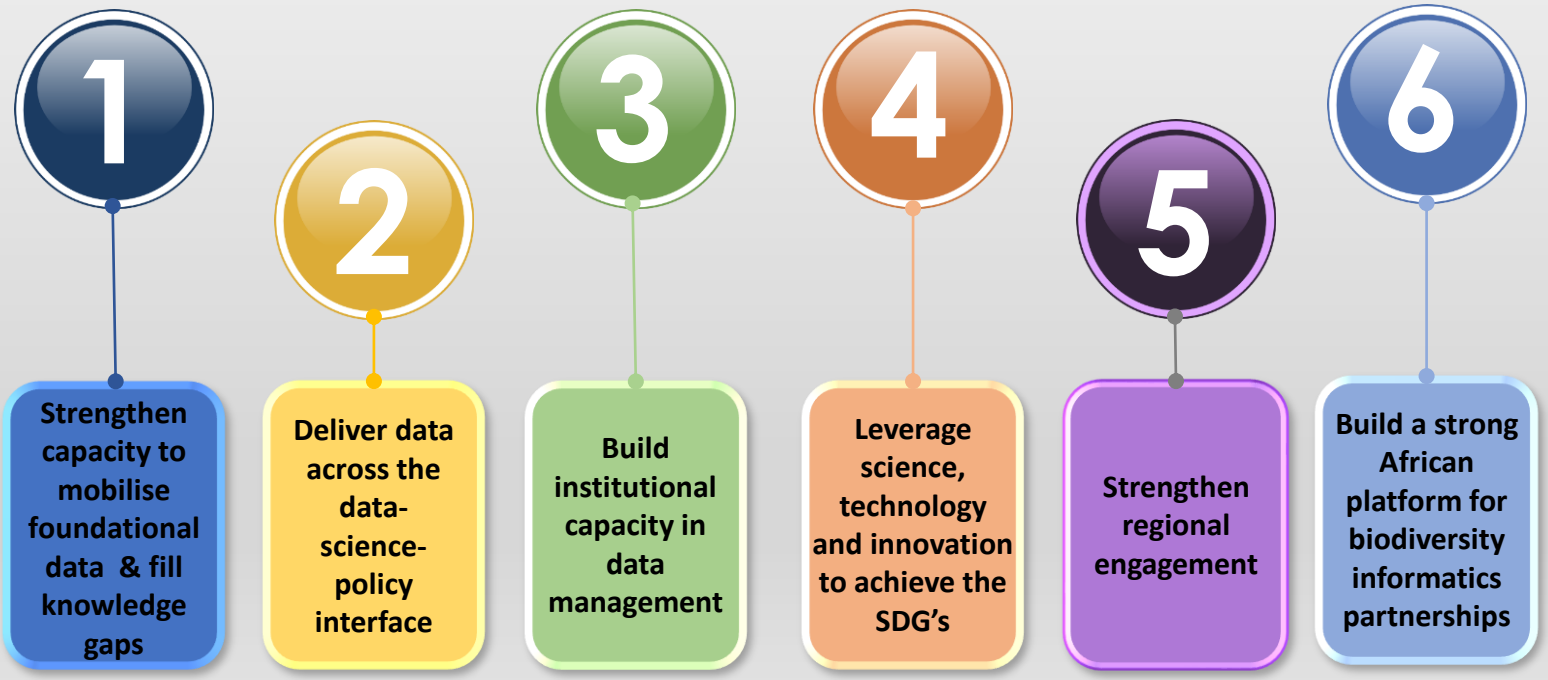
African Coordinating Mechanism

What is it?

A formal regional structure for supporting biodiversity information management on the continent

Strategic Objectives

Six strategic priority areas to advance the African biodiversity informatics efforts



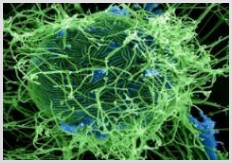
Key Achievements

Science Review and Research Priorities

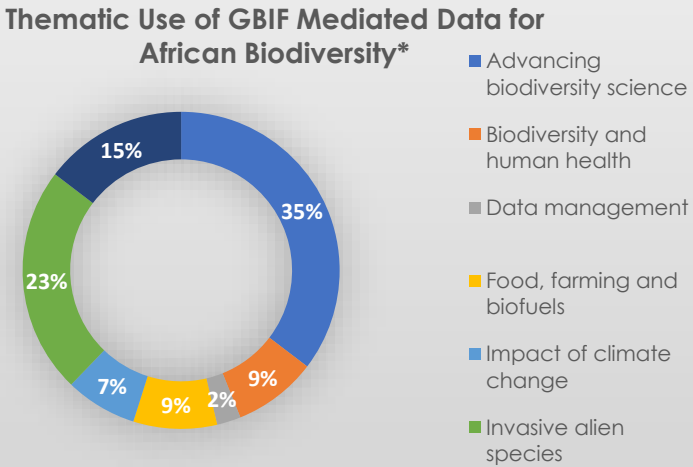
Science Review of literature citing GBIF - Biodiversity in Africa

Invasive alien species: Building national watch lists for invasive alien species

Public health: Mapping the niche of Ebola host animals



Food security: Conserving genetic diversity of crops in West Africa



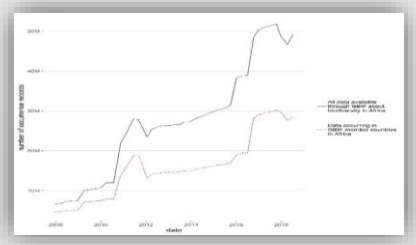
* Summary 2011-2017, GBIF science review

Key Achievements

10 Voting country participants
11 Associate country participants
4 Participant organisations

The achievements of the GBIF-Africa Partnership

Data



More than

30 MILLION

Primary biodiversity data records mobilised by regional members

Funding

The GBIF-Africa Nodes have leveraged more than

US$ 9 MILLION*

in funding since 2014

Capacity Building

Continuous regional engagements since

2010

Approximate 50 BID & 11 CESP projects enabling training and capacity development

* Sources: Country contribution, GBIF CESP, JRS Foundation & BID

Action Plan

The ACM will enable the implementation of the **holistic action plan** that will foster a dynamic, capacitated network in biodiversity informatics able to generate, publish and use biodiversity data for sustainable development.

Regional Presence

The need for regional coordinating offices has been placed on the GBIF agenda for the first time, since adopting a regional approach, at the 2019 GBIF Governing Board. This was highlighted in the 20 year review

Secure Funding

Through the ACM explore funding avenues with governments and other funding agencies that has a strong focus on promoting science, technology and innovation.

Catalytic Projects

The conceptualisation and development of catalytic projects, like mass digitization, to enable activities to support the implementation of the ACM

Community of Practice

The ACM will explore a broader community of practice for biodiversity informatics initiatives. The aim is to enhance the use of data in of support science, technology, innovation and conservation outcomes.

Call to Action

Funders, National Institutions, Science Councils, Governments, Academia,

NGOs, Conservation Agencies, Museums, Research Institutions

Become part of our Africa biodiversity informatics network

Invest in the Africa Biodiversity informatics community

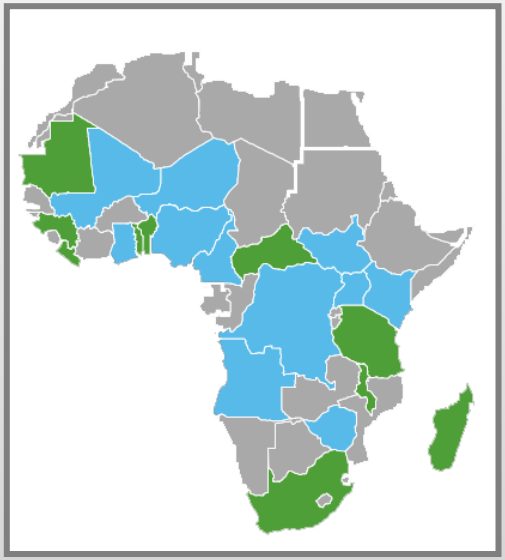
Share your data

Share your knowledge and expertise to build capacity

Use the available technology, platforms and tools

Support the data revolution by ensuring that data supports open science and decision making at the national, regional and global policy levels.

Partnerships



More Information

The African Coordinating Mechanism Report

Contact information:
Ms. Fatima Parker-Allie: F.Parker@sanbi.org.za
Prof. Jean Ganglo: ganglocj@gmail.com

Resources

Africa Coordinating Mechanism presentation

Benin GBIF Node

SANBI-GBIF Fitness for Use Training

SANBI Biodiversity Advisor

Node Managers training

Masters program in Biodiversity Informatics

Data Use for Decision Making

Biodiversity Informatics Training

GBIF

JRS grants led by African Nodes

GBIF e-Learning




GBIF-AFRICA REGIONAL ENGAGEMENT STRATEGY

FUNDING PROPOSAL: TOWARDS THE ESTABLISHMENT OF THE AFRICA COORDINATING MECHANISM 2019-2024

Fatima Parker-Allie, Kristal Maze and GBIF-Africa Nodes

21 November 2018

TABLE OF CONTENTS

ACRONYMS AND ABBREVIATIONS

ABC	African Biodiversity Challenge
ACM	African Coordinating Mechanism
AMCOST	African Ministerial Council on Science and Technology
AU	African Union
BID	Biodiversity Information for Development
BIFA	Biodiversity Information Fund for Asia
BIOPAMA	Biodiversity and Protected Areas Management Programme
CBD	Convention on Biological Diversity
CEPDEC	Capacity Enhancement Programme for Developing Countries
CESP	Capacity Enhancement Support Programme
CITES	Convention on International Trade in Endangered Species
CMS	Convention on Migratory Species
CSP	Consortium of Scientific Partners
CWR	Crop Wild Relatives
DEA	Department of Environmental Affairs
DST	Department of Science and Technology
EIA	Environmental Impact Assessment
EU	European Union
GDP	Gross Domestic Product
GBIF	Global Biodiversity Information Facility
GBIO	Global Biodiversity Informatics Outlook
GBO	Global Biodiversity Outlook

GEO-BON	Group on Earth Observations - Biodiversity Observation Network
IUCN	International Union for Conservation of Nature
IPBES	Intergovernmental Platform on Biodiversity and Ecosystem Services
NBA	National Biodiversity Assessment
NBSAP	National Biodiversity Strategies and Action Plans
NEPAD	New Partnership for Africa's Development
NEMBA	National Environmental Management Biodiversity
OECD	Organisation for Economic Cooperation and Development IPBES
SADC	Southern African Development Community
SANBI	South African National Biodiversity Institute
SDG's	Sustainable Development Goals
SEP2D	Sud Expert Plantes Développement Durable
STISA	Science, Technology and Innovation Strategy for Africa
UNCCD	United Nations Convention to Combat Desertification
UNEP-WCMC	United Nations Environmental Programme – World Conservation Monitoring Centre
UNFCCC	United Nations Framework Convention on Climate Change

1. INTRODUCTION

Africa is one of the most megadiverse continents in the world. Here biodiversity plays a critical role in sustainable development, provides vital ecosystem services and is one of our greatest regional assets. The benefits of biodiversity are crucial to key economic sectors (i.e. forestry, agriculture, fisheries, tourism, health and energy) and to providing solutions to sustainable development and poverty alleviation on the continent. The management of our natural assets and the information related to this are crucial.

Africa is a continent grappling with many challenges, but it is also alive with possibility and booming with optimism. To some Africa is the birth place of human kind, a place with exceptional beauty, brimming with amazing wildlife and human ingenuity. To others, its narrative has evolved from yesterday's story, a story of slavery, of everything gone wrong, a history of extractive resource utilisation by foreign interests, a "dark continent"- to an **Africa Rising**. A place "not so dark" as indicated by the Economist in the 1990s, to a continent with significant foreign direct investment which has increased over time. Although regional peace and prosperity is marred by episodes of conflict, disease and famine, African lives have by most accounts, improved considerably over the past decade.

Africa's economies are on the move, the continents GDP rose significantly from 2000-2008, the incidence of poverty, as measured by the World Bank, has declined significantly[1] and today Africa ranks amongst the **fastest growing economic** regions in the world. [2,3] This growth has been sustained for the last decade, with seven of the world's fastest growing economies being located in Africa. But it is expected that this growth will be sustained for the next few decades, and that this economic growth not just be high but also that it is shared, in order to reduce the inequality of the people.

The average African's ecological footprint is still well below the average bio-capacity available per person and entirely dwarfed that of the average Westerner[4]. Currently, Africa supports approximately 60% of uncultivated land, and with a growing global population and mounting food requirements worldwide, most of this land is likely to come from six countries in Africa called the Guinea Savanna, where most of our natural assets are located. This is a great concern, as our **natural assets** are important to move towards a **green economy.**

There is significant potential for Africa to transition toward a **Green Economy** "that results in improved human well-being and social equity, while significantly reducing (or maintaining low) environmental risks and ecological scarcities."[5] Central to realising a Green Economy in Africa are the

---

[1] World Bank (2015). Poverty & Equity – Regional Dashboard. Available from: http://povertydata.worldbank.org/poverty/region/SSA (accessed 10 Jul. 2015).

[2]Bloomberg (2015). The 20 Fastest-Growing Economies this Year. Available from: http://www.bloomberg.com/news/articles/2015-02-25/the-20-fastest-growing-economies-this-year

[3] Roxburgh C., et al. 2010. Lions on the move: the progress and potential of African economies. McKinsey Global Institute, Washington, DC.

[4]Http://www. footprintnetwork.org/en/index.php/newsletter/bv/humanity_now_demanding_1.4_earths.

[5]United Nations Environment Programme, 2016. What is the 'Green Economy'? Available from: http://www.unep.org/greeneconomy/AboutGEI/WhatisGEI/tabid/29784/Default.aspx [accessed 27 Jan. 2016].

conservation and sustainable use of biodiversity and ecosystem services. Here, producing relevant, reliable and targeted biodiversity data will support better and targeted decisions by policymakers, leading to smarter economies. **The collection, collation, digitization, preservation, presentation dissemination and use of biodiversity data are therefore of critical importance.**

Africa's natural capital and ecological infrastructure is very important. In South Africa, we speak about ecological infrastructure, nature's equivalent of built infrastructure. It includes our mountain catchments, wetlands, coastal dunes and is increasingly being recognised as important for service delivery. Approximately 36% of Africa's wealth is based on natural capital. Many assume that this growth comes only from oil. But this is not the case, while some do in fact have oil, countries like Ethiopia, Rwanda and Uganda have SOIL, they have developed there agricultural (natural) assets. While it is very positive that the economy has grown, we need to ensure that the data which supports our analysis, are mobilised and priority datasets are available to support analysis for amongst other things, natural capital accounting; and sectors such as energy, climate, water, food, infrastructure, mining and extractives as well as trade and investment. In ***a world that counts*** [6] the United Nations describe data as the lifeblood of decision making and the raw material for accountability. Thus, good and accurate data are key building blocks for analysis, in support of the 17 Sustainable Development Goals, including the management of our biodiversity and ecological infrastructure.

Africa boasts a substantial share of the world's biodiversity including one-fifth of all mammal species and one-quarter of all bird species.[7] Despite this, African species are dramatically underrepresented in the world's freely-accessible biodiversity information resources. In 2015, it was reported that only 4 % of the circa 0.5 billion records available through the Global Biodiversity Information Facility (GBIF) concern African biodiversity, the majority of which were published by non-African institutions.[8] Even within Africa, distributional biodiversity databases exhibit strong spatial bias due to uneven efforts in sampling, storing and sharing data which may, in turn, reflect high regional variation in capacity, funding and political will.

South Africa has made considerable progress in the field of biodiversity informatics, not least by joining GBIF and publishing over 20 million primary biodiversity records (South African GBIF country report). In collaboration with the Department of Science and Technology (DST) and the Department of Environmental Affairs (DEA), SANBI has exercised leadership by galvanizing a broader African community of practice to share lessons, strategize and collaborate in mobilising biodiversity data, and in this way, strengthening South-South and North-South cooperation. SANBI-GBIF has played a critical role in coordinating the GBIF-Africa position into the Global Nodes agenda from 2010-2013; and 2015 onwards.

SANBI-GBIF has also developed a five-year Regional Engagement Strategy for Africa (2016-2021), which identifies 5 strategic priority areas to advance SANBI's efforts across the value chain, to support the generation, management and use of biodiversity information for conservation, decision-

[6] IEAG 2014. A world that counts. Mobilising the Data Revolution for Sustainable Development. Report prepared by The United Nations Secretary-General's Independent Expert Advisory Group on a Data Revolution for Sustainable Development, at the request of Secretary General of the United Nations, New York.

[7] United Nations Environment Programme, 2008. Africa: Atlas of our changing environment. UNEP, Nairobi, 2008. ISBN: 9789280728712, at p. 23.

[8] Bánki, O., 2015. The State of Biodiversity Data in Africa. Presented at Africa Rising: Mobilising Biodiversity Data for Sustainable Development, Cape Town. Available at: <http://biodiversityadvisor.sanbi.org/wp-content/uploads/2014/11/1.5._OlafBanki_State-of-biodiversity-data-in-Africa.pdf> [accessed 9 Dec. 2015].

making and sustainable development in Africa. SANBI-GBIF's role in convening The GBIF-Africa network falls within this framework, with these two strategies aligning very well with one another.

One of Africa's main challenges in meeting its own development needs, as well its ability to participate in, and influence, international agendas, is the lack of robust evidence to inform decision making, including information on biodiversity. This was highlighted in the recent global process to assess the decline in pollinators and its impact on food security run by the Intergovernmental Platform on Biodiversity and Ecosystem Services (IPBES). There was limited participation by African countries leading to concerns expressed through the Convention on Biodiversity that African issues were not receiving sufficient attention.

The establishment of the Global Biodiversity Information Facility (GBIF) in 2001, and its associated country nodes, was a response by the Organisation for Economic Cooperation and Development (OECD) to establish a mega-science initiative to make the worlds data freely and openly available. The availability of this biodiversity data would subsequently provide the means for addressing threats to biological diversity and measures of mitigation. By encouraging and helping institutions to publish data according to common standards, GBIF enables research not possible before, and informs better decisions to conserve and sustainably use the biological resources of the planet.

GBIF operates through a network of 'nodes', coordinating the biodiversity information activities of Participant countries and organisations that are collaborating with each other and the GBIF Secretariat to share skills, experiences and technical capacity. It is guided by a strategic plan as well as the Global Biodiversity Informatics Outlook, which proposes a framework that will help harness the immense power of information technology and an open data culture, to gather unprecedented evidence about biodiversity and to inform better decisions[9]. Since 2009, GBIF has actively following a regional engagement approach, and placed its participant countries and associate organisations into regional groups, one of which is the 'GBIF Africa' consortium. Working closely at a regional level has made it easier to set shared priorities, identify challenges and explore opportunities, for the mobilisation and use of biodiversity data between countries.

2. PURPOSE

The **GBIF-Africa Regional Engagement Strategy and Business Case** has been developed to guide the efforts of the GBIF-Africa Nodes and strategic partners, in the region in support of national and regional priorities for biodiversity information management, while ensuring alignment to the GBIF Strategic Plan (2017-2021). It provides a framework for the implementation of biodiversity Informatics priorities in the African region, as opportunities for collaboration on the continent are growing, due to an increase in emerging economies and investment on the continent. In October 2015 at a GBIF-Governing Board side meeting in Madagascar, a ***Communiqué*** was drafted (Appendix 1), requesting that SANBI-GBIF plays a leadership role in the establishment of the African Coordinating Mechanism (ACM). The ACM is the ultimate v**ision for a formal regional structure** for biodiversity information management on the continent, and has been identified as far back as 2010, as a requirement to foster the implementation of the GBIF strategic plan, in Africa.

[9] Hobern et al. 2012. Delivering biodiversity knowledge in the information age. Global Biodiversity Informatics Outlook, GBIF

Global changes (socio-economic, geopolitical, scientific and technological, environmental i.e climate change) have profound implications for the National System of Innovation (NSI). To illustrate, inter- and transdisciplinary knowledge is increasingly important, as research is becoming increasingly data-driven. This means that an open science approach is required to enable greater access to existing information. The success of South Africa's response to the Fourth Industrial Revolution, which will include ensuring that people are not left behind as society and the economy become more technologically driven, will depend on how well we exploit the pivotal role of information and communication technology (ICT) and harness the potential of big data. Furthermore, STI has a fundamental role to play in achieving the Sustainable Development Goals. South Africa's future is inextricably linked to that of the rest of the African continent, and therefore the potential of STI for African development and continental integration needs to be fully exploited[10], and aligned to the African Union 2063 Agenda.

2.1. Strategic Objectives

This GBIF-Africa Business Case identifies six strategic priority areas to advance the biodiversity informatics efforts (driven by the GBIF-Africa Nodes and strategically identified partners), across the value chain to support the generation, management and use of biodiversity information for conservation, decision-making and sustainable development in Africa. These include:

Strategic Objective 1: Strengthen capacity to mobilise foundational data to fill the data and knowledge gaps in support of education, research, analysis and use that is necessary for decision making for sustainable development.

Strategic objective 2: Build capacity to deliver relevant data across the data-science-policy interface, to support biodiversity research, assessments, scenario modelling and planning for decision making.

Strategic objective 3: Build institutional capacity in Biodiversity Information Management through empowering stakeholders to produce, make accessible and use accurate biodiversity data, information & knowledge in support of sustainable development.

Strategic Objective 4: African countries in the GBIF-Africa network leverage science, technology and innovation (STI) to achieve the SDG's and aspirations of the African Union, as identified in its Agenda 2063

Strategic Objective 5: Strengthen regional engagement through advocacy, awareness-raising and enhancing GBIF-Africa's role in supporting regional strategies (eg. Science, Technology and Innovation Strategy for Africa 2024) and in fulfilment of international conventions including UNFCCC, CITES, UNCCD, CBD.

Strategic Objective 6. In the 1st three years explore the need and feasibility of developing a bigger platform that can provide for a strengthening of a community of practice for all African biodiversity informatics initiatives, to enhance and make more efficient use of the data.

[10] Department of Science and Technology | DRAFT White Paper on Science, Technology and Innovation 2018

2.2. SANBI's role in the national and regional landscape to support a Convening Function for the ACM

The **South African National Biodiversity Institute (SANBI)** has a mandate to, amongst others, monitor, manage, co-ordinate, research and report on many aspects of biodiversity within the country.

One of SANBI's very clear mandates is to "Collect, generate process, coordinate and disseminate information about biodiversity and sustainable use of indigenous biological resources and maintain databases". As a knowledge-based organisation, **biodiversity information is *the* key resource which drives research and innovation, informs planning and policy development processes, informs decisions and is the basis to evaluate progress and impact.** It is therefore important that our biodiversity and biodiversity information is managed as a strategic asset that will leverage shared value to South Africa in supporting sustainable decisions towards the broader national developmental objectives.

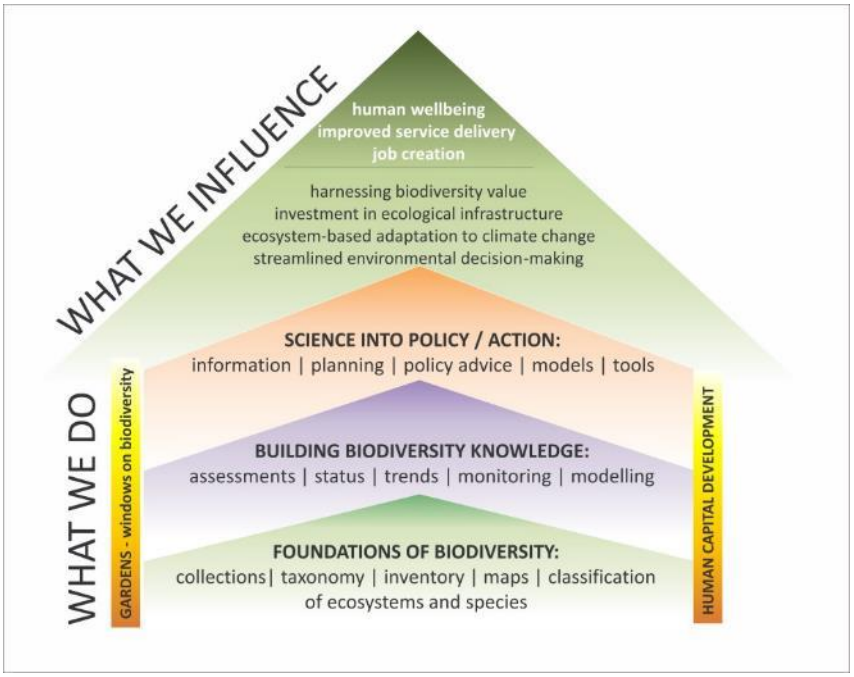


Figure 1. The SANBI value chain

SANBI is a dedicated national biodiversity institution that bridges science, knowledge, policy and implementation. SANBI's value chain (Fig. 1) builds from a foundation of basic scientific information to create assessments and build a knowledge base that can influence policy and contribute to government objectives. These efforts are conducted across the Biodiversity Science and Policy Branch of the organisation and involve the divisions of Biosystematics and Collections, Biodiversity Research, Assessment and Monitoring Biodiversity Information and Policy Advice and Conservation Gardens & Tourism.

These divisions work across the value chain to harness the value of biodiversity, facilitate the improvement of ecosystem services and ecological infrastructure, and achieve objectives to deal with climate change, all to support developmental objectives such as improving poverty alleviation, job creation and human well-being.

SANBI has recently developed its Regional Engagement Strategy (2016-2021), formulated by SANBI-GBIF, which will ensure that programmatic activities at the regional level are coordinated and aligned to national government priorities and to relevant regional, international and national initiatives as we strive towards Outcome 10 and Outcome 11, of the National Development Plan, to ***"Create a better South Africa, a better Africa and a better world".***

3. BACKGROUND AND POLICY CONTEXT OF AFRICAN ENGAGEMENTS

3.1. Context: South Africa's role

South Africa is playing an increasingly active role across Africa. In recent years, the country has been involved in peace-keeping missions[11] and conflict resolution.[12] It has also played a leadership role by championing African interests in multilateral environmental agreements.[13] It has succeeded in elevating sustainable development as a special priority of the African Union (AU), now manifested in various continent-wide initiatives such as the New Partnership for Africa's Development (NEPAD) Environment Initiative and Agenda 2063.[14]

South Africa has engaged key regional and international partners to generate and access financial, technical and institutional support for Africa. At the sub-regional level, South Africa has encouraged enhanced integration particularly in **the Southern African Development Community (SADC)**, and in alignment with **NEPAD**, Agenda 2063 and the Programme of Action.

In seeking to strengthen African and SADC institutions, South Africa has actively supported AU programmes on the environment, climate change and wildlife management. So too, South Africa has participated actively in the African Ministerial Conference of Environment (AMCEN) as well as various multilateral engagements with an environmental focus.

South Africa supports **DST's regional strategy** which is in line **with DST's ten-year innovation plan**. This plan aims to grow the economy from a resource based economy to a knowledge based economy. In June 2014, the 23rd Ordinary Session of **African Union Heads of State** and Government Summit adopted a **10-year Science, Technology and Innovation Strategy for Africa (STISA-2024)**. The strategy is part of the long-term people centred AU Agenda 2063 which is underpinned by science, technology and innovation as tools and enablers for achieving continental development goals. The strategy fosters social transformation and economic competitiveness through human capital development, innovation, industrialisation and entrepreneurship.

The **Department of Environmental Affairs (DEA)** has a **mandate** to strengthen regional cooperation on the continent, a key area of interest for the **Africa and Bilateral Relations component**. The scope of strategic environmental engagements at continental and SADC level is evolving and there are a number of potential opportunities which can be harnessed. This includes (1) documenting the range of African and SADC regional environmental and biodiversity programmes in which SANBI and DEA could play a role; (2) interrogating SANBI's potential role for research and documenting Africa's biodiversity while advancing DEA's /South Africa's interests; and (3) SANBI and DEA to continue collaboration in developing strategic approaches and programmes for work on biodiversity in Africa and the SADC Region.

3.2. Policy framework

The ACM will deliver products that contribute to the fulfilment of the following international strategies and objectives:

[11] http://www.sanews.gov.za/south-africa/sa-soldiers-applauded-peace-keeping-efforts-africa
[12] http://mg.co.za/article/2011-07-09-zuma-hails-mbekis-role-in-sudan
[13] http://www.climateemergencyinstitute.com/unfccc_2015.html
[14] http://agenda2063.au.int/en/sites/default/files/agenda2063_popular_version_05092014_EN.pdf

3.2.1. International

3.2.1.1. The GBIF-Strategic Plan

GBIF has a unique position among international organizations working within the field of biodiversity informatics. It is the only body supported by national governments with a mandate for mobilization and management of data on all taxonomic groups. Since it was set up in 2001, GBIF's Participant community has grown (as of July 2018) to include 57 countries and 36 organizations or economies, all signatories to the GBIF Memorandum of Understanding (MoU). This global network, supported by a secretariat in Copenhagen, has mobilized more than a billion data records and serves as a resource for a growing body of peer-reviewed research and policy applications, with the volume of use growing each year. GBIF has completed its early development phases and is now an operational infrastructure, recognized as the global aggregator for species occurrence data and as a leader in development of globally connected solutions for biodiversity information. GBIF's role is recognized in the context of the Convention on Biological Diversity (CBD), Intergovernmental Platform on Biodiversity and Ecosystem Services (IPBES), Group on Earth Observations Biodiversity Information Network (GEO BON) and other international activities to support biodiversity assessment and planning.

The network is in its fourth funding period, from 2017 to 2021, and the current GBIF Strategic Plan[15] identifies five strategic priority areas. These are:

SP 1: Empower global network
SP 2: Enhance biodiversity information infrastructure
SP 3: Improve data quality
SP 4: Fill data gaps
SP 5: Deliver relevant data

The ACM will seek to ensure alignment with the GBIF Strategic Plan and its associated strategic objectives.

3.2.1.2. Sustainable Development Goals (SDG's)

Built on the Millennium Development Goals (MDG's) and the many multilateral agreements, the 17 SDGs represent a series of **visionary goals**, to end poverty, fight inequality and injustice, and tackle climate change by 2030. It aims to contribute to a more equitable future for humankind.

Biodiversity has a potential role in supporting a number of the SDGs (see below), thus **African Institutions contributes to the sustainable development goals through national and international obligations including**,

Figure 2. The 17 SDGs

[15] https://www.gbif.org/strategic-plan

Goal 2 End hunger, achieve food security and improve nutrition and promote sustainable agriculture

Goal 4 Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all

Goal 6 Ensure availability and sustainable management of water and sanitation for all

Goal 8 Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all

Goal 13 Take urgent action to combat climate change and its impacts

Goal 14 Conserve and sustainably use the oceans, seas and marine resources for sustainable development

Goal 15 Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss

Goal 17 Strengthen the means of implementation and revitalize the global partnership for sustainable development

Institutional contribution to SDGs through national & international obligations & priorities

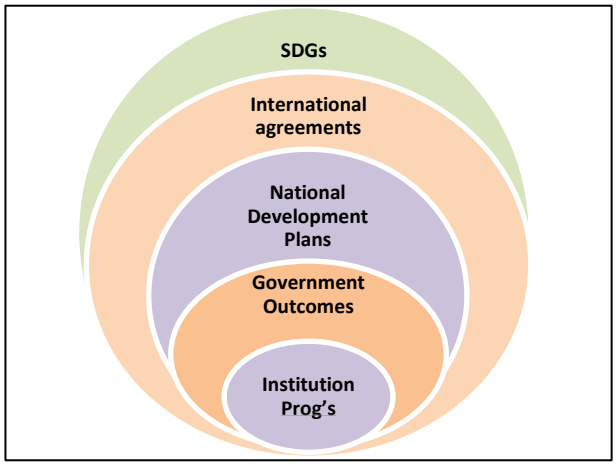


Figure 3. National obligations

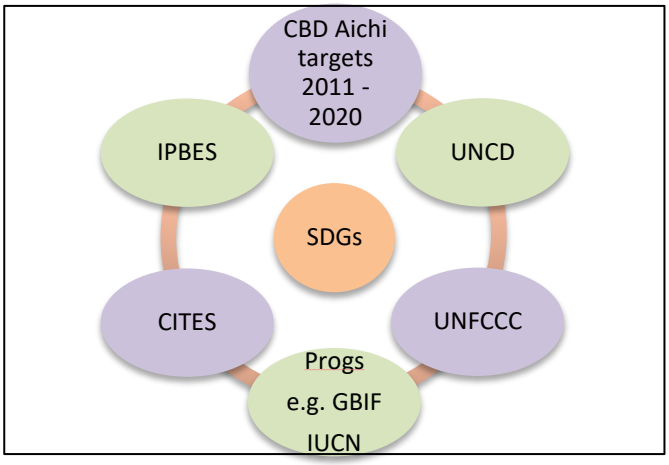


Figure 4. International obligations

3.2.1.3. **Science, Technology and Innovation**

The relationship between STI and sustainable development is non-linear and complex. Most African countries tend to focus on funding scientific research, with less emphasis on technology development and innovation. There is also weak coordination between scientific research and science policy communities, leading to misalignment of research priorities and design with the SDG[16]. This ultimately may lead to the production of knowledge for short term economic growth, but fails to spur social inclusion and environmental sustainability necessary for long term sustainable development. There is a critical need to better understand how to most effectively use technology and be more innovative, to support transition to a knowledge based economy. The GBIF platform is

[16] The African Academy of Science 2018, Africa beyond 2030 – Leveraging knowledge and innovation to secure sustainable development goals

one such infrastructure that provides an opportunity for an increase in innovation on many levels, including technological, research and policy.

3.2.1.4. Aichi Targets of the Strategy of the Convention on Biological Diversity (CBD) for 2011-2020

All countries in Africa are signatory to the Convention on Biological Diversity (except South Sudan), which means it has an obligation to conserve its biodiversity. As part of the CBD's Strategic Plan for Biodiversity, member states must strive to achieve the 20 Aichi Targets for biodiversity conservation. The regional strategy will produce outputs or have direct relevance to the following targets, but may also be used for others:

- Strategic goal C: Improve the status of biodiversity by safeguarding ecosystems, species and genetic diversity
- Strategic goal E: Enhance implementation through participatory planning, knowledge management and capacity building.
    - ***Target 19*****:** By 2020, knowledge, the science base and technologies relating to biodiversity, its values, functioning, status and trends, and the consequences of its loss, are improved, widely shared and transferred, and applied.

The fourth *Global Biodiversity Outlook* (GBO-4), a mid-term assessment of progress towards the Strategic Plan 2011 to 2020, identified a number of 'key potential actions' that could accelerate progress towards each of the Aichi Biodiversity Targets, if more widely applied. With respect to Target 19 on sharing of information and knowledge, these actions included **"strengthening and promoting the further mobilization of and access to data by, for example, encouraging the use of common informatics standards and protocols, promoting a culture of data sharing … investing in digitization of natural history collections and promoting citizen scientists' contributions to the body of biodiversity observations."**

The 'Pyeongchang Roadmap' encouraged countries to make use of the 'key potential actions' needed to implement the Strategic Plan, including further mobilization of and access to data. **The activities enabled under this initiative thus respond directly to globally-agreed priorities for accelerated action to achieve targets on biodiversity conservation and thus support sustainable development.**

3.2.2. Regional

Key environmental initiatives in Africa include the New Partnership for Africa's Development (NEPAD) Environment Initiative, the African Convention on Conservation of Nature and Natural Resources (Maputo Convention), the environmental components of Agenda 2063, the AU Climate Change Strategy, and the African Common Strategy on Combatting Illegal Exploitation and Illegal Trade in Wild Fauna and Flora. Several of these merit further discussion.

The NEPAD Environment Initiative has eight subthemes for priority interventions. These include: combating desertification, wetland conservation, invasive alien species, coastal management, global warming and climate change, trans-frontier conservation areas, environmental governance and financing.

The African Convention on Conservation of Nature and Natural Resources (Maputo Convention) is a continent-wide instrument for the conservation of Africa's natural resources. South Africa signed the Convention on 18 April 2012 in Addis Ababa and ratified this Convention in April 2013.

GBIF and the Convention on Biological Diversity

Although independent of the UN system, GBIF has from the start had a close connection with the Convention on Biological Diversity (CBD) and other biodiversity-related conventions. The GBIF Memorandum of Understanding states that "nothing in this MoU should be read to contradict the principles of the Convention on Biological Diversity and other relevant Conventions" [Paragraph 2], and includes among its objectives "development of joint work programmes in areas of mutual interest with the Secretariat of the Convention on Biological Diversity … to avoid duplication and to benefit from existing resources and expertise" [Paragraph 3]

In terms of the formal connection, GBIF is an Observer to the CBD with the status of Intergovernmental Organization (IGO), and the Secretariat actively participates in meetings of the Conference of the Parties (COP), the Subsidiary Body on Technical, Technological and Scientific Advice (SBSTTA) and the Subsidiary Body on Implementation (SBI). Specific areas of collaboration include the following:

- As a member of the Biodiversity Indicators Partnership (BIP), the number of species occurrence records published through GBIF provides an indicator of progress towards Aichi Target 19 on sharing of data and knowledge. This may be disaggregated to national or regional level.
- Through coordination of the Global Invasive Alien Species Information Partnership (GIASIP), GBIF has collaborated with the CBD, IUCN and others to enhance access to country-level data on occurrence of invasive species, especially through the Global Register of Introduced and Invasive Species (GRIIS).
- At the request of CBD Secretariat, GBIF drafted guidance to improve the accessibility of biodiversity-related data in information, included as an annex to Decision XIII/31 agreed at CBD COP 13 in Mexico in 2016. This guidance includes the key components of GBIF participation including open data policies and incentives, establishing national biodiversity information facilities and investment in digitization, among other steps.
- GBIF works with a number of CBD-related initiatives and fora to promote capacity building in the mobilization and use of standardized biodiversity data, including for example the Consortium of Scientific Partners (CSP), the Bio Bridge Initiative (BBI) and the Global Taxonomy Initiative (GTI).

3.2.3. National

3.2.3.1. National Biodiversity Framework: all five Strategic Objectives for regional cooperation with other Southern African countries

- Strengthen and improve the development of integrated management and tourism plans of the Transfrontier Conservation Areas and Transboundary World Heritage Sites.
- Develop and implement appropriate incentives for biodiversity conservation and its sustainable use in cooperation with our neighbouring countries

- Develop, implement and strengthen programmes for international scientific collaboration, sharing of information and technology transfer
- Develop and implement a coordinated regional programme to increase awareness, knowledge and appreciation of biological resources at various levels
- Strengthen the research and development capacity of the protected area system

3.2.3.2. Medium Term Strategic Framework (2014-2019):

- Strategic Objective 6.5: Develop a skilled and capable workforce to support an inclusive growth path.
- Strategic objective 6.10: Protect and enhance our environmental assets and natural resources.
- Strategic Objective 6.11: Create a better South Africa and contribute to a better Africa and a better world.

3.2.3.3. DST's 10-Year Innovation Plan: The regional strategy will contribute to the achievement of the objectives of the DST's 10-Year Innovation Plan for South Africa, Innovation towards a Knowledge-based Economy 2008–2018 through:

- Developing human capital;
- Generating new and relevant knowledge;
- Facilitating the establishment of research infrastructure
- Bridging the divide between research results and socio-economic outcomes.

3.2.3.4. National Biodiversity Strategy and Action Plans (NBSAPs) are instruments for implementing the Convention on Biological Diversity at the national level, and while the vast majority of Parties to the Convention have compiled NBSAPs, Aichi Target 17 calls for all Parties to develop, adopt and begin implementing "effective, participatory and updated" NBSAPs by 2015. South Africa's updated NBSAP was published in mid-2015. One of the document's six objectives concerns "building effective knowledge foundations". A pertaining outcome is that "relevant datasets of species and ecosystems are coordinated and accessible". **The NBSAP also includes a strengthened mandate to engage and assist other African countries in managing biodiversity information.** This presents opportunities for SANBI to secure enhanced political support and resources for regional work, and to further the outcomes of the ACM.

3.2.3 Institutional

SANBI's mandate comes from the National Environmental Management Biodiversity (NEMBA) Act No. 10 of 2004. In the framework of this strategy, it is intended to look at strengthening South Africa's role in supporting SADC and other African countries in fulfilment of the National Development Plan and international conventions including UNFCCC, UNCCD and the CBD. SANBI's divisions support a number of the conventions and international initiatives, as indicated in Figure 4. **It stipulates that "The Institute… (j) must collect, generate, process, coordinate and disseminate information about biodiversity and the sustainable use of indigenous biological resources and establish and maintain databases in this regard…"**

As an institution, data is mobilised by SANBI and its partners. It coordinates the generation, management, publishing and use of data, across its divisions and value chain, including efforts by the

Foundational Biodiversity Information Programme, the monitoring framework, NBA, SANBI-GBIF, IUCN red listing efforts and others.

All this data and knowledge generated will ultimately support the objectives of the CBD, SDGs, Intergovernmental Panel for Biodiversity and Ecosystem Services (IPBES), and the conventions which national governments are committed to (Fig. 5). The IPBES platform includes capacity building and the generation of data and knowledge among its four core functions, alongside the development of policy tools and preparation of assessments to enhance the science-policy interface. Improving the availability of data and scientific information on biodiversity will strengthen the ability of developing countries to contribute to and benefit from IPBES activities.

GBIF formalizes collaboration with biodiversity assessment platform (IPBES)

Since the establishment of the Intergovernmental Platform on Biodiversity and Ecosystem Services (IPBES), GBIF has worked closely with the platform's secretariat and advisory bodies to ensure that the activities of the two networks are complementary and closely aligned. This culminated in March, 2018 with the signature of a Memorandum of Understanding between IPBES and GBIF on the margins of the 6th IPBES Plenary in Medellín, Colombia. Specific areas identified for collaboration in this MoU include:

- Helping IPBES to identify and access biodiversity datasets relevant to IPBES assessments and indicators
- Using knowledge gaps identified through IPBES assessments to help prioritize mobilization of new data through GBIF's network of nodes and data publishers
- Coordinating GBIF's capacity building activities to support data mobilization and access relevant to IPBES
- Encouraging collaboration between GBIF's national nodes and IPBES national focal points.

GBIF Secretariat remains in continuous and close contact with IPBES Secretariat and Technical Support Units across a range of activities and processes including:

- Taking part as an Observer at IPBES plenary meetings
- Providing a resource person to the IPBES Task Forces on Data and Knowledge and on Capacity Building

Specific areas of collaboration in the coming period include providing support on the data needs for national ecosystem assessments through a project under the International Climate Initiative (implemented through UN Environment WCMC and UNDP), involving the following countries: Cameroon, Ethiopia, Colombia, Vietnam, Azerbaijan, Cambodia, Grenada and Bosnia-Herzegovina.

Additionally, GBIF is actively involved in the work of the IPBES Data and Knowledge Task Force to respond to identified knowledge gaps by developing priorities for new data mobilization.

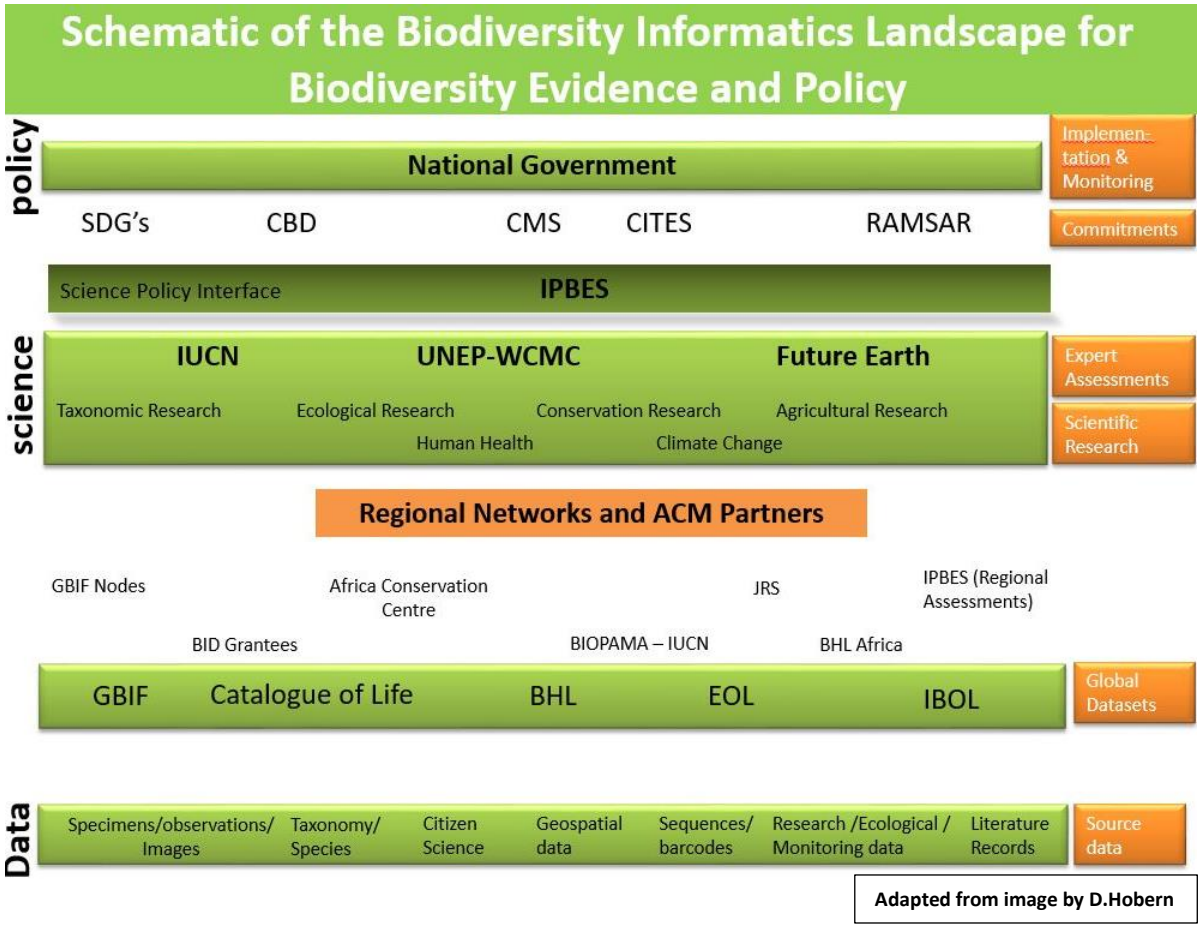


Figure 5. A representation of how biodiversity data adds value to science (assessments) and policy (conventions), enabled through partners and data accessibility on the global informatics platforms

4. PAST AND CURRENT BIODIVERSITY AND BIODIVERSITY INFORMATICS INITIATIVES OF GBIF-AFRICA

The GBIF Africa region has shown a continued increase in collaboration and capacity building efforts over the past ten years, mostly driven by the GBIF capacity building programme (CEPDEC)[17], more recently the SEP2D programme, the GBIF mentoring programme[18] which has evolved into the Capacity Enhancement Support Programme (CESP), and through proposals funded by the JRS Foundation[19], the Biodiversity for Development Initiative (BID), the JRS funded West African Innovations in Biodiversity Informatics and the Africa Biodiversity Challenge (ABC). A number of Partnerships has been developed globally with Nodes from Costa Rica, India, US, France, Belgium and The Netherlands, where tools have been developed i.e. an Environmental Impact Assessment (EIA) Tool; data publishing has been enabled through GBIF France and capacity development

[17] This programme includes the Sud Expert Plantes project supported by France and involving 19 African countries, and the support of Tanzania (TanBIF) by Denmark.

[18] Countries and International Organizations such as Togo, Ghana, Benin, Cameroon, Central African Republic, ICLEI, France, Netherlands, Kenya, Finland, South Africa, Uganda, Belgium, Mauritania and ETI have all benefitted from this programme which promotes collaboration and capacity development.

[19] Many projects have been supported that help strengthen the African GBIF network and community.

activities have also taken place, through engagements with the United States and a number of other Nodes.

Moreover, GBIF-Africa is playing a significant role in many international initiatives and intergovernmental processes, like the Convention on Biological Diversity's Consortium of Scientific Partners (CSP), the IUCN, IPBES, and others. Details of these initiatives are provided in Appendix 2 and section 7.

5. THE GLOBAL BIODIVERSITY INFORMATION FACILITY IN AFRICA

5.1. Vision of GBIF Africa

A world in which Africa's biodiversity information is freely and universally available, in service to science, economy, decision making and the public good for a sustainable future in Africa.

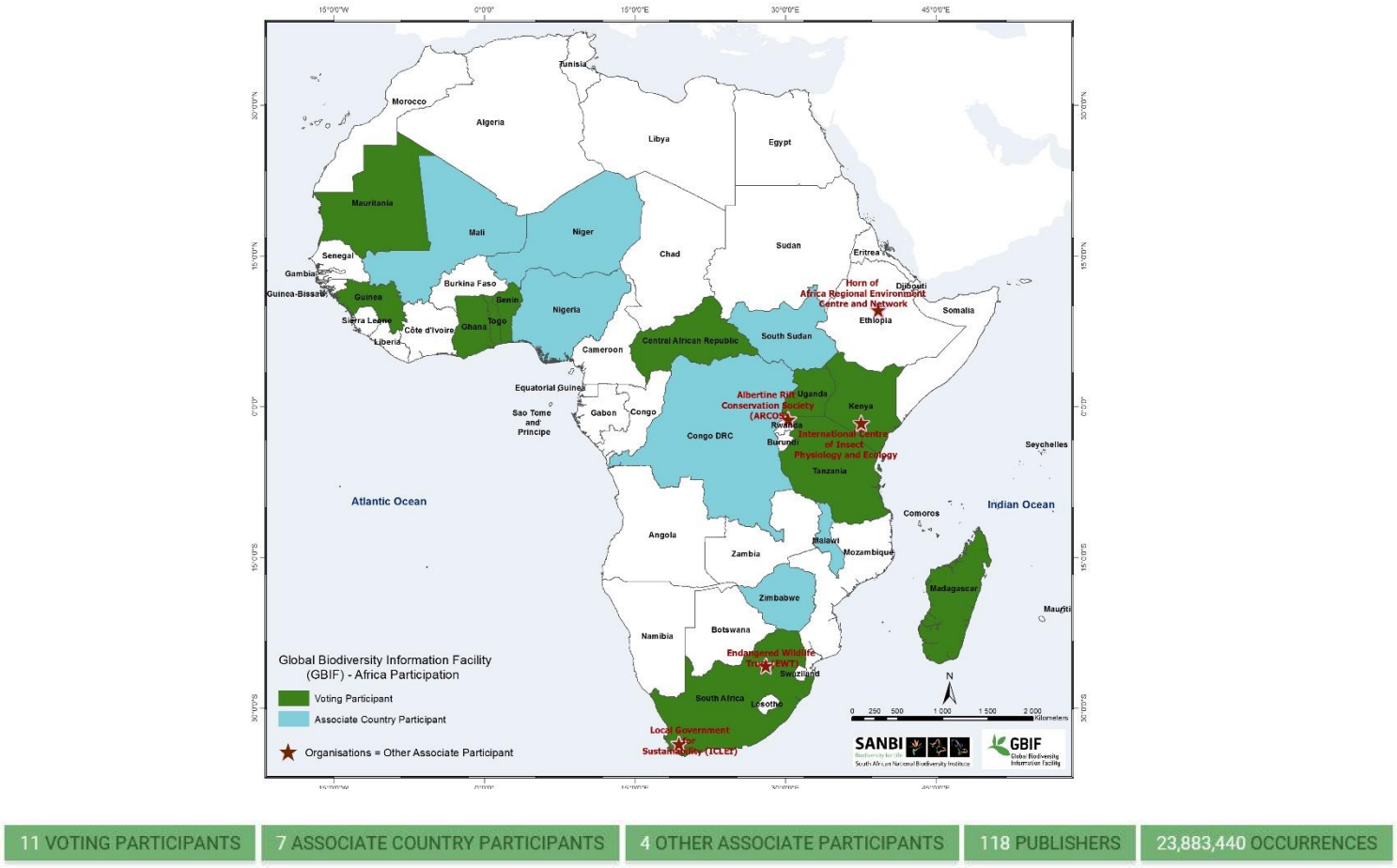
5.2. Mission of GBIF Africa

- To facilitate GBIF Nodes to be the **focal point for biodiversity information coordination** and dissemination, in support of national, regional and international biodiversity obligations by providing biodiversity informatics infrastructure for sharing and use of biodiversity data and information.
- To develop a biodiversity informatics **research agenda**.
- To contribute to **training and capacity development** for promoting global access to biodiversity data and to enhance the **biodiversity informatics capacity** and technical skills base of developing countries.
- To generate relevant knowledge from biodiversity data that supports the **science–policy** interface.
- To advance **strategic partnerships** with national, regional and global biodiversity initiatives.

5.3. The establishment of GBIF Africa

At the GBIF 16 Nodes meeting in Copenhagen in 2009, the need for a regional approach to liaising with the participant nodes was identified. The GBIF Governing Board endorsed a recommendation to have a series of regional meetings with the aim of improving the coordination of activities in biodiversity information management between the country nodes and the GBIF Secretariat, as well as to support collaboration amongst nodes, at a regional level. Thus GBIF Africa came into existence.

The GBIF-Africa network is a regional sub-committee of the Nodes Committee which is guided by the GBIF Nodes Committee ToR. It was however identified by the Africa network that in order to ensure a dynamic and vibrant community in biodiversity informatics on the continent, it will be important to grow our community and include strategy partners to this network, to leverage opportunities and show the best possible results in growing Africa's capacity to mobilising, manage and use data for a sustainable Africa and a sustainable world. Today the GBIF Africa membership stretches across the continent (Fig. 6), and includes eleven Voting Participants, seven Associate Country Participants, and four Participant Organisations.



11 VOTING PARTICIPANTS | 7 ASSOCIATE COUNTRY PARTICIPANTS | 4 OTHER ASSOCIATE PARTICIPANTS | 118 PUBLISHERS | 23,883,440 OCCURRENCES

Figure 6. Map of GBIF Participants in Africa as at July 2018

6. AFRICAN REGIONAL BIODIVERSITY INFORMATION COORDINATION MECHANISM

GBIF Africa first convened in Entebbe, Uganda, during the International Year of Biodiversity in 2010. At that meeting, the consortium identified a number of key areas for intervention to address the then fragmented information management landscape, through a needs analysis of the GBIF-Africa Nodes, conducted ahead of the meeting. Some of the critical areas for intervention included capacity development/enhancement and infrastructure development. Capacity development included strengthening institutional skills in biodiversity informatics, as well improving institutional capacity in technical infrastructure such as web portals and improving data management. Other key areas for intervention included strengthening policies and regional partnerships (much of the challenges and details can be found in the Entebbe Report). It was acknowledged that the above areas for improvement will not be adequately addressed if there is no Africa-wide coordinating mechanism in place to facilitate the continental interaction. It was therefore decided to establish the African Coordinating Mechanism (ACM) as a means to promote and coordinate biodiversity informatics activities in Africa, to improve collaborative action in data mobilisation, publishing and use, and to compliment the global activities of the GBIF Nodes Committee. Further to this, it was also identified that the primary source of funding for node activities were GBIF and GBIF related programs (47%), Governments (16%), host institutions (21%), JRS foundation (11%) and Mac-Arthur foundation (5%). Ideally, through support of the ACM, it is hoped to move away from a donor funded mechanism towards more a more sustainable model of funding (Figure 7.), where national governments and

Africa wide initiatives such as Nepad, AMCEN and AMCOST will bear most of the funding costs to build sustainability and enhance ownership of informatics on the continent.

.

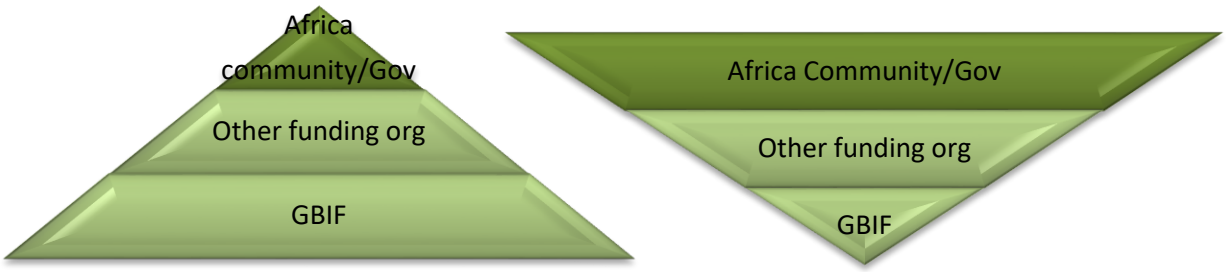


Figure 7. Towards a more sustainable funding model

Through the ACM, the African nodes strive to become the data–science-policy interface for this mega-diverse continent, in support of the implementation of the Africa's Science and Technology Consolidated Plan of Action – a plan of action which consolidates science and technology programmes of the African Union (AU) and the New Partnership for Africa's Development (NEPAD). This plan has now been taken forward through the Science, Technology and Innovation Strategy for Africa 2024 (Fig. 8), with an aim to accelerate Africa's transition to an innovation led, knowledge based economy.

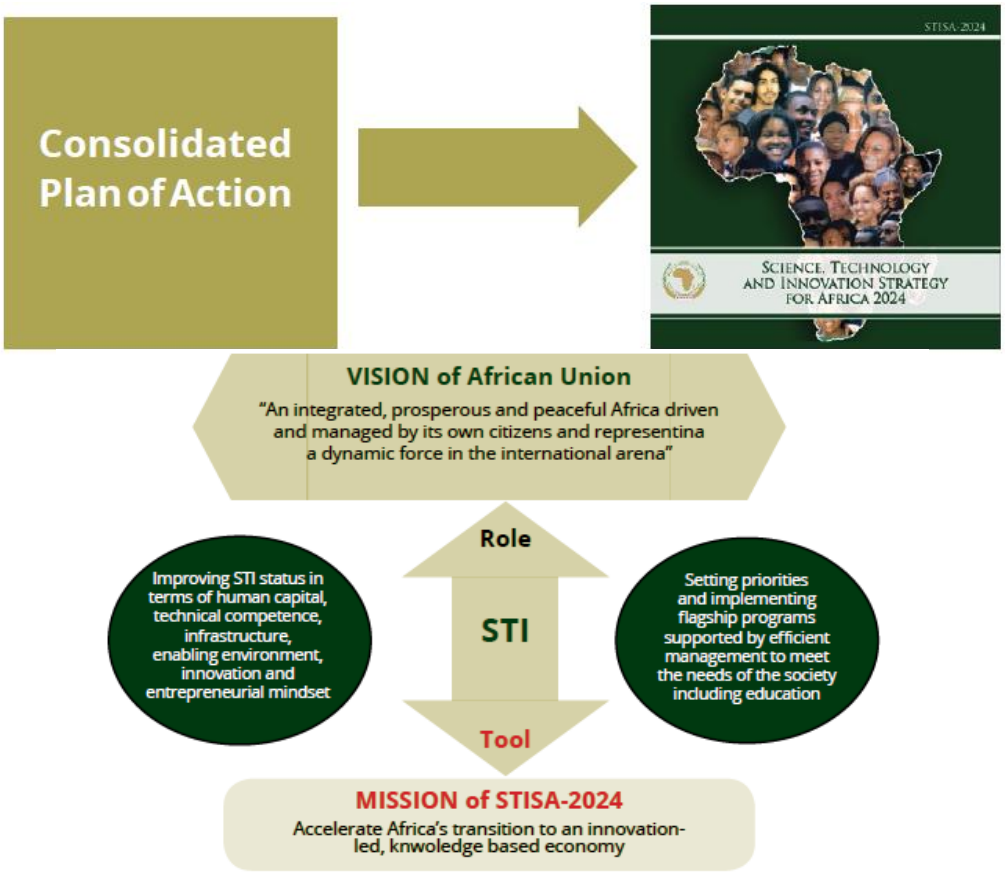


Figure 8: Moving from the CPA to the STISA 2024, achieving the vision of the African Union

Through a series of regional meetings from 2009 onwards, enabled by GBIF and SANBI-GBIF, and hosted by a number of GBIF country nodes and international organisations, including Uganda, Benin and the Albertine Rift Conservation Society, the region has developed a series of action plans, with outcomes in **three priority areas i.e. regional engagement, content mobilization and capacity enhancement.** A number of highlight reports were produced, which provided input into the GBIF Governing Board processes. With the new GBIF strategic plan (2017-2021) these priority areas were reviewed and a new work plan was developed for 2016-2018 (Table 3). The activities of the community is well detailed in this table, but also see section 7. The ACM will be critical to enable more effective implement of workplans going forward and will drive the efforts of the region more dynamically and strategically.

6.1. Governance Structure and Functions of the ACM

6.1.1. Functions

The core functions of the GBIF-Africa network as identified and recognized by participants of the 1st meeting of the GBIF Africa Regional meeting, are embedded in the following objectives:

1. Formulate policy on biodiversity information and data management in Africa and recommend its implementation by GBIF members in Africa;
2. Coordinate regional activities relating to biodiversity informatics;
3. Facilitate acquisition, storage and dissemination of biodiversity data and information in Africa and worldwide;
4. Promote application of biodiversity data for the purposes research, conservation, policy formulation, and decision making in Africa;
5. Develop strategic relations with relevant African and International Institutions and initiatives like AMCOST,CBD,EU to address biodiversity informatics issues;
6. Mobilize funds for support and promotion of biodiversity informatics in Africa;
7. Promote and coordinate human and institutional capacity development in the field of biodiversity informatics;
8. Develop and implement Africa research agenda on biodiversity informatics

6.1.2. Organisational Structure

The African Regional Biodiversity Information Coordinating Mechanism will adopt a decentralized System in implementing its functions. GBIF-Africa is being envisaged as a network of African countries and organizations that promote the sharing of biodiversity data and information in service to science, economy and public good. This distributed system of biodiversity informatics institutions and experts would build coalitions among ongoing regional and international initiatives, encourage new developments and provide mechanism for coordinating regional and national biodiversity investments.

The Organization Structure is composed of the GBIF-Africa Governing Board, Node Committee and the Secretariat (Fig. 9). The GBIF-Africa Governing Board is the apex body of GBIF-Africa. It is

represented by members of GBIF Participants residing in Africa including the Heads of Delegation and Node Managers.

i. Overall strategy, planning, stakeholder and participant engagement and responsibility for implementation of the ACM activities: ACM Convener

ii. ACM specific strategy, planning and implementation: The activities of the ACM will be supported by a number of programme officers as shown below.

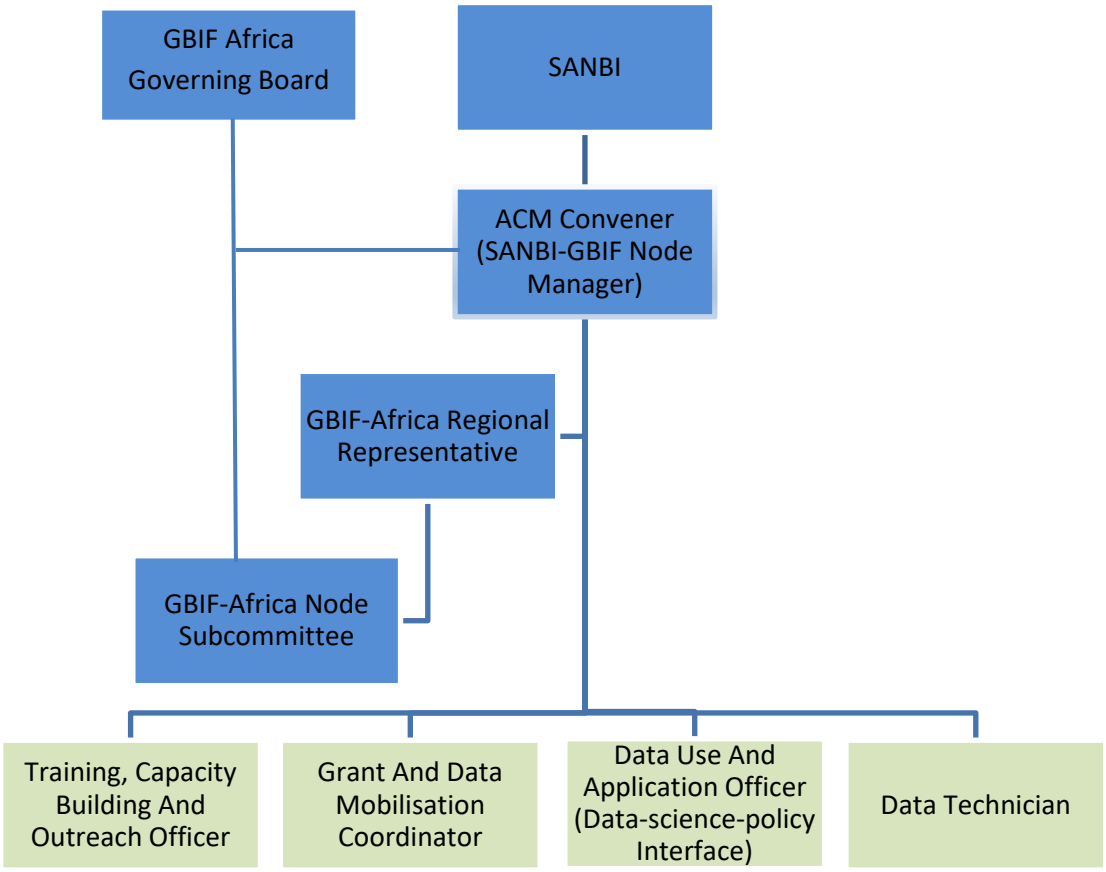


Figure 9. Africa Coordinating Mechanism Structure (green shading indicates new positions and blue shading indicate existing structures)

7. THE KEY ACHIEVEMENTS OF GBIF-AFRICA

Since its establishment, GBIF Africa has shown a continued increase in collaboration and coordination which has made a significant contribution to its three priority areas; data mobilisation and publishing, training and capacity development and regional engagement. Here consortiums have been established, websites and infrastructure has been developed, products such as toolkits, checklists and guidelines have been produced and countries have initiated and implemented the collaborative development of a biodiversity informatics curriculum and led specialist training sessions across the continent to facilitate the publication of data. At the 2015 Africa Rising Conference, a the delegates produced a joint Declaration on Biodiversity Information for Sustainable

Development in Africa and a Plan of Action for Mobilising and Mainstreaming Africa's Biodiversity Data (Appendix 3). This is very relevant and useful for new GBIF-Africa Participants joining the network.

7.1.1. Data Mobilization and Publishing

African biodiversity make up approximately 4% of the total amount of primary biodiversity data records available in GBIF, which currently stands at **1 011 613 931 records.** Countries in Africa have mobilized almost 20 million primary biodiversity records, about biodiversity in Africa (Fig. 10, Appendix 4), which are openly accessible through the GBIF portal. These figures were derived in July 2017, and primary biodiversity records now exceed this (see below). These data are vital in addressing important issues of great social and economic relevance such as land-use planning, developing and managing protected areas, identifying and tracking agricultural pests and diseases of humans and farm animals, achieving distribution and niche models to inform biodiversity conservation decisions, scenario modelling to project change in biodiversity and predicting the spread of invasive species.

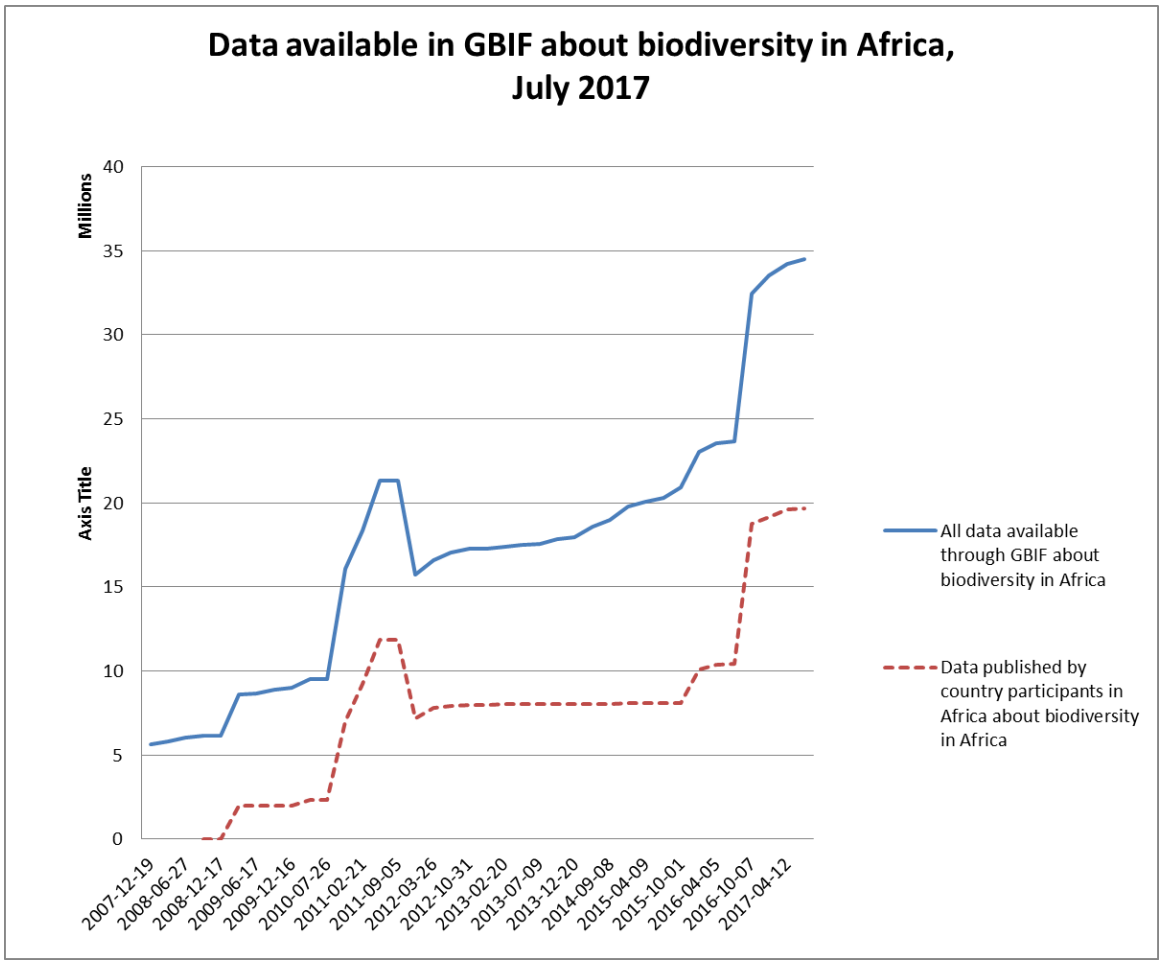


Figure 10. Data available in GBIF about biodiversity in Africa (July 2017)

The GBIF-Africa region has mobilised over **23 000 000**, primary biodiversity records to date Appendix 4 (July 2018). More than 20 million records has been mobilised from South Africa, through the SANBI-GBIF Node and data publishers in the country. The Department of Science and Technology

has actively supported a funding mechanism for data mobilisation, as early as 2006 through the SANBI-GBIF Nodes, which was catalytic in overcoming barriers to data sharing. The Foundational Biodiversity Information Programme funded by DST and implemented by SANBI, now also plays a key role in ensuring that biodiversity data is mobilised for science and policy uptake. Further to this, it should be noted that citizen science bird records also contributes substantially to the millions of biodiversity data records for Africa.

The West African countries such as Benin, Ghana and Togo have contributed just over 550 000 records collectively, with Benin having the largest number of records and data publishers compared to any other West African country and Togo also playing a very active role in the publication space (Figure 11). East, Central and North Africa (Mauritania) have all actively mobilised and published data, which is a significant milestone especially if we consider publishing by the DRC, which is one of the most mega-diverse countries in the world, and faced with many conflicting priorities.

If we look at the rate of publication by African countries itself, over time (Figure 12), we see that many countries have published data, although in many instances there may have been a lag phase. This may be due to a lack of technical capacity at a particular time, staff turnover etc.

Through the BID initiative a number of additional countries has also published data, thus enabling the technical skills to make data openly and freely available. This is a great achievement for the ongoing mobilisation of biodiversity. Ultimately, it is clear and a very positive sign that from a technical perspective many countries in the GBIF-Africa network are publishing data, and that the **sustainability of publishing data must then be addressed** in many instances.

Where countries have not published data as yet, **capacity development is very critical** to ensure active participation as a GBIF Node. It is also important to note that for a mega-diverse continent, there are huge gaps in the data, in space, time and taxonomy (Fig. 13), which needs to be filled for its use downstream, in support of science, policy and conservation planning.

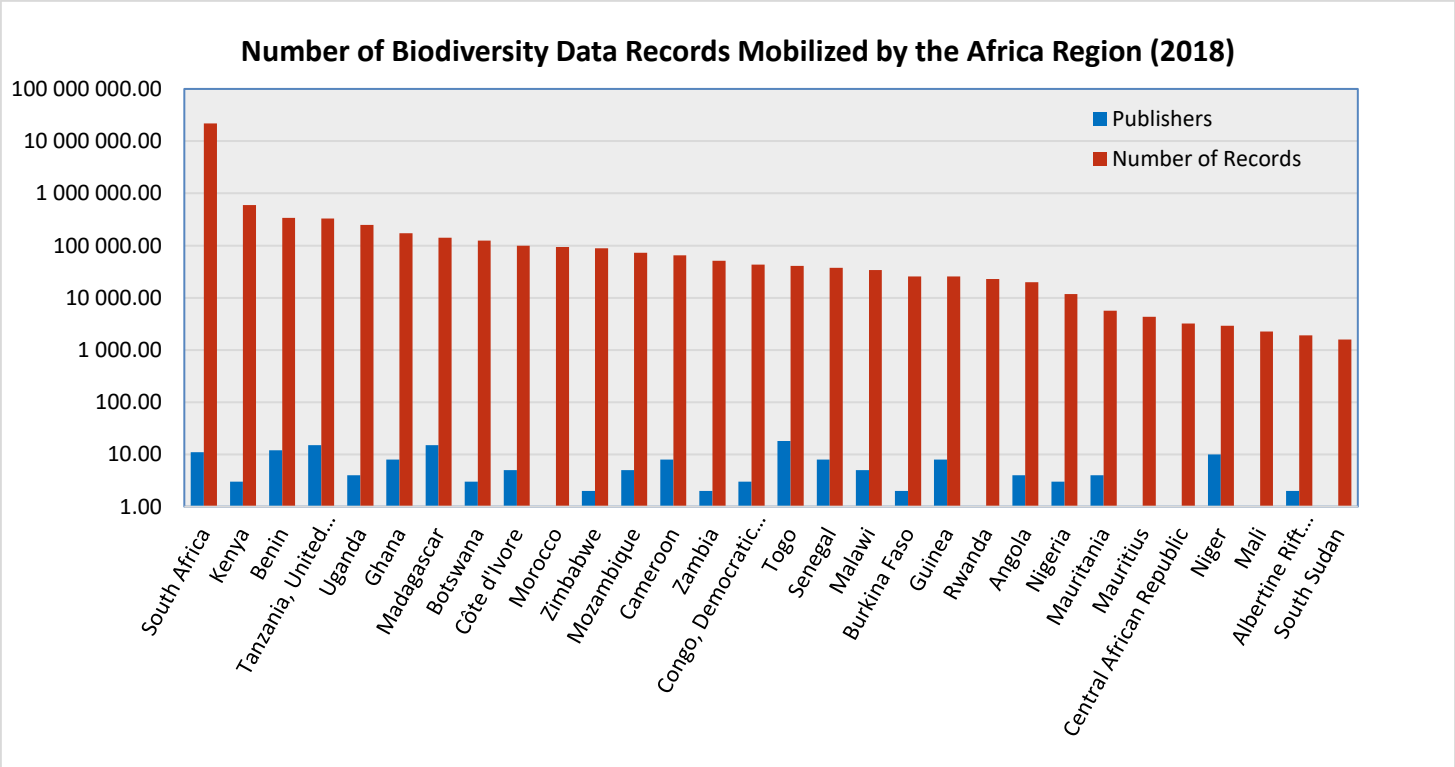


Figure 11. Biodiversity data records and publishers of data from Africa

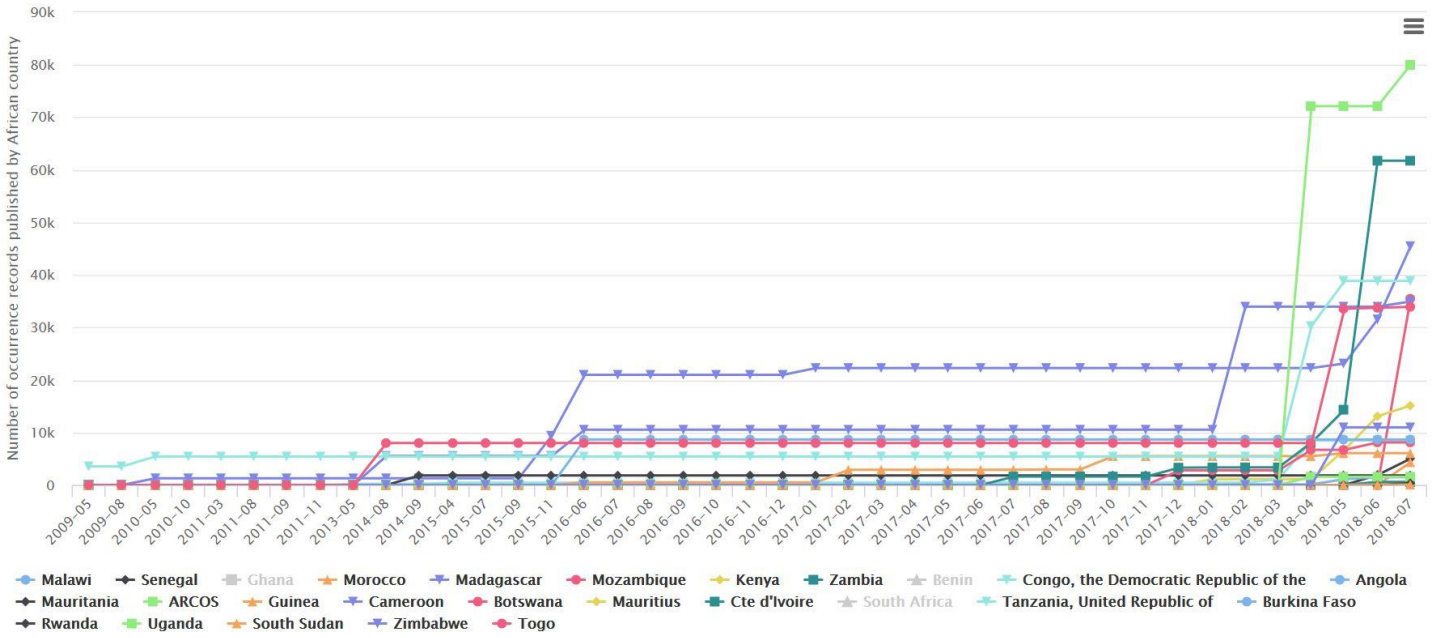


Figure 12. Publication statistics of the GBIF-Africa network over time (including non-Participants; South Africa, Benin and Ghana not included for improved visualisation of country figures above)

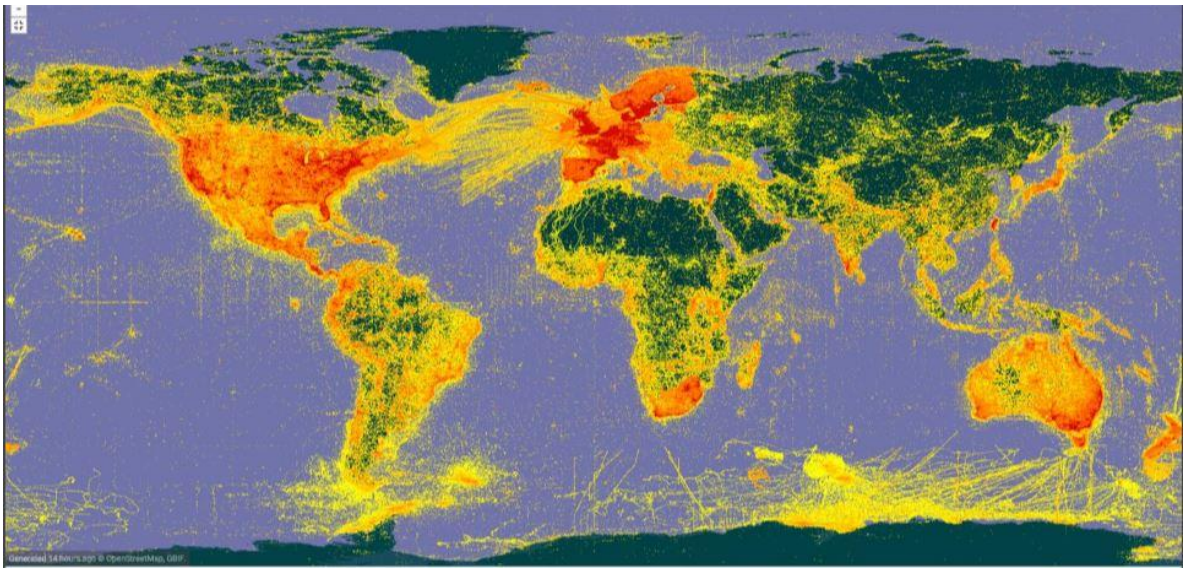


Figure 13. Map depicting species occurrence with red shading indicating dense species occurrence, with data gaps also evident

Another data mobilisation project funded by the JRS and implemented by SANBI-GBIF, called the Africa Biodiversity Challenge, aims to capacitate and incentivise three African countries to mobilise as much national biodiversity data of strategic importance as possible (through an adjudicated competition that evaluates quantity, quality and fitness for use) by developing a cohesive national biodiversity information management network in support of the country's sustainable development agenda**.** Countries engaged include Rwanda, Namibia, Ghana and Malawi through collaboration agreements.

7.1.1.1. Funding Mechanisms for Data Mobilisation at the Global Level

At the global level a number of initiatives have contributed substantial investment in biodiversity data mobilisation efforts on the continent. Two initiatives have focused on providing funding for the mobilisation of biodiversity data, includes the Biodiversity Information for Development (BID) Initiative and the Biodiversity Information Fund for Asia (BIFA).

The EU funded BID programme has invested approximately €975 000 in Africa during phase 1 of BID, supporting 23 African projects through 3 regional consortia, 10 national projects and 10 small data mobilization projects (Appendix 5). The second year of BID Africa funding, is projected at €350 000, with a focus on national projects and has aligned to the SANBI implemented and JRS funded, 'Africa Biodiversity Challenge' and the Sud Expert Plantes Développement Durable (SEP2D). It is also of relevance to note that the JRS Foundation has a focus on investment in data mobilization in Africa, with a priority thematic focus on freshwater ecosystems and taxa. SANBI-GBIF has played a role in the assessment and evaluation process for data mobilization projects submitted to both BID and BIFA, and demonstrates expertise in both managing a grants process, such as what has been enabled through the National Node, as well as implementing policies and procedures for evaluation at the national level.

7.1.2. Training and Capacity Development

Many bio-diverse participant countries in Africa have made great strides in making data available via the internet, through collaborative engagement. Here, the GBIF Mentoring Programme, with an initial global investment of approximate €60 000 annually, has been very valuable, in bringing countries together in support of the North - South and South-South engagement. The benefit of this funding has been that many countries have **uploaded data** to GBIF, some have **developed data portals nationally** and others like Tanzania has developed **products like a national checklist of Tanzanian Plants.** The GBIF-Africa Nodes have further leveraged approximately € 71 030.00 from 2014-2017, through the subsequent GBIF Capacity Enhancement Support Programme.

The Africa region takes a holistic approach towards capacity development. While many Nodes conduct training efforts on an ongoing basis, at the national and regional levels, pursuing biodiversity informatics teaching and training at the academic level, has also been identified as crucial, to develop the critical mass to support a data revolution.

Biodiversity informatics is also new area of science, and the ability to recruit and retain staff remains a big challenge, making human capital development in this new and dynamic field, very critically important. In support of this Benin, Ghana, South Africa and Togo are working with Universities to develop and implement curricula in biodiversity informatics and are establishing Centres for Biodiversity Information Management.

A BIM Honours elective was rolled out at the University of Western Cape (2012-2014). Current engagement also includes the potential implementation of curriculum elements of biodiversity information management to an Honours degree course in biodiversity at a University in the Northern Cape, in 2019. Through consultation and refinement, a curriculum will be rolled out to other universities nationally and regionally. Two postdoctoral researchers have also been recruited and supported thus far.

GBIF Benin is implementing a Master degree course in biodiversity informatics, which started October 2017, at the the University of Abomey-Calavi, and includes approximately 20 registered students. The University of Kansas is a strategic partner in the development of curricula and BDI skills to SANBI-GBIF, GBIF Benin and the GhanaBIF.

7.1.3. Regional Engagement

A number of **consortiums** have developed on the continent, which is a result of ongoing coordination and leadership enabled by GBIF, JRS, SANBI-GBIF and the Biodiversity for Development Initiative, as well as some key GBIF Nodes. West African Consortiums have developed through two exciting initiatives including: the "**the capture of primary biodiversity data on West African plants** (Benin, Ghana, Cameroon & Togo), in Partnership with 5 major global herbaria of the world (Europe and North America). The second is a West African Consortium which has developed within the framework of the BID programme, and is led by GBIF-Benin. Another consortium is being driven by the Albertine Rift Conservation Society and also the Africa Insect Atlas consortium.

The **GBIF Capacity Enhancement Support Programme (CESP)** has contributed substantially towards capacity development and has enabled regional engagement between Nodes on the continent, as well as with the broader global nodes partners. An example of this includes the GBIF Africa Nodes data mobilization, ecological niche modelling and data paper training and mentorship, which as lead by the Endangered Wildlife Trust, and brought together five African Node staff and collaborators including Mauritania, Benin, Uganda, Kenya and South Africa. Another project lead by South Africa and funded by the JRS called the "African Biodiversity Challenge", is a regional effort focussed on four countries with the aim to mobilise data and to develop communities of practice in biodiversity informatics by developing national networks and rolling out a Biodiversity Information Management Forum (BIMF), modelled on the South African BIMF, which has been established as far back as 2007, and harmonises data sharing between organisations and the national GBIF Node.

8. SCIENCE REVIEW AND PRIORITY THEMATIC AREAS

8.1. Priority thematic areas

A number of **priority thematic areas** were endorsed by African GBIF Node Managers and Heads of Delegations in **2013 in Berlin**, Germany, during GB20. Priorities were identified based on a review of the National Biodiversity Strategies and Action Plans (NBSAP), National Biodiversity Assessment (NBA) and Fourth National Reports to the CBD, which provided insight into national needs and priorities.

Focusing on these priority thematic areas will further support efforts to meet obligations such as the Aichi Biodiversity Targets, the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), the Convention on Migratory Species (CMS), and the Convention on Wetlands (RAMSAR Convention). It will also support efforts to promote the biodiversity informatics agenda for the continent and global collaborations with initiatives such as the Intergovernmental Platform on Biodiversity and Ecosystem Services (IPBES) and the Group on Earth Observations – Biodiversity Observation Network (GEO-BON).

These priority thematic areas include (1) Invasive alien species (2) Endangered species (3) Agro-biodiversity and forests (4) Native and endemic species (5) Medicinal plants (6) Freshwater and wetland biodiversity (7) Marine biodiversity data (8) Crop Wild Relatives (CWR).

Identification of these focus areas will also provide guidance for the practical implementations at the node level, including data mobilisation activities and the ability to demonstrate use through the development of key scientific research priorities that can respond or connect to policy-driven issues or initiatives. This will further provide opportunities to consider research agenda's for biodiversity informatics science.

8.2. Africa Science Review

An analysis was conducted of the peer-reviewed literature using GBIF-mediated data, focused on African biodiversity between 2011-2017. Appendix 6 details these citations and indicates the publications which were authored by scientists based in African institutions. This information provides a measure of tracking literature relevant to GBIF, and highlights the impact of free and open data and its use in science and policy application. In the figure below (Fig. 14), we see a representation of the thematic uses of GBIF mediated data. It is very positive to note a growing network of researchers making use of GBIF data including the fields of invasive alien species (23%), protected areas research (15%) and climate change (7%). Interestingly, data management papers have been published by researchers on the continent, showing increasing efforts in biodiversity informatics science.

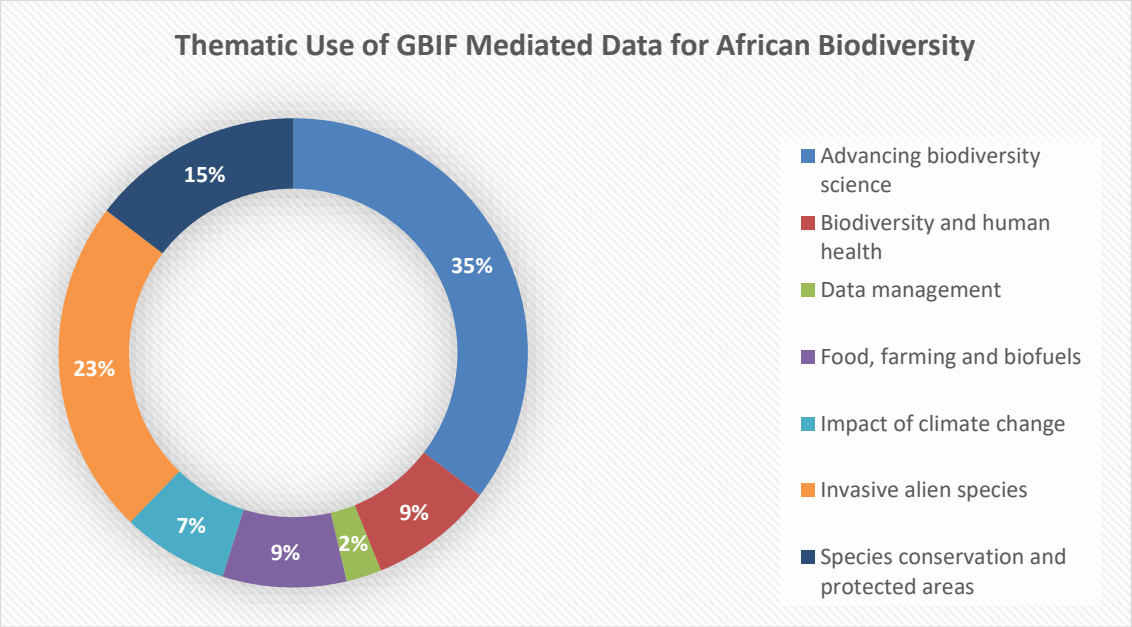


Figure 14. Publication statistics of the GBIF-Africa network over time

8.3. Example applications of biodiversity data

Insofar as Africa is concerned, these uses and applications of biodiversity data pertain to important social, environmental and economic development issues such as public health, food security, invasive alien species, tourism, energy and climate change (Fig. 15). Biodiversity data is essential for evidence-based policy and decision-making.

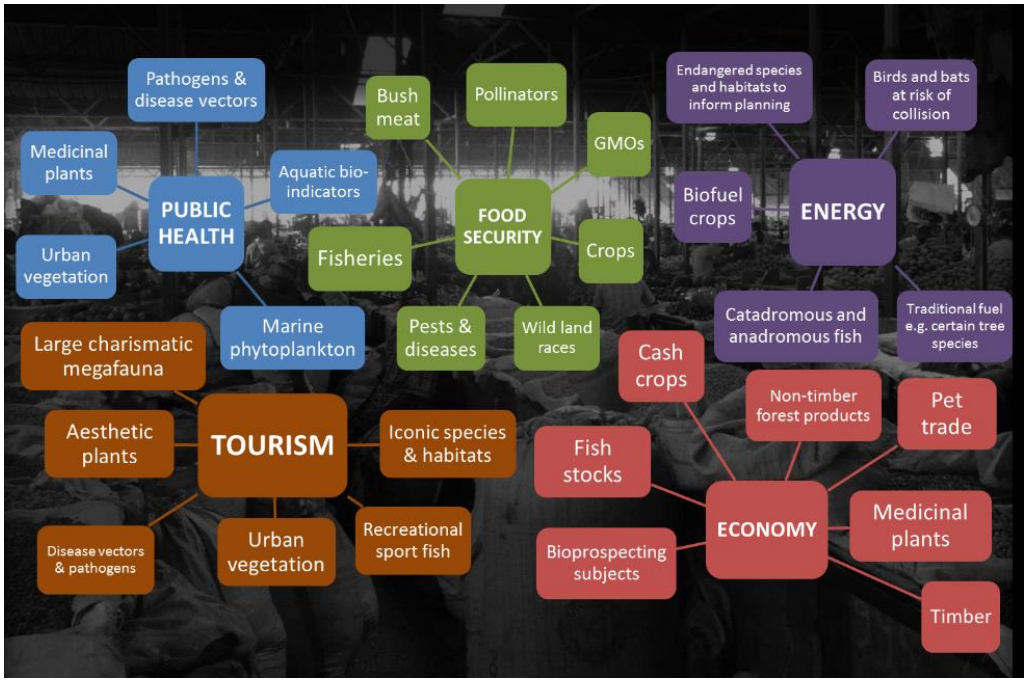


Figure 15. Mind map depicting the breadth of development issues requiring biodiversity data for informed policy and decision-making (image credit: SANBI)

8.3.1. Public health: Mapping the niche of Ebola host animals

A research team from the United Kingdom, the United States and Canada mapped the areas of Africa potentially at risk from outbreaks of the Ebola virus, based on the environmental niche of bat species believed to act as reservoir hosts of the disease.[20]

While human outbreaks such as the one currently affecting West Africa are very rare, the study identified at-risk areas covering 22 countries in Central and West Africa, with a combined human population of 22 million.

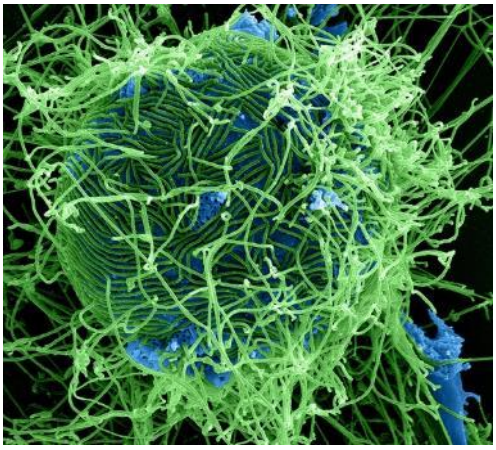


Figure 16. Colorized scanning electron micrograph of filamentous Ebola virus (image credit: NIAID).

The research published in the eLife online journal modelled the zoonotic niche of the virus using occurrence data accessed through GBIF.org for three bat species, the hammer-headed bat (*Hypsignathus monstrosus*), little collared fruit bat (*Myonycteris torquata*) and Franquet's epauletted fruit bat (*Epomops franqueti*), identified as the most likely candidates to be reservoir species associated with transmission to humans.

The authors argue that better knowledge of the areas potentially at risk from the disease will help to prioritise surveillance for Ebola virus outbreaks, and improve the diagnostic capacity in the countries identified.

[20] Pigott, David M et al. "Mapping the Zoonotic Niche of Ebola Virus Disease in Africa." Ed. Prabhat Jha. *eLife* 3 (2014): e04395. *PMC*. Web. 28 Jan. 2016.

8.3.2. Food security: Conserving genetic diversity of crops in West Africa

This study by a team from Benin, China and the United Kingdom aimed to draw up a list of priority plants to conserve in Benin, based on their importance as wild relatives of the crops used by local people for food, livestock fodder, medicines and other purposes.[21]

An inventory of crop wild relatives (CWR) was compiled using a variety of sources, including records from major herbaria and gene banks worldwide, accessed online through GBIF. Using a series of criteria to rank their importance, the study identified 20 priority crop wild relatives for active conservation.

Figure 17. Farmers in Nigeria (image credit: Mike Blyth).

8.3.3. Invasive alien species: Building national watch lists for invasive alien species

A research team from GBIF's partners in the South African National Biodiversity Institute (SANBI) developed a simple methodology for drawing up a 'watch list' that countries can use to identify those alien species most likely to pose a substantial threat of invasion.[22]

The team, led by Katelyn Faulkner, drew up a watch list for South Africa using three predictors of invasion success: history of invasion, environmental suitability and propagule pressure. For the study, the researchers downloaded more than 20 million occurrence records from GBIF.org for 884 species in the Global Invasive Species Database. They used these records to assess how many species were likely to establish themselves successfully in South Africa, based on the similarity between the environmental conditions in South Africa and those in regions where the species have been observed.

Trade and tourism data were also used to assess the likelihood of alien species arriving in South Africa from regions where they currently occur. From this, the researchers identified 400 species as potential invaders for South Africa. The authors argue that this technique could be used in any region as an initial assessment of key threats, and could be an important step in developing biosecurity schemes for resource-poor regions.

Figure 18. The beautiful *Lantana camara* is one of many invasive alien species spreading across Africa (image credit: Maxwildcat).

[21] Idohou, R. *et al.*, 2013. National inventory and prioritization of crop wild relatives: case study for Benin. 60:34 *Genetic Resources and Crop Evolution* 1337-1352.

[22] Faulkner, K. T., Robertson, M. P., Rouget, M., & Wilson, J. R. U. (2014). A simple, rapid methodology for developing invasive species watch lists. 179 *Biological Conservation* 25–32.

8.4. The way ahead for GBIF Africa

The African Regional Biodiversity Information Coordination Mechanism (ACM), towards a fully operational GBIF Africa community, will be taken forward through the refinement of this business case for biodiversity informatics for Africa. This business case consolidates concepts, efforts and activities of the Africa nodes, implemented over time through the regional engagement process, in an endeavour to make collective progress. The business case includes:

1. ACM Concept (inclusion of the vision, mission, the ACM structure and function).
2. Showcase examples highlighting how the mobilisation and use of biodiversity data can enhance scientific research and policymaking so as to render social and economic benefits and an African Science Review.
3. Strategic Objectives and key goals (section 9 below)
4. Logframe (Table 1.)
5. Budget (Table 2.)
6. GBIF Africa Workplan (2016/18) (Table 3.)

In light of further regional engagement, the business case will be broadened and refined to include the voices of other African partners that are not yet participants of GBIF. This will ensure that the organisation better reflects and represents the interests of Africa ***as a whole.***

9. THE WAY FORWARD

Achieving the four strategic objectives will require further expansion of GBIF-Africa and partners, more broadly into Africa, to further strengthen its role in supporting the data-science-policy interface, and contributing to key international obligations and conventions. The key goals for the six strategic objectives captured below. This is further elaborated in the log-frame component.

- **Strategic Objective 1:** Strengthen capacity to **mobilise foundational data** to **fill the data and knowledge gaps** in support of education, research and analysis that is necessary for decision making for sustainable development
- **Strategic objective 2:** Build capacity to **deliver relevant data** across the **data-science-policy interface**, to support biodiversity research, assessments, scenario modelling and planning for decision making
- **Strategic objective 3:** Build institutional capacity in Biodiversity Information Management through **empowering stakeholders to produce, make accessible and use accurate** biodiversity data, information & knowledge in support of sustainable development
- **Strategic Objective 4:** African countries in the GBIF-Africa network leverage science, technology and innovation (STI) to achieve the SDG's and aspirations of the African Union, as identified in its Agenda 2063
- **Strategic Objective 5:** Strengthen **regional engagement** through advocacy, awareness-raising and enhancing GBIF-Africa's role in supporting regional strategies (eg. Science, Technology and Innovation Strategy for Africa 2024) and in fulfilment of international conventions including UNFCCC, CITES, UNCCD, CBD

- **Strategic Objective 6.** In the 1st three years explore the need and feasibility of developing a bigger platform that can provide for a strengthening of a community of practice for all African biodiversity informatics initiatives, to enhance and make more efficient use of the data.

Strategic Objective 1: Strengthen capacity to **mobilise foundational data** to **fill the data and knowledge gaps (taxonomic, ecological, geographic and environmental)** in support of education, research, analysis and use that is necessary for decision making for sustainable development

Alignment to GBIF Strategic Plan: SO1, SO3 & SO4

a. Funding provided for mobilization of foundational data to fill data and knowledge gaps

b. Mobilise[23] historic and priority primary biodiversity records to be published on the GBIF platform which will support analysis and modelling, monitoring and assessment, and inform foundational data gaps

c. Identify data gaps, including deficiencies in taxonomic and geographic coverages using environmental variables (rainfall, temperature, topographic…) to help set data priorities

d. Promote the mobilisation of datasets/datatypes for countries protected areas and key ecosystems, to fill data gaps, and produce relevant, land cover maps, protected area maps and key ecosystem maps

Strategic objective 2: Build capacity to **deliver relevant/thematic data** across the **data-science-policy interface**, to support biodiversity research, assessments, scenario modelling and planning for decision making

Ensure that data is accessible in the form and completeness required to meet the highest-priority needs of science and society, including research, conservation and sustainable use, particularly through the CBD, IPBES and GEOBON.

Alignment to GBIF Strategic Plan: SO1, SO3 & SO5

a. Provide **incentives** to support the generation, data mobilisation and/or use of policy relevant thematic data

b. Enable information sharing and gathering on GBIF-Africa priority thematic areas including (1) Invasive alien species (2) Threatened species (3) Agro-biodiversity and forests (4) Native and endemic species (5) Medicinal plants (6) Freshwater and wetland biodiversity (7) Marine biodiversity data (8) Crop Wild Relatives (CWR); in support of CBD, IPBES, GEOBON, BIOPAMA and UNEP-WCMC and other national, regional and international initiatives and conventions.

c. Build capacity to support the development of **biodiversity scenario's** under **projections of change** on biodiversity and ecosystem services, to develop strategies to build resilience and reduce vulnerability to **climate variability.**

[23] Mobilise refers to the digitization of new/existing specimens or, making accessible non digital accessible data (digital but not published as yet)

d. Support and participate in **species and ecosystem assessments** for countries in the region

e. Support the development of capacity in spatial biodiversity assessment and planning as a tool at national and regional scale, and for developing map products, headline biodiversity indicators & guidelines eg. in NBSAP development

f. Participate in capacity building activities in support of Natural Capital Accounting and the management of biological invasions.

Strategic objective 3: Build institutional capacity in Biodiversity Information Management through **empowering scientists, practitioners and policy-makers to produce, make accessible and use accurate** biodiversity data, information & knowledge in support of sustainable development

Alignment to GBIF Strategic Plan: SO1, SO2 & SO5

a. To contribute to **training and capacity development** for promoting global access to biodiversity data and to **enhance the BDI capacity and technical skills base of developing countries**

    i. Enhance technical capacity of National Biodiversity Information Facilities

    ii. Building the institutional capacity i.e. to support institutional relations and frameworks i.e. MoUs, MoAs, Legislation, Convention;

    iii. Increasing technical skills to develop and manage biodiversity informatics tools and infrastructure (websites, portals, servers).

    iv. Enhancing capacity and growing skills of existing staff in biodiversity informatics

b. Build capacity to ensure fitness for use, management and publishing of data for science and policy
c. Ensure that technology, tools, systems and infrastructure that is used and developed, for data sharing is relevant to the African context for easy adoption
d. Equip data publishers (where possible) by providing data hosting services
e. Build biodiversity informatics capacity in the use of approved biodiversity standards and tools, to enable the sharing of data on the continent.
f. Develop and/or promote Biodiversity Informatics as a field of science through the development of curricula and - research agendas, towards the vision for Centres for Biodiversity Information Management for Africa.

Strategic Objective 4: African countries in the GBIF-Africa network **leverage science, technology and innovation (STI)** to achieve the SDG's and aspirations of the African Union, as identified in its Agenda 2063

Alignment to GBIF Strategic Plan: New Area

a. Grow the ACM role to consider the knowledge and innovation chasm
b. Identify innovative regional partnership projects to further STI objectives and its alignment with the SDG's
c. Work with the African Academy of Science or academies nationally to further STI objectives

Strategic Objective 5: Strengthen **regional engagement** through advocacy, awareness-raising and enhancing GBIF-Africa's role in supporting regional strategies (eg. Science, Technology and Innovation Strategy for Africa 2024) and in fulfilment of international conventions including UNFCCC, CITES, UNCCD, CBD

Alignment to GBIF Strategic Plan: SO1 & SO5

a. Participate in regional governance and networks to coordinate continental processes to support biodiversity informatics agendas
    i. Establish the ACM to coordinate biodiversity informatics activities at regional level, so as to support sustainability of national facilities
    ii. SANBI-GBIF leads and coordinates the **GBIF-Africa Network**, to facilitate the establishment of the ACM for improved biodiversity data publication and use, in support of the conventions and for sustainable development
    iii. SANBI coordinates the **BHL-Africa Network**, to facilitate improved biodiversity literature publication and use, in African countries.
    iv. A number of the Nodes in Africa support the **IPBES regional and thematic assessments** and other regional and international initiatives in support of the data-science-policy interface

b. Lobby our ministries to include biodiversity informatics dialogues on the agenda of high-level African regional meetings or gatherings such as the AU, AMCEN and AMCOST, to leverage funds and enhance Nodes sustainability.

c. Marketing and Awareness Raising of the ACM

d. Communication and outreach of the ACM

Strategic Objective 6. In the 1st three years explore the need and feasibility of developing a bigger platform that can provide for a strengthening of a community of practice for all African biodiversity informatics initiatives, to enhance and make more efficient use of the data.

Alignment to GBIF Strategic Plan: SO1 & SO5

a. Grow the strategic biodiversity informatics networks on the continent and include as ACM Partners
b. Identify emerging common approaches in member countries in systems, technology, data use which will form the basis of shared action in projects and activities on the continent
c. Drive the establishment of a Bio-bridge Hub in support of technical and scientific cooperation with the CBD
d. Develop and strengthen IPBES engagements and identify key strategic areas for GBIF Node and ACM partner activities, in support of Africa assessments and filling data and knowledge gaps
e. Engage focal points on various conventions CBD, CITES, IPBES, UNFCC, ABS clearing house, BIOPAMA to strengthen biodiversity informatics objectives and include in national plans

In the last decade, SANBI-GBIF has played a strong leadership role in guiding the Africa agenda in the area of Biodiversity Informatics, continentally. It has convened numerous meetings to foster increased coordination of activities in this new field of science and fostered a stronger network and partnerships in Biodiversity Information Management. It has been instrumental in the development of consortia, in the sub-regions to take the work of this data-science-policy network forward, and for Africa to come together with a unified voice in the global context. With these 4 strategic objectives in place, and with SANBI-GBIF being requested to convene the GBIF-Africa Network, it is intended to develop this business case for Biodiversity Informatics in Africa, to explore funding opportunities with government departments such as the Department of Science and Technology, that has a strong focus on promoting technology and innovation, biodiversity data mobilisation and publication in Africa, in an endeavour to support the Global Change Grand Challenge imperative. The African continent is alive with opportunity and over the next five years, it is intended to further explore these opportunities to foster a dynamic, capacitated network in biodiversity informatics able to generate, publish and use biodiversity data for sustainable development.

Table 1: Log-frame and Implementation Plan for the African Coordinating Mechanism

Key Performance Areas	Sub-Objective	Activities	Outputs	Outcomes	Indicators and targets	Time frame
Strategic Objective 1: Strengthen capacity to **mobilise foundational data** to **fill the data and knowledge gaps (taxonomic, ecological, geographic and environmental)** in support of education, research and analysis that is necessary for decision making for sustainable development						
a. Allocation of funding for the mobilization of foundational data to fill data and knowledge gaps to support of education, research and analysis that is necessary for decision making for sustainable development	a. Funding provided for mobilization of foundational data to fill data and knowledge gaps.	Distribution of call for proposals	Proposals received	Funds disbursed, received and increased data mobilization activities in the region	At least 5 National projects funded annually	2019: 5 national projects funded for completion in 2020
					At least two regional projects funded annually	2019: 2 regional projects funded for completion in 2021
		Establishment of project steering committee to oversee the projects	Operational Steering Committee in place	Good governance of projects	ToR developed to ensure a committee with a range of taxonomic expertise	2019-2021
		Technical/Evaluation panel constituted; Criteria developed to evaluate proposals	Projects evaluated	Good governance of projects	ToR developed to ensure a committee with a range of taxonomic expertise	2019-2021
		Monitoring and evaluation	ME conducted and document produced	Effective governance	Deliverables on track and achieved	2019,2020, 2021

		Incentive such as certification provided to the best grantee	Certificate allocated	More outstanding results achieved	1 award	2020 –award granted
b. Coordination of foundational data mobilisation and publication projects	b. Mobilise historic and priority primary biodiversity records to be published on the GBIF platform which will support analysis and modelling, monitoring and assessment, and inform foundational data gaps	**Mobilise** historic and priority primary biodiversity records of GBIF-Africa	Occurrence data (specimens, observations, literature data (BHL), Scientific publications), abundance, checklists are mobilized in GBIF-Africa countries	Data mobilization and data publishing are planned as core activity in GBIF-Africa community	At least 300, 000 occurrence records on historic and priority primary biodiversity records are mobilized per year	2019: National projects 200,000 occurrence records 2019: regional projects 100, 000 occurrence records
			checklists of species are mobilised	historic and priority primary biodiversity records of GBIF-Africa are more and more freely available on GBIF site	At least 5 species checklists per year.	2020: 5 species checklists
		Publish historic and priority primary biodiversity records of GBIF-Africa on the GBIF platform	Historic and priority primary biodiversity records of GBIF-Africa are published on the GBIF platform	Data mobilization and data publishing are planned as core activity in GBIF-Africa community	At least 300, 0000 occurrence records on historic and priority primary biodiversity records are published annually	2019: regional projects 100, 000 occurrence records are published 2019: National projects 200,000 occurrence records are published
				Historic and priority primary biodiversity records of GBIF-	At least 5 species checklists are published per year.	2020: 5 species checklists

				Africa are freely available on GBIF site		
	c. Identify data gaps, including deficiencies in taxonomic and geographic coverages, using environmental variables (rainfall, temperature, topographic…) to help set data priorities	Data gap identification through analysis and needs; Identify and mobilise where possible new data types	Data gaps identified	Data and knowledge gaps filled	Taxonomic gaps more complete; geographic gaps more complete	2020 – at the end of each project
	d. Promote the mobilisation of datasets for countries protected areas and key ecosystems, to fill data gaps, and produce relevant, land cover maps, protected area maps and key ecosystem maps	Develop and support products such as protected area maps, key ecosystem maps and to address land cover maps, through data mobilisation activities	Protected area maps and key ecosystem maps	Improved maps in key biodiversity conservation areas	At least two spatial products achieved	2020 – at the end of each project

Strategic objective 2: Build capacity to **deliver relevant/thematic data** across the **data-science-policy interface**, to support biodiversity research, assessments, scenario modelling and planning for decision making						
Deliver relevant /thematic data across the data/science/policy interface	a. Provide **incentives** to support the generation, data mobilisation and/or use of policy relevant thematic data	Provide awards for young scientists to support the data-science- policy value chain	Proposal received and incentive granted	Increased understanding of the data-science-policy value chain	1 award per year	2020
	b. Enable information sharing and gathering on GBIF-Africa priority thematic areas in the region in support of initiatives and conventions such as CBD, IPBES, GEOBON, BIOPAMA and UNEP-WCMC and other national, regional and international efforts	Collect and analyse data on thematic priority areas for assessments; (1) Invasive alien species (2) Threatened species (3) Agro-biodiversity and forests (4) Native and endemic species (5) Medicinal plants (6) Freshwater and wetland biodiversity (7) Marine biodiversity data (8) Crop Wild Relatives (CWR)	Data on thematic priorities are mobilised and used for research and policy at different scales	Support research and policy for biodiversity	At least 3 thematic areas addressed	2020

	c. Build capacity to support the development of **biodiversity scenario's** under **projections of change** on biodiversity and ecosystem services, to develop strategies to build resilience and reduce vulnerability to climate variability.	Support the development of **biodiversity scenario's** under **projections of change** on biodiversity and ecosystem services	Species distribution and ecological niche models supporting global change projections	•Species distribution maps and ecological niche models supporting global change projections are achieved • The impact of global change are identified • Strategies for biodiversity conservation in the context of global change are implemented	At least 5 species modelled and species ecological niche maps produced	2020
	d. Support and participate in species and ecosystem assessments for countries in the region	Mobilize data on critical ecosystems; Participate in species and ecosystems assessments such as red list	Data in critical ecosystems mobilized	Priority data mobilised and assessment completed for policy review and development	Number of records mobilised and published; At least 5 species and ecosystems assessment reports produced	2019: data for assessment mobilized 2020: Assessment conducted 2021: information product in place and disseminated

	e. Support the development of capacity in spatial biodiversity assessment and planning as a tool at national and regional scale, and for developing map products, headline biodiversity indicators & guidelines eg. in NBSAP development	Support spatial biodiversity assessments and planning at national and regional scale	Map products, priority biodiversity indicators for monitoring and NBSAP development	Spatial products are taken up and applied for biodiversity conservation and policy development and implementation	At least 5 spatial products produced to support assessment, planning and conservation	2019 – data mobilisation and assessment 2020 – assessment 2021-product produced
	f. Participate in capacity building activities in support of Natural Capital Accounting and the management of biological invasions	Participate in Natural Capital Accounting processes; Participate in processes dealing with the management of biological invasions	Natural capital accounting processes supported	Natural capital accounting achieved	At least 3 events supported	2019
Strategic objective 3: Build institutional capacity in Biodiversity Information Management through **empowering scientists, practitioners and policy-makers to produce, make accessible and use accurate** biodiversity data, information & knowledge in support of sustainable development						
a. To contribute to training and capacity development for promoting global access to biodiversity data	Enhance technical capacity of National Biodiversity Information Facilities	Develop a training strategy for the region to enhance technical capacity of National Biodiversity Information Facilities	National facilities have increased capacity through efforts of the training strategy	More biodiversity data are accessible online; Data analysis, distribution maps of species, checklists… are promoted	Training strategy developed and document available	2019 2020 Strategy revised and implemented; 2021 strategy implemented

and to enhance the BDI capacity and technical skills base of developing countries	Build the institutional capacity i.e. to support institutional relations and frameworks i.e. MoUs, MoAs, Legislation, Convention;	Identify key partnerships and put in place agreements to support Node activities and enhance institutions	Institutional relations and frameworks i.e. MoUs, MoAs, Legislation, Convention are promoted to support GBIF nodes activities	Increased understanding of legal framework and policy documentation to support data sharing and node activities	New agreements, MoUs, MoAs are achieved in at least 3 institutions in various countries	2019-2021
	Increase technical skills to develop and manage biodiversity informatics tools and infrastructure (websites, portals, servers).	Identify mentors and mentees and establish learning exchanges;	Technical experts are identified to mentor nodes and partners	African region is able to use and maintain tools and technical infrastructure	At least 5 technical experts are identified to mentor nodes and partners	2019-2021
	Enhancing capacity and growing skills of existing staff in biodiversity informatics	Implement training and capacity development workshops in-line with the strategy including: (1) Digitization and data cleaning (2) biodiversity information management, (3) web-based tools and resources (4) Data Standards (5) Niche Modelling	BDI technical skills base in the region are enhanced through training and capacity development workshops	Institutions are able to support the coordination biodiversity data more effectively	2 workshops per year 2 workshops per year 3 workshops per year	2019 2020 2021

	b. Build capacity to ensure fitness for use, management and publishing of data for science and policy	Organize training workshops to enhance skills	Clean and fitness for use data are more and more published	More fitness for use data are available in public domain	At least 100,000 cleaned and fitness for use data are published	2019-2021
			Data for science and policy are more and more available online and used in policy implementation	More and more citations of GBIF-Africa data are available	At least 10 citations of GBIF-Africa data	2019-2021
	c. Ensure that technology, tools, systems and infrastructure that is used and developed, for data sharing is relevant to the African context for easy adoption	Needs assessment of technology, tools, systems and infrastructure in GBIF-Africa community; Promote relevant technical infrastructure and tools in countries	Reports of needs assessment are available	Biodiversity informatics infrastructure (portals, systems and tools) are in place	In at least 5 functional portals	2019-2021
	d. Equip data publishers (where possible) by providing data hosting services	Needs assessment of data publishers; Identify potential Data Hosting options on the continent; Provide adequate data hosting facilities	Adequate data hosting facilities are in place	More and more data are published	At least 2 data hosting facilities identified and in place	2019-2021

	e. Build biodiversity informatics capacity in the use of approved biodiversity standards and tools, to enable the sharing of data on the continent	Organize training workshops to enhance skills	Approved biodiversity standards and tools are used; Data sharing are reinforced at the regional level	Collaboration and cooperation are enhanced at regional level	At least 10 countries use approved biodiversity standards and tools	2019-2021
b. Develop BDI as a field of Science	f. Develop and/or promote Biodiversity Informatics as a field of science through the development of curricula and -research agendas, towards the vision for Centres for Biodiversity Information Management for Africa	Promote existing training programs in biodiversity informatics	Postgraduate students in biodiversity informatics in Africa	More relevant data analysis are achieved	At least 20 graduated students registered for training programmes at universities -BSc, Hons, Masters, PhD	2019-2021
		Promote the development of biodiversity Informatics curricula in sub regions	Biodiversity Informatics curricula are available in sub regions	Biodiversity conservation is promoted at Africa level	At least in 2 sub regions, BDI curricula is being developed	2019-2021
		Develop research agendas in BDI	Research agenda in BDI are promoted	More relevant and useful BDI research are achieved at regional levels	Capacity developed in a number of BDI research areas	2019-2021
		Promote the development of Centres for/in Biodiversity Information Management for Africa	centres for Biodiversity information management for Africa are in place	Increase in Human Capital in BDI in Africa; increased research & development of biodiversity informatics	At least in 2 countries, Centres for Biodiversity information management are being developed	2019-2021

Strategic Objective 4: African countries in the GBIF-Africa network leverage **science, technology and innovation (STI)** to achieve the SDG's and aspirations of the African Union, as identified in its Agenda 2063						
Explore the value of GBIF mediated data and its use to expand the ACM's role in innovation facilitation (also beyond conservation sector)	a. Grow the ACM role to consider the knowledge and innovation chasm	Identify the potential innovation areas or Partners and determine a strategy for engagement or activities (eg. Health i.e. Data to support Malaria and/or Ebola research/product development; burden of disease)	Facilitating innovation becomes part of the ACM agenda	The value and impact of GBIF-mediated data is realised; increase in STI drives economic change	Strategy in place	2019
	b. Identify innovative regional partnership projects to further STI objectives and its alignment with the SDG's	Develop concept notes to identify partnership projects	Increase in innovative outputs on the continent	The value and impact of GBIF-mediated data is realised and innovation; increase in STI drives economic change	2 concept notes developed	2019/2020
	a. Work with the African Academy of Science or academies nationally to further STI objectives	Establish partnership and identify possible areas of collaboration	Increase in STI outputs on the continent	The value and impact of GBIF-mediated data is realised and innovation; increase in STI drives economic change	Agreement with AAS in place	2019/2020

Strategic Objective 5: Strengthen **regional engagement** through advocacy, awareness-raising and enhancing GBIF-Africa's role in supporting regional strategies (eg. Science, Technology and Innovation Strategy for Africa 2024) and in fulfilment of international conventions including UNFCCC, CITES, UNCCD, CBD						
Regional Engagement	a. Participate in regional governance and networks to **coordinate** continental processes to support biodiversity informatics agendas	a. Establish the **ACM** to coordinate biodiversity informatics activities at regional level, so as to support sustainability of national facilities	**a. ACM established** through **approval** of the GBIF-Africa **business case**; Enhanced implementation of bilateral agreements between countries ; Conventions and agreements on sustainable development promoted	More engagement at regional level	Formalisation and recognition of the ACM by members of GBIF-Africa countries and Partners through the **signing of an agreement**	2019 - ACM formalisation
			b. Host a regional workshop to launch the establishment of the ACM, including strategic stakeholders	Awareness raising of the ACM and GBIF-Africa advocacy	1 workshop held	2019
		b. Expand membership of country Participants in GBIF in Africa	Develop and implement a strategy to bring more members on board GBIF-Africa network	Increase in GBIF Participants in Africa	strategy produced	2019

		c. SANBI-GBIF leads and coordinates the **GBIF-Africa Network**, to facilitate the establishment of the ACM for improved biodiversity data publication and use, in support of the conventions and for sustainable development	Functional ACM coordinating office in place enabling the coordination of Biodiversity informatics activities	Increase in science, technology and innovation in the field of biodiversity informatics	ACM Coordinating Office in place; Funding agreement in place for the establishment and operationalisation of the ACM; Increase in consortiums and projects	2019 – office in place; 2019: Agreement between SANBI and DST
		d. SANBI coordinates the **BHL-Africa Network**, to facilitate improved biodiversity literature publication and use, in African countries.	Biodiversity literature publication and use promoted through Increased BHL membership in Africa	Increase in collaboration and cooperation between countries on the continent	Increase the network by at least 3 institutions	2019-2020
	b. Lobby our **ministries** to include biodiversity informatics dialogues on the agenda of high-level African regional meetings or gatherings such as the **AU, AMCEN and AMCOST, to leverage funds** and enhance Nodes sustainability	a. Nodes to engage with ministries to support biodiversity informatics	Email/letters/ documentation and consultation achieved	Increased support from governments and development Partners for Biodiversity Informatics activities at national and regional level	At least 1 signed agreement	2020-2021 – agreement to position BDI at the high level
		b. ACM Convener and DST to engage with institutions and initiatives at regional level to support biodiversity informatics initiatives	Agreements in place between ACM/DST and AU/AMCEN/AMCOST	Promotion of biodiversity conservation initiatives and more adaptive strategies to conserve biodiversity	3 projects supported by governments and development partners	2021 – projects funded and implementation started

		c. Foster regional engagement efforts to leverage sustained funding from government and other donors	Funding secured; Functional and active Nodes increased; Capacity self-assessment tool used to identify functional Nodes	Promotion of biodiversity conservation initiatives and more adaptive strategies to conserve biodiversity; Inclusion of BDI technologies and techniques into biodiversity conservation efforts	At least 10 functional Nodes which contributes to data, science and/or policy objectives; Reports of Capacity Self Assessments for Nodes	2019-2021 – Nodes functional
	Marketing and Awareness Raising of the ACM	Engagement with marketing department around branding and marketing aspects for the ACM	Development of a marketing strategy/approach	Increased visibility of the efforts GBIF-Africa to increase biodiversity informatics engage and uptake of data for science and policy	strategy produced and available	2019
	Communication and outreach	a. Develop marketing materials to promote GBIF-Africa/ACM and biodiversity informatics	popular articles, website articles, brochures, banners	Increased visibility of the efforts GBIF-Africa to increase biodiversity informatics engage and uptake of data for science and policy	4 Materials produced	2019-2021

		b. Identify and participate in relevant industry conferences to communicate the value of the ACM, GBIF and highlighting biodiversity informatics efforts for science and policy	Conferences attended and presentations/posters available	Increased visibility of the efforts GBIF-Africa to increase biodiversity informatics engage and uptake of data for science and policy	3 conferences attended where GBIF and the ACM is highlighted	2019-2021
Strategic objective 6: In the 1st three years explore the need and feasibility of **developing a bigger sustainable platform** for the ACM that can provide for a strengthening of a community of practice for all African biodiversity informatics initiatives, to enhance and make more efficient and innovative use of the data						
Develop strategic networks (beyond GBIF) and Partnerships to support sustainability of the ACM	a. Grow the strategic biodiversity informatics networks on the continent and include as ACM Partners	a. Develop and distribute a survey to identify the strategic partners to expand the ACM beyond the GBIF Nodes Community in Africa	Survey results documented	Increase in Partners engaged in common understanding of Biodiversity Information Management and its use for research, policy and decision making	survey produced and strategic partners identified	2019
		b. Establish partnerships through formal or informal arrangements like MoU's; data sharing agreements; formal contracts	Agreements in place	A coalition of partners formed to enhance integrated biodiversity informatics activities on the continent	identify 2 strategic partners annually and initiate a formal agreement	2019-2021

	Identify emerging common approaches (in GBIF member countries and strategic networks) in systems, technology, data use which will form the basis of shared action in projects and activities on the continent	Develop a concept note to take further a collaborative regional project based on common goals	community of practice in biodiversity informatics strengthened	Stronger more inclusive network engaged in biodiversity informatics activities working towards a common goal	1 project identified	2020
	b. Engage focal points on various conventions CBD, CITES, IPBES, UNFCC, ABS clearing house, BIOPAMA and include in national plans in-line with possible Node activities	Determine mechanisms to engage focal points and look at how best to streamline into Nodes workplans and GBIF-Africa regional action plan	community of practice in biodiversity informatics strengthened	Stronger more inclusive network engaged in biodiversity informatics activities working towards a common goal	1 new engagement identified per Node	2019-2020
	Drive the establishment of a Bio-bridge Hub in support of technical and scientific cooperation with the CBD	SANBI-GBIF to lead the establishment of the **Bio-bridge Hub** and arrange a workshop to look at the establishment	Technical and scientific cooperation with the CBD in place	Increase in collaboration and cooperation between countries on the continent and with the CBD	Contract in place with the CBD	2019-2020

	Develop and strengthen IPBES engagements and identify key strategic areas for Node activities	Organise a workshop to look at strategic areas and taking this forward	GBIF-Nodes support IPBES and the Africa Assessments more concretely	Increase in collaboration and cooperation between countries on the continent and with the IPBES TSU; and support for the filling of data and knowledge gaps for the Assessments; increase in capacity on the continent	Contract/ in place with the CBD	2019
	A number of the Nodes in Africa support the IPBES, IUCN red lists authorities, CITES, UNFCCC to support assessments and improve oversight of species in trade	Identify priority engagements and work areas and establish agreements	Agreements in place; More engagement between the initiatives and ACM partners	Increased collaboration and alignment between ACM activities and initiatives	At least two agreements in place	2019-2021

Table 2. Budget to support the operationalisation of the ACM

Activities		2019	2020	2021
Personnel & recruitment		**1 900 000**	**2 014 000**	**2 134 840**
Contract staff				
~Training, Capacity Building And Outreach Officer (level 9/10)		450000	477000	505620
~Grant Administrator and Data Coordination Officer (Level 9/10)		450000	477000	505620
~Data Technician/Specialist (level 8/9)		450000	477000	505620
~Data Publication, Use And Application Officer (Data-science-policy Interface) level 10		550000	583000	617980
Grants		**4 500 000**	**4 500 000**	**4 500 000**
Annual Grants (Regional grants - runs on 2 year cycle)	regional grants (approx. Euro 20000 for 5 countries, not more than 1.5m)	3000000	3000000	3000000
Annual Grants - National grants		1500000	1500000	1500000
Operational Expenses		**1 630 000**	**1 630 000**	**1 855 000**
Programme operating expenses	Office consumables, phone, travel for programme officers, outreach activities	150000	150000	150000
Hardware and Software	computers, equipment etc	100000	100000	100000
Technical Committee meetings	1/2 per annum; travel and logistics	100000	100000	100000
Training and Capacity Building	2/3 centrally coordinated training events per annum 2018/2019/ 2020	450000	450000	675000
New areas for engagement		100000	100000	100000
SANBI Management Fee		730000	730000	730000
		8 030 000	**8 144 000**	**8 489 840**

Table 3: GBIF-Africa regional action plan 2016-2018 developed during the 2016 GBIF-Africa Meeting

Activities Identified	Progress against the workplan
Strategic Objective 1: Strengthen capacity to mobilise foundational data to fill the data and knowledge gaps in support of education, research and analysis that is necessary for decision making for sustainable development	
Alignment to GBIF Strategic Plan: SO1, SO3 & SO4	
Fill the Data Gaps in African Priority Thematic Areas	
➢ Mobilisation of data on invasive species, threatened and endemic species in **West Africa** - JRS Ghana Project	➢ Ongoing
➢ Mobilization of data on medicinal, agroforestry, threatened, and invasive alien species through BID projects (Benin, Senegal, Mali, Niger, Guinea, DRC, Madagascar, Côte-d'Ivoire)	➢ Ongoing
➢ Identify scenarios to **sustain node point** activities in mobilizing data in each member country - Benin Bid Consortium	➢ Ongoing
➢ Identify and prioritize gaps in spatial and temporal data - research ongoing in Ghana, NMK, Tanzania and Benin	➢ Ongoing
➢ Collaborative repatriation of data with the **big museums of the world** - West African project (including eg. Ghana/Benin/Nigeria)	➢ Nigeria is an active Partner in the JRS funded West African Initiative. Here Nigeria is engaged in the mobilization of herbarium data with 6,907 data entries and herbarium 12,863 images.

Promote Data Mobilization	
➢ Work with **Higher Education Institutions (HEI) & Research ıdations** to make state owned data accessible via GBIF eg. NRF in SA	➢ SANBI-GBIF provides strategic guidance on the Foundational Biodiversity Information Programme Steering Committee to support this engagement with Research Foundations. ➢ GBIF Benin is engaged with several institutions who are now increasingly active in data publication
➢ **Engage with IPBES** task team and **Regional Assessment process** to identify data gaps	➢ SANBI-GBIF attended the IPBES 5 National Stakeholder consultation workshop in February 2017. The aim of the workshop was to prepare South Africa's position for the upcoming 5th Plenary Session of the IPBES. This provided valuable insight into the operations and workplan of IPBES, and also supports further engagements in discussions and agenda setting with GBIF as well as nationally. ➢ SANBI-GBIF provided input into the IPBES capacity building rolling plan
➢ Southern African Mammal Red List - EWT data mobilisation project with SANBI lessons learnt.	➢ It has been agreed that a post-publication assessment of the project, and lessons learnt, would be documented, which would include data mobilization.
➢ Promote projects on data mobilisation dealing with **indigenous populations and ancestor uses** - DRC, NMK, Benin, Togo	➢ Carrying out the activities of the BID project, the Federation of Phytotherapists was involved in the **training workshop on the mobilization, cleaning and publication of biodiversity data**. Several participants pledged to contribute their data to the enrichment of the GBIF platform. Activities have started well even if they remain timid from our point of view. Sensitization (door-to-door) continues in this topic.
➢ **Literature data** is being mobilised through the **BHL Africa** network - SA, Kenya, Uganda (Regional)	➢ Ongoing

Implement Data Quality Tools	
➢ Systematic control of data before publishing using Geolocate, Google Refine, QGIS and "R". This will be showcased in the BID consortiums, led by Benin	➢ Ongoing
➢ Geomancer is used to clean data at the National Museums of Kenya. Regional training on Geomancer, of BID consortiums by KenBIF.	➢ Ongoing
Expand the Mobilization of Data Types	
➢ Genetics Data to be mobilised by Togo, South Africa, Kenya, Democratic Republic of Congo, through Genebank	➢ Genetics data mobilised through funds from the FBIP programme in South Africa and uploaded to BOLD ➢ In Togo, two departments are solicited for this cause: botany and zoology. Neither of them has any physical or financial means to engage in this collection of genebank. Teaching and technical staff have few skills in this area. The node manager participated in the Global Genome Biodiversity Network Symposium in Germany and made a presentation on the situation and the will of Togo to join the organization.
➢ Sampling /abundance data to be mobilized through the BID eg. North Africa and Togo	➢ In the framework of the BID project, data published by **Togo** to date have increased from 8,000 to nearly 60,000. The 100,000 mark remains the goal to be achieved before the end of the project. A monitoring committee of 5 members (including the Ministry of the Environment, scientific researchers, NGOs, research institutes) is set up by the data holders to assist and accompany the Node during and after the project.

Strategic objective 2: Build capacity to **deliver relevant data** across the **data-science-policy interface**, to support biodiversity research, assessments, scenario modelling and planning for decision making

Alignment to GBIF Strategic Plan: SO1, SO3 & SO5

Promote data use to deliver relevant products

- Data Mobilisation and use action plans for 3 countries – Africa Biodiversity Challenge SANBI-GBIF

- Funding provided to data generation and mobilization activities that show the use and relevance of data for decision making – SANBI, JRS, BID.

- A template for Biodiversity Mobilisation Roadmaps for each of the four ABC participating countries has been developed and will be finalised by the end of 2017. These roadmaps will be centred around 1) managing the **wildlife economy in Namibia** by mobilisiing wildlife permit data; 2) assessing the effectiveness of **Community Resource Management Areas** in **Ghana** by mobilising occurrence records in these areas; 3) galvanising biodiversity data mobilisation in **Malawi** by **digitising specimen collections** and data contained in **reports and journals**; and 4) **mobilising freshwater biodiversity records in Rwanda** to inform a State of Freshwater Biodiversity Report for the region.

- Funding budgeted through FBIP programme ± € 645 000;
- The ABC project, through JRS funding provides 80 000 US$ in prize money for data mobilization
- Data use are actively promoted through JRS Biodiversity Foundation project and BID projects in Benin to support decision making on biodiversity conservation and sustainable use

Deliver Communication and Outreach for Decision and Policy making

➢ Working regionally to support **biodiversity planning**. Guidelines such as Mapping Biodiversity Priorities developed – SANBI	➢ Project development underway for a partnership project between SANBI and UNEP-WCMC to pilot the Mapping Biodiversity Priorities guidance in three African countries (Botswana, Ethiopia and Malawi), with support from the CBD Secretariat and the Japan Biodiversity Fund.
➢ Working regionally to support processes to develop **NBSAP's** – SANBI	➢ Through the ABC initiative, policy-relevant data will be incorporated into NBSAP revisions and the 6th CBD National Report (2018) for the participating countries. ➢ The spatial products of Mapping Biodiversity Priorities are intended to feed into NBSAP development and/or implementation in the countries concerned
Deliver Relevant Data	
➢ Priority Theme- **Ecosystem Services (ES)** species important for ES and livelihoods/quality of life (ind & local knowledge) - Connection to IPBES	
Strategic objective 3: Build institutional capacity in Biodiversity Information Management through **empowering stakeholders to produce, make accessible and use accurate** biodiversity data, information & knowledge in support of sustainable development	
Alignment to GBIF Strategic Plan: SO1, SO2 & SO5	
Capacity Enhancement	
➢ Training event hosted in data analysis in Ghana (W. African participation - JRS Funded)	➢ The course was completed in August 2016, held at Makerere University with 25 participants

- Ecological Niche Modelling training & Data Paper training to be hosted in Uganda through a Bid small grant - EWT to lead

- In Benin, many training workshops were organized at national and regional levels and were funded either by JRS Biodiversity foundation or EU through BID project. A regional training also took place last June in Madagascar in the framework of our regional BID project

- Acting as BID/GBIF mentors to develop capacity in the region - Ghana, Togo, Benin

- Data management training event for African Biodiversity Challenge project teams

- 2nd regional biodiversity workshop within the BID-AF2015-0066-REG entitled "Capacity building and biodiversity data mobilization for conservation and sustainable use and decision making in Africa and Madagascar", coordinated by GBIF-Benin took place in Madagascar (19-28 June 2017). Seven countries attended the workshop (Benin, Madagascar, Ivory Coast, Senegal, Mali, Niger and Guinea).

- Training activities completed

- GBIF Togo manager participated at the BID first workshop held in Kigali, as a mentor.

- Training event scheduled for December 4-7 2017, co-hosted between SANBI and GBIF at Cape Town. Training event will combine participants from BID and ABC projects

- The workshop was about data capture, publishing and use through niche modelling using R package and data paper preparation. The training was conducted by two macroecology specialists and Pr J.C. Cossi. This workshop followed a first one hosted by Benin and concerning mainly data cleaning and publishing (28 November to 02 December 2016).
- DRC is contributing to BID-AF2015-0066 - Digitizing biodiversity data of the herbarium UNIKIN-INERA (IUK) of the Faculty of Sciences of the University of Kinshasa, and supports the elaboration of an illustrated file of invasive alien plants of DR Congo. Here capacity development efforts include the training of 6 students from the Department of Biology of the University of Kinshasa in the mobilizing biodiversity data. There are concerns with delivery on this project.

Build in depth capacity in BI (Academic) - strengthen skills	
➢ Develop partnerships in Africa to support the curriculum - SA, Benin, Togo, Ghana	➢ A Masters' Degree Program in Biodiversity Informatics is being launched in October 2017, at the **University of Abomey-Calavi**. Here, a curriculum of a master program in biodiversity informatics has been developed, supported and approved and the master program is created by the University. ➢ SANBI-GBIF is working with the **University of Sol Plaatjes** to develop a Biodiversity Information Management teaching module at the Honours level. Here an MoU is being developed between SANBI and Sol Plaatjes University. ➢ At the annual Biodiversity Information Management Forum 2016, SANBI-GBIF explored opportunities with the research and university community to look at how to unlock opportunities to take the establishment of a BIM Centre forward. The aim was to consider if Universities where willing to support the Biodiversity Informatics teaching and research efforts. ➢ Engagement with The Southern African Regional Universities Association is ongoing to look at possible support from them in taking these efforts forward.
➢ Develop and finalise the GBIF endorsed curriculum - GBIFs and GBIF Africa	➢ SANBI-GBIF has drafted a report based on the outcomes of the GBIF Nodes meeting in Madagascar. This needs to be taken forward.
➢ Enhance research and teaching activities in BI and reusable teaching material - SA, Benin, Togo, Ghana	➢ Teaching activities in BI accepted on Master curricula that will started on academic year 2017-2018 at the Faculty of Science (**University of Lome**).
➢ Produce research papers demonstrating the value of data - Benin, Ghana	➢ Research papers in progress in Togo ➢ Research papers in progress in South Africa, looking at use and

	relevance of marine biodiversity data for sustainable development ➢ Research papers published and ongoing, through GBIF Benin and scientists
Enhance Biodiversity Information Infrastructure	
➢ Working on standardized data for Invasive Alien Species - Mauritania, Senegal and Burkina Faso ➢ Enhance the informatics infrastructure and tools which will be relevant regionally – South Africa	➢ Ongoing ➢ SANBI-GBIF is proceeding with the implementation of standardised invasive fields for species pages that was developed this year, as well as the link to BRAHMS. ➢ SANBI is currently in Phase 1 (scoping and design of the architecture) which is planned to be completed by 31 August 2017. Outputs from this phase are i.) the design for an approved systems architecture and ii) an implementation plan for establishing the architecture.
Equip Data Publishers	
➢ Data hosting services are provided by a number of Nodes including South Africa for EWT and ICLEI; Kenya for IGAD; GBIF-France for Benin and Belgium for Togo. ➢ Consider the development of a task group on **disease transmission/vectors**, consider funding ➢ Create and empower a network of experts by taxonomic groups: disease vectors, phytopathology	➢ Ongoing

Strategic Objective 4: Strengthen **regional engagement** through advocacy, awareness-raising and enhancing GBIF-Africa's role in supporting regional strategies (eg. Science, Technology and Innovation Strategy for Africa 2024) and in fulfilment of international conventions including UNFCCC, CITES, UNCCD, CBD	
Alignment to GBIF Strategic Plan: SO1 & SO5	
➢ Ensure the implementation of the ACM through finalization of the business case - (SANBI & region)	➢ A SANBI Regional Engagement Strategy has been developed by SANBI-GBIF NM and Regional Rep., which includes the GBIF Africa Work and has been presented to the SANBI Board. The ACM business case is under development and will align with this strategy.
➢ Ensure sustainability of ACM through active engagement with government and partners for fund raising.	➢ The GBIF-Africa proposal will be submitted to the Department of Science and Technology. DST has been advised of the proposal development. DST representative has been elected as the new South African Head of Delegation
➢ Ongoing fund raising and project development from participants in regions	➢ **GBIF Togo** had submitted proposal to TWAS and had obtained a grant to organize a scientific meeting on Data Paper writing in Lomé (Togo). EWT was solicited but because of commitments, the meeting was cancelled and funds taken out by TWAS. ➢ In the framework of the African and Malagasy Council of Tertiary Education, the Node manager of GBIF Benin is leading the section on biodiversity informatics with the aim of promotion biodiversity informatics in that space of about 20 countries
Empower the regional and global network	
➢ Sensitise more African countries to join the GBIF community, so as	➢ Through the African Biodiversity Challenge, both Namibia (Minstry

to develop more projects which can mobilse biodiversity information

and Environment and Tourism) and Rwanda (Centre of Excellence in Biodiversity and Natural Resource Management, University of Rwanda) have indicated they would be willing to develop national nodes. SANBI and GBIF will work with the identified institutions to bring this to fruition.

- In the framework of the BID regional project lead by GBIF Benin, one of the objectives is to encourage participation in GBIF. In that framework, **Mali and Niger** signed the MOU and are GBIF participants. Côte-D'Ivoire and Senegal are awaited

- Translation of resources – Togo + Benin

- GBIFS has repeatedly solicited the GBIF Togo for documents translation to be posted on the GBIF website. The node has responded favourably to this request. Among others, we can cite BID call proposals document.

- Develop communities of practice in Biodiversity Information Management through the implementation of Biodiversity Information Management Forums.

- Biodiversity Information Management Forum is held annually in South Africa, and is managed by the SANBI-GBIF Node. The 2016 event had a strong regional focus and included colleagues from Benin and Kenya and also worked towards strengthening the data-science-policy interface by creating strong linkages to the IPBES agenda. At the 2017 Forum, colleagues from the Namibian Ministry of Environment and Tourism have been invited to participate for skills transfer, to enable the rollout of BIMF's subsequently in Namibia, as part of the ABC initiative. Here there is also a strong link to the Wildlife economy which will be made.

- Through the ABC initiative, BIMFs will also be organised through the Malawi and Ghana nodes, as well as the Namibia and Rwanda potential nodes later in 2017.

- Data Repatriation – Improve the **policy and legislative frameworks** around data repatriation as international scientists leave the study regions with data and material - this should be better legislated. An example of Mexico was presented.

- SANBI manages the publication of scientific papers through *Bothalia* - African Biodiversity and Conservation Journal (Explore the possibility of a connection to **Data Papers**)

- Inter-regional cooperation and support

- Bothalia-ABC, is open to the publication of data papers by the Africa network, as there are no publication charges. Other journals that publish data papers have publication charges which may prove a barrier to the publication of data papers from Africa.

- Nodes managers from Benin and Ghana, and colleagues from the African Conservation Centre provide strategic guidance to the ABC initiative through various governance mechanisms i.e. Steering committee and Judging Panel.
- All Node Managers have played a role in the review and endorsement of BID proposals - including national, regional and small grants, as is required by the BID guidelines to ensure appropriate coordination regionally of projects, and to support coordination nationally and regionally of new projects coming on board.
- GBIF Benin is actively coordination a regional consortium in the framework of a BID project to promote biodiversity informatics in African community

APPENDIX 1: GBIF-AFRICA *COMMUNIQUÉ*

Members of GBIF-Africa during their side-meeting held at Akany Soa Fonenako Hotel, Madagascar on this date of 7th October 2015 announces a Communiqué as an initiative to establish the African Coordinating Mechanism (ACM)

We, the undersigned agree on the following:

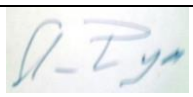
1. Biodiversity data and information are indispensable resources to support research, policy formulation, education, and decision making for biodiversity conservation and sustainable development in Africa;
2. Access to this data and information will help Africa to address important issues of great social and economic relevance such as land-use planning, setting up and managing protected areas, identifying and tracking agricultural pests and diseases of livestock, wildlife and humans, and predicting the spread of invasive species;
3. Through the establishment of a data-science platform for Africa, the African Coordinating Mechanism is an initiative towards achieving goals made by the Global Biodiversity Information Facility, Convention on Biological Diversity, Intergovernmental Platform for Biodiversity and Ecosystem Services, New Partnership for Africa's Development, African Union, and other national, regional and international obligations. It intends to support the development and application of science, technology and Innovation, in order to attain sustainable development in Africa;
4. The GBIF regional engagement process has ensured that the Nodes in Africa have been actively working towards increased regional coordination since 2008/9.
5. The GBIF-Africa network is an initiative that will help coalesce different biodiversity informatics advancements, expertise and efforts in Africa in order to reduce duplication and improve resource utilization in the African region, with regards to data in support of science, society and a sustainable future.
6. GBIF-Africa membership is open to all African countries and/or organizations that subscribe to the GBIF vision of free and open access to biodiversity data and information.

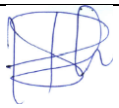
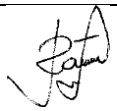
We therefore agree on the following: -

1. To align efforts and outcomes such as the establishment of the ACM, the Africa Rising outcomes (which took place in Cape Town in May 2015), and the Declaration on Biodiversity Information for Sustainable Development in Africa.
2. To explore and support science-policy initiatives such as IPBES.
3. An African Coordinating Mechanism shall be established as a coordinated unit of National Biodiversity Information Facilities and/or organizations that enable scientists, managers, and policy and decision makers, to share and use biodiversity data effectively;

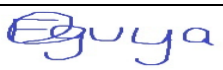
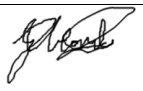
4. The South African National Biodiversity Institute (SANBI) shall act as the Secretariat of the ACM for a period of three years, and lead the process of establishing an ACM within the appropriate framework of the African Union;
5. Three representatives from the GBIF-Africa Regional Node Committee shall develop the necessary Communiqué required for SANBI to take action, i.e. Ms. Fatima Parker-Allie (South Africa); Ms. Hulda Gideon (Tanzania) and Mr. Innocent Akampurira (Uganda);
6. All members of GBIF-Africa shall participate actively in the engagement of other biodiversity initiatives in Africa to establish and sustain the ACM;
7. In the development of new and existing efforts aimed at mobilizing policy relevant data in the region, all members of GBIF-Africa, shall strongly endeavor to work towards ensuring the sustainability of the ACM
8. The ACM shall be inaugurated within a period of two years from the adoption of this Communiqué.
9. It was recommended that Node Managers sign off on the Communiqué, indicating support of South Africa taking a leadership role in the process of establishing an ACM and acting as a Secretariat.
10. Although the Nodes have worked towards the establishment of an "African Coordinating Mechanism" since 2010, it was felt that this terminology is outdated, and does not adequately capture the essence of what this network/initiative is trying to achieve. Therefore, the name will be changed through consultation, to ensure understanding and adoption by the entire network. An initial recommendation is
    a. GBIF - Africa Biodiversity Informatics Network or
    b. GBIF - Africa Biodiversity Informatics Platform

Node Managers and Heads of (to GBIF Governing Board) in Attendance of the Side Meeting at *Akany Soa Fonenako Hotel, Madagascar on this date of 7th October 2015. Node Managers hereby agree that South Africa takes a leadership role in establishing the ACM*

No	GBIF Node	Name	Email Address	Signature
1.	Benin	Jean Ganglo	gangloj@gmail.com	
2.	Ghana	Asase Alex	alexasase@gmail.com	
3.	Guinea	Saïdou Doumbouya	doumbouyasaidou@yahoo.fr	
4.	Mauritania	Moulaye Mohamed Baba Ainina	ainina_3@hotmail.com	

5.	Tanzania, United Republic of	Hulda Gideon	hgideon@hotmail.com; hgideon@costech.or.tz	
6.	Togo	Pierre A.R. Radji	pradji@msn.com; pradji@hotmail.com	
7.	Uganda	Innocent Akampurira	i.akampurira@uncst.go.ug iakampurira@gmail.com	
8.	ARCOS	Faustin Gashakamba	gashakamba@arcosnetwork.org	
9.	Madagascar	Jaona Ranaivo	ranaivo_jaona@yahoo.fr	
10.	South Africa	Tanya Abrahamse	T.Abrahamse@sanbi.org.za	
11.	South Africa	Fatima Parker-Allie	F.Parker@sanbi.org.za	

Node Managers not present in *Madagascar on this date of 7th October 2015, but agree that South Africa takes a leadership role in establishing the ACM*

1.	Kenya	Francis Oguya	foguya@gmail.com	
2.	Central African Republic	Denis Beina	d_beina@yahoo.fr	
3.	Malawi	Lyson John Kampira	Lkampira@ncst.mw	
4.	ICLEI	Georgina Avlonitis	georgina.avlonitis@iclei.org	
5.	EWT	Lizanne Roxburgh	lizanner@ewt.org.za	
6.	Republic of Congo	Emile Kami	emile.kami@yahoo.fr	No Response

APPENDIX 2: PAST AND CURRENT REGIONAL BIODIVERSITY INFORMATICS INITIATIVES LED, SUPPORTED AND/OR IMPLEMENTED BY GBIF-AFRICA

- **Sud Experts Plantes - Développement durable (SEP2D).** Following the success of the first SEP project, the French government has agreed to fund a EUR 5.3 million follow-up project which will focus on engaging African Francophone countries to enhance understanding of plant biodiversity, strengthen scientific capacities, streamline the science-policy interface and promote the interests of African countries in international environmental forums. The project began in late 2015 and will continue for five years.

- **Capacity Enhancement Programme for Developing Countries (CEPDEC).** CEPDEC is a GBIF-developed multi-stakeholder initiative for capacity building in developing countries. Its main objective is to enhance the communication between science, policy and society through improving access to, and management of, biodiversity data thus helping developing countries move towards a sustainable future. The GBIF Node of Tanzania (TanBIF) has activity participated in the CEPDEC initiative which was funded by the Department of Environment and Sustainable Development of the Royal Danish Ministry of Foreign Affairs. Here key achievements include (1.) the TanBIF web portal (2.) digitization of data (3.) numerous training events (4.) 29 MOU signatories (5.) development of an information tool that enables the analysis of primary biodiversity data to support policy and decision making on related issues (6.) development of a support network for East African GBIF nodes. A closing function for the CEPDEC programme took place in 2012 and one of the key products produced under this programme has been the publication of a Book on the Checklists of Tanzanian Species.

- **Innovations in Biodiversity Informatics - Capture of primary biodiversity data on West African plants.** This JRS funded project runs from 2014-2018 and explores and demonstrate the promise of a new paradigm in specimen digitization: developing-world scientists lead digitization efforts in close collaboration with institutions holding specimens from biodiversity- rich, information-poor regions. The flexibility of this model, tailoring workflows to the capacity and needs of each individual partner institution, is transferrable to other regions, and can be used with other taxa. The data on West African plants themselves will be a valuable resource for informing policy and resource management and can be factored into land-use planning, and protected area decisions.

- **Mobilising Africa's Biodiversity Data.** The project, 'Mobilizing Africa's policy and decision-making relevant biodiversity data' ran from October 2013 to December 2015.[24] Achievements of the programme have included the setting of thematic priorities for data mobilisation and the identification of capacity needs for mobilizing policy-relevant biodiversity information in a large number of African countries. This project was funded by the JRS Foundation and led by SANBI in close partnership with GBIF.

- **African Biodiversity Challenge (ABC).** The JRS has awarded SANBI-GBIF a grant of USD 250,000 to implement a project which will engage, capacitate and incentivize a selection of African countries to mobilise biodiversity data. The project will entail organising specialised training workshops, a virtual helpdesk, national biodiversity information management forums, and a

[24] http://biodiversityadvisor.sanbi.org/participation/mobilising-africas-biodiversity-data/

data-publishing competition. The project will commence once a Project Coordinator has been recruited to manage it.

- **Africa Rising:** The conference, *Africa Rising: Mobilising Biodiversity Data for Sustainable Development* took place from 19 to 22 May 2015 at Kirstenbosch National Botanical Garden in Cape Town. Approximately 100 delegates participated representing 21 African countries and 10 international organisations. The delegates produced a joint *Declaration on Biodiversity Information for Sustainable Development in Africa* and a *Plan of Action for Mobilising and Mainstreaming Africa's Biodiversity Data*.
- **Foundational Biodiversity Information Programme.** SANBI coordinates this long-term programme to generate, manage and disseminate foundational biodiversity information and knowledge to improve decision-making, service delivery and create new economic opportunities. It is funded by DST and the National Research Foundation (NRF). Calls for proposals are issued each year and fund projects up to ZAR 1,000,000 over a 2 year period. The funding is currently earmarked for South African applicants, but the scope of eligible projects may expand to other African countries, and through other funding streams.
- **Intergovernmental Platform on Biodiversity and Ecosystem Services (IPBES) Africa Regional Assessment.** SANBI and other GBIF Nodes, like Ghana, have actively participated in IPBES meetings and is currently playing a key role in the compilation of an Africa Regional Assessment. In consultation with the GBIF Africa Group, the JRS Project Coordinator led the compilation of two data-related sections for inclusion in the assessment. This work was undertaken upon a request from a lead author, namely, Dr Sebataolo Rahlao. It can be anticipated that various additional opportunities for capacity building and knowledge production will arise as IPBES strengthens. SANBI enjoys strong relations with the Council for Scientific and Industrial Research (CSIR) which hosts the IPBES Technical Support Unit (IPBES) for Africa. Thus SANBI may be well-placed to contribute to and benefit from future IPBES-related activities. SANBI-GBIF has also contributed to the 2017 capacity building rolling plan of IPEBS.
- **Biodiversity Heritage Library (BHL) Africa.** BHL Africa is a consortium of natural history and botanical libraries that co-operate to digitise the legacy literature of biodiversity held in their collections and to make that literature available for open access. Though much of the core biodiversity literature from Africa exists in non-African institutions, rich and unique collections of materials reside in the national institutions and universities on the continent. In February 2015, the JRS Biodiversity Foundation awarded a USD 150,000 grant to SANBI to grow BHL Africa through the collaboration, assessment, and digitisation of African collections and by creating a sustainable network of institutions and countries to increase access to biodiversity materials held in Sub-Saharan African institutions. This project also entails developing the skills of the current BHL Africa members and forging relationships with potential members.
- **Biodiversity Information for Development.** The EU-funded, GBIF-led project, *Biodiversity Information for Development*, was launched at the Africa Rising conference. This EUR 3.9 million project will be implemented in Africa, the Caribbean and the Pacific. It will entail several calls for proposals worth up to EUR 60,000 each. The first call for proposals from African institutions is set to award EUR 900,000 in grants.

- **Mainstreaming Biodiversity Information into the Heart of Government Decision Making.** UNEP-WCMC's has successfully raised USD 5.12 million in funding from the Global Environment Facility (GEF) to work intensively with 3 African countries – Ghana, Mozambique and Uganda – to mobilise policy-relevant biodiversity data and integrate it into decision-making processes. Case studies and lessons will be shared across the continent. The project will commence in early 2016.
- **Urban Natural Assets for Africa.** The UNA-Africa project, funded by SwedBio and coordinated by ICLEI – Local Governments for Sustainability drew to a close in December 2015. SANBI and GBIF partnered with ICLEI to implement this project. The project has subsequently been renewed with a USD 1 million grant to support capacity enhancement in African cities. ICLEI has requested that SANBI and GBIF remain as advisors to the project as the UNA-Africa training programme will involve biodiversity information management.
- **Biodiversity and Protected Areas Management Programme (BIOPAMA).** With support from GIZ, the International Union for Conservation of Nature (IUCN) and the EU's Joint Research Centre (JRC) are implementing a BIOPAMA Programme, which is focused on developing capacity in protected areas management and deploying the Digital Observatory for Protected Areas (DOPA) in Africa. The establishment of Regional Observatories for Protected Areas and Biodiversity is a central component of the BIOPAMA objective to build capacity and improve decision-making. The Regional Observatories will provide the best available scientific data, traditional knowledge, and lessons learned from field activities. A key feature of each Observatory is a Regional Reference Information System (RRIS). The RRIS integrates a diverse range of relevant protected area and biodiversity data and information, using open source web services.

APPENDIX 3: AFRICA RISING DECLARATION

Proclaimed on the International Day for Biological Diversity, the *Declaration on Biological Information for Sustainable Development in Africa* serves as a formal record of the Africa Rising conference, a rallying call for increased action, and a calling card for increased investment in unlocking Africa's biodiversity information.

Declaration on Biodiversity Information for Sustainable Development in Africa

On this International Day for Biological Diversity in 2015, we the participants of the conference, *Africa Rising: Mobilising Biodiversity Data for Sustainable Development*, held in Cape Town, South Africa, from 19 to 22 May 2015, agree that the quality of decision-making relies on the quality of information considered and hereby declare our vision for 2030 as a world in which biodiversity information contributes fully to sustainable development in Africa. Specifically, we desire that:

- Governments subscribe to the principle of free and open access to biodiversity information.
- Policymakers are adequately informed to respond effectively to global environmental change.
- Countries are sufficiently capacitated to measure and track the status and trends of biodiversity and ecosystem services.
- Biodiversity considerations are mainstreamed into all planning decisions.
- All sectors of society can contribute towards and benefit from a global pool of biodiversity knowledge derived from Earth observations.

Biodiversity is the bedrock of sustainable development. In Africa, biodiversity makes a profound contribution to human wellbeing and security, underpinning vital sectors including agriculture, fisheries, forestry, water, public health, tourism and energy. Next to our people, biodiversity is our greatest asset. If managed wisely, it could bring about a surge in green economic opportunities, strengthening the resilience of livelihoods and catalysing sustainable development across the continent.

Data is the currency of the information age. The global data revolution presents new opportunities for evidence-based decision-making, active citizenship, technology transfer, education and research.

Critical data-deficits impair decision-making. Achieving sustainable development in Africa will require relevant reliable biodiversity information as well as tailored products and services to be made available to researchers, natural resource managers and policymakers in consumable forms.

Regional co-operation can spur co-ordinated action. By working together we can pool resources, share expertise, enhance capacity and efficiently progress towards the following goals:

- Evidence-based decision-making supported by co-ordinated science-policy dialogue within and outside the biodiversity sector
- Capacity building across the information value chain to empower stakeholders to produce and make accessible accurate biodiversity data for sustainable development
- Mobilize and make openly accessible relevant biodiversity data to support education, research and decision-making for sustainable development
- Leverage sustained funding

Africa could lead the world in biodiversity information management. Our continent is bursting with human ingenuity and brimming with natural resource wealth. Let us unlock the potential of biodiversity information to help secure a sustainable future for all. It is our responsibility.

APPENDIX 4: NUMBER OF RECORDS PUBLISHED BY GBIF COUNTRIES AND INTERNATIONAL ORGANISATIONS IN AFRICA

Participant	Membership	Member Since	Number of Datasets Published	Records Published (July 2018)	Number of Publishers
South Africa	Voting participant	2003	43	21 764 662	11
Kenya	Voting participant	2008	10	595 379	1
Benin	Voting participant	2004	91	340 139	12
Tanzania United Republic of	Voting participant	2002	20	331 114	15
Uganda	Voting participant	2009	4	248 209	4
Ghana	Voting participant	2001	5	171 417	8
Madagascar	Voting participant	2003	30	141 769	15
Zimbabwe	Associate country participant	2018	10	88 497	0
Congo, Democratic Republic of the	Associate country participant	2015	10	42 954	0
Togo	Voting participant	2009	67	40 993	18
Malawi	Associate country participant	2015	1	33 818	5
Guinea	Voting participant	2005	9	25 498	8
Nigeria	Associate country participant	2016	0	11 866	3
Mauritania	Voting participant	2009	5	5 671	4
Central African Republic	Voting participant	2011	0	3 226	0
Niger	Associate country participant	2016	0	2 903	10
Mali	Associate country participant	2017	0	2 272	1
Albertine Rift Conservation Society	Other associate participant	2010	6	1 905	2
South Sudan	Associate country participant	2018	1	1 580	0
Endangered Wildlife Trust	Other associate participant	2008	2	29 568	0
Horn of Africa Regional Environment Centre and Network	Other associate participant	2015	0	0	0
ICLEI – Local Governments for Sustainability	Other associate participant	2010	0	0	1
Grand Total			**314**	**23 883 440**	**118**

Source: https://www.gbif.org/the-gbif-network/africa

APPENDIX 5. PROJECTS FUNDED THROUGH THE BIODIVERSITY FOR DEVELOPMENT (BID) INITIATIVE

Project ID	Project name	Project coordinator	Country Lead	Budget
BIDAF2015 0032NAC	Capacity enhancement for Ghana node of Global Biodiversity Information Facility (GBIF)	Alex Asase	Ghana	€36,500
BIDAF2015 0035NAC	Organizing and mobilizing biodiversity information from the Kenya Wildlife Service	Wycliffe Mutero	Kenya	€60,000
BIDAF2015 0042NAC	Towards a Red List of the Globally Threatened Plants of Guinea	Doumbouya Saïdou	Guinea	€41,826
BIDAF2015 0116NAC	Building capacity in the Democratic Republic of Congo (DRC) to establish an effective GBIF Participant node in order to strengthen national biodiversity data mobilization for policies and decisionmaking processes	Henri Mbale Kunzi	DR Congo	€60,000
BIDAF2015 0004NAC	Strengthening the biodiversity stakeholders network in Togo	Dr. A. Raoufou Pierre RADJI	Togo	€60,000
BIDAF2015 0038NAC	Support for data collection of plant biodiversity in Gabon	Engone OBIANG	Gabon	€59,959
BIDAF2015 0065NAC	Capacity building and biodiversity data mobilization to address health and food security priorities in Benin (West Africa)	Jean Ganglo	Benin	€35,000
BIDAF2015 0025NAC	Evaluation and development of a funding mechanism and efficient management of data on plant biodiversity in Côte d'Ivoire (Ivory Coast)	Joseph Ipou Ipou	Côte d'Ivoire	€59,132
BIDAF2015 0122NAC	Strengthening of an Institutional Network in Angola in Order to Mobilize National Biodiversity Data	David Elizalde Castells	Angola	€60,000
BIDAF2015 0064NAC	Senegalese National Information System on Biodiversity: "SENBIOINFOS"	Bienvenu Sambou	Senegal	€60,000
BIDAF2015 0066REG	Capacity building and biodiversity data mobilization for conservation, sustainable use, and decision making in Africa and Madagascar	Jean Ganglo	Benin	€180,000
BIDAF2015 0115REG	Strengthening collaboration for increased biodiversity mobilization on key biodiversity ecosystems of the Albertine rift Region	Faustin Gashakamba	Uganda	€90,000
BIDAF2015 0134REG	African Insect Atlas: unleashing the potential of insects in conservation and sustainability research in Africa	Balsama Rajemison	Madagascar	€120,000
BIDAF2015 0117SMA	Making the zoology collection at the Natural History Museum of Zimbabwe accessible through GBIF by end of 2017	Tsitsi Maponga	Zimbabwe	€5,000
BIDAF2015 0124SMA	Kenya's Other Carnivores: Harnessing Biodiversity Data for Effective Development of National Conservation Strategies	Adam W. Ferguson	Kenya	€5,000
BIDAF2015 0139SMA	Mobilizing plant biodiversity data in Uganda through training	Collins E. Bulafu	Uganda	€5,000
BIDAF2015 0114SMA	Data Rescue for Records of the Botswana Wildlife Management Association	Monica Morrison	Botswana	€5,000
BIDAF2015 0097SMA	Mobilisation of diversity data on bees for conservation and sustainable development of the beekeeping sector in Cameroon	Yves Bertrand Soukontoua	Cameroon	€5,000
BIDAF2015 0045SMA	Mobilizing freshwater snails' biodiversity datasets for advancing biodiversity knowledge access, conservation and human wellbeing in Kenya	Charles Lange	Kenya	€5,000
BIDAF2015 0030SMA	Digitalization and mobilization of biodiversity data of protected area and threatened species in Benin	Isidore O. AMAHOWE	Benin	€4,986
BIDAF2015 0046SMA	Strengthening the sustainable conservation of genetic resources by biodiversity data mobilizing in the forest reserve of southern and center of Benin	Romaric Lokossou	Benin	€4,995
BIDAF2015 0044SMA	Gathering of biodiversity data on bird species for their sustainable management in Benin	Charles Nounagnon GANGNIBO	Benin	€5,000
BIDAF2015 0069SMA	Establishing metadata of Biodiversity Data generated from REDD+ Projects in Tanzania	Hulda Gideon	Tanzania	€4,758

APPENDIX 6: SCIENCE REVIEW FOR GBIF-AFRICA (2011-2017)

Peer-reviewed literature using GBIF-mediated data, focused on African biodiversity

- *Invasive alien species*
- *Impact of climate change*
- *Species conservation and protected areas*
- *Biodiversity and human health*
- *Food, farming and biofuels*
- *Ecosystem services*
- *Advancing biodiversity science*
- *Data management*
- *Data papers*

Asterisk denotes authors from African countries

*	Sawyerr H, Salako G, Olalubi O, Adio A, Adebayo A, Badmos B, Jambo UM and Adepoju G (2017) Spatio Temporal Land Use Land Cover Change Mapping of Malete Elemere: Implication on Development Planning of Emerging Communities. International Journal of Environment, Agriculture and Biotechnology. AI Publications 2(4): 2088–2097. Available at: https://doi.org/10.22161/ijeab/2.4.67. *Author countries*: Nigeria
*	Gaisberger H, Kindt R, Loo J, Schmidt M, Bognounou F, Da SS, Diallo OB, Ganaba S, Gnoumou A, Lompo D, Lykke AM, Mbayngone E, Nacoulma BMI, Ouedraogo M, Ouédraogo O, Parkouda C, Porembski S, Savadogo P, Thiombiano A, Zerbo G and Vinceti B (2017) Spatially explicit multi-threat assessment of food tree species in Burkina Faso: A fine-scale approach. PLOS ONE. Public Library of Science (PLoS) 12(9): e0184457. Available at: https://doi.org/10.1371/journal.pone.0184457. *Author countries*: Chad, Germany, Burkina Faso, Denmark, Niger, Kenya, Italy, Canada
	Parmar A, Kirchner SM, Langguth H, Döring TF and Hensel O (2017) Boxwood BorerHeterobostrychus brunneus(Coleoptera: Bostrichidae) Infesting Dried Cassava: A Current Record from Southern Ethiopia. Journal of Insect Science. Oxford University Press (OUP) 17(1): 14. Available at: https://doi.org/10.1093/jisesa/iew106. *Author countries*: Germany
*	Magwé-Tindo J, Zapfack L and Sonké B (2015) Diversity of wild yams (Dioscorea spp., Dioscoreaceae) collected in continental Africa. Biodiversity and Conservation. Springer Nature 25(1): 77–91. Available at: https://doi.org/10.1007/s10531-015-1031-4. *Author countries*: Cameroon
*	Adite A, Sonon SP and Gbedjissi GL (2013) Feeding ecology of the mangrove oyster, <i>Crassostrea gasar</i> (Dautzenberg, 1891) in traditional farming at the coastal zone of Benin, West Africa. Natural Science. Scientific Research Publishing, Inc, 05(12): 1238–1248. Available at: https://doi.org/10.4236/ns.2013.512151. *Author countries*: Benin
*	Idohou R, Assogbadjo AE, Fandohan B, Gouwakinnou GN, Glele Kakai RL, Sinsin B and Maxted N (2012) National inventory and prioritization of crop wild relatives: case study for Benin. Genetic Resources and Crop Evolution. Springer Nature 60(4): 1337–1352. Available at: https://doi.org/10.1007/s10722-012-9923-6. *Author countries*: Benin, China, United Kingdom

*	Rodenburg J, Zossou-Kouderin N, Gbèhounou G, Ahanchede A, Touré A, Kyalo G and Kiepe P (2011) Rhamphicarpa fistulosa, a parasitic weed threatening rain-fed lowland rice production in sub-Saharan Africa – A case study from Benin. Crop Protection. Elsevier BV 30(10): 1306–1314. Available at: https://doi.org/10.1016/j.cropro.2011.06.007. *Author countries*: Tanzania, Benin, Italy
*	Kryštufek B, Stanciu C, Ivajnšič D, Cherkaoui SI and Janžekovič F (2017) Facts and misconceptions on the Palaearctic existence of the striped ground squirrel. Mammalia. Walter de Gruyter GmbH 0(0). Available at: https://doi.org/10.1515/mammalia-2017-0060. *Author countries*: Morocco, Slovenia, Romania
*	Allport GA, Curtis C, Pampulim Simões T and Rodrigues MJ (2017) The first authenticated record of Pygmy Killer Whale (Feresa attenuata Gray 1874) in Mozambique; has it been previously overlooked? Marine Biodiversity Records. Springer Nature 10(1). Available at: https://doi.org/10.1186/s41200-017-0119-9. *Author countries*: United Kingdom, Mozambique
*	Williams E, Elia Ntandu J, Ficinski P and Vorontsova M (2016) Checklist of Serengeti Ecosystem Grasses. Biodiversity Data Journal. Pensoft Publishers 4: e8286. Available at: https://doi.org/10.3897/BDJ.4.e8286. *Author countries*: Tanzania, United Kingdom
*	Cramer MD and Verboom GA (2016) Measures of biologically relevant environmental heterogeneity improve prediction of regional plant species richness. Journal of Biogeography. Wiley-Blackwell 44(3): 579–591. Available at: https://doi.org/10.1111/jbi.12911. *Author countries*: South Africa
*	Oberlander KC, Dreyer LL, Goldblatt P, Suda J and Linder HP (2016) Species-rich and polyploid-poor: Insights into the evolutionary role of whole-genome duplication from the Cape flora biodiversity hotspot. American Journal of Botany. Botanical Society of America 103(7): 1336–1347. Available at: https://doi.org/10.3732/ajb.1500474. *Author countries*: Switzerland, Czech Republic, South Africa, United States
*	Fuchs J, Lemoine D, Parra JL, Pons J-M, Raherilalao MJ, Prys-Jones R, Thebaud C, Warren BH and Goodman SM (2016) Long-distance dispersal and inter-island colonization across the western Malagasy Region explain diversification in brush-warblers (Passeriformes:Nesillas). Biological Journal of the Linnean Society. Oxford University Press (OUP) 119(4): 873–889. Available at: https://doi.org/10.1111/bij.12825. *Author countries*: Switzerland, Madagascar, United Kingdom, Colombia, France, United States
	Londei T (2016) Piapiacs (Ptilostomus aferLinnaeus, 1766) and yellow-billed oxpeckers (Buphagus africanusLinnaeus, 1766) avoid proximity when on African buffaloes (Syncerus cafferSparrman, 1779). African Journal of Ecology. Wiley-Blackwell 54(3): 389–391. Available at: https://doi.org/10.1111/aje.12319. *Author countries*: Italy
*	Langejans GHJ, Dusseldorp GL and Thackeray JF (2017) Pleistocene molluscs from Klasies River (South Africa): Reconstructing the local coastal environment. Quaternary International. Elsevier BV 427: 59–84. Available at: https://doi.org/10.1016/j.quaint.2016.01.013. *Author countries*: South Africa, Netherlands
	Onstein RE and Linder HP (2016) Beyond climate: convergence in fast evolving sclerophylls in Cape and Australian Rhamnaceae predates the mediterranean climate. Journal of Ecology. Wiley-Blackwell 104(3): 665–677. Available at: https://doi.org/10.1111/1365-2745.12538. *Author countries*: Switzerland, France
*	Salako Gabriel, Chandalin Bennett, Aliyu Muhammad Ba, Sawyerr Henry (2015) Modeling the Suitability Index of Selected Conifers on Mambilla Plateau Taraba State, Nigeria: Implication on Planted Forest. International Journal of Agroforestry Remote Sensing and GIS. Volume 1, Issue 1, pp.1-9. Available at: http://technical.cloud-journals.com/index.php/IJARSGIS/article/view/Tech-474 *Author countries*: Nigeria, United States
*	Idohou R, Arino A, Assogbadjo A, Glele Kakai R and Sinsin B (2015) DIVERSITY OF WILD PALMS (ARECACEAE) IN THE REPUBLIC OF BENIN: FINDING THE GAPS IN THE NATIONAL INVENTORY COMBINING FIELD AND DIGITAL ACCESSIBLE KNOWLEDGE. Biodiversity Informatics. The University of Kansas 10(2). Available at: https://doi.org/10.17161/bi.v10i2.4914. *Author countries*: Benin, Spain
*	Borokini TI (2014) Okoubaka Aubrevillei (Pelleg & Norman): A Synthesis of Existing Knowledge for Research and Conservation in West and Central Africa. Journal of Biology and Life Science. Macrothink Institute, Inc. 6(1): 67. Available at: https://doi.org/10.5296/jbls.v6i1.6399. *Author countries*: Nigeria

Litsios G, Wüest RO, Kostikova A, Forest F, Lexer C, Linder HP, Pearman PB, Zimmermann NE and Salamin N (2013) EFFECTS OF A FIRE RESPONSE TRAIT ON DIVERSIFICATION IN REPLICATED RADIATIONS. Evolution. Wiley-Blackwell 68(2): 453–465. Available at: https://doi.org/10.1111/evo.12273.
Author countries: Switzerland, United Kingdom

Figuerola B, Gordon DP, Polonio V, Cristobo J and Avila C (2014) Cheilostome bryozoan diversity from the southwest Atlantic region: Is Antarctica really isolated? Journal of Sea Research. Elsevier BV 85: 1–17. Available at: https://doi.org/10.1016/j.seares.2013.09.003.
Author countries: New Zealand, Spain

Letardi A (2014) Note on some antlions from Mozambique (Neuroptera: Myrmeleontidae). Biodiversity Data Journal. Pensoft Publishers 2: e1050. Available at: https://doi.org/10.3897/BDJ.2.e1050.
Author countries: Italy

* Demos TC, Kerbis Peterhans JC, Agwanda B and Hickerson MJ (2014) Uncovering cryptic diversity and refugial persistence among small mammal lineages across the Eastern Afromontane biodiversity hotspot. Molecular Phylogenetics and Evolution. Elsevier BV 71: 41–54. Available at: https://doi.org/10.1016/j.ympev.2013.10.014.
Author countries: Kenya, United States

* Habel JC, Mulwa RK, Gassert F, Rödder D, Ulrich W, Borghesio L, Husemann M and Lens L (2014) Population signatures of large-scale, long-term disjunction and small-scale, short-term habitat fragmentation in an Afromontane forest bird. Heredity. Springer Nature 113(3): 205–214. Available at: https://doi.org/10.1038/hdy.2014.15.
Author countries: Germany, Belgium, Kenya, Poland, United States

* Todou, G. Onana, J. Akoa, A. Eeckenbrugge, G. Joly, H. (2014) Journal ofTropical Forest Science 26 (3) 420-427
Author countries: Cameroon, France

Brundu G and Camarda I (2013) The Flora of Chad: a checklist and brief analysis. PhytoKeys. Pensoft Publishers 23(0): 1–18. Available at: https://doi.org/10.3897/phytokeys.23.4752.
Author countries: Italy

Cocquyt C, Jüttner I and Kusber W-H (2013) Reinvestigation of West African Surirellaceae (Bacillariophyta) described by Woodhead and Tweed from Sierra Leone. Diatom Research. Informa UK Limited 28(2): 121–129. Available at: https://doi.org/10.1080/0269249X.2012.752411.
Author countries: Germany, Belgium, United Kingdom

* TODOU G (2013) Climatic niche of Dacryodes edulis (G. Don) H.J. Lam (Burseraceae), a semi-domesticated fruit tree native to Central Africa. Journal of Ecology and The Natural Environment. Academic Journals 5(9): 231–240. Available at: https://doi.org/10.5897/JENE12.075.
Author countries: Cameroon, France

Habel JC, Husemann M, Schmitt T, Dapporto L, Rödder D and Vandewoestijne S (2012) A Forest Butterfly in Sahara Desert Oases: Isolation Does Not Matter. Journal of Heredity. Oxford University Press (OUP) 104(2): 234–247. Available at: https://doi.org/10.1093/jhered/ess092.
Author countries: Germany, Belgium, Luxembourg, Italy, United States

Molina-Venegas R, Aparicio A, Pina FJ, Valdés B and Arroyo J (2013) Disentangling environmental correlates of vascular plant biodiversity in a Mediterranean hotspot. Ecology and Evolution. Wiley-Blackwell 3(11): 3879–3894. Available at: https://doi.org/10.1002/ece3.762.
Author countries: Spain

* Cramer MD and Barger NN (2013) Are Namibian 'Fairy Circles' the Consequence of Self-Organizing Spatial Vegetation Patterning? PLoS ONE. Public Library of Science (PLoS) 8(8): e70876. Available at: https://doi.org/10.1371/journal.pone.0070876.
Author countries: South Africa, United States

* Nel, H. Perissinotto, R. Taylor, R. (2012) Diversity of bivalve molluscs in the St Lucia Estuary, with an annotated and illustrated checklist. African Invertebrates. Available at: http://www.africaninvertebrates.org.za/Uploads/183b32fe-fc9d-4e6c-9528-eb07e31d8765/Nel_etal_2012_AfrInvertebr_BivalvesStLucia_LR.pdf
Author countries: South Africa

Jacquard C, Virgilio M, David P, Quilici S, De Meyer M and Delatte H (2012) Population structure of the melon fly, Bactrocera cucurbitae, in Reunion Island. Biological Invasions. Springer Nature 15(4): 759–773. Available at: https://doi.org/10.1007/s10530-012-0324-8.
Author countries: Belgium, France

* Du Toit N, Jansen van Vuuren B, Matthee S and Matthee CA (2012) Biome specificity of distinct genetic lineages within the four-striped mouse Rhabdomys pumilio (Rodentia: Muridae) from southern Africa with implications for taxonomy. Molecular Phylogenetics and Evolution. Elsevier BV 65(1): 75–86. Available at: https://doi.org/10.1016/j.ympev.2012.05.036.
Author countries: South Africa

Dikow, T. (2012) Review of Namibimydas Hesse, 1972 and Nothomydas Hesse, 1969 (Diptera: Mydidae: Syllegomydinae: Halterorchini) with the description of new species. African Invertebrates. Available at: http://www.africaninvertebrates.org.za/Uploads/a344a966-4d9b-4931-b426-0496b3da5fd3/dikow_correctedproof.pdf
Author countries: United States

Friis I, Phillips SM, Gilbert MG, Challen G, Schrire B, D. (2011) New additions to the Flora of Ethiopia and Eritrea in the families Euphorbiaceae, Fabaceae (Leguminosae), Lamiaceae, Campanulaceae, Eriocaulaceae and … Symbolae Botanicae Upsalienses. Available at: https://www.researchgate.net/publication/260050709_New_additions_to_the_Flora_of_Ethiopia_and_Eritrea_in_the_families_Euphorbiaceae_Fabaceae_Leguminosae_Lamiaceae_Campanulaceae_Eriocaulaceae_and_Poaceae
Author countries: Denmark

* J Gbètoho Alain Jaures Gbètoho, P. N Aoudji, A. Roxburgh, L. Ganglo, J. Jaures, A. (2017) Assessing the suitability of pioneer species for secondary forest restoration in Benin in the context of global climate change. Bois et Forets des Tropiques. Available at: http://bft.cirad.fr/cd/BFT_332_43-55.pdf
Author countries: South Africa, Benin

* Jacob Koundouonon Moutouama, Belarmain Adandé Fandohan, Honoré Samadori Sorotori Biaou, Ogoundjè Isidore Amahowe, Fidèle Tchossi Moutouama, and Armand K. Natta (2016) Potential climate change favored expansion of a range limited species, Haematostaphis barteri Hook f. Journal of Agriculture and Environment for International Development (JAEID). Italian Agency for Development Cooperation 2(110). Available at: http://doi.org/10.12895/jaeid.2016110.516.
Author countries: Benin

* DOTCHAMOU Oyélèyè Fafunkè Titilayo (2016) Density and spatial distribution of Parkia biglobosa pattern in Benin under climate change. Journal of Agriculture and Environment for International Development (JAEID). Italian Agency for Development Cooperation 110(1). Available at: http://doi.org/10.12895/jaeid.20161.447.
Author countries: Benin

* Vårhammar A, Wallin G, McLean CM, Dusenge ME, Medlyn BE, Hasper TB, Nsabimana D and Uddling J (2015) Photosynthetic temperature responses of tree species in Rwanda: evidence of pronounced negative effects of high temperature in montane rainforest climax species. New Phytologist. Wiley-Blackwell 206(3): 1000–1012. Available at: https://doi.org/10.1111/nph.13291.
Author countries: Sweden, Australia, Rwanda

DeSoto L, Varino F, Andrade JP, Gouveia CM, Campelo F, Trigo RM and Nabais C (2014) Different growth sensitivity to climate of the conifer Juniperus thurifera on both sides of the Mediterranean Sea. International Journal of Biometeorology. Springer Nature 58(10): 2095–2109. Available at: https://doi.org/10.1007/s00484-014-0811-y.
Author countries: Portugal

* Webber BL, Yates CJ, Le Maitre DC, Scott JK, Kriticos DJ, Ota N, McNeill A, Le Roux JJ and Midgley GF (2011) Modelling horses for novel climate courses: insights from projecting potential distributions of native and alien Australian acacias with correlative and mechanistic models. Diversity and Distributions. Wiley-Blackwell 17(5): 978–1000. Available at: https://doi.org/10.1111/j.1472-4642.2011.00811.x.
Author countries: Australia, South Africa

* Jamâa, M. Boudhina, S. Dhahri, S. Hdidi, S. (2017) Potosia opaca, an Insect Newly Found on Canary Palm (Phoenix canariensis) in Tunisia. Tunisian Journal of Plant Protection. Available at: http://www.tjpp.tn/SiteWeb/CurrentIssue/7BenJamaa.pdf
Author countries: Tunisia

* Samadori SHB, Jacob KM, Bai SCD, Ogoudje IA, Fidele TM and Armand KN (2017) Uses of Haematostaphis barteri Hook.f. among the Waaba and Btammarib in North-Benin and impact on the species vulnerability. International Journal of Biodiversity and Conservation. Academic Journals 9(5): 146–157. Available at: https://doi.org/10.5897/ijbc2016.1063.
Author countries: Benin

	Agulló JC, Juan A, Crespo MB, Alonso MÁ and Terrones A (2017) An updated report on the distribution and conservation status of the endangered Cat's Head Rockrose <I>Helianthemum caput-felis</I> (Magnoliopsida: Violales: Cistaceae) in Algeria. Journal of Threatened Taxa. Wildlife Information Liaison Development Society 9(3): 9885. Available at: https://doi.org/10.11609/jott.2592.9.3.9885-9891. *Author countries*: Spain
*	Kabiel HF, Hegazy AK, Lovett-Doust L, Al-Rowaily SL and Borki AE-NE (2016) Demography of the threatened endemic shrub, Arbutus pavarii, in the Al-Akhdar mountainous landscape of Libya. Journal of Forestry Research. Springer Nature 27(6): 1295–1303. Available at: https://doi.org/10.1007/s11676-016-0263-9. *Author countries*: Egypt, Libya, Canada, Saudi Arabia
*	Vroh BTA, Yao CYA, Kpangui KB, Gone Bi ZB, Kouame D, Koffi KJ, Koffi BJC and N Guessan KE (2016) Comparing Suitable Habitat Models to Predict Rare and Endemic Plant Species Distributions: What are the Limits of the Niche of Cola lorougnonis (Malvaceae) in Cote d'Ivoire? Environment and Natural Resources Research. Canadian Center of Science and Education 6(3): 1. Available at: https://doi.org/10.5539/enrr.v6n3p1. *Author countries*: Côte d'Ivoire
*	Abdou L, Diouf A, Maarouhi Inoussa M, Moussa Mamoudou B, Abdourahamane Illiassou S and Mahamane A (2016) Modeling the Geographic Distribution of Prosopis africana (G. and Perr.) Taub. in Niger. Environment and Natural Resources Research. Canadian Center of Science and Education 6(2): 136. Available at: https://doi.org/10.5539/enrr.v6n2p136. *Author countries*: Niger
	Tóth AB, Lyons SK and Behrensmeyer AK (2014) A Century of Change in Kenya's Mammal Communities: Increased Richness and Decreased Uniqueness in Six Protected Areas. PLoS ONE. Public Library of Science (PLoS) 9(4): e93092. Available at: https://doi.org/10.1371/journal.pone.0093092. *Author countries*: United States
*	Faulkner KT, Robertson MP, Rouget M and Wilson JRU (2014) A simple, rapid methodology for developing invasive species watch lists. Biological Conservation. Elsevier BV 179: 25–32. Available at: https://doi.org/10.1016/j.biocon.2014.08.014. *Author countries*: South Africa
*	Hjarding A, Tolley KA and Burgess ND (2014) Red List assessments of East African chameleons: a case study of why we need experts. Oryx. Cambridge University Press (CUP) 49(04): 652–658. Available at: https://doi.org/10.1017/S0030605313001427. *Author countries*: South Africa, United Kingdom, United States
*	Mokhatla MM, Measey GJ, Chimimba CT and van Rensburg BJ (2011) A biogeographical assessment of anthropogenic threats to areas where different frog breeding groups occur in South Africa: implications for anuran conservation. Diversity and Distributions. Wiley-Blackwell 18(5): 470–480. Available at: https://doi.org/10.1111/j.1472-4642.2011.00870.x. *Author countries*: South Africa
*	Domínguez Lozano F, Rebelo AG and Bittman R (2012) How plant inventories improve future monitoring. Biodiversity and Conservation. Springer Nature 21(8): 1937–1951. Available at: https://doi.org/10.1007/s10531-012-0286-2. *Author countries*: South Africa, Spain, United States
*	Allnutt TF, McClanahan TR, Andréfouët S, Baker M, Lagabrielle E, McClennen C, Rakotomanjaka AJM, Tianarisoa TF, Watson R and Kremen C (2012) Comparison of Marine Spatial Planning Methods in Madagascar Demonstrates Value of Alternative Approaches. PLoS ONE. Public Library of Science (PLoS) 7(2): e28969. Available at: https://doi.org/10.1371/journal.pone.0028969. *Author countries*: New Caledonia, South Africa, Madagascar, France, Canada, United States
*	Asase A and Peterson AT (2016) Completeness of Digital Accessible Knowledge of the Plants of Ghana. Biodiversity Informatics. The University of Kansas 11. Available at: https://doi.org/10.17161/bi.v11i0.5860. *Author countries*: Ghana, United States Ganglo JC and Kakpo (2016) Completeness of Digital Accessible Knowledge of the Plants of Benin and Priorities for Future Inventory and Data Discovery. Biodiversity Informatics. The University of Kansas 11. Available at: https://doi.org/10.17161/bi.v11i0.5860. *Author countries*: Benin, United States

*	Moraga P, Cano J, Baggaley RF, Gyapong JO, Njenga SM, Nikolay B, Davies E, Rebollo MP, Pullan RL, Bockarie MJ, Hollingsworth TD, Gambhir M and Brooker SJ (2015) Modelling the distribution and transmission intensity of lymphatic filariasis in sub-Saharan Africa prior to scaling up interventions: integrated use of geostatistical and mathematical modelling. Parasites & Vectors. Springer Nature 8(1). Available at: https://doi.org/10.1186/s13071-015-1166-x. *Author countries*: Ghana, Australia, Nigeria, Kenya, United Kingdom, United States
*	Samy AM, van de Sande WWJ, Fahal AH and Peterson AT (2014) Mapping the Potential Risk of Mycetoma Infection in Sudan and South Sudan Using Ecological Niche Modeling. PLoS Neglected Tropical Diseases. Public Library of Science (PLoS) 8(10): e3250. Available at: https://doi.org/10.1371/journal.pntd.0003250. *Author countries*: Sudan, Egypt, Netherlands, United States
*	Thomassen HA, Fuller T, Asefi-Najafabady S, Shiplacoff JAG, Mulembakani PM, Blumberg S, Johnston SC, Kisalu NK, Kinkela TL, Fair JN, Wolfe ND, Shongo RL, LeBreton M, Meyer H, Wright LL, Muyembe J-J, Buermann W, Okitolonda E, Hensley LE, Lloyd-Smith JO, Smith TB and Rimoin AW (2013) Pathogen-Host Associations and Predicted Range Shifts of Human Monkeypox in Response to Climate Change in Central Africa. PLoS ONE. Public Library of Science (PLoS) 8(7): e66071. Available at: https://doi.org/10.1371/journal.pone.0066071. *Author countries*: Germany, Congo, United States
*	Kung, S. Mazhani, L. Steenhoff, A. (2013) Allergy in Botswana. Current Allergy & Clinical Immunology. Available at: http://downloads.hindawi.com/journals/jmy/aip/490847.pdf *Author countries*: Botswana, United States
*	Berman, D. (2013) Regional Specific Pollen and Fungal Spore Allergens in South Africa. Current Allergy & Clinical Immunology. Available at: http://www.allergysa.org/journals/November2013/RegionalSpecific.pdf *Author countries*: South Africa
	Van Andel T, Mitchell S, Volpato G, Vandebroek I, Swier J, Ruysschaert S, Rentería Jiménez CA and Raes N (2012) In search of the perfect aphrodisiac: Parallel use of bitter tonics in West Africa and the Caribbean. Journal of Ethnopharmacology. Elsevier BV 143(3): 840–850. Available at: https://doi.org/10.1016/j.jep.2012.08.008. *Author countries*: Belgium, Jamaica, Colombia, Netherlands, United States
*	Hamid, A. Aiyelaagbe, O. (2012) Pharmacological investigation of Asystasia calyciana for its antibacterial and antifungal properties. International Journal of Chemical and Biochemical Sciences. Available at: http://www.iscientific.org/Archive/17 IJCBS-12-1-23.pdf *Author countries*: Nigeria
*	Cindi D and Jaca T (2016) First record of Opuntia pubescens H.L.Wendland ex Pfeiffer, 1835 naturalised in South Africa. BioInvasions Records. Regional Euro-Asian Biological Invasions Centre Oy (REABIC) 5(4): 213–219. Available at: https://doi.org/10.3391/bir.2016.5.4.04. *Author countries*: South Africa
*	Cheek MD and Semple JC (2016) First official record of naturalised populations of Solidago altissima L. var. pluricephala M.C. Johnst. (Asteraceae: Astereae) in Africa. South African Journal of Botany. Elsevier BV 105: 333–336. Available at: https://doi.org/10.1016/j.sajb.2016.05.001. *Author countries*: South Africa, Canada
*	Keet J-H, Cindi DD and du Preez PJ (2016) Assessing the invasiveness of Berberis aristata and B. julianae (Berberidaceae) in South Africa: Management options and legal recommendations. South African Journal of Botany. Elsevier BV 105: 288–298. Available at: https://doi.org/10.1016/j.sajb.2016.04.012. *Author countries*: South Africa
*	Visser V, Wilson JRU, Fish L, Brown C, Cook GD and Richardson DM (2016) Much more give than take: South Africa as a major donor but infrequent recipient of invasive non-native grasses. Global Ecology and Biogeography. Wiley-Blackwell 25(6): 679–692. Available at: https://doi.org/10.1111/geb.12445. *Author countries*: Australia, South Africa
*	Weyl P and Martin G (2016) Have grass carp driven declines in macrophyte occurrence and diversity in the Vaal River, South Africa? African Journal of Aquatic Science. Informa UK Limited 41(2): 241–245. Available at: https://doi.org/10.2989/16085914.2015.1137856. *Author countries*: South Africa
*	Nxumalo MM, Lalla R, R. (2016) Hydrocleys nymphoides (Humb. & Bonpl. ex Willd.) Buchenau: first record of naturalisation in South Africa. BioInvasions Records. Available at: http://www.reabic.net/journals/bir/2016/Accepted/BIR_2016_Nxumalo_etal_correctedproof.pdf *Author countries*: South Africa

*	Rouget M, Robertson MP, Wilson JRU, Hui C, Essl F, Renteria JL and Richardson DM (2015) Invasion debt - quantifying future biological invasions. Diversity and Distributions. Wiley-Blackwell 22(4): 445–456. Available at: https://doi.org/10.1111/ddi.12408. *Author countries*: Austria, South Africa
*	Fandohan, A. Koko, I. Avocevou-Ayisso, C. Gouwakinnou, G. Savi, M. Assogbadjo, A. (2015) Lantana camara (verbenaceae) : a potential threat to the effectiveness of protected areas to conserve flora and fauna in Benin. Agronomie Africaine. Available at: http://www.ajol.info/index.php/aga/article/view/125514 *Author countries*: Benin
	Subhashni T and Lalit K (2014) Impacts of climate change on invasive Lantana camara L. distribution in South Africa. African Journal of Environmental Science and Technology. Academic Journals 8(6): 391–400. Available at: https://doi.org/10.5897/AJEST2014.1705. *Author countries*: Australia
*	Weyl P and Coetzee J (2014) The invasion status of Myriophyllum spicatum L. in southern Africa. Management of Biological Invasions. Regional Euro-Asian Biological Invasions Centre Oy (REABIC) 5(1): 31–37. Available at: https://doi.org/10.3391/mbi.2014.5.1.03. *Author countries*: South Africa
*	Lübcker N, Zengeya T, Dabrowski J and Robertson M (2014) Predicting the potential distribution of invasive silver carpHypophthalmichthys molitrixin South Africa. African Journal of Aquatic Science. Informa UK Limited 39(2): 157–165. Available at: https://doi.org/10.2989/16085914.2014.926856. *Author countries*: South Africa
*	Tererai F and Wood AR (2014) On the present and potential distribution of Ageratina adenophora (Asteraceae) in South Africa. South African Journal of Botany. Elsevier BV 95: 152–158. Available at: https://doi.org/10.1016/j.sajb.2014.09.001. *Author countries*: South Africa
	Borges, L. Sivrikaya, H. Cragg, S. (2014) First records of the warm water shipworm Teredo bartschi Clapp, 1923 (Bivalvia, Teredinidae) in Mersin, southern Turkey and in Olhão, Portugal. Bioinvasion Records. Available at: http://www.reabic.net/journals/bir/2014/Accepted/BIR_2014_Borges_etal_correctedproof.pdf *Author countries*: Germany, United Kingdom, Turkey
	Pearson RG (2014) Asian common toads in Madagascar: an urgent effort to inform surveys and eradication efforts. Global Change Biology. Wiley-Blackwell 21(1): 9–9. Available at: https://doi.org/10.1111/gcb.12693. *Author countries*: United Kingdom
*	Jacobs LEO, Richardson DM and Wilson JRU (2014) Melaleuca parvistaminea Byrnes (Myrtaceae) in South Africa: Invasion risk and feasibility of eradication. South African Journal of Botany. Elsevier BV 94: 24–32. Available at: https://doi.org/10.1016/j.sajb.2014.05.002. *Author countries*: South Africa
*	Geerts S, Botha PW, Visser V, Richardson DM and Wilson JRU (2013) Montpellier broom (Genista monspessulana) and Spanish broom (Spartium junceum) in South Africa: An assessment of invasiveness and options for management. South African Journal of Botany. Elsevier BV 87: 134–145. Available at: https://doi.org/10.1016/j.sajb.2013.03.019. *Author countries*: South Africa
*	Gildenhuys E, Ellis A, Carroll S and Le Roux J (2013) The ecology, biogeography, history and future of two globally important weeds: Cardiospermum halicacabum Linn. and C. grandiflorum Sw. NeoBiota. Pensoft Publishers 19: 45–65. Available at: https://doi.org/10.3897/neobiota.19.5279. *Author countries*: South Africa, United States
*	Zengeya TA, Robertson MP, Booth AJ and Chimimba CT (2012) A qualitative ecological risk assessment of the invasive Nile tilapia, Oreochromis niloticus in a sub-tropical African river system (Limpopo River, South Africa). Aquatic Conservation: Marine and Freshwater Ecosystems. Wiley-Blackwell 23(1): 51–64. Available at: https://doi.org/10.1002/aqc.2258. *Author countries*: South Africa
*	Geerts S, Moodley D, Gaertner M, Le Roux JJ, McGeoch MA, Muofhe C, Richardson DM and Wilson JRU (2013) The absence of fire can cause a lag phase: The invasion dynamics ofBanksia ericifolia(Proteaceae). Austral Ecology. Wiley-Blackwell 38(8): 931–941. Available at: https://doi.org/10.1111/aec.12035. *Author countries*: Australia, South Africa