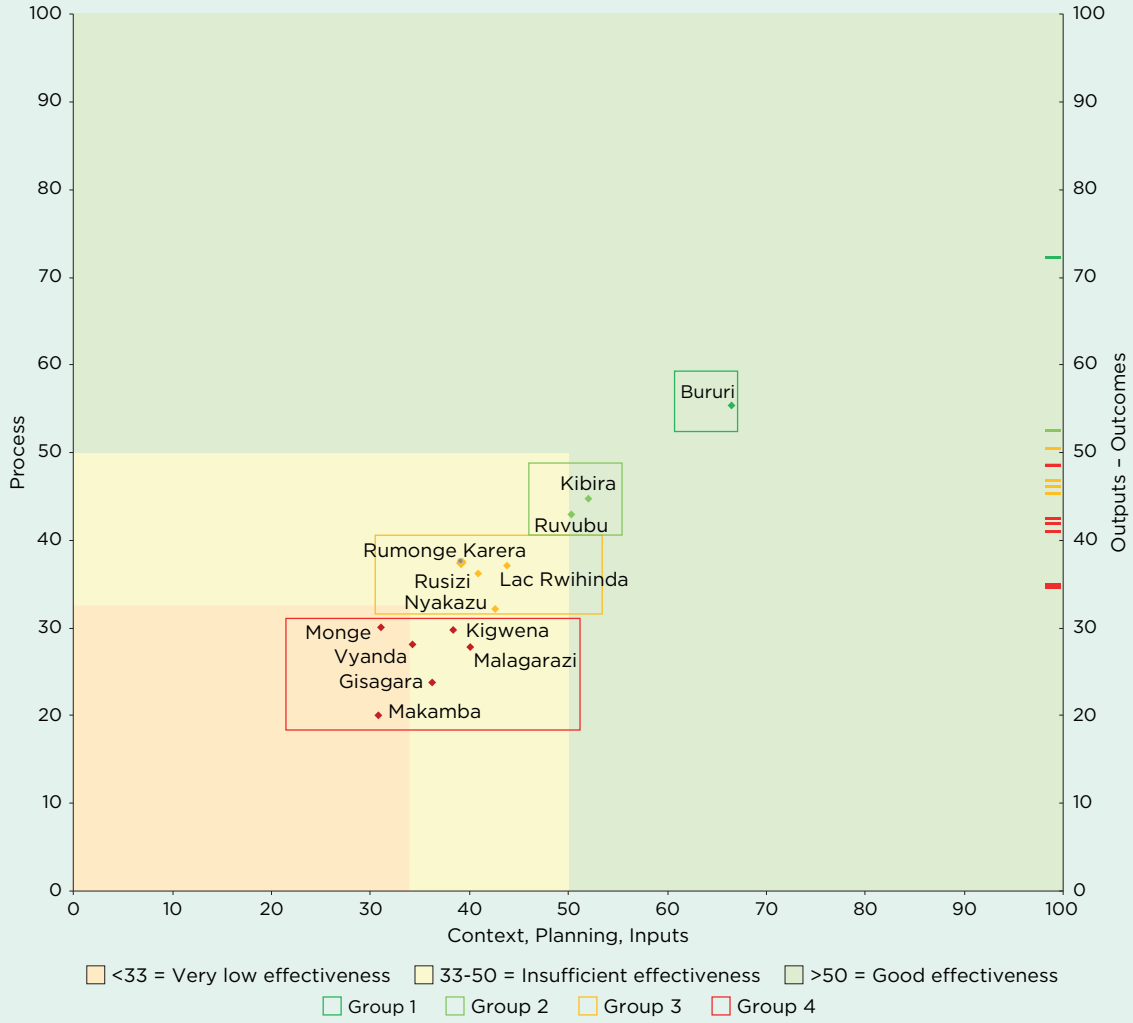
This facilitates the monitoring of countries' implementation of international commitments and makes it easier to prepare reports for the CBD or other agencies. Examples include monitoring Sustainable Development Goals (SDGs), commitments made under the United Nations Framework Convention on Climate Change (UNFCCC) such as Nationally Determined Contributions (NDC) to reduce emissions at the national level and adapt to the effects of climate change, etc.

Justifying the importance of the benefits of protected areas can open up opportunities to diversify funding sources for the effective management of protected areas. The work carried out following IMET exercises conducted on a set of 38 protected areas in the protected area networks of Burundi, Gabon, Cameroon, Republic of Congo and Chad has shown the potential of such an approach (Paolini *et al.*, 2020; COMIFAC, 2020).

Scaling up of analysis in the IMET tool

The analysis at scales higher than that of a site uses a technical model developed by the BIOPAMA program (Biodiversity and Protected Area Management Programme). Through statistical analysis, the model organizes and structures information in order to procure new aggregated data for a set of protected areas. It is then possible to establish operational indicators for a network or for each protected area. Comparisons between protected areas also make it possible to draw parallels and facilitate the formulation of strategic and operational solutions.

Figure 4 – Example of a graphical representation of the grouping of sites in a network of protected areas (Burundi)



Source: BIOPAMA (2018). Note 1: The terms "Context, Planning, Inputs, Process, Outputs and Outcomes" refer to the six steps of the management cycle of protected areas (see the text box associated with Figure 3). Note 2: on each axis, the elements of the management cycle are scored between 0 and 100. The third axis "Outputs – Outcomes" is independent from the two others. Each protected area is materialized by a colored dot..

The technical model proposes a scaling up of analysis based on several elements:

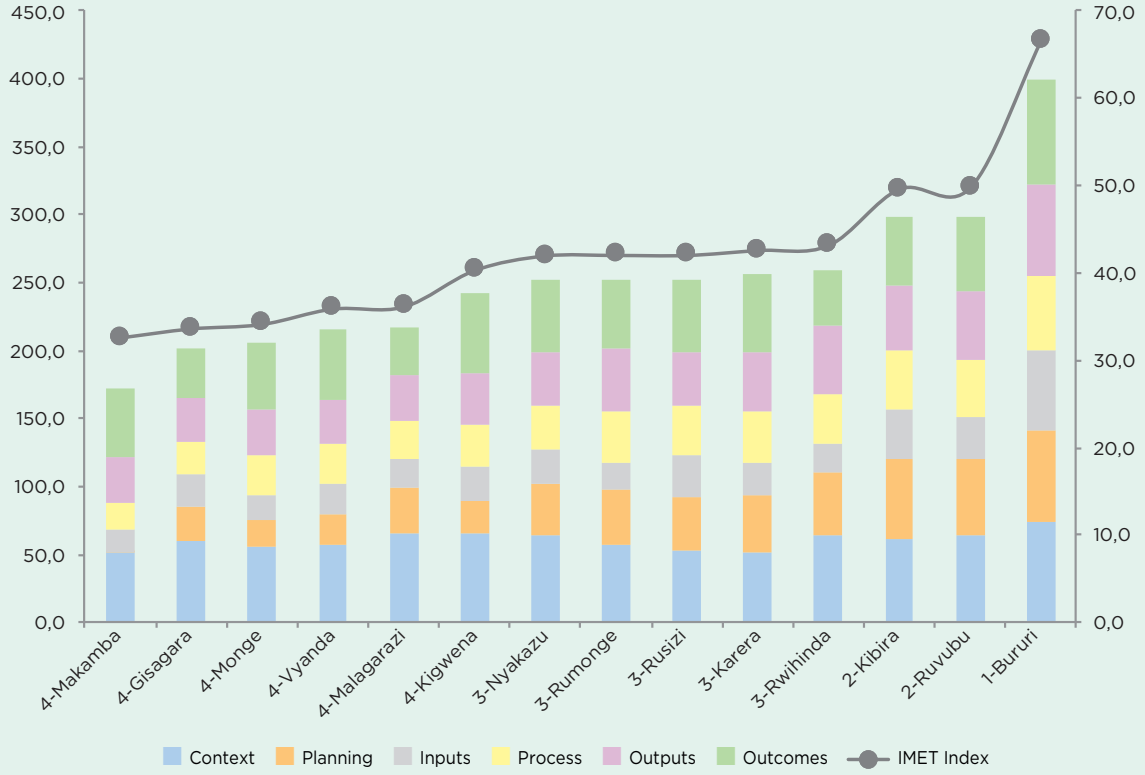
1. **clustering**, to identify protected areas with sufficiently similar (homogeneous) scores in the six different elements of the management cycle (see Figure 4);

2. **ranking**, against targeted benchmarks for the management cycle elements or indicators;
3. the **IMET index**, which is proposed to provide an assessment of the overall performance of each protected area (an example of the demonstration of the IMET index is shown in Figure 5);
4. **calculation of the average** to define the average in relation to IMET scores for numerous elements of analysis;
5. **cross-analysis**, which makes it easier to appreciate and quantify the discrepancies between the scores of groups of indicators that are supposed to be functionally linked to each other;
6. **quantification of indicators of non-response** to IMET questions, to determine the propensity of protected area staff to avoid answering certain questions or to provide answers perceived as difficult;
7. **technical analysis**, to support biodiversity conservation from an operational point of view and to augment the effectiveness of natural resource management and conservation efforts based on the values recorded for the indicators of the IMET tool.

It is important to note that in the scaling up, statistical and technical analyses are functionally integrated in order to make it easier to develop proposals related to:

- mitigating threats and building on strengths;
- identification of operational priorities;
- required improvements in management and governance policies.

Figure 5 - Example of a graphical representation of the IMET index to visualize the results of the scaling up analysis of Burundi's protected areas network



Source: BIOPAMA (2018). Note 1: The IMET synthetic index is evaluated between 0 and 100 (maximum level which can be achieved by each histogram). It refers to the average of the indexes as presented in Figure 3 and in the associated text box. The relative contribution of each element is represented by a different color. Note 2: the figures associated with each protected area refer to the groups of protected areas identified in Figure 4.

Answering specific conservation questions

A well-designed and organized information system can provide more insight into the situation relating to a specific problem, linked for example to a species, habitat, ecosystem service or any other element. Table 5 presents an example of an approach to consider the management of a species based on long-term objectives.

Better understand specific situations

In a protected area in Bolivia, the analysis of «External constraints and supports» easily revealed that one of the four communities participating on the national park's management committee had a strongly negative attitude. The protected area's management team did not seem to consider this to be much of problem as co-management could be ensured through the existing majority (three communities out of four).
However, interactions between the park management team and the IMET facilitators supporting them in the evaluation of the management effectiveness of the protected enabled a more in-depth analysis of the problem and the reasons for divergence. This joint reflection made it possible to propose initiatives aiming for a more balanced and higher quality governance of the protected area, taking into account all of the communities involved in management.

Table 5 – Example of long-term management of the elephant population in a protected area

Status	Actions	Results	Effects	Impact	Objective
Year zero The elephant population estimated to be about 500 individuals, decreasing and in danger of extinction 	Anti-poaching patrols	Control of 90% of the park area	• Decrease in cases of slaughtered animals • Better community-park co-management of large wildlife • Better knowledge about elephant population management • Suppression of acts of poaching (slaughter and illegal trade)	**Year +6** The elephant population has increased from 2 to 6%, i.e., approximately 510 to 530 individuals after 6 years of intervention 	**Future years** The viable elephant population is approximately 700 to 950 and more after 18-20 years 
	Raising awareness and responsibility of actors	Information on illegal activities from external actors			
	Management of human/elephant conflicts	Decreased conflicts			
	Strengthening and application of laws	Poaching cases brought to court			
	Monitoring and biomonitoring	Sufficient knowledge of distribution, trends and migration			

Source: Paolini *et al.* (2015)

By defining specific search criteria, IMET evaluation summary tables and radar diagrams (see Figure 3) render it easier to compare protected areas. An example of a comparative table is presented below; it focuses on certain elements measuring the importance of the protected areas in the Burundi national network (Table 6).

Table 6 – Comparison of the values obtained by Burundi's protected areas in the six sub-indicators of the IMET "value and importance" indicator

Protected area	Governance	Classifications	Key species	Habitats	Climate change	Ecosystem services
1-Bururi	62.5	66.7	86.7	75.8	66.7	57.0
2-Kibira	30.3	88.9	61.9	74.4	80.0	41.8
2-Ruvubu	27.8	66.7	66.7	66.7	60.0	55.7
3-Karera	11.1	66.7	33.3	66.7	0.0	55.0
3-Rwihinda	25.0	66.7	68.4	66.7	51.9	61.4
3-Nyakazu	18.2	66.7	56.8	60.3	26.7	39.7
3-Rumonge	25.0	66.7	66.7	50.0	26.7	14.8
3-Rusizi	36.4	41.7	33.3	33.3	29.6	38.3
4-Gisagara	5.6	66.7	47.6	63.0	37.0	49.3
4-Kigwena	5.6	66.7	66.7	66.7	25.0	45.0
4-Makamba	6.1	66.7	60.0	66.7	10.0	48.2
4-Malagarazi	7.4	68.1	66.7	66.7	23.8	45.2
4-Monge	5.6	66.7	50.0	66.7	18.5	51.1
4-Vyanda	6.7	73.2	47.6	66.7	20.0	40.1

The value of each indicator is estimated between 0 and 100: 0 1-32 33-50 51-100. Note: the values associated with each protected area refer to the groups of protected areas identified in Figure 4. Source: BIOPAMA (2018)

Planning-monitoring-evaluation approach

Conservation actions must be increasingly results-oriented, linking planning, monitoring and evaluation with the outcomes of interventions. The quality and targeting of field actions must be improved by establishing clear links between past, present and future initiatives and the long-term objectives of the protected area.

The adoption of the PME process requires the collection of information to be targeted on the effects and outcomes sought. Monitoring and evaluation focused on conservation targets facilitate the extraction of relevant information on past and current activities which can serve as a basis for the development of programs, reorientation of activities and planning for the future. This approach also promotes the establishment of a functional flow of information between protected areas and information providers such as observatories, groups of specialists, experts, conservation networks, NGOs, etc.

6. Role of a regional observatory

The role of a regional observatory for biodiversity conservation in Central Africa is decisive in more ways than one. First of all, it facilitates access to information for a wide range of users and helps fill information gaps and select information essential for planning and management. In particular, it provides policymakers and managers with dashboards for monitoring the situation on the ground and the level of implementation of the various objectives of the national conservation strategies. The presence of such an observatory makes it possible to support the work of decision-makers by developing visualization tools that facilitate decision-making (DSS), by producing specific analyses, by facilitating interaction with groups of experts for the formulation of operational recommendations, by promoting the harmonization of approaches and by offering an overall vision.

Value added of information coming from digital observatories

The analysis of the "intervention context" in Moukalaba-Doudou National Park, in Gabon, noted that the most important conservation elements were, for the most part, correctly listed in the planning document, but that their prioritization in terms of management had not been specified. With the help of the list of species recorded in the protected area and the indicators from the IUCN Red List available on the DOPA Explorer website of the Digital Observatory for Protected Areas (https://dopa-explorer. jrc.ec.europa.eu/dopa_explorer), it was possible to refine the intervention priorities. The analysis demonstrated that certain assets did not received the attention which they were due and did not benefit from sufficient conservation efforts in relation to the selected intervention priorities. The exercise finally made it possible to correctly identify the conservation actions to be carried out for each of the main «assets» of the protected area.

A regional observatory also interacts with countries and supports them in processing, analyzing and interpreting data. It provides various actors not only all of the information available, but also all of the tools that could facilitate their work. When an observatory is staffed with individuals who are skilled in statistics, it can even support countries in their efforts to adopt monitoring and information management tools. In this respect, it plays a vital role in human capacity building. It also plays a specific and decisive role in supporting countries to develop national information systems that are able to interact with the regional system.

Central Africa Forest Observatory (OFAC)

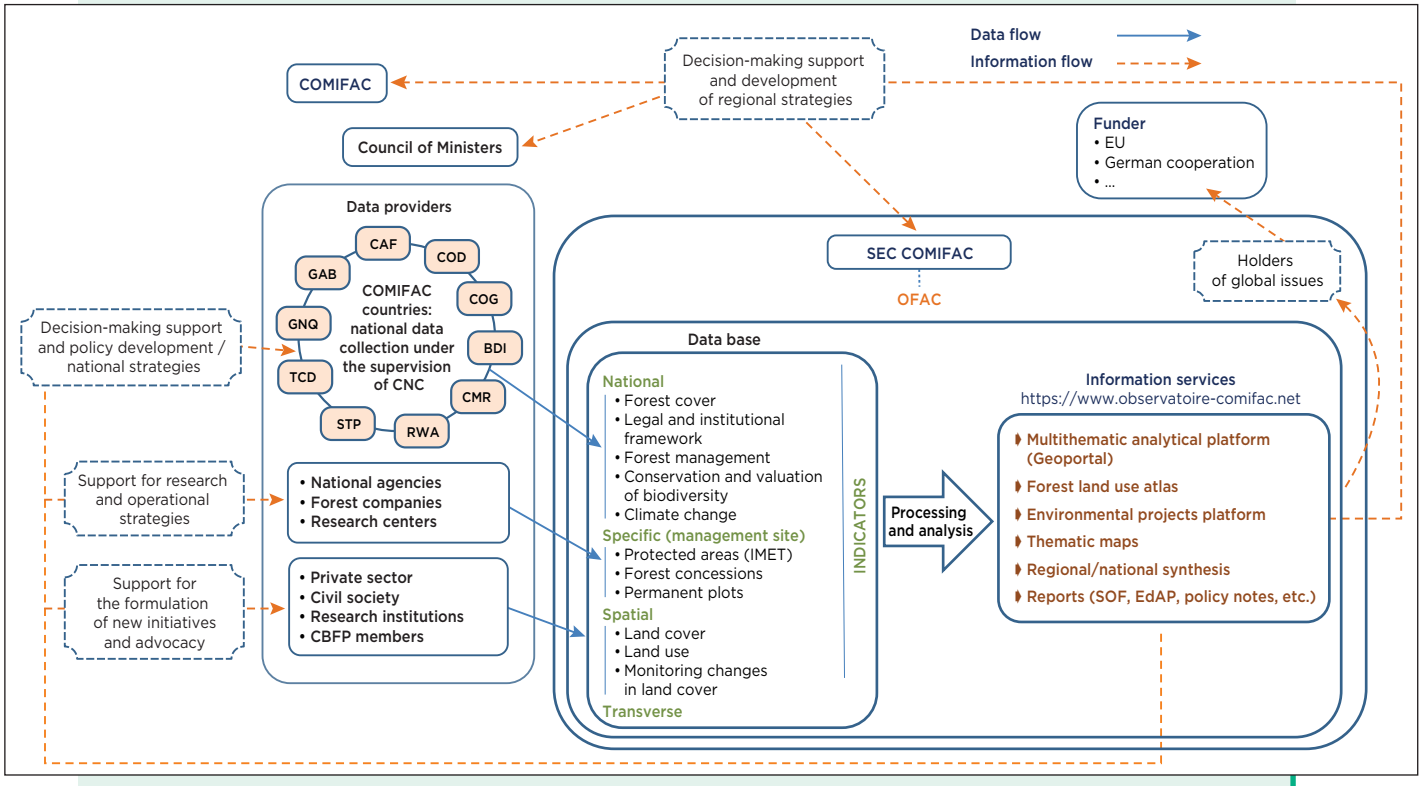
OFAC's mission is to ensure the availability of information to support the sustainable management of forest ecosystems in Central Africa. The observatory, supported by diverse partners, has set up several systems to collect and manage environmental data at different scales of intervention.

At the national level, OFAC conducts annual campaigns to collect reference data in its 10 member states. These indicators, which are defined in a concerted and participatory manner, are chosen according to their relevance, the nature of the variables and the possibility of obtaining information on them. They are regularly reviewed to take into account new emerging themes, and to facilitate synergies with other international mechanisms for collecting environmental data (for example, FAO's Forest Resources Assessment (FRA) and the biannual campaigns of the International Tropical Timber Organization (ITTO).

The information available at the level of management sites is collected by different actors using different collection tools which are most often their own. These data are sometimes sensitive and must be analyzed in a very precise context.

OFAC's information system brings together these different processes by ensuring that the mechanisms for collecting, storing, processing and disseminating information meet the requirements of confidentiality, harmonization, security, interactivity and exchange, making it possible to capitalize on this information at other levels but also at the site level.

Figure 6 – Flow of data and information between OFAC and its partners



The main constraints to the proper functioning of a regional observatory like OFAC concern the availability of the necessary resources in terms of staff (skills and profiles), infrastructure and funding, but also the need to interact openly with each country. To achieve the shared objectives of increasing "useful knowledge" and facilitating the emergence of an overall regional vision, it is essential that countries share the information which they have and that they adhere to the approach advocated by a regional observatory. Countries must simultaneously rely on the observatory's services and value its role for their own benefit and that of the region as a whole.

7. Preliminary considerations for an action plan

It is often said that information is power. In the field of conservation, information can be viewed by a protected area manager as "the power to protect the area and its associated assets". However, to what extent can we become good conservation managers by finding and using good information? How can "good information" give us the power to move in the right direction? Here are a few answers that could be given to these questions:

- information makes it possible to know the assets and wealth that we need to manage;
- it allows us to stay a step ahead of threats and opportunities, and to take a proactive approach;
- it strengthens the validity of our intervention because it favors the adoption of innovative, flexible and adaptive management in terms of conservation;
- it makes management effective and efficient because it is results-oriented;
- it makes it possible to consider and make suitable decisions in real time.

Despite all of these advantages, some protected area managers do not use information correctly. As something which can be stored, analyzed and used to better achieve objectives which have been set, information has enabled the transformation and evolution of various activity sectors in the world today. Although it could play the same role in conservation, some protected area managers seem to tend to overlook its importance.

One of the main reasons for this attitude is that we believe that our knowledge and experience match the information we need to manage. This confusion between necessary information and acquired knowledge does not exist in other fields of intervention where, to the contrary, knowledge is reinforced at the same time that available information is sought and used.

Research and information management require sustainable resources and significant capacity on the part of staff involved in the management of a protected area. However, these resources are generally insufficient and capacity building is often limited to anti-poaching activities.

Several factors should be considered for the better use of information in conservation:

- managers must understand that the knowledge-experience they have acquired can and must be enriched with new information necessary for results-oriented management;
- it is a mistake to think that information management involves taking resources away from "priority" management activities. First of all, investing in the collection and analysis of information is necessary for better informed decision-making; it is a priority that must be assumed as such. Second, investing in research and analysis of the information already available, in synergy with the different actors and using existing information systems, does not require excessive efforts in terms of time, and even less in terms of money. A lot information is often already available and can be generated without any kind of special contribution being requested from management sites by website operators or observatories such as OFAC. The issue of what resources are available or are to be mobilized must be analyzed above all with the objective of exploiting or rendering usable the information that is already available rather than generating new information. OFAC, with the support of analysts and specialists in digital data processing, could play the role of facilitator to make the available scientific information more accessible and usable;
- the use of data collection and analysis tools such as IMET and SMART must be expanded. These tools are designed to collet, store, analyze and directly use calibrated information to support management at the site level. They are a powerful means to improve

decision-making within the reach of managers. Here again OFAC can play an important role by securing data storage, supporting data analysis, and combining data coming from different sources. OFAC also can transmit to managers structured data which respond to management needs and priorities. Consultation and harmonization work between the parties is required to better define the type of priority information essential for management;

- protected area staff must be trained in the use of information management tools and in the interpretation of data and information for planning and decision-making purposes.

Ultimately, considering the many external and internal factors affecting the conservation of protected areas and the management of natural resources in general, it is essential to define and implement a strategy aimed at promoting a coordinated effort by the various actors to fill critical information gaps and promote a results-oriented approach. OFAC has an important role to play in the promotion and refinement of an information strategy in the subregion.

In order to launch discussions for the preparation of an information strategy at the level of the COMIFAC area, some basic principles can already be set out. To improve the management of conservation sites and of the impact of human interventions, it is essential to:

1. recognize the contribution of information to the effective, proactive and targeted management of protected areas and the overall environment;

2. make the most of the knowledge and experience of field actors by combining these with information produced by scientists and other data providers;

3. orient the collection of data and knowledge around well-targeted management objectives in a results-oriented management framework;

4. develop synergies and design coordinated data collection approaches by promoting more direct involvement of managers in identifying and formulating information needs;

5. ensure better use of the information available by facilitating access and effective use for operational purposes. It also involves promoting collaboration in the interpretation of data between managers, scientists and other stakeholders in order to encourage all possible synergy with existing actors and programs;

6. guarantee, with the support of observatories (in particular OFAC), the use of instruments such as IMET and SMART, which allow the information available at the site level to be used through its analysis and translation into targeted operational indications;

7. promote information sharing and transparency;

8. use information to lobby for the mobilization of resources needed for effective management of protected areas.

Conclusion

Information plays a crucial role in protected area management and biodiversity conservation. However, for its potential to be fully exploited and for managers and policy makers to achieve their goals and reverse current trends, a change in culture is needed. Data providers, managers and researchers must pull together and establish a dialogue that can ensure a continuous flow of information between all stakeholders. This could generate a virtuous circle to better guide research and the collection of critical information, supporting better planning that will enable actions in the field to be better targeted. These are the foundations of a proactive and results-oriented approach, based on informed and effective decision-making.

To do so, it is essential to be able to rely on user-friendly information systems, easy to access and search, based on well-structured databases from which information can be easily extracted. Above all, these databases must help to better present the reality on the ground. Through the analysis of this information, it will then be possible to formulate the most appropriate operational recommendations possible with regard to the actions and strategies to be implemented at the site, country and subregional levels. While qualitative information can be useful for decision-making, the use of quantitative information should be improved. The latter allows for a simpler and finer representation of the situation as well as the comparison, scaling and repetition of assessments. The process should encourage a better use of information by enhancing the information that already exists, but also promote the collection and search for essential information that will enable better targeted interventions.

The capacity to analyze the information available and formulate operational recommendations is without doubt a critical component in the chain of information processing in which investments will be essential. Human capacity building is undoubtedly one of the priorities for intervention. OFAC can and should play a central role in the region in the management, analysis and flow of information, as well as in capacity building, facilitating better coordination between different intervention levels and by supporting countries in their efforts to formulate priorities and policies.

However, all of this alone is not enough. Countries need to recognize and support the principles of data sharing and transparency, rendering data accessible to all stakeholders, of course while respecting the limitations imposed by sensitivity and security concerns. This sharing would benefit above all the countries themselves by enabling them to solicit both actors in the field and scientists. The resulting transparency and objective regional vision would facilitate dialogue and reciprocal trust between countries and donors, contributing to a greater mobilization of resources for conservation.

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Annexes

Annex 1. General considerations regarding data collection

What is meant by "data collection"?

Data collection refers to the systematic approach of bringing together and measuring information from a variety of sources in order to gain a complete and accurate view of a domain of interest. Collecting data allows a person, organization, or business to answer relevant questions, assess results, and better anticipate future probabilities and trends.

Table 7 – Basic principles for data collection

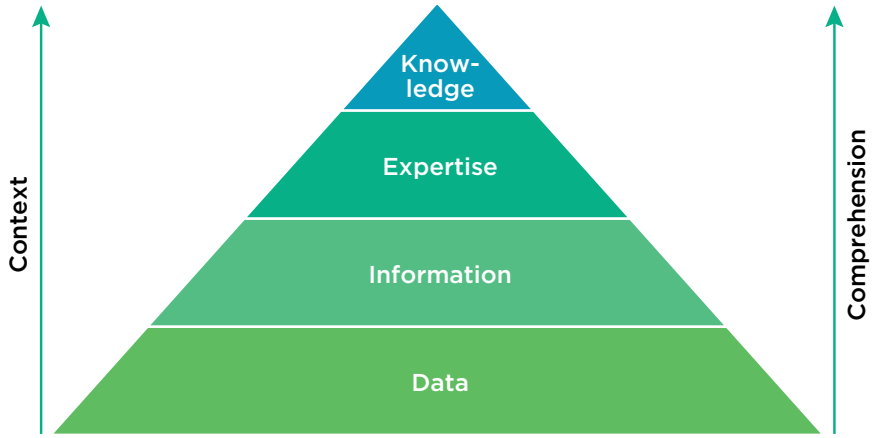
Systemic approach	which is done methodically and proceeds in a predetermined order
Measure	seek to know, or determine a quantity by means of a measurement
Come from various sources	different sources, different data producers, or different types of data, that can contribute to updating the same subject
Obtain a comprehensive and accurate view	the information sought must be focused on filling a lack of critical information and must be as complete and quantified as possible
Allows answers to relevant questions	all data collection must be done with the objective of answering one or more specific, previously defined question(s)
Allows results to be assessed	the data collected are the basis of all analysis and interpretation processes and are therefore the basis of all decision-making
Allows better anticipation of future trends	understanding the problem and the dynamics underlying it allow predictions to be made and response / adaptation strategies to be identified

Data collection should be undertaken by following a certain number principles presented in Table 7. On the one hand, data collection involves research and the compilation of information that is already available (bibliographic research and retrieval of information from experts or specialized institutions), and, on the other, the collection of new relevant data in relation to the field of interest or the question asked.

Accessibility of data and information: data ownership and visualization

The data-information-knowledge-wisdom/learning hierarchy (Figure 7; Bellinger *et al.*, 2019) shows that data, information, knowledge and learning are interrelated concepts. This implies that decisions – whether they affect the management of a protected area or the definition of a national conservation strategy – will only be sufficiently justified and sound if they are based on relevant and sufficient data and information.

Figure 7 – From data to knowledge



Source: modified from BID-REX (2019).

Challenges

Despite the amounts of data available, the challenges and difficulties that exist generally lead to inefficient data flows from the data collection process to the decision-making stage (BID-REX, 2019). These difficulties or obstacles can be regrouped into four categories following the classification proposed by Natural Capital Coalition (2019), and are presented in Table 8.

Table 8 – Main difficulties related to data management

Type of difficulty	Associated issues
Accessibility of data This refers to the ease with which users can find and use data	This difficulty refers to the formatting, cost and ownership of data. The challenges are related to: • the availability of data: a number of factors may complicate users' access to data, such as: – how the data is formatted: data available in incompatible formats or where the process of formatting data for compatibility is time consuming, – restrictions on licenses, costs and ownership by third parties: in some cases, it may be difficult to access datasets due to confidentiality issues or because the payment of a royalty or a license is required; • the volume and complexity of data: users may have access to a dataset but this requires significant investments in time and resources which can be difficult to manage.
Data infrastructure This refers to the need to support organizations which produce, provide and manage data	This difficulty refers to measurement protocols, standards and guidance documents, as well as software. The challenges are related to: • weak governance: the lack of good governance of data (management, policies, standards, etc.) can undermine the quality of data, • volume of data: this can exceed the capacity of the available management systems and analysis capabilities, • standards and advice on how to use data: their absence can lead to poor quality data and incorrect analyses.
Data quality This is crucial for data to be reliable	This difficulty refers to the comprehensiveness, accuracy, and consistency of the data, as well as their availability to answer questions raised. The challenges are related to: • incomplete data: in many cases, data are not available at the scale, accuracy or frequency required for the evaluation, • robustness of the data: depending on the robustness of the evaluation and the type of output required, data may need to come from authoritative sources and be highly credible.
Capacity building This refers to the ability of the actors involved in all phases to use the data.	This difficulty refers to the lack of capacity to understand the data and use it wisely. The challenges are related to: • identifying and solving problems with data, • filling gaps and uncertainties in datasets, • using new technologies and streamlining efforts, • understanding the limitations of data in decision-making.

Recommendations

Possible solutions to the challenges presented in the preceding paragraph are proposed below (BIDREX, 2019; Natural Capital Coalition, 2019).

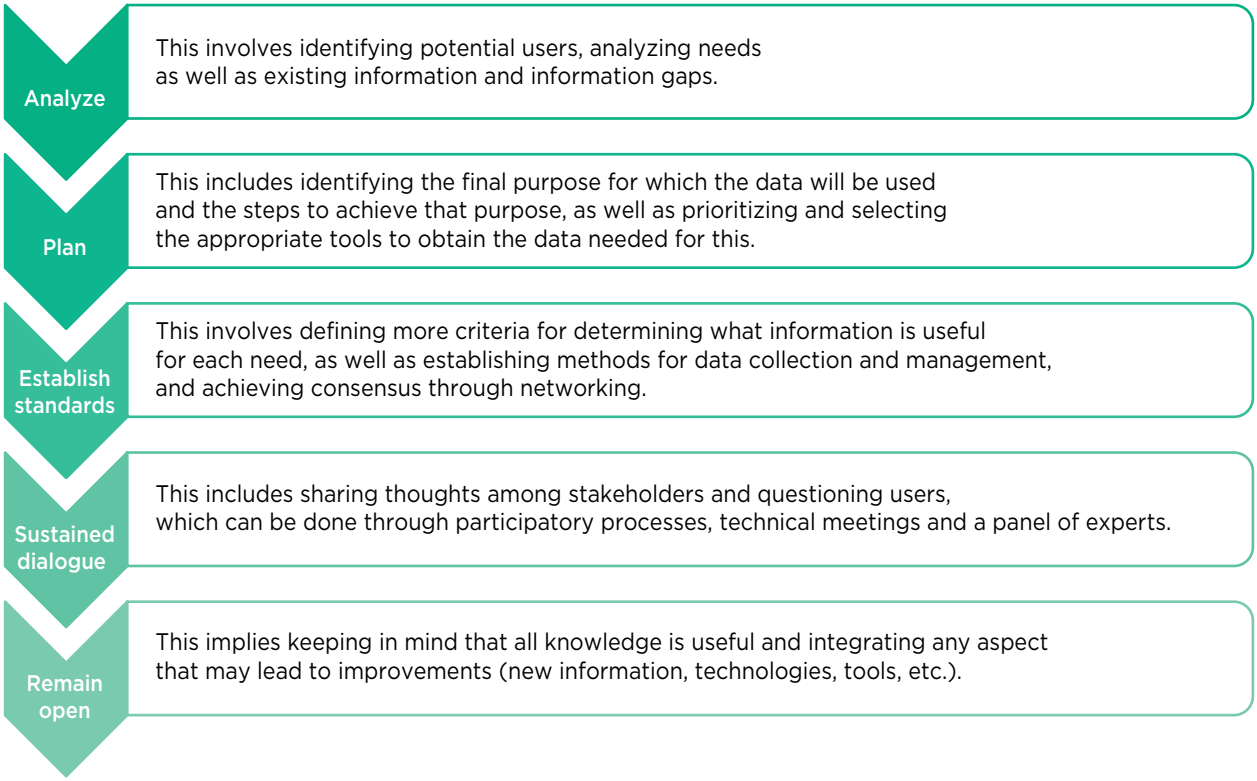
- Make data sets open-access without compromising their robustness and, where possible, adopt approaches that allow free access to the data. Communicate the benefits of sharing data to all stakeholders.
- Communicate basic licensing requirements to data providers to facilitate access rights.
- Establish an in-house protocol for data collection and management. Create policies to ensure ethical access and use of data. Establish standards and guidelines for quality assurance and data verification.

- Use new technologies and new information systems. Automate data management processes. Use custom-built systems to manage large volumes of data and ensure efficiency.
- Provide more guidance on the use of data, data interpretations and issues related to data quality and data management.
- Use internal and external resources when data quality is not guaranteed at the source (e.g., consultants, interdepartmental collaboration, etc.) to ensure data quality.
- Invest to fill gaps in key data and/or explore the use of technologies or models to fill these gaps.
- Provide capacity building and training - throughout the data chain - from data collectors to data users and analysts. Ensure that data limitations and uncertainties are well understood and taken into account in decision-making.
- Work with partners (other organizations and the general public) because this can help build community and provide a network of support.

Best practices

Sometimes the data used may not have been produced specifically for the primary purpose under study (they may have been produced or derived from other related processes). To ensure that the information is appropriate for the target objective, reflection is needed about the data needs and intended uses. This can be undertaken by considering five main elements (Figure 8; BID-REX, 2019).

Figure 8 – Main elements to consider in data collection



Annex 2. Contributions of decision-support tools in protected area strategy development, planning, monitoring & evaluation, and management

How can we make the right decisions for the effective management of Central African protected areas in a changing and complex context?

What types of tools and methodologies can be relied on to address the management and governance challenges facing the managers of protected areas in Central Africa? Which tools could help us identify concrete courses of action and feasible solutions? How do these decision-support tools help the managers of our protected areas?

In general, decision-support tools, especially tools for assessing the management effectiveness of protected areas, enable protected area managers and their partners to: (i) measure the performance of a protected area (or of a protected area network) in relation to its conservation objectives; (ii) make decisions to improve this performance and facilitate the evolution of the protected area context; (iii) in so doing, improve the achievement of objectives; and lastly (iv) be able to be accountable to all partners involved in the management of protected areas.[1] The choice of a specific tool depends on the scale at which the protected area manager wishes to work and the level of precision s/he expects from results and analyses. Considering the array of tools used in Central Africa, this document lists the most widely used tools in terms of their usefulness, user type and application framework.

1. https://papaco.org/fr/evaluations/

Table 9 – Overview of the main tools used in Central Africa for decision support

	SMART	IBA	IMET	METT	RAPPAM	EoH	SAPA	SAGE	GAPA	Green list
General information										
Context of application	PA	PA	PA	PA	PA	Assets to conserve	Social impact of conservation measures	PA + periphery Governance and equity of conservation measures	Governance and equity of conservation measures	PA + reference context
Approximate period when the tool began to be used in Central Africa	2005	2001	2015	2002	2008	2010	2019	2019	Not yet used	Not yet used
Level of dissemination of the tool in Central Africa	High	Low	Medium	High	Low	Low	Low	Low	None	None
Ease of use of the tool	Medium	Forte	Medium	High	Medium	Medium	Low	Low	Low	Low
Time required for implementation	Long	Short	Medium	Short	Medium	Medium	Long	Long	Long	Long
Flexibility of the tool in collecting information to better reflect the specific features of the PA considered	Medium	Medium	High	Low	Medium	Medium	Medium	Medium	Medium	Medium
Fundamentally quantitative evaluation	YES	NO	YES	NO	NO	NO	NO	NO	NO	YES
Fundamentally qualitative evaluation	NO	YES	NO	YES	YES	YES	YES	YES	YES	YES
Adaptability of the tool for multiple uses in PA management (themes and applications)	Medium	Low	High	Low	High	High	High	High	High	High
Possibility of inserting information on the intervention context	Low	Medium	High	Low	Medium	Medium	Medium	Medium	Medium	Low

	SMART	IBA	IMET	METT	RAPPAM	EoH	SAPA	SAGE	GAPA	Green list
General information										
Level of objectivity in the attribution of values, estimated on the basis of: 1) openness to stakeholder participation, 2) number of elements considered and 3) range of the assessment scale	Medium	Medium	High	Medium	Medium	High	High	High	High	High
Information on the content										
The tool considers elements related to the following themes:										
1. Climate change	NO	NO	YES	Medium	Medium	NO	NO	NO	NO	YES
2. Ecosystem services	NO	NO	YES	NO	NO	NO	NO	NO	NO	YES
3. Anti-poaching	YES	YES	YES	YES	YES	YES	NO	NO	NO	YES
4. Ecological monitoring	YES	Medium	YES	Medium	Medium	YES	NO	NO	NO	YES
5. Marine Protected Areas	NO	YES	YES	NO	NO	YES	NO	NO	NO	YES
6. Governance	NO	NO	Medium	NO	YES	YES	YES	YES	YES	YES
7. Social dimension	NO	NO	Medium	Medium	YES	YES	YES	YES	YES	YES
8. Participatory management and local communities	NO	NO	Medium	Medium	YES	YES	YES	YES	YES	YES
Respect for the succession of elements of the management cycle	Low	Low	High	Medium	Medium	Medium	Low	Low	Low	Medium
Services and products provided										
Tool supporting the results-oriented approach	YES	Medium	YES	Medium	Medium	YES	YES	YES	YES	YES
Tool that integrates a database	YES	NO	YES	NO	NO	NO	NO	NO	NO	YES
Possibility of integrating information into a database supporting the results-oriented approach	YES	Medium	YES	Medium	Medium	Low	Low	Low	Low	YES
Possibility of carrying out analyses of the entire PA (multi-theme)	Medium	Medium	YES	Medium	NO	YES	NO	NO	NO	YES
Possibility of changing the scale of analysis	YES	Medium	YES	Low	YES	Low	Low	Low	Low	YES
Operational support in monitoring key conservation elements	YES	Medium	YES	Medium	Medium	Medium	NO	NO	NO	YES
Support for planning	YES	Medium	YES	Medium	YES	YES	YES	YES	YES	YES
Contributes to capacity building	YES	Medium	YES	Medium	NO	YES	YES	YES	YES	YES

Note: this table is compiled based on the authors' personal experience and knowledge and reflects their opinion only.

PA: Protected Area. Response level: Low Medium High

Tableau 10 – Outils d'aide à la décision utilisés en Afrique centrale pour évaluer et améliorer l'efficacité de gestion et la gouvernance des aires protégées

Tool	Objective targeted by the tool	Advantages	Disadvantages
SMART **(Spatial Monitoring and Reporting Tool)** smartconservationtools.org	The spatial monitoring and reporting tool is designed to: (i) improve anti-poaching efforts in a protected area, (ii) ensure effective monitoring of law enforcement in protected areas and conservation zones, (iii) conduct ecological monitoring, and (iv) understand the level of pressures and threats to the protected area. SMART facilitates the collection, storage, and analysis of data on patrol efforts, and the extraction, transfer, and sharing of data with key actors. The tool helps to create and maintain a flow of information between eco-guard teams, protected area managers and their partners, as well as data managers and users. The SMART approach helps to significantly improve the protection of wildlife and their habitats. SMART is a combination of patrol efforts, ecological monitoring, monitoring the application of the law, and monitoring management measures to improve the protection of protected areas, control threats and pressures, and inform decision-making.	The SMART approach is applicable in all protected areas and is implemented by patrol teams to protect wildlife and natural ecosystems. It contributes effectively to the protection of protected areas as well as biodiversity as a whole. SMART is the protected area manager's ideal software. The tool makes it possible to: i) work towards better law enforcement to reduce threats to wildlife and natural resources; ii) motivate field teams through a system of bonuses adapted to the performance of eco-guards, and iii) have a database through the systematic collection of data during patrols, and data storage and analysis upon return from patrols.	The use of SMART and the establishment of a patrol database alone will not improve the protection of a protected area. The use of SMART must be combined with effective law enforcement and the provision of sufficient multifaceted resources to the protected area. Adaptive patrol management requires: (i) additional resources; (ii) qualified staff in the fields of IT, team management, data processing and analysis. The evaluation of feedback mechanisms between managers and eco-guards is an important element that must not be neglected in the process.
IBA **(Important Bird Areas)** https://rris.biopama.org/node/18654	BirdLife International has developed this global framework to identify and monitor the conservation status, threats and protection actions in IBAs. IBAs are places of international importance for birds and, therefore, for biodiversity conservation. The tool aims to identify, monitor and protect essential sites for birds and biodiversity. It has a threat calculator, a record sheet to specify the status of bird populations and a record sheet of actions in progress. The designation of a site as an IBA is made on the basis of one of the following criteria: i) it regularly hosts a species that is endangered at the country level; ii) it hosts a species that is endemic or has a restricted range; iii) it hosts an avian community representative of a biome; iv) it constitutes a gathering area hosting a number of birds representing at least 1% of the national, continental or global population, whether for nesting, migrating or wintering.	BirdLife provides a standard "Pressure-State-Response" (PSR) framework as a management approach. PSR is simple, flexible and practical enough to be implemented effectively on a wide range of sites. The framework enables the compilation of data at national, regional and global levels for better monitoring of BirdLife partnerships. It enables the identification of conservation actions to be undertaken and key partners for achieving the objectives set. Through this conservation plan, it is easier to mobilize human resources and to help obtain the financial and material resources needed to implement the selected activities.	The designation of an IBA has no legal implications because it works above all to encourage decision-makers and tourism promoters to respect the heritage value of the site. However, the prestige of an IBA label often brings legal protection and facilitates ecotourism. The ZICO monitoring tool can be used to feed databases but these are not always accessible to protected area managers.

Tool	Objective targeted by the tool	Advantages	Disadvantages
IMET **(Integrated Management Effectiveness Tool)** https://rris.biopama.org/node/18643	The main objective of IMET is to support the planning, monitoring and evaluation of protected areas to improve management and ensure the achievement of conservation objectives. It is designed to build the capacity of protected area managers to adopt a results-oriented approach. Although IMET assessments include the assessment of protected area management effectiveness, the scope of the tool is much broader than some of the methods in the Global Database on Protected Area Management Effectiveness (GD-PAME). IMET is a participatory and program-based approach that relies on the results of the analysis of adaptive management of protected areas. It provides a comprehensive set of decision-support tools for protected area managers, organizations and biodiversity conservation agencies. The tool covers all elements of the protected area management cycle. The results of the assessment are visualized in real time, which facilitates exchanges between the different stakeholders for participatory decision-making.	IMET exercises are carried out with the support of facilitators, "IMET Coaches". The assessment is based on a database that allows functional links to be established between different management levels: from the site to the landscape and ecosystem, or from the site to the national and regional network of protected areas. The tool is adapted for the manager and his/her partners who wish to obtain a complete inventory of the intervention context and management of a protected area or a network of protected areas. IMET makes it possible to adapt to the specificities of the protected area. The visualization of analyses and scores through the graphs automatically generated by the tool can support decision-making. In the absence of a development and management plan, the tool facilitates the planning of activities and helps provide guidance for the revision of work and management plans.	The tool is intended for centralized data collection and helps improve management efforts and reporting on protected areas. IMET should not be used to compare protected areas but rather to assess the specific features of each. While including elements that allow an initial assessment of governance and social impacts, the tool – in its current state – is not meant to be used specifically to assess these aspects. If required, it would be useful to conduct more in-depth studies using tools such as SAPA and SAGE (see below for a brief presentation of these tools). It should be noted that an IMET module for assessing the governance of ecosystem services has been developed and is currently being tested in Central Africa.
METT **(Management Effectiveness Tracking Tool)** https://rris.biopama.org/node/18647	A tool for measuring the performance of a protected area in relation to community development actions, METT allows for a rapid assessment of the effectiveness of a protected area's management. The different versions of METT allow managers and their partners to identify needs, constraints, trends, strengths, weaknesses and priority actions to improve the management effectiveness of a protected area. The tool is used by donors to obtain an inventory of the state of the protected area and to monitor and evaluate conservation objectives. When carried out on a regular basis, METT makes it possible to monitor improvements and setbacks with a view to defining management priorities. Advanced METT+ covers other important aspects that are not in the traditional METT version, notably climate change. RAPAC (Réseau des Aires Protégées d'Afrique Centrale) has used METT under the name PAMETT (Protected Area Management Effectiveness Tracking Tool), which has been used widely in Central Africa. To measure progress and correct management actions on an ongoing basis, the assessment should be repeated annually.	Easy to use by managers themselves, METT provides sufficient information to identify the main management issues that need to be communicated to decision-makers. It is useful for protected area managers who would like to carry out a rapid assessment of individual sites without the need for additional studies or research. The tool consists of a series of forms to be filled in by the user (whether an expert or not) that have a relatively simple interface and are easy to understand. Indicators on assets, habitats and species are filled in during discussions and do not necessarily need to be well documented.	The assessments are relatively superficial and should not be the only basis for improving the management effectiveness of protected areas. The quality of the assessment is directly related to how it is carried out. If the method is not properly applied, the assessment can easily be biased, leading to results that are not comparable from year to year. The scoring method for each criterion (scores from 0 to 3) makes it difficult to assess the evolution of different situations over time and does not allow a comparison of the management effectiveness between different protected areas. The absence of a database does not ensure complete standardization of the tool for comparable analyses over time.

Tool	Objective targeted by the tool	Advantages	Disadvantages
RAPPAM **(Rapid Assessment and Prioritization of Protected Area Management)** https://rris.biopama.org/node/18645	Designed for large-scale comparisons across many protected areas, the tool provides policy makers and managers with a relatively quick and easy method to identify key trends and issues that need to be addressed to improve management effectiveness in a given protected area system or group of protected areas. RAPPAM is a decision support tool for setting priorities and allocating resources throughout the system to improve management. It represents a first step in the identification of management priorities for a network of protected areas, whether at the national or regional level. It highlights gaps or obstacles in legislation and policies for urgent action, particularly for IUCN category I-IV protected areas.	RAPPAM is implemented by protected area managers but is more useful to policy makers and stakeholders as a decision support tool for an entire protected area network. Participatory evaluation is carried out in the framework of discussions with stakeholders, which makes it possible for decision-makers to define strategic interventions to improve the management of the entire protected area system. When a protected area network needs to be rapidly assessed, it is recommended in the case of an initial assessment to prioritize the key management issues which require attention.	The tool is more useful for a network of protected areas. An isolated assessment at the level of a single protected area reduces the relevance of the analyses, which are meant to be comparative. The protected areas evaluated should have similar objectives. If the objectives vary, the evaluation should be divided into different "sub-evaluations", otherwise the results may be inaccurate. The method relies on questionnaires that include definitions of terms and details on key concepts, hence the need for reliable data to produce credible reports.
EoH **(Enhancing our Heritage)** https://rris.biopama.org/node/18648	Although developed for World Heritage sites, the tool can be used in all protected areas. The tool makes it possible to: i) identify gaps in the management of the protected area; ii) explore appropriate solutions based on the values and objectives for the establishment and management of the protected area; iii) identify threats to the assets of the protected area; iv) develop and implement a system for the monitoring and evaluation of the management effectiveness of the protected area.	User-friendly and flexible, the tool helps managers identify the main values that contribute to the conservation of heritage assets, the respect of the protected area's management objectives and the evaluation of management effectiveness in achieving these objectives. The tool is very useful for managers of protected areas who wish to carry out a complete assessment or to analyze in more detail certain aspects of the management of their site according to a particular objective.	The compilation of the tool is lengthy and essentially qualitative and not quantitative in nature, which makes it difficult to compare two successive exercises. The tool does not allow the multitude of information collected during the assessment to be inserted into a database that would allow it to be processed. This is unfortunate because the information collected is very complete and could be very useful in filling in gaps in governance and management. It would be desirable to have a database for monitoring and comparative analyses that would allow for changes in scale and the monitoring of developments over time.

Tool	Objective targeted by the tool	Advantages	Disadvantages
SAPA **(Social Assessment for Protected and conserved Areas)** https://www.iied.org/assessing-social-impacts-protected-conserved-areas-sapa	Within the framework of poverty reduction for communities living in and around protected areas, SAPA enables the assessment of the positive and negative social impacts of protected areas on the well-being of these communities. The process includes a self-assessment using a combination of community workshops, a household survey, and stakeholder workshops, all conducted by a SAPA facilitation team. It is intended to help managers increase and share more equitably the social benefits (positive impacts) of conservation and reduce the negative social impacts. The community stakeholder workshop also helps to develop an action plan in a participatory manner to bring about positive change regarding stumbling blocks identified during the assessment.	The SAPA process is carried out with the help of community SAPA facilitators in collaboration with protected area managers, neighboring communities and key stakeholders. The diagnosis of the positive and negative impacts of the protected area on local and indigenous communities is done in a participatory manner, which promotes the joint search for appropriate solutions to reduce negative social impacts and improve social dialogue between different actors.	SAPA is useful for protected areas with human communities living in and around them. The method is more applicable for individual protected areas, but it can be adapted for the needs of protected area networks. It should be noted that where local communities exist, their support is the key to success in co-managing protected area resources. SAPA sheds light on the population-protected area relationship. The approach focuses on social aspects.
SAGE **(Site-level Assessment of Governance and Equity)** https://www.iied.org/site-level-assessment-governance-equity-sage	SAGE is a method used to assess the governance and equity of measures to conserve biodiversity, ecosystem services and other actions to support conservation, such as cost-benefit sharing programs. SAGE has two objectives. The first is to enable actors at the site level to improve governance and equity in their daily work to conserve biodiversity and preserve the environment. The second is to generate information for actors at higher levels to monitor the effective management of protected areas, improve governance and produce national reports. Initially developed for protected areas, its use has been extended to other sites and conservation areas for sustainable natural resource management. The assessment is based on a framework of 10 principles of effective and equitable governance in line with IUCN protected area governance principles. It is generally not recommended to use the full set of 10 principles because experience has shown that summarizing the findings will take more than a full day's work and participants may lose interest in the proceedings.	Supervised by SAGE facilitators, site-level actors and rights holders conduct the assessment themselves in close collaboration with protected area conservation services. This allows the key actors to appropriate the process as they participate in identifying and prioritizing problems, and preparing actions to be taken to improve governance of the protected area. The SAGE exercise would not be considered credible if the following «basic principles» are absent from the assessment of equity and governance: equity, respect for actors, participation of all stakeholders in the decision-making process, transparency, responsibility or accountability, and sharing of costs and benefits.	Before starting the SAGE process, it is important to verify the feasibility of its use on the proposed conservation site. Five key conditions must be met for a SAGE assessment to produce reliable results and improve the equity and governance of the site: (i) the area's management and governance systems have been operating for at least 2 years (i.e., the assessment is based on concrete experience); ii) there is a low risk that the assessment will lead to conflicts between or within different groups of actors; iii) all key actors are willing to commit themselves to the assessment; iv) the lead facilitator must be independent and considered to be neutral by all actors; v) key actors commit to supporting short and medium-term actions in response to the assessment's results.

Tool	Objective targeted by the tool	Advantages	Disadvantages
GAPA **(Governance Assessment for Protected and conserved Areas)** https://pubs.iied.org/17632IIED/	GAPA is an assessment tool designed for the managers of protected areas and their key players. It helps to identify the strengths and challenges of the governance of a protected area, and aims to promote robust and equitable governance. The evaluation framework is based on IUCN governance principles. GAPA is suitable for all types of protected areas, and allows biodiversity conservation and local development to be covered. To conduct an in-depth analysis of specific points, the actors and managers of the protected area select five or six principles to focus on from 11 governance principles. The collection of data on the status of the protected area in terms of good governance is achieved by combining several actions, namely: the consultation of key stakeholders, the organization of target groups, and conducting surveys/interviews and workshops. The results of the assessment enable the preparation of the action plan and are validated by the stakeholders.	The tool has three main elements: the principles of good governance, the assessment process, and a set of methods and tools. GAPA is comparable to a health check-up that shows the strengths and challenges of the governance of a protected area, enabling the identification of the problems to be solved. It renders possible a diagnosis of the protected area to understand the underlying causes of gaps in governance. This in turn renders it possible to identify the actions likely to improve the situation and to establish a baseline to monitor changes in governance over time.	The multi-stakeholder GAPA approach involves the active participation of key stakeholders in: i) designing the assessment process, ii) analyzing and validating the results, and iii) preparing the action plan. This is essential for the transparency, ownership and credibility of the results. The assessment has six stages: preparation, framing, information, data collection, governance assessment and action plan. The four key people facilitating the process should be experienced: the GAPA Facilitator, the Animator, the Host, and the Rapporteur. The Facilitator must be competent, neutral and impartial. The tool has not yet been used in Central Africa; it has been used in Southern/Eastern Africa (Kenya, Uganda, Zambia, etc.).
Green List (IUCN) https://www.iucn.org/theme/protected-areas/our-work/iucn-green-list-protected-and-conserved-areas/global-standard	The Green List is a process that includes several tools for assessing the management effectiveness of a protected area and an external evaluation of its performance. It aims to provide international recognition of the quality of protected area management. This certification process defines quality criteria that encourage managers to make efforts to better manage protected areas and achieve conservation objectives. The Green List serves to label protected areas that are effectively managed and equitably governed. The method is based on a unique and comprehensive verification process that gives independence and credibility to the evaluation process and its results.	The certification application process is conducted by the protected area manager with stakeholders, independent experts, mentors (similar to IMET coaches) and independent assessors. Ideal for individual protected areas, the certification process also can be adapted to protected area networks that wish to be eligible for the «Green List» label. Green List certification is based on internationally recognized quality standards. The tool relies on the COMPASS data base, whose access is restricted to the global community of the Green List.	The standards for defining best practices are ambitious. Developed to help achieve, among other objectives, target 11 of the Convention on Biological Diversity (CBD), the Green List includes an independent mechanism for verifying the protected area's performance (as opposed to a self-assessment). The certification process is long and can be expensive. It takes place in successive stages and the cost is borne entirely by the protected area.

Figure 9 – Main tools used in Central Africa to support decision-making